MINISTRY OF
INTERNATIONAL TRADE AND INDUSTRY

STRATEGIC TRADE ACT 2010

STRATEGIC TRADE (STRATEGIC ITEMS) LIST 2021

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[*Paragraph 3*]

PART 1: MILITARY ITEMS LIST

Category Code	*Items Description*	*Note*	*Relevant Authority*
	MILITARY ITEM LIST	Note 1: Terms in 'quotations' are defined terms. Refer to 'Definitions of Terms used in Part 1' annexed to this List. Note 2: In some instances chemicals are listed by name and CAS number. The list applies to chemicals of the same structural formula (including hydrates) regardless of name or CAS number. CAS numbers are shown to assist in identifying a particular chemical or mixture, irrespective of nomenclature. CAS numbers cannot be used as unique identifiers because some forms of the listed chemical have different CAS numbers, and mixtures containing a listed chemical may also have different CAS numbers.	
ML1	Smooth-bore weapons with a calibre of less than 20mm, other arms and automatic weapons with a calibre of 12.7mm (calibre 0.50 inches) or less and accessories, as follows, and specially designed components therefor:	Note: ML1 does not apply to— a. Firearms specially designed for dummy ammunition and which are incapable of discharging a projectile; b. Firearms specially designed to launch tethered projectiles having no high explosive charge or communications	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		link, to a range of less than or equal to 500m.; c. Weapons using non-centre fire cased ammunition and which are not of the fully automatic firing type. d. 'Deactivated firearms'.	
	a. Rifles and combination guns, handguns, machine, sub-machine and volley guns;	Note: ML1.a. does not apply to— a. Rifles and combination guns, manufactured earlier than 1938; b. Reproductions of rifles and combination guns, the originals of which were manufactured earlier than 1890; c. Handguns, volley guns and machine guns manufactured earlier than 1890, and their reproductions; d. Rifles or handguns, specially designed to discharge an inert projectile by compressed air or CO_2.	
	b. Smooth-bore weapons as follows: 1. Smooth-bore weapons specially designed for military use;	Note: ML1.b. does not apply to— a. Smooth-bore weapons manufactured earlier than 1938;	

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		b. Reproductions of smooth-bore weapons, the originals of which were manufactured earlier than 1890; c. Smooth-bore weapons used for military use or of the fully automatic firing type; d. Smooth-bore weapons specially designed for any of the following: 1. Slaughtering of domestic animals; 2. Tranquilizing of animals; 3. Seismic testing; 4. Firing of industrial projectiles; or 5. Disrupting Improvised Explosive Devices (IEDs). N.B.: For disruptors, see ML4 and entry 1A006 on the Dual-Use List.	
	2. Other smooth-bore weapons as follows: a. Fully automatic type weapons; b. Semi-automatic or pump-action type weapons;	Note: ML1.b.2. does not apply to weapons specially designed to discharge an inert projectile by compressed air or CO_2.	

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	c. Weapons using caseless ammunition; and d. Accessories designed for arms specified by ML1.a, ML1.b or ML1.c as follows: 1. Detachable cartridge magazines; 2. Sound suppressors or moderators; 3. Special gun-mountings; 4. Flash suppressors; 5. Optical weapon-sights with electronic image processing; or 6. Optical weapon-sights specially designed for military use.		
ML2	Smooth-bore weapons with a calibre of 20mm or more, other weapons or armament with a caliber greater than 12.7mm (calibre 0.50 inches), projectors and accessories, as follows, and specially designed components therefor: a. Guns, howitzers, cannon, mortars, anti-tank weapons, projectile launchers, military flame throwers, rifles, recoilless rifles, smooth-bore weapons and signature reduction devices therefor;	Note 1: ML2.a. includes injectors, metering devices, storage tanks and other specially designed components for use with liquid propelling charges for any of the equipment specified by ML2.a.	Controller

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		Note 2: ML2.a. does not apply to weapons as follows: a. Rifles, smooth-bore weapons and combination guns, manufactured earlier than 1938; b. Reproductions of rifles, smooth-bore weapons and combination guns, the originals of which were manufactured earlier than 1890; c. Guns, howitzers, cannons and mortars, manufactured earlier than 1890; d. Smooth-bore weapons used for hunting or sporting purposes. These weapons must not be specially designed for military use or of the fully automatic firing type; e. Smooth-bore weapons specially designed for any of the following: 1. Slaughtering of domestic animals; 2. Tranquilizing of animals; 3. Seismic testing; 4. Firing of industrial projectiles; or	

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		5. Disrupting Improvised Explosive Devices (IEDs); N.B.: For disruptors, see ML4 and entry 1A006 on the Dual-Use List. f. Hand-held projectile launchers specially designed to launch tethered projectiles having no high explosive charge or communications link, to a range of less than or equal to 500 m.	
	b. Smoke, gas and pyrotechnic projectors or generators, specially designed or modified for military use; c. Weapons sights and weapon sight mounts, having all of the following: 1. Specially designed for military use; and 2. Specially designed for weapons specified in ML2.a.; d. Mountings and detachable cartridge magazines, specially designed for the weapons specified in ML2.a.	Note: ML2.b. does not apply to signal pistols.	
ML3	Ammunition and fuze setting devices, as follows, and specially designed components therefor:	Note 1: Specially designed components specified by ML3 include:	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Ammunition for weapons specified in ML1, ML2 or ML12;	a. Metal or plastic fabrications such as primer anvils, bullet cups, cartridge links, rotating bands and munitions metal parts; b. Safing and arming devices, fuzes, sensors and initiation devices; c. Power supplies with high one-time operational output; d. Combustible cases for charges; e. Submunitions including bomblets, minelets and terminally guided projectiles. Note 2: ML3.a. does not apply to any of the following: a. Ammunition crimped without a projectile (blank star); b. Dummy ammunition with a pierced powder chamber; c. Other blank and dummy ammunition, not incorporating components designed for live ammunition; or d. Components specially designed for blank or dummy ammunition, specified in this Note 2.a., b. or c.	

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	b. Fuze setting devices specially designed for ammunition specified in ML3.a.	Note 3: ML3.a. does not apply to cartridges specially designed for any of the following purposes: a. Signalling; b. Bird scaring; or c. Lighting of gas flares at oil wells.	
ML4	Bombs, torpedoes, rockets, missiles, other explosive devices and charges and related equipment and accessories, as follows, and specially designed components therefor: a. Bombs, torpedoes, grenades, smoke canisters, rockets, mines, missiles, depth charges, demolition-charges, demolition-devices, demolition-kits, 'pyrotechnic' devices, cartridges and simulators (i.e. equipment simulating the characteristics of any of these items), specially designed for military use; b. Equipment having all of the following: 1. Specially designed for military use; and	N.B.1: For guidance and navigation equipment, see ML11. N.B.2: For Aircraft Missile Protection Systems (AMPS), see ML4.c. Note: ML4.a. includes— a. Smoke grenades, fire bombs, incendiary bombs and explosive devices; b. Missile rocket nozzles and re-entry vehicle nosetips. Note 1: ML4.b. includes— a. Mobile gas liquefying equipment capable of producing 1,000 kg or more per day of gas in liquid form;	Controller

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		b. Buoyant electric conducting cable suitable for sweeping magnetic mines. Note 2: ML4.b. does not apply to hand-held devices, limited by design solely to the detection of metal objects and incapable of distinguishing between mines and other metal objects.	
	2. Specially designed for 'activities' relating to any of the following: a. Items specified by ML4.a.; or b. Improvised Explosive Devices (IEDs). c. Aircraft Missile Protection Systems (AMPS).	Technical Note: For the purpose of ML4.b.2. 'activities' applies to handling, launching, laying, controlling, discharging, detonating, activating, powering with one-time operational output, decoying, jamming, sweeping, detecting, disrupting or disposing. Note: ML4.c. does not apply to AMPS having all of the following: a. Any of the following missile warning sensors: 1. Passive sensors having peak response between 100-400 nm; or 2. Active pulsed Doppler missile warning sensors; b. Countermeasures dispensing systems;	

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		c. Flares, which exhibit both a visible signature and an infrared signature, for decoying surface-to-air missiles; and d. Installed on 'civil aircraft' and having all of the following: 1. The AMPS is only operable in a specific 'civil aircraft' in which the specific AMPS is installed and for which any of the following has been issued: a. A civil Type Certificate issued by civil aviation authorities of one or more EU Member States or Wassenaar Arangement Participating States ; or b. An equivalent document recognised by the International Civil Aviation Organisation (ICAO); 2. The AMPS employs protection to prevent unauthorised access to 'software'; and *3.* The AMPS incorporates an active mechanism that forces the system not to function when it is removed	

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		from the 'civil aircraft' in which it was installed.	
ML5	Fire control, and related alerting and warning equipment, and related systems, test and alignment and countermeasure equipment, as follows, specially designed for military use, and specially designed components and accessories therefor: a. Weapon sights, bombing computers, gun laying equipment and weapon control systems; b. Other fire control, surveillance and warning equipment and related systems as follows: 1. Target acquisition, designation, range-finding, surveillance or tracking systems; 2. Detection, recognition or identification equipment; and 3. Data fusion or sensor integration equipment. c. Countermeasure equipment for items specified by ML5.a. or ML5.b.; d. Field test or alignment equipment, specially designed for items specified by ML5.a., ML5.b. or ML5.c.	Note: For the purposes of ML5.c., countermeasure equipment includes detection equipment.	Controller

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ML6	Ground vehicles and components, as follows: a. Ground vehicles and components therefor, specially designed or modified for military use;	N.B.: For guidance and navigation equipment, see ML11. Technical Note: For the purposes of ML6.a. the term ground vehicles includes trailers. N.B.: See also ML13.a. Note 1: ML6.a. includes— a. Tanks and other military armed vehicles and military vehicles fitted with mountings for arms or equipment for mine laying or the launching of munitions specified by ML4; b. Armoured vehicles; c. Amphibious and deep water fording vehicles; d. Recovery vehicles and vehicles for towing or transporting ammunition or weapon systems and associated load handling equipment; e. Trailers.	Controller

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	b. Other ground vehicles and components, as follows: 1. Vehicles having all of the following: a. Manufactured or fitted with materials or components to provide ballistic protection to level III (NIJ 0108.01, September 1985, or comparable national standard) or better; b. A transmission to provide drive to both front and rear wheels simultaneously, including those vehicles having additional wheels for load bearing purposes whether driven or not;	Note 2: Modification of a ground vehicle for military use specified by ML6.a. entails a structural, electrical or mechanical change involving one or more components that are specially designed for military use. Such components include— a. Pneumatic tyre casings of a kind specially designed to be bullet-proof; b. Armoured protection of vital parts, (e.g. fuel tanks or vehicle cabs); c. Special reinforcements or mountings for weapons; d. Black-out lighting. Note 3: ML6 does not apply to civil vehicles designed or modified for transporting money or valuables. Note 4: ML6 does not apply to vehicles that meet all of the following; a. Were manufactured before 1946; b. Do not have items specified in the Military List and manufactured after 1945, except for reproductions of	

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	c. Gross Vehicle Weight Rating (GVWR) greater than 4,500kg; and d. Designed or modified for off-road use; 2. Components having all of the following: a. Specially designed for vehicles specified in ML6.b.1.; and b. Providing ballistic protection to level III (NIJ 0108.01, September 1985, or comparable national standard) or better.	original components or accessories for the vehicle; and c. Do not incorporate weapons specified in ML1, ML2 or ML4 unless they are inoperable and incapable of discharging a projectile.	
ML7	Chemical or biological toxic agents, 'riot control agents', radioactive materials, related equipment, components and materials, as follows: a. Biological agents or radioactive materials, 'adapted for use in war' to produce casualties in humans or animals, degrade equipment or damage crops or the environment; b. Chemical warfare (CW) agents, including: 1. CW nerve agents: a. O-Alkyl (equal to or less than C_{10}, including cycloalkyl) alkyl (Methyl,		Controller

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	Ethyl, n-Propyl or Isopropyl) - phosphonofluoridates, such as: Sarin (GB):O-Isopropyl methylphosphonofluoridate (CAS 107-44-8); and Soman (GD):O-Pinacolyl methylphosphonofluoridate (CAS 96-64-0); b. O-Alkyl (equal to or less than C_{10}, including cycloalkyl) N,N-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphoramidocyanidates, such as: Tabun (GA):O-Ethyl N,N-dimethylphosphoramidocyanidate (CAS 77-81-6); c. O-Alkyl (H or equal to or less than C_{10}, including cycloalkyl) S-2-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl)-aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonothiolates and corresponding alkylated and protonated salts, such as: VX: O-Ethyl S-2-diisopropylaminoethyl methyl phosphonothiolate (CAS 50782-69-9);		

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	2. CW vesicant agents: a. Sulphur mustards, such as: 1. 2-Chloroethylchloromethylsulphide (CAS 2625-76-5); 2. Bis (2-chloroethyl) sulphide (CAS 505-60-2); 3. Bis (2-chloroethylthio) methane (CAS 63869-13-6); 4. 1,2-bis (2-chloroethylthio) ethane (CAS 3563-36-8); 5. 1,3-bis (2-chloroethylthio) -n-propane (CAS 63905-10-2); 6. 1,4-bis (2-chloroethylthio) -n-butane (CAS 142868-93-7); 7. 1,5-bis (2-chloroethylthio) -n-pentane (CAS 142868-94-8); 8. Bis (2-chloroethylthiomethyl) ether (CAS 63918-90-1); 9. Bis (2-chloroethylthioethyl) ether (CAS 63918-89-8); b. Lewisites, such as:		

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	1. 2-chlorovinyldichloroarsine (CAS 541-25-3); 2. Tris (2-chlorovinyl) arsine (CAS 40334-70-1); 3. Bis (2-chlorovinyl) chloroarsine (CAS 40334-69-8); c. Nitrogen mustards, such as: 1. HN1: bis (2-chloroethyl) ethylamine (CAS 538-07-8); 2. HN2: bis (2-chloroethyl) methylamine (CAS 51-75-2); 3. HN3: tris (2-chloroethyl) amine (CAS 555-77-1); 3. CW incapacitating agents, such as: a. 3-Quinuclidinyl benzilate (BZ) (CAS 6581-06-2); 4. CW defoliants, such as: a. Butyl 2-chloro-4-fluorophenoxyacetate (LNF); b. 2,4,5-trichlorophenoxyacetic acid (CAS 93-76-5) mixed with 2,4-		

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	dichlorophenoxyacetic acid (CAS 94-75-7) (Agent Orange (CAS 39277-47-9)); c. CW binary precursors and key precursors, as follows: 1. Alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) Phosphonyl Difluorides, such as: DF: Methyl Phosphonyldifluoride (CAS 676-99-3); 2. O-Alkyl (H or equal to or less than C_{10}, including cycloalkyl) O-2-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl)-aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonites and corresponding alkylated and protonated salts, such as: QL: O-Ethyl O-2-di-isopropylaminoethyl methylphosphonite (CAS 57856-11-8); 3. Chlorosarin: O-Isopropyl methylphosphonochloridate (CAS 1445-76-7); 4. Chlorosoman: O-Pinacolyl methylphosphonochloridate (CAS 7040-57-5);		

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	d. 'Riot control agents', active constituent chemicals and combinations thereof, including: 1. α-Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8); 2. [(2-chlorophenyl) methylene] propanedinitrile, (o-Chlorobenzylidenemalononitrile (CS) (CAS 2698-41-1); 3. 2-Chloro-1-phenylethanone, Phenylacyl chloride (ω-chloroacetophenone) (CN) (CAS 532-27-4); 4. Dibenz-(b,f)-1,4-oxazephine, (CR) (CAS 257-07-8); 5. 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9); 6. N-Nonanoylmorpholine, (MPA) (CAS 5299-64-9); e. Equipment specially designed or modified for military use, designed or modified for the dissemination of any of the following, and specially designed components therefor:	Note 1: ML7.d. does not apply to 'riot control agents' individually packaged for personal self-defence purposes. Note 2: ML7.d. does not apply to active constituent chemicals, and combinations thereof, identified and packaged for food production or medical purposes.	

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	1. Materials or agents specified by ML7.a., ML7.b. or ML7.d.; or 2. CW agents made up of precursors specified by ML7.c. f. Protective and decontamination equipment, specially designed or modified for military use, components and chemical mixtures, as follows: 1. Equipment designed or modified for defence against materials specified in ML7.a., ML7.b. or ML7.d., and specially designed components therefor; 2. Items designed or modified for decontamination of items contaminated with materials specified in ML7.a. or ML7.b. and specially designed components therefor; or ML7.d. and specially designed components therefor; 3. Chemical mixtures specially developed or formulated for the decontamination of objects contaminated with materials specified in ML7.a. or ML7.b.; g. Equipment specially designed or modified for military use designed or modified for the detection or identification of materials	Note: ML7.f.1. includes— a. Air conditioning units specially designed or modified for nuclear, biological or chemical filtration; b. Protective clothing. N.B.: For civil gas masks, protective and decontamination equipment, see also entry 1A004 on the Dual-Use List. Note: ML7.g. does not apply to personal radiation monitoring dosimeters. N.B.: See also entry 1A004 on the Dual-Use List.	

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	specified in ML7.a., ML7.b. or ML7.d., and specially designed components therefor; h. 'Biopolymers' specially designed or processed for the detection or identification of CW agents specified in ML7.b., and the cultures of specific cells used to produce them; i. 'Biocatalysts' for the decontamination or degradation of CW agents, and biological systems therefor, as follows: 1. 'Biocatalysts' specially designed for the decontamination or degradation of CW agents specified in ML7.b., and resulting from directed laboratory selection or genetic manipulation of biological systems; 2. Biological systems containing the genetic information specific to the production of 'biocatalysts' specified by ML7.i.1., as follows: a. 'Expression vectors'; b. Viruses; c. Cultures of cells.		

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		Note 1: ML7.b. and ML7.d. do not apply to the following: a. Cyanogen chloride (CAS 506-77-4). See entry 1C450.a.5. on the Dual-Use List; b. Hydrocyanic acid (CAS 74-90-8); c. Chlorine (CAS 7782-50-5); d. Carbonyl chloride (phosgene) (CAS 75-44-5). See entry 1C450.a.4. on the Dual-Use List; e. Diphosgene (trichloromethyl-chloroformate) (CAS 503-38-8); f. Not used since 2004; g. Xylyl bromide, ortho: (CAS 89-92-9), meta: (CAS 620-13-3), para: (CAS 104-81-4); h. Benzyl bromide (CAS 100-39-0); i. Benzyl iodide (CAS 620-05-3); j. Bromo acetone (CAS 598-31-2); k. Cyanogen bromide (CAS 506-68-3);	

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		l. Bromo methylethylketone (CAS 816-40-0); m. Chloro acetone (CAS 78-95-5); n. Ethyl iodoacetate (CAS 623-48-3); o. Iodo acetone (CAS 3019-04-3); p. Chloropicrin (CAS 76-06-2). See entry 1C450.a.7. on the Dual-Use List. Note 2: The cultures of cells and biological systems specified by ML7.h. and ML7.i.2. are exclusive and these sub-items do not apply to cells or biological systems for civil purposes, such as agricultural, pharmaceutical, medical, veterinary, environmental, waste management, or in the food industry.	
ML8	'Energetic materials', and related substances, as follows:	N.B.1: See also entry 1C011 on the Dual-Use List. N.B.2: For charges and devices, see ML4 and entry 1A008 on the Dual-Use List Technical Notes: 1. For the purposes of ML8, mixture refers to a composition of two or more substances with at least one substance being listed in the ML8 sub-items.	Controller

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		2. Any substance listed in the ML8 sub-items is subject to this list, even when utilised in an application other than that indicated. (e.g. TAGN is predominantly used as an explosive but can also be used either as a fuel or an oxidizer.) 3. For the purposes of ML8., particle size is the mean particle diameter on a weight or volume basis. International or equivalent national standards will be used in sampling and determining particle size. Note: ML8.a. includes 'explosive co –crystals'.	
	a. 'Explosives' as follows, and mixtures thereof: 1. ADNBF (aminodinitrobenzofuroxan or 7-amino-4,6-dinitrobenzofurazane-1-oxide) (CAS 97096-78-1); 2. BNCP (cis-bis (5-nitrotetrazolato) tetra amine-cobalt (III) perchlorate) (CAS 117412-28-9); 3. CL-14 (diamino dinitrobenzofuroxan or 5,7-diamino-4,6-dinitrobenzofurazane-1-oxide) (CAS 117907-74-1); 4. CL-20 (HNIW or Hexanitrohexaazaisowurtzitane) (CAS 135285-90-4); chlathrates of CL-20 (see	Technical Note: An 'explosive co-crystal' is a solid material consisting of an ordered three dimensional arrangement of two or more explosive molecules, where at least one is specified in ML8.a.	

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	also ML8.g.3. and g.4. for its 'precursors'); 5. CP (2-(5-cyanotetrazolato) penta amine-cobalt (III) perchlorate) (CAS 70247-32-4); 6. DADE (1,1-diamino-2,2-dinitroethylene, FOX7) (CAS 145250-81-3); 7. DATB (diaminotrinitrobenzene) (CAS 1630-08-6); 8. DDFP (1,4-dinitrodifurazanopiperazine); 9. DDPO (2,6-diamino-3,5-dinitropyrazine-1-oxide, PZO) (CAS 194486-77-6); 10. DIPAM (3,3'-diamino-2,2',4,4',6,6'-hexanitrobiphenyl or dipicramide) (CAS 17215-44-0); 11. DNGU (DINGU or dinitroglycoluril) (CAS 55510-04-8); 12. Furazans, as follows: a. DAAOF (DAAF, DAAFox, or diaminoazoxyfurazan); b. DAAzF (diaminoazofurazan) (CAS 78644-90-3);		

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	13. HMX and derivatives (see also ML8.g.5. for its 'precursors'), as follows: a. HMX (Cyclotetramethylenetetranitramine, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine, 1,3,5,7-tetranitro-1,3,5,7-tetraza-cyclooctane, octogen or octogene) (CAS 2691-41-0); b. difluoroaminated analogs of HMX; c. K-55 (2,4,6,8-tetranitro-2,4,6,8-tetraazabicyclo [3,3,0]-octanone-3, tetranitrosemiglycouril or ketobicyclic HMX) (CAS 130256-72-3); 14. HNAD (hexanitroadamantane) (CAS 143850-71-9); 15. HNS (hexanitrostilbene) (CAS 20062-22-0); 16. Imidazoles as, follows: a. BNNII (Octahydro-2,5-bis(nitroimino)imidazo [4,5-d]imidazole); b. DNI (2,4-dinitroimidazole) (CAS 5213-49-0);		

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	c. FDIA (1-fluoro-2,4-dinitroimidazole); d. NTDNIA (N-(2-nitrotriazolo)-2,4-dinitroimidazole); e. PTIA (1-picryl-2,4,5-trinitroimidazole); 17. NTNMH (1-(2-nitrotriazolo)-2-dinitromethylene hydrazine); 18. NTO (ONTA or 3-nitro-1,2,4-triazol-5-one) (CAS 932-64-9); 19. Polynitrocubanes with more than four nitro groups; 20. PYX (2,6-Bis(picrylamino)-3,5-dinitropyridine) (CAS 38082-89-2); 21. RDX and derivatives, as follows: a. RDX (cyclotrimethylenetrinitramine, cyclonite, T4, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitro-1,3,5-triaza-cyclohexane, hexogen or hexogene) (CAS 121-82-4); b. Keto-RDX (K-6 or 2,4,6-trinitro-2,4,6-triazacyclohexanone) (CAS 115029-35-1);		

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	22. TAGN (triaminoguanidinenitrate) (CAS 4000-16-2); 23. TATB (triaminotrinitrobenzene) (CAS 3058-38-6) (see also ML8.g.7 for its 'precursors'); 24. TEDDZ (3,3,7,7-tetrabis(difluoroamine) octahydro-1,5-dinitro-1,5-diazocine); 25. Tetrazoles, as follows: a. NTAT (nitrotriazol aminotetrazole); b. NTNT (1-N-(2-nitrotriazolo)-4-nitrotetrazole); 26. Tetryl (trinitrophenylmethylnitramine) (CAS 479-45-8); 27. TNAD (1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin) (CAS 135877-16-6) (see also ML8.g.6. for its 'precursors'); 28. TNAZ (1,3,3-trinitroazetidine) (CAS 97645-24-4) (see also ML8.g.2. for its 'precursors'); 29. TNGU (SORGUYL or tetranitroglycoluril) (CAS 55510-03-7);		

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	30. TNP (1,4,5,8-tetranitro-pyridazino[4,5-d]pyridazine) (CAS 229176-04-9); 31. Triazines, as follows: a. DNAM (2-oxy-4,6-dinitroamino-s-triazine) (CAS 19899-80-0); b. NNHT (2-nitroimino-5-nitro-hexahydro-1,3,5-triazine) (CAS 130400-13-4); 32. Triazoles, as follows: a. 5-azido-2-nitrotriazole; b. ADHTDN (4-amino-3,5-dihydrazino-1,2,4-triazole dinitramide) (CAS 1614-08-0); c. ADNT (1-amino-3,5-dinitro-1,2,4-triazole); d. BDNTA ([bis-dinitrotriazole]amine); e. DBT (3,3′-dinitro-5,5-bi-1,2,4-triazole) (CAS 30003-46-4); f. DNBT (dinitrobistriazole) (CAS 70890-46-9); g. Not used since 2010;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	h. NTDNT (1-N-(2-nitrotriazolo) 3,5-dinitrotriazole); i. PDNT (1-picryl-3,5-dinitrotriazole); j. TACOT (tetranitrobenzotriazolobenzotriazole) (CAS 25243-36-1); 33. Explosives not listed elsewhere in ML8.a. and having any of the following: a. Detonation velocity exceeding 8,700 m/s, at maximum density; or b. Detonation pressure exceeding 34 GPa (340 kbar); 34. Not used since 2013 35. DNAN (2,4-dinitroanisole) (CAS 119-27-7); 36. TEX (4,10-Dinitro-2,6,8,12-tetraoxa-4,10-diazaisowurtzitane) 37. GUDN (Guanylurea dinitramide) FOX-12 (CAS 217464-38-5) 38. Tetrazines, as follows: a. BTAT (Bis(2,2,2-trinitroethyl)-3,6-diaminotetrazine);		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. LAX-112 (3,6-diamino-1,2,4,5-tetrazine-1,4-dioxide); 39. Energetic ionic materials melting between 343K (70°C) and 373 K (100°C) and with detonation velocity exceeding 6,800m/s or detonation pressure exceeding 18GPa (180kbar); 40. BTNEN (Bis(2,2,2-trinitroethyl)-nitramine) (CAS 19836-28-3); 41. FTDO (5,6-(3',4-furazano)-1,2,3,4-tetrazine-1,3-dioxide; 42. EDNA (Ethylenedinitramine) (CAS 505-71-5); 43. TKX-50 (Dihydroxylammonium 5, 5'-bistetrazole-1,1'diolate). b. 'Propellants', as follows: 1. Any solid 'propellant' with a theoretical specific impulse (under standard conditions) of more than: a. 240 seconds for non-metallized, non-halogenized 'propellant'; b. 250 seconds for non-metallized, halogenized 'propellant'; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. 260 seconds for metallized 'propellant'; 2. Not used since 2013 3. 'Propellants' having a force constant of more than 1,200 kJ/kg; 4. 'Propellants' that can sustain a steady-state linear burning rate of more than 38 mm/s under standard conditions (as measured in the form of an inhibited single strand) of 6.89 MPa (68.9 bar) pressure and 294K (21°C); 5. Elastomer Modified Cast Double Base (EMCDB) 'propellants' with extensibility at maximum stress of more than 5% at 233K (– 40°C); 6. Any 'propellant' containing substances specified by ML8.a. 7. 'Propellants', not specified elsewhere in the Military List, specially designed for military use; c. 'Pyrotechnics', fuels and related substances, as follows, and mixtures thereof: 1. Aircraft fuels specially formulated for military purposes;	Note: Aircraft fuels specified in ML8.c.1. are finished products, not their constituents.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Alane (aluminium hydride) (CAS 7784-21-6); 3. Boranes, as follows, and their derivaties: a. Carboranes; b. Borane homologues, as follows: 1. Decaborane (14) (CAS 17702-41-9); 2. Pentaborane (9) (CAS 19624-22-7); 3. Pentaborane (11) (CAS 18433-84-6); 4. Hydrazine and derivatives, as follows (see also ML8.d.8. and d.9. for oxidising hydrazine derivatives): a. Hydrazine (CAS 302-01-2) in concentrations of 70% or more; b. Monomethyl hydrazine (CAS 60-34-4); c. Symmetrical dimethyl hydrazine (CAS 540-73-8); d. Unsymmetrical dimethyl hydrazine (CAS 57-14-7); 5. Metal fuels, fuel mixtures or 'pyrotechnic' mixtures, in particle form whether spherical, atomised, spheroidal,	Note: ML8.c.4.a. does not apply to hydrazine 'mixtures' specially formulated for corrosion control. Note 1: ML8.c.5 applies to "explosives" and fuels, whether or not the metals or alloys are	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	flaked or ground, manufactured from material consisting of 99% or more of any of the following: a. Metals, as follows, and mixtures thereof: 1. Beryllium (CAS 7440-41-7) in particle sizes of less than 60 μm; 2. Iron powder (CAS 7439-89-6) with particle size of 3 μm or less produced by reduction of iron oxide with hydrogen; b. Mixtures containing any of the following: 1. Zirconium (CAS 7440-67-7), magnesium (CAS 7439-95-4) or alloys of these in particle sizes of less than 60μm; or 2. Boron (CAS 7440-42-8) or boron carbide (CAS 12069-32-8) fuels of 85% purity or higher and particle sizes of less than 60μm; 6. Military materials, containing thickeners for hydrocarbon fuels, specially formulated for use in flame throwers or incendiary munitions, such as metal	encapsulated in aluminium, magnesium, zirconium, or beryllium. Note 2: ML8.c.5.b. only applies to metal fuels in particle form when they are mixed with other substances to form a mixture formulated for military purposes such as liquid 'propellant' slurries, solid 'propellants', or 'pyrotechnic' mixtures. Note 3: ML8.c.5.b.2. does not apply to boron and boron carbide enriched with boron-10 (20% or more of total boron-10 content.)	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	stearates(e.g., octal (CAS 637-12-7)) or palmitates; 7. Perchlorates, chlorates and chromates, composited with powdered metal or other high energy fuel components; 8. Spherical or spheroidal aluminium powder (CAS 7429-90-5) with a particle size of 60 µm or less and manufactured from material with an aluminium content of 99% or more; 9. Titanium subhydride (TiH_n) of stoichiometry equivalent to n = 0.65 – 1.68; 10. Liquid high energy density fuels not specified in ML8.c.1., as follows: a. Mixed fuels, that incorporate both solid and liquid fuels (e.g., boron slurry), having a mass-based energy density of 40 MJ/kg or greater; b. Other high energy density fuels and fuel additives (e.g., cubane, ionic solutions, JP-7, JP-10), having a volume-based energy density of 37.5 GJ per cubic meter or greater, measured at 293K (20°C) and one atmosphere (101.325kPa) pressure;	Note: ML8.c.10.b. does not apply to JP-4, JP-8, fossil refined fuels or biofuels, or fuels for engines certified for use in civil aviation.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	11. 'Pyrotechnic' and pyrophoric materials, as follows: a. 'Pyrotechnic' or pyrophoric materials specifically formulated to enhance or control the production of radiated energy in any part of the IR spectrum; b. Mixtures of magnesium, polytetrafluoroethylene (PTFE) and a vinylidene difluoride-hexafluoropropylene copolymer (e.g., MTV); 12. Fuel mixtures, 'pyrotechnic' mixtures or 'energetic materials', not specified elsewhere in ML8, having all of the following: a. Containing greater than 0.5% of particles of any of the following: 1. Aluminium; 2. Beryllium; 3. Boron; 4. Zirconium; 5. Magnesium; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	6. Titanium; b. Particles specified in ML8.c.12.a. with a size less than 200nm in any direction; and c. Particles specified in ML8.c.12.a. with a metal content of 60% or greater; d. Oxidizers, as follows, and mixtures thereof: 1. ADN (ammonium dinitramide or SR 12) (CAS 140456-78-6); 2. AP (ammonium perchlorate) (CAS 7790-98-9); 3. Compounds composed of fluorine and any of the following: a. Other halogens; b. Oxygen; or c. Nitrogen; 4. DNAD (1,3-dinitro-1,3-diazetidine) (CAS 78246-06-7); 5. HAN (hydroxylammonium nitrate) (CAS 13465-08-2);	Note 1: ML8.d.3. does not apply to chlorine trifluoride (CAS 7790-91-2). Note 2: ML8.d.3 does not apply to nitrogen trifluoride (CAS 7783-54-2) in its gaseous state.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	6. HAP (hydroxylammonium perchlorate) (CAS 15588-62-2); 7. HNF (hydrazinium nitroformate) (CAS 20773-28-8); 8. Hydrazine nitrate (CAS 37836-27-4); 9. Hydrazine perchlorate (CAS 27978-54-7); 10. Liquid oxidisers comprised of or containing inhibited red fuming nitric acid (IRFNA) (CAS 8007-58-7); e. Binders, plasticisers, monomers and polymers, as follows: 1. AMMO (azidomethylmethyloxetane and its polymers) (CAS 90683-29-7) (see also ML8.g.1. for its 'precursors'); 2. BAMO (bisazidomethyloxetane and its polymers) (CAS 17607-20-4) (see also ML8.g.1. for its 'precursors'); 3. BDNPA (bis (2,2-dinitropropyl)acetal) (CAS 5108-69-0); 4. BDNPF (bis (2,2-dinitropropyl)formal) (CAS 5917-61-3);	Note: ML8.d.10 does not apply to non-inhibited fuming nitric acid.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	5. BTTN (butanetrioltrinitrate) (CAS 6659-60-5) (see also ML8.g.8. for its 'precursors'); 6. Energetic monomers, plasticizers or polymers, specially formulated for military use and containing any of the following: a. Nitro groups; b. Azido groups; c. Nitrate groups; d. Nitrataza groups; or e. Difluoroamino groups; 7. FAMAO (3-difluoroaminomethyl-3-azidomethyl oxetane) and its polymers; 8. FEFO (bis-(2-fluoro-2,2-dinitroethyl) formal) (CAS 17003-79-1); 9. FPF-1 (poly-2,2,3,3,4,4-hexafluoropentane-1, 5-diol formal) (CAS 376-90-9); 10. FPF-3 (poly-2,4,4,5,5,6,6-heptafluoro-2-tri-fluoromethyl-3-oxaheptane-1,7-diol formal);		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	11. GAP (glycidylazide polymer) (CAS 143178-24-9) and its derivatives; 12. HTPB (hydroxyl terminated polybutadiene) with a hydroxyl functionality equal to or greater than 2.2 and less than or equal to 2.4, a hydroxyl value of less than 0.77 meq/g, and a viscosity at 30°C of less than 47 poise (CAS 69102-90-5); 13. Alcohol functionalised poly (epichlorohydrin) with a molecular weight less than 10,000, as follows: a. Poly(epichlorohydrindiol); b. Poly(epichlorohydrintriol) 14. NENAs (nitratoethylnitramine compounds) (CAS 17096-47-8, 85068-73-1, 82486-83-7, 82486-82-6 and 85954-06-9); 15. PGN (poly-GLYN, polyglycidylnitrate or poly(nitratomethyl oxirane)) (CAS 27814-48-8); 16. Poly-NIMMO (poly nitratomethylmethyloxetane), poly-NMMO or poly(3-Nitratomethyl-3-methyloxetane) (CAS 84051-81-0);		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	17. Polynitroorthocarbonates; 18. TVOPA (1,2,3-tris[1,2-bis (difluoroamino)ethoxy] propane or tris vinoxy propane adduct) (CAS 53159-39-0); 19. 4,5 diazidomethyl-2-methyl-1,2,3-triazole (iso- DAMTR); 20. PNO (Poly(3-nitrato oxetane)); 21. TMETN (Trimethylolethane trinitrate) (CAS 3032-55-1). f. 'Additives', as follows: 1. Basic copper salicylate (CAS 62320-94-9); 2. BHEGA (bis-(2-hydroxyethyl) glycolamide) (CAS 17409-41-5); 3. BNO (butadienenitrileoxide); 4. Ferrocene derivatives, as follows: a. Butacene (CAS 125856-62-4); b. Catocene (2,2-bis-ethylferrocenyl propane) (CAS 37206-42-1); c. Ferrocene carboxylic acids and ferrocene carboxylic acid esters;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. N-butyl-ferrocene (CAS 31904-29-7); e. Other adducted polymer ferrocene derivatives not specified elsewhere in ML8.f.4.; f. Ethyl ferrocene (CAS 1273-89-8); g. Propyl ferrocene; h. Pentyl ferrocene (CAS 1274-00-6); i. Dicyclopentyl ferrocene; j. Dicyclohexyl ferrocene; k. Diethyl ferrocene (CAS 1273-97-8); l. Dipropyl ferrocene; m. Dibutyl ferrocene (CAS 1274-08-4); n. Dihexyl ferrocene (CAS 93894-59-8); o. Acetyl ferrocene (CAS 1271-55-2)/1,1'-diacetyl ferrocene (CAS 1273-94-5); 5. Lead beta-resorcylate (CAS 20936-32-7); 6. Lead citrate (CAS 14450-60-3);		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	7. Lead-copper chelates of beta-resorcylate or salicylates (CAS 68411-07-4); 8. Lead maleate (CAS 19136-34-6); 9. Lead salicylate (CAS 15748-73-9); 10. Lead stannate (CAS 12036-31-6); 11. MAPO (tris-1-(2-methyl)aziridinyl phosphine oxide) (CAS 57-39-6); BOBBA 8 (bis(2-methyl aziridinyl) 2-(2-hydroxypropanoxy) propylamino phosphine oxide); and other MAPO derivatives; 12. Methyl BAPO (bis(2-methyl aziridinyl) methylamino phosphine oxide) (CAS 85068-72-0); 13. N-methyl-p-nitroaniline (CAS 100-15-2); 14. 3-Nitraza-1,5-pentane diisocyanate (CAS 7406-61-9); 15. Organo-metallic coupling agents, as follows: a. Neopentyl[diallyl]oxy, tri[dioctyl]phosphato-titanate (CAS 103850-22-2); also known as titanium IV, 2,2[bis 2-propenolato-		

Category Code	*Items Description*	*Note*	*Relevant Authority*

	methyl, butanolato, tris (dioctyl) phosphato] (CAS 110438-25-0); or LICA 12 (CAS 103850-22-2);
	
	b. Titanium IV, [(2-propenolato-1) methyl, n-propanolatomethyl] butanolato-1, tris[dioctyl] pyrophosphate or KR3538;
	
	c. Titanium IV, [(2-propenolato-1)methyl, n-propanolatomethyl] butanolato-1, tris(dioctyl)phosphate;
	
	16. Polycyanodifluoroaminoethyleneoxide;
	
	17. Bonding agents, as follows:
	
	a. 1,1R,1S-trimesoyl-tris(2-ethylaziridine) (HX-868, BITA) (CAS 7722-73-8);
	
	b. Polyfunctional aziridine amides with isophthalic, trimesic, isocyanuric or trimethyladipic backbone also having a 2-methyl or 2-ethyl aziridine group;
	
	18. Propyleneimine (2-methylaziridine) (CAS 75-55-8);
		Note: Item ML.8.f.17.b. includes—
		
		a. 1,1H-Isophthaloyl-bis(2-methylaziridine) (HX-752) (CAS 7652-64-4);
		
		b. 2,4,6-tris(2-ethyl-1-aziridinyl)-1,3,5-triazine (HX-874) (CAS 18924-91-9);	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	19. Superfine iron oxide (Fe_2O_3) (CAS 1317-60-8) with a specific surface area more than 250 m^2/g and an average particle size of 3.0 nm or less; 20. TEPAN (tetraethylenepentaamineacrylonitrile) (CAS 68412-45-3); cyanoethylated polyamines and their salts; 21. TEPANOL (tetraethylenepentaamineacrylonitrilegl ycidol) (CAS 68412-46-4); cyanoethylated polyamines adducted with glycidol and their salts; 22. TPB (triphenyl bismuth) (CAS 603-33-8); 23. TEPB (Tris (ethoxyphenyl) bismuth) (CAS 90591-48-3); g. 'Precursors', as follows: 1. BCMO (bischloromethyloxetane) (CAS 142173-26-0) (see also ML8.e.1. and e.2.); 2. Dinitroazetidine-t-butyl salt (CAS 125735-38-8) (see also ML8.a.28.); 3. Hexaazaisowurtzitane derivates including HBIW (hexabenzylhexaazaisowurtzitane) (CAS	c. 1,1'-trimethyladipoyl-bis(2-ethylaziridine)(HX-877) (CAS 71463-62-2). N.B.: In ML8.g. the references are to specified 'Energetic Materials' manufactured from these substances.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	124782-15-6) (see also ML8.a.4.) and TAIW (tetraacetyldibenzylhexaazaisowurtzitane) (CAS 182763-60-6) (see also ML8.a.4.); 4. Not used since 2013; 5. TAT (1,3,5,7 tetraacetyl-1,3,5,7,-tetraazacyclo-octane) (CAS 41378-98-7) (see also ML8.a.13.); 6. 1,4,5,8-tetraazadecalin (CAS 5409-42-7) (see also ML8.a.27.); 7. 1,3,5-trichlorobenzene (CAS 108-70-3) (see also ML8.a.23.); 8. 1,2,4-trihydroxybutane (1,2,4-butanetriol) (CAS 3068-00-6) (see also ML8.e.5.); 9. DADN (1,5-diacetyl-3,7-dinitro-1, 3, 5, 7-tetraaza-cyclooctane) (see also ML8.a.13.). h. 'Reactive material' powders and shapes, as follows: 1. Powders of any of the following materials, with a particle size less than	Technical Notes: 1. 'Reactive materials' are designed to produce an exothermic reaction only at high shear rates and for use as liners or casings in warheads.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	250 µm in any direction and not specified elsewhere in ML8: a. Aluminium; b. Niobium; c. Boron; d. Zirconium; e. Magnesium; f. Titanium; g. Tantalum; h. Tungsten; i. Molybdenum; or j. Hafnium; 2. Shapes, not specified in ML3, ML4, ML12 or ML16, fabricated from powders specified in ML8.h.1	2. 'Reactive material' powders are produced by, for example, a high energy ball milling process. 3. 'Reactive material' shapes are produced by, for example, selective laser sintering. Note 1: ML8 does not apply to the following substances unless they are compounded or mixed with the 'energetic material' specified in ML8.a. or powdered metals specified in ML8.c.: a. Ammonium picrate (CAS 131-74-8); b. Black powder;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		c. Hexanitrodiphenylamine (CAS 131-73-7); d. Difluoroamine(CAS 10405-27-3); e. Nitrostarch (CAS9056-38-6); f. Potassium nitrate (CAS 7757-79-1); g. Tetranitronaphthalene; h. Trinitroanisol; i. Trinitronaphthalene; j. Trinitroxylene; k. N-pyrrolidinone; 1-methyl-2-pyrrolidinone (CAS 872-50-4); l. Dioctylmaleate (CAS 142-16-5); m. Ethylhexylacrylate (CAS 103-11-7); n. Triethylaluminium (TEA) (CAS 97-93-8), trimethylaluminium (TMA) (CAS 75-24-1), and other pyrophoric metal alkyls and aryls of lithium, sodium, magnesium, zinc or boron; o. Nitrocellulose (CAS 9004-70-0);	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		p. Nitroglycerin (or glyceroltrinitrate, trinitroglycerine) (NG) (CAS 55-63-0); q. 2,4,6-trinitrotoluene (TNT) (CAS 118-96-7); r. Ethylenediaminedinitrate (EDDN) (CAS 20829-66-7); s. Pentaerythritoltetranitrate (PETN) (CAS 78-11-5); t. Lead azide (CAS 13424-46-9), normal lead styphnate(CAS 15245-44-0) and basic lead styphnate (CAS 12403-82-6), and primary explosives or priming compositions containing azides or azide complexes; u. Triethyleneglycoldinitrate (TEGDN)(CAS 111-22-8); v. 2,4,6-trinitroresorcinol (styphnic acid) (CAS 82-71-3); w. Diethyldiphenylurea (CAS 85-98-3); dimethyldiphenylurea(CAS 611-92-7); methylethyldiphenyl urea [Centralites]; x. N,N-diphenylurea (unsymmetrical diphenylurea) (CAS 603-54-3);	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		y. Methyl-N,N-diphenylurea (methyl unsymmetrical diphenylurea)(CAS 13114-72-2); z. Ethyl-N,N-diphenylurea (ethyl unsymmetrical diphenylurea) (CAS 64544-71-4); aa. 2-Nitrodiphenylamine (2-NDPA)(CAS 119-75-5); bb. 4-Nitrodiphenylamine (4-NDPA)(CAS 836-30-6); cc. 2,2-dinitropropanol (CAS 918-52-5); dd. Nitroguanidine (CAS 556-88-7) (see entry 1C011.d. on the EU Dual-Use List). Note 2: ML8. does not apply to ammonium perchlorate (ML8.d.2.), NTO (ML8.a.18.), catocene (ML8.f.4.b.) and meeting all of the following: a. Specially shaped and formulated for civil-use gas generation devices*;* b. Compounded or mixed, with non-active thermoset binders or	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		plasticizers, and having a mass of less than 250g; c. Having a maximum of 80% ammonium perchlorate (ML8.d.2.) in mass of active material; d. Having less than or equal to 4g of NTO (ML8.a.18.); and e. Having less than or equal to 1g of catocene (ML8.f.4.b.).	
ML9	Vessels of war (surface or underwater), special naval equipment, accessories, components and other surface vessels, as follows: a. Vessels and components, as follows: 1. Vessels (surface or underwater) specially designed or modified for military use, regardless of current state of repair or operating condition, and whether or not they contain weapon delivery systems or armour, and hulls or parts of hulls for such vessels, and components therefor specially designed for military use; 2. Surface vessels, other than those specified in ML9.a.1., having any of the	N.B.: For guidance and navigation equipment, see ML11.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	following, fixed or integrated into the vessel: a. Automatic weapons (having a caliber of 12.7mm or greater) specified in ML1, or weapons specified in ML2, ML4, ML12 or ML19, or 'mountings' or hard points for such weapons having a caliber of 12.7mm or greater; b. Fire control systems specified in ML5; c. Having all of the following: 1. 'Chemical, Biological, Radiological and Nuclear (CBRN) protection'; and 2. 'Pre-wet or wash down system' designed for decontamination purposes; or d. Active weapon countermeasure systems specified in ML4.b., ML5.c. or ML11.a. and having any of the following: 1. 'CBRN protection';	Technical Note: 'Mountings' refers to weapon mounts or structural strengthening for the purpose of installing weapons. Technical Notes: 1. 'CBRN protection' is a self contained interior space containing features such as over-pressurization, isolation of ventilation systems, limited ventilation openings with CBRN filters and limited personnel access points incorporating air-locks. 2. 'Pre-wet or wash down system' is a seawater spray system capable of simultaneously wetting the exterior superstructure and decks of a vessel.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Hull and superstructure, specially designed to reduce the radar cross section; 3. Thermal signature reduction devices, (e.g., an exhaust gas cooling system), excluding those specially designed to increase overall power plant efficiency or to reduce the environmental impact; or 4. A degaussing system designed to reduce the magnetic signature of the whole vessel; b. Engines and propulsion systems, as follows, specially designed for military use and components therefor specially designed for military use: 1. Diesel engines specially designed for submarines and having all of the following: a. Power output of 1.12 MW (1,500 hp) or more; and b. Rotary speed of 700 rpm or more;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Electric motors specially designed for submarines and having all of the following: a. Power output of more than 0.75MW (1,000hp); b. Quick reversing; c. Liquid cooled; and d. Totally enclosed; 3. Non-magnetic diesel engines having all of the following: a. Power output of 37.3kW (50hp) or more; and b. Non-magnetic content in excess of 75% of total mass; 4. 'Air Independent Propulsion' (AIP) systems specially designed for submarines; c. Underwater detection devices, specially designed for military use, controls therefor and components therefor specially designed for military use;	Technical Note: 'Air Independent Propulsion' (AIP) allows a submerged submarine to operate its propulsion system, without access to atmospheric oxygen, for a longer time than the batteries would have otherwise allowed. For the purposes of ML9.b.4., AIP does not include nuclear power.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Anti-submarine nets and anti-torpedo nets, specially designed for military use; e. Not used since 2003; f. Hull penetrators and connectors, specially designed for military use, that enable interaction with equipment external to a vessel, and components therefor specially designed for military use; g. Silent bearings having any of the following, components therefor and equipment containing those bearings, specially designed for military use: 1. Gas or magnetic suspension; 2. Active signature controls; or 3. Vibration suppression controls. h. Naval nuclear equipment and related equipment and components as follows nuclear power generating equipment or propulsion equipment, specially designed for vessels specified in ML9.a. and components therefor specially designed or 'modified' for military use.	Note: ML9.f. includes connectors for vessels which are of the single-conductor, multi-conductor, coaxial or waveguide type, and hull penetrators for vessels, both of which are capable of remaining impervious to leakage from without and of retaining required characteristics at marine depths exceeding 100m; and fibre-optic connectors and optical hull penetrators, specially designed for 'laser' beam transmission, regardless of depth. ML9.f. does not apply to ordinary propulsive shaft and hydrodynamic control-rod hull penetrators. Technical Note: For the purpose of ML9.h.1., 'modified' means any structural, electrical, mechanical, or other change that provides a non-military item with military capabilities equivalent to an item which is specially designed for military use. Note ML9.h.1. includes 'nuclear reactors'.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
ML10	'Aircraft', 'lighter-than-air vehicles', Unmanned Aerial Vehicles ('UAVs'), aero-engines and 'aircraft' equipment, related equipment, and components, as follows, specially designed or modified for military use: a. Manned 'aircraft' and 'lighter-than-air vehicles', and specially designed components therefor; b. Not used since 2011; c. Unmanned aircraft and related equipment, as follows, and specially designed components therefor: 1. 'UAVs', Remotely Piloted Air Vehicles (RPVs), autonomous programmable vehicles and unmanned 'lighter than-air vehicles'; 2. Launchers, recovery equipment and ground support equipment; 3. Equipment designed for command or control; d. Propulsion aero-engines and specially designed components therefor;	N.B.: For guidance and navigation equipment, see ML11. Note 1: ML10.a. does not apply to 'aircraft' and 'lighter-than-air vehicles' or variants of those 'aircraft' specially designed for military use, and which are all of the following: a. Not a combat aircraft; b. Not configured for military use and not fitted with equipment or attachments specially designed or modified for military use; and c. Certified for civil use by the civil aviation authority in an EU Member State or in a Wassenaar Arrangement Participating State. Note 2: ML10.d. does not apply to: a. Aero-engines designed or modified for military use which have been certified by civil aviation authorities in an EU Member State or	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Airborne refueling equipment specially designed or modified for any of the following, and specially designed components therefor: 1. 'Aircraft' specified in ML10.a.; or 2. Unmanned 'aircraft' specified in ML10.c.; f. 'Ground equipment' specially designed for aircraft specified in ML10.a. or aero-engines specified in ML10.d.; g. Aircrew life support equipment, aircrew safety equipment and other devices for emergency escape, not specified in ML10.a., designed for 'aircraft' specified in ML10.a.; h. Parachutes, paragliders and related equipment, as follows, and specially designed components therefor: 1. Parachutes not specified elsewhere in the Military List; 2. Paragliders; 3. Equipment specially designed for high altitude parachutists (e.g. suits, special helmets, breathing systems, navigation equipment);	in a Wassenaar Arrangement Participating State for use in 'civil aircraft', or specially designed components therefor; b. Reciprocating engines or specially designed components therefor, except those specially designed for 'UAVs'. Technical Note: 'Ground equipment' includes pressure refueling equipment and equipment designed to facilitate operations in confined areas. Note: ML10.g. does not control aircrew helmets that do not incorporate, or have mountings or fittings for, equipment specified in the Military List. N.B.: For helmets, see also ML13.c. Note 3: For the purposes of ML10.a. and ML10.d., specially designed components and related equipment for non-military 'aircraft' or aero-engines modified for military use applies only to those military components and to military related equipment required for the modification to military use. Note 4: For the purposes of ML10.a., military use includes: combat, military reconnaissance,	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	i. Controlled opening equipment or automatic piloting systems, designed for parachuted loads.	assault, military training, logistics support, and transporting and airdropping troops or military equipment. Note 5: ML10.a. does not apply to 'aircraft' that meet all of the following: a. Were first manufactured before 1946; b. Do not incorporate items specified in the Military List, unless the items are required to meet safety or airworthiness standards of an EU Member State or of a Wassenaar Arrangement Participating State; and c. Do not incorporate weapons specified in the Military List, unless inoperable and incapable of being returned to operation. Note 6: ML10.d. does not apply to propulsion aero-engines that were first manufactured before 1946.	
ML11	Electronic equipment, 'spacecraft' and components, not specified elsewhere on the Military List, as follows: a. Electronic equipment specially designed for military use and specially designed components therefor;	Note: ML11.a. includes:	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Global Navigation Satellite Systems (GNSS) jamming equipment and specially designed components therefor; c. 'Spacecraft' specially designed or modified for military use, and 'spacecraft' components specially designed for military use.	a. Electronic countermeasure and electronic counter-countermeasure equipment (i.e. equipment designed to introduce extraneous or erroneous signals into radar or radio communication receivers or otherwise hinder the reception, operation or effectiveness of adversary electronic receivers including their countermeasure equipment), including jamming and counter-jamming equipment; b. Frequency agile tubes; c. Electronic systems or equipment, designed either for surveillance and monitoring of the electro-magnetic spectrum for military intelligence or security purposes or for counteracting such surveillance and monitoring; d. Underwater countermeasures, including acoustic and magnetic jamming and decoy, equipment designed to introduce extraneous or erroneous signals into sonar receivers; e. Data processing security equipment, data security equipment and transmission and signalling line	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		security equipment, using ciphering processes; f. Identification, authentification and keyloader equipment and key management, manufacturing and distribution equipment; g. Guidance and navigation equipment; h. Digital troposcatter-radio communications transmission equipment; i. Digital demodulators specially designed for signals intelligence; j. 'Automated command and control systems'. N.B.: For 'software' associated with military 'Software' Defined Radio (SDR), see ML21.	
ML12	High velocity kinetic energy weapon systems and related equipment, as follows, and specially designed components therefor: a. Kinetic energy weapon systems specially designed for destruction or effecting mission-abort of a target; b. Specially designed test and evaluation facilities and test models, including	N.B.: For weapon systems using sub-calibre ammunition or employing solely chemical propulsion, and ammunition therefor, see ML1 to ML4. Note 1: ML12 includes the following when specially designed for kinetic energy weapon systems:	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	diagnostic instrumentation and targets, for dynamic testing of kinetic energy projectiles and systems.	a. Launch propulsion systems capable of accelerating masses larger than 0.1g to velocities in excess of 1.6km/s, in single or rapid fire modes; b. Prime power generation, electric armour, energy storage (e.g., high energy storage capacitors), thermal management, conditioning, switching or fuel-handling equipment; and electrical interfaces between power supply, gun and other turret electric drive functions; N.B.: See also 3A001.e.2. on the Dual-Use List for high energy storage capacitors. c. Target acquisition, tracking, fire control or damage assessment systems; d. Homing seeker, guidance or divert propulsion (lateral acceleration) systems for projectiles. Note 2: ML12 applies to weapon systems using any of the following methods of propulsion: a. Electromagnetic; b. Electrothermal;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		c. Plasma; d. Light gas; or e. Chemical (when used in combination with any of the above).	
ML13	Armoured or protective equipment, constructions and components, as follows: a. Metallic or non metallic armoured plate, having any of the following: 1. Manufactured to comply with a military standard or specification; or 2. Suitable for military use; b. Constructions of metallic or non-metallic materials, or combinations thereof, specially designed to provide ballistic protection for military systems, and specially designed components therefor; c. Helmets manufactured according to military standards or specifications, or comparable national standards, and specially designed components therefor, (i.e. helmet shell, liner and comfort pads); d. Body armour or protective garments, and components therefor, as follows:	N.B.: For body armour plate, see ML13.d.2. N.B.: For other military helmet components or accessories, see the relevant ML entry	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Soft body armour or protective garments, manufactured to military standards or specifications, or to their equivalents, and specially designed components therefor; 2. Hard body armour plates providing ballistic protection equal to or greater than level III (NIJ 0101.06, July 2008) or national equivalents.	Note: For the purposes of ML13.d.1., military standards or specifications include, at a minimum, specifications for fragmentation protection. Note 1: ML13.b. includes materials specially designed to form explosive reactive armour or to construct military shelters. Note 2: ML13.c. does not apply to conventional steel helmets, neither modified or designed to accept, nor equipped with any type of accessory device. Note 3: ML13.c. and d. do not apply to helmets, body armour or protective garments, when accompanying their user for the user's own personal protection. Note 4: The only helmets specially designed for bomb disposal personnel that are specified in ML13. are those specially designed for military use. N.B. 1: See also entry 1A005 on the Dual-Use List. N.B. 2: For 'fibrous or filamentary materials' used in the manufacture of body armour and helmets, see entry 1C010 on the Dual Use List.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
ML14	'Specialised equipment for military training' or for simulating military scenarios, simulators specially designed for training in the use of any firearm or weapon specified in ML1 or ML2, and specially designed components and accessories therefor.	Technical Note: The term 'specialised equipment for military training' includes military types of attack trainers, operational flight trainers, radar target trainers, radar target generators, gunnery training devices, anti-submarine warfare trainers, flight simulators (including human-rated centrifuges for pilot/astronaut training), radar trainers, instrument flight trainers, navigation trainers, missile launch trainers, target equipment, drone 'aircraft', armament trainers, pilotless 'aircraft' trainers, mobile training units and training equipment for ground military operations. Note 1: ML14 includes image generating and interactive environment systems for simulators, when specially designed or modified for military use. Note 2: ML14 does not apply to equipment specially designed for training in the use of hunting or sporting weapons.	Controller
ML15	Imaging or countermeasure equipment, as follows, specially designed for military use, and specially designed components and accessories therefor: a. Recorders and image processing equipment;	Note 1: In ML15, the term specially designed components includes the following when specially designed for military use: a. Infrared image converter tubes; b. Image intensifier tubes (other than first generation);	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Cameras, photographic equipment and film processing equipment; c. Image intensifier equipment; d. Infrared or thermal imaging equipment; e. Imaging radar sensor equipment;	c. Microchannel plates; d. Low-light-level television camera tubes; e. Detector arrays (including electronic interconnection or read out systems); f. Pyroelectric television camera tubes; g. Cooling systems for imaging systems; h. Electrically triggered shutters of the photochromic or electro-optical type having a shutter aped of less than 100μs, except in the case of shutters which are an essential part of a high-speed camera; i. Fibre optic image inverters; j. Compound semiconductor photocathodes Note : ML15 does not apply to 'first generation image intensifier tubes' or equipment specially designed to incorporate 'first generation image intensifier tube'. N.B.: For the classification of weapons sights incorporating 'first generation image intensifier tubes' see ML1., ML2. and ML5.a.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	f. Countermeasure or counter-countermeasure equipment for the equipment specified in ML15.a. to ML15.e..	N.B.: See also entries 6A002.a.2. and 6A002.b. on the Dual-Use List. Note: ML15.f. includes equipment designed to degrade the operation or effectiveness of military imaging systems or to minimize such degrading effects.	
ML16	Forgings, castings and other unfinished products, specially designed for items specified in ML1 to ML4, ML6, ML9, ML10, ML12 or ML19.	Note: ML16 applies to unfinished products when they are identifiable by material composition, geometry or function.	Controller
ML17	Miscellaneous equipment, materials and 'libraries', as follows, and specially designed components therefor: a. Diving and underwater swimming apparatus, specially designed or modified for military use, as follows: 1. Self-contained diving rebreathers, closed or semiclosed circuit; 2. Underwater swimming apparatus; specially designed for use with the diving apparatus specified in ML17.a.1;	Technical Notes: 1. Not used since 2014 2. For the purpose of ML17, 'modified' means any structural, electrical, mechanical, or other change that provides a nonmilitary item with military capabilities equivalent to an item which is specially designed for military use. N.B.: See also 8A002.q. on the Dual-Use List.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Construction equipment specially designed for military use; c. Fittings, coatings and treatments for signature suppression, specially designed for military use; d. Field engineer equipment specially designed for use in a combat zone; e. 'Robots', 'robot' controllers and 'robot' 'end-effectors', having any of the following characteristics: 1. Specially designed for military use; 2. Incorporating means of protecting hydraulic lines against externally induced punctures caused by ballistic fragments (e.g., incorporating self-sealing lines) and designed to use hydraulic fluids with flash points higher than 839K (566°C); or 3. Specially designed or rated for operating in an electro-magnetic pulse (EMP) environment;	Technical Note: Electro-magnetic pulse does not refer to unintentional interference caused by electromagnetic radiation from nearby equipment (e.g., machinery, appliances or electronics) or lightning.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	f. 'Libraries' (parametric technical databases) specially designed for military use with equipment specified in the Military List;		
	g. Nuclear power generating equipment or propulsion equipment including 'nuclear reactors', specially designed for military use and components therefor specially designed or 'modified' for military use;		Atomic Energy Licensing Board (AELB)
	h. Equipment and material, coated or treated for signature suppression, specially designed for military use, other than those specified elsewhere in the Military List;		Controller
	i. Simulators specially designed for military "nuclear reactors";		Atomic Energy Licensing Board (AELB)
	j. Mobile repair shops specially designed or 'modified' to service military equipment;		Controller
	k. Field generators specially designed or 'modified' for military use;		
	l. ISO intermodal containers or demountable vehicle bodies (i.e. swap bodies) specially designed or 'modified' for military use;		
	m. Ferries, other than those specified elsewhere in the Military List, bridges and pontoons, specially designed for military use;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	n. Test models specially designed for the 'development' of items specified in ML4, ML6, ML9 or ML10; o. 'Laser' protection equipment (e.g., eye and sensor protection) specially designed for military use; p. 'Fuel cells', other than those specified elsewhere in the Military List, specially designed or 'modified' for military use.		
ML18	Production equipment and components, as follows: a. Specially designed or modified 'production' equipment for the 'production' of products specified in the Military List, and specially designed components therefor; b. Specially designed environmental test facilities and specially designed equipment therefor, for the certification, qualification or testing of products specified in the Military List.	Technical Note: For the purposes of ML18, the term 'production' includes design, examination, manufacture, testing and checking. Note: ML18.a. and ML18.b. include the following equipment: a. Continuous nitrators; b. Centrifugal testing apparatus or equipment having any of the following: 1. Driven by a motor or motors having a total rated horsepower of more than 298kW (400hp);	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		2. Capable of carrying a payload of 113kg or more; or 3. Capable of exerting a centrifugal acceleration of 8 g or more on a payload of 91kg or more; c. Dehydration presses; d. Screw extruders specially designed or modified for military explosive extrusion; e. Cutting machines for the sizing of extruded propellants; f. Sweetie barrels (tumblers) 1.85m or more in diameter and having over 227kg product capacity; g. Continuous mixers for solid propellants; h. Fluid energy mills for grinding or milling the ingredients of military explosives; i. Equipment to achieve both sphericity and uniform particle size in metal powder listed in ML8.c.8.;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		j. Convection current converters for the conversion of materials listed in ML8.c.3.	
ML19	Directed Energy Weapon (DEW) systems, related or countermeasure equipment and test models, as follows, and specially designed components therefor: a. 'Laser' systems specially designed for destruction or effecting mission-abort of a target; b. Particle beam systems capable of destruction or effecting mission-abort of a target; c. High power radio-frequency (RF) systems capable of destruction or effecting mission-abort of a target; d. Equipment specially designed for the detection or identification of, or defence against, systems specified in ML19.a. to ML19.c.; e. Physical test models for the systems, equipment and components specified in ML19; f. 'Laser' systems specially designed to cause permanent blindness to un-enhanced vision	Note 1: DEW systems specified in ML19 include systems whose capability is derived from the controlled application of: a. 'Lasers' of sufficient power to effect destruction similar to the manner of conventional ammunition; b. Particle accelerators which project a charged or neutral particle beam with destructive power; c. High pulsed power or high average power radio frequency beam transmitters, which produce fields sufficiently intense to disable electronic circuitry at a distant target. Note 2: ML19 includes the following when specially designed for DEW systems: a. Prime power generation, energy storage, switching, power conditioning or fuel-handling equipment; b. Target acquisition or tracking systems;	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	(i.e., to the naked eye or to the eye with corrective eyesight devices).	c. Systems capable of assessing target damage, destruction or mission-abort; d. Beam-handling, propagation or pointing equipment; e. Equipment with rapid beam slew capability for rapid multiple target operations; f. Adaptive optics and phase conjugators; g. Current injectors for negative hydrogen ion beams; h. 'Space-qualified' accelerator components; i. Negative ion beam funnelling equipment; j. Equipment for controlling and slewing a high energy ion beam; k. 'Space qualified' foils for neutralising negative hydrogen isotope beams.	
ML20	Cryogenic and "superconductive" equipment, as follows, and specially designed components and accessories therefor:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Equipment specially designed or configured to be installed in a vehicle for military ground, marine, airborne or space applications, capable of operating while in motion and of producing or maintaining temperatures below 103 K (-170 °C); b. "Superconductive" electrical equipment (rotating machinery and transformers) specially designed or configured to be installed in a vehicle for military ground, marine, airborne or space applications and capable of operating while in motion.	Note: ML20.a. includes mobile systems incorporating or employing accessories or components manufactured from nonmetallic or non-electrical conductive materials, such as plastics or epoxy-impregnated materials. Note: ML20.b. does not apply to direct current hybrid homopolar generators that have single-pole normal metal armatures which rotate in a magnetic field produced by superconducting windings, provided those windings are the only superconducting components in the generator.	
ML21	'Software', as follows: a. 'Software', specially designed or modified for any of the following: 1. 'Development', 'production', operation or maintenance of equipment specified in the Military List; 2. 'Development' or 'production' of materials specified in the Military List; or 3. 'Development', 'production', operation or maintenance of 'software' specified in the Military List;		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Specific 'software', other than that specified in ML21.a., as follows: 1. 'Software' specially designed for military use and specially designed for modeling, simulating or evaluating military weapon systems; 2. 'Software' specially designed for military use and specially designed for modeling or simulating military operational scenarios; 3. 'Software' for determining the effects of conventional, nuclear, chemical or biological weapons; 4. 'Software' specially designed for military use and specially designed for Command, Communications, Control and Intelligence (C^3I) or Command, Communications, Control, Computer and Intelligence (C^4I) applications; c. 'Software', not specified in ML21.a. or ML21.b., specially designed or modified to enable equipment not specified in the Military List to perform the military functions of equipment specified in the Military List.		

Category Code	*Items Description*	*Note*	*Relevant Authority*
ML22	"Technology" as follows: a. 'Technology', other than specified in ML22.b., which is 'required' for the 'development', 'production', operation, installation, maintenance (checking), repair, overhaul or refurbishing of items specified in the Military List;. b. 'Technology' as follows: 1. 'Technology' 'required' for the design of, the assembly of components into, and the operation, maintenance and repair of, complete production installations for items specified in the Military List, even if the components of such production installations are not specified; 2. 'Technology' 'required' for the 'development' and 'production' of small arms even if used to produce reproductions of antique small arms; 3. Not used since 2013 4. Not used since 2013 5. 'Technology' 'required' exclusively for the incorporation of 'biocatalysts', specified in ML7.i.1., into military carrier substances or military material.	N.B.: See ML22.a. for 'technology' previously specified in ML22.b.3. N.B.: See ML22.a. for 'technology' previously specified in ML22.b.4. Note 1: 'Technology' 'required' for the 'development', 'production', operation, installation, maintenance (checking), repair, overhaul or refurbishing of items specified in the Military List remains under control even when applicable to any item not specified in the Military List. Note 2: ML22 does not apply to: a. 'Technology' that is the minimum necessary for the installation, operation, maintenance (checking) or repair, of those items which are not controlled or whose export has been authorised; b. 'Technology' that is 'in the public domain', 'basic scientific research' or the minimum necessary information for patent applications;	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		c. 'Technology' for magnetic induction for continuous propulsion of civil transport devices.	

DEFINITIONS OF TERMS USED IN PART 1

The following are definitions of the terms used in Part 1, in alphabetical order.

Note 1: *Definitions apply throughout Part 1. The references are purely advisory and have no effect on the universal application of defined terms throughout Part 1.*

Note 2: *Words and terms contained in this Part of Definitions only take the defined meaning where this is indicated by their being enclosed in 'double quotations marks'. Definitions of terms between 'single quotation marks' are given in a Technical note to the relevant item. Elsewhere, words and terms take their commonly accepted (dictionary) meanings.*

ML8 'Additives'

Substances used in explosive formulations to improve their properties.

ML8, ML10, ML14 'Aircraft'

A fixed wing, swivel wing, rotary wing (helicopter), tilt rotor or tilt-wing airborne vehicle.

ML10 'Airship'

A power driven airborne vehicle that is kept buoyant by a body of gas (usually helium, formally hydrogen) which is lighter than air.

ML11 'Automated Command and Control Systems'

Electronic systems, through which information essential to the effective operation of the grouping, major formation, tactical formation, unit, ship, subunit or weapons under command is entered, processed and transmitted. This is achieved by the use of computer and other specialised hardware designed to support the functions of a military command and control organisation. The main functions of an automated command and control system are: the efficient automated collection, accumulation, storage and processing of information; the display of the situation and the circumstances affecting the preparation and conduct of combat operations; operational and tactical calculations for the allocation of resources among force groupings or elements of the operational order of battle or battle deployment according to the mission or stage of the operation; the preparation of data for appreciation of the situation and

decision-making at any point during operation or battle; computer simulation of operations.

ML22 'Basic Scientific Research'

Experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena or observable facts, not primarily directed towards a specific practical aim or objective.

ML7, ML22 'Biocatalysts'

Enzymes for specific chemical or biochemical reactions or other biological compounds which bind to and accelerate the degradation of CW agents.

Technical Note:

'*Enzymes*' *means* '*biocatalysts*' *for specific chemical or biochemical reactions.*

ML7 'Biological agents'

Pathogens or toxins, selected or modified (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) to produce casualties in humans or animals, degrade equipment or damage crops or the environment.

ML7 'Biopolymers'

Biological macromolecules as follows:

a. Enzymes for specific chemical or biochemical reactions;

b. 'Anti-idiotypic', 'monoclonal' or 'polyclonal' antibodies;

c. Specially designed or specially processed 'receptors'.

Technical Notes:

1. '*Anti-idiotypic antibodies*' *means antibodies which bind to the specific antigen binding sites of other antibodies;*
2. '*Monoclonal antibodies*' *means proteins which bind to one antigenic site and are produced by a single clone of cells;*

3. '*Polyclonal antibodies*' *means a mixture of proteins which bind to the specific antigen and are produced by more than one clone of cells;*

4. '*Receptors*' *means biological macromolecular structures capable of binding ligands, the binding of which affects physiological functions.*

ML4, 10 'Civil aircraft'

Those 'aircraft' listed by designation in published airworthiness certification lists by the civil aviation authorities of one or more EU Member States or Wassenaar Arrangement Participating States to fly commercial civil internal and external routes or for legitimate civil, private or business use.

ML1 'Deactivated firearms'

A firearm that has been made incapable of firing by process defined by the national authority. These processes permanently modify the essential elements of the firearms. According to the national law and regulations, deactivation of the firearm may be attested by a certificate delivered by a competent authority and may be marked on the firearm by a stamp on an essential part.

ML17, ML21, ML22 'Development'

Is related to all stages prior to serial production, such as: design, design research, design analyses, design concepts, assembly and testing of prototypes, pilot production schemes, design data, process of transforming design data into a product, configuration design, integration design, layouts.

ML17 'End-effectors'

Grippers, 'active tooling units' and any other tooling that is attached to the baseplate on the end of a "robot" manipulator arm.

Technical Note:

'*Active tooling units*' *are devices for applying motive power, process energy or sensing to a work piece.*

ML8 'Energetic materials'

Substances or mixtures that react chemically to release energy required for their intended application. 'Explosives', 'pyrotechnics' and 'propellants' are subclasses of energetic materials.

ML8, 18 'Explosives'

Solid, liquid or gaseous substances or mixtures of substances which, in their application as primary, booster, or main charges in warheads, demolition and other applications, are required to detonate.

ML7 'Expression Vectors'

Carriers (e.g. plasmid or virus) used to introduce genetic material into host cells.

ML13 'Fibrous or filamentary materials' include—

a. Continuous monofilaments;

b. Continuous yarns and rovings;

c. Tapes, fabrics, random mats and braids;

d. Chopped fibres, staple fibres and coherent fibre blankets;

e. Whiskers, either monocrystalline or polycrystalline, of any length;

f. Aromatic polyamide pulp.

ML15 'First generation image intensifier tubes'

Electrostatically focused tubes, employing input and output fibre optic or glass face plates, multi-alkali photocathodes (S-20 or S-25), but not microchannel plate amplifiers.

ML17 'Fuel cell'

An electrochemical device that converts chemical energy directly into Direct Current (DC) electricity by consuming fuel from an external source.

ML22 'In the public domain'

This means 'technology' or 'software' which has been made available without restrictions upon its further dissemination.

Note: Copyright restrictions do not remove '*technology*' *or* '*software*' *from being* '*in the public domain*'.

ML9, ML19 'Laser'

An assembly of components which produce both spatially and temporally coherent light that is amplified by stimulated emission of radiation.

ML17	'Library' (parametric technical database) A collection of technical information, reference to which may enhance the performance of relevant systems, equipment or components.
ML10	'Lighter-than-air vehicles' Balloons and "airships" that rely on hot air or on lighter-than-air gases such as helium or hydrogen for their lift.
ML21	'Microprogram' A sequence of elementary instructions maintained in a special storage, the execution of which is initiated by the introduction of its reference instruction into an instruction register.
ML17	'Nuclear reactor' Includes the items within or attached directly to the reactor vessel, the equipment which controls the level of power in the core, and the components which normally contain or come into direct contact with or control the primary coolant of the reactor core.
ML8	'Precursors' Speciality chemicals used in the manufacture of explosives.
ML18, ML21, ML22	'Production' Means all production stages, such as: product engineering, manufacture, integration, assembly (mounting), inspection, testing, quality assurance.
ML21	'Program' A sequence of instructions to carry out a process in, or convertible into, a form executable by an electronic computer.
ML8	'Propellants' Substances or mixtures that react chemically to produce large volumes of hot gases at controlled rates to perform mechanical work.
ML4, ML8	'Pyrotechnic(s)' Mixtures of solid or liquid fuels and oxidizers which, when ignited, undergo an energetic chemical reaction at a controlled rate intended to produce specific time delays, or quantities of heat, noise, smoke, visible light or infrared radiation. Pyrophorics are a subclass of pyrotechnics, which contain no oxidizers but ignite spontaneously on contact with air.

ML22 'Required'

As applied to 'technology', refers to only that portion of 'technology' which is peculiarly tindak balassible for achieving or exceeding the controlled performance levels, characteristics or functions. Such 'required' 'technology' may be shared by different products.

ML7 'Riot control agents'

Substances which, under the expected conditions of use for riot control purposes, produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure. (Tear gases are a subset of 'riot control agents'.)

ML17 'Robot'

A manipulation mechanism, which may be of the continuous path or of the point-to-point variety, may use sensors, and has all the following characteristics:

a. Multifunctional;

b. Capable of positioning or orienting material, parts, tools or special devices through variable movements in three-dimensional space;

c. Incorporates three or more closed or open loop servo-devices which may include stepping motors; and

d. 'User-accessible programmability' by means of the teach/playback method or by means of an electronic computer which may be a programmable logic controller, i.e. without mechanical intervention.

Note: The above definition does not include the following devices:

1. *Manipulation mechanisms which are only manually/teleoperator controllable;*

2. *Fixed sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed stops, such as pins or cams. The sequence of motions and the selection of paths or angles are not variable or changeable by mechanical, electronic or electrical means;*

3. *Mechanically controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed, but adjustable, stops, such as pins or cams. The sequence*

of motions and the selection of paths or angles are variable within the fixed programme pattern. Variations or modifications of the programme pattern (e.g. changes of pins or exchanges of cams) in one or more motion axes are accomplished only through mechanical operations;

4. *Non-servo-controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is variable but the sequence proceeds only by the binary signal from mechanically fixed electrical binary devices or adjustable stops;*

5. *Stacker cranes defined as Cartesian coordinate manipulator systems manufactured as an integral part of a vertical array of storage bins and designed to access the contents of those bins for storage or retrieval.*

ML21 'Software'

A collection of one or more 'program' or 'microprogram' fixed in any tangible medium of expression.

ML 11 'Spacecraft'

Active and passive satellites and space probes

ML19 'Space-qualified'

Designed, manufactured, or qualified through successful testing, for operation at altitudes greater than 100 km above the surface of the Earth.

Note: A determination that a specific item is 'space- qualified' by virtue of testing does not mean that other items in the same production run or model series are 'space-qualified' if not individually tested.

ML 20 'Superconductive'

Refers to materials, (i.e. metals, alloys or compounds) which can lose all electrical resistance (i.e. which can attain infinite electrical conductivity and carry very large electrical currents without Joule heating).

'Critical temperature' (sometimes referred to as the transition temperature) of a specific 'superconductive' material is the temperature at which the material loses all resistance to the flow of direct electrical current.

Technical Note:

The '*superconductive*' *state of a material is individually characterised by a* '*critical temperature*'*, a critical magnetic field, which is a function of temperature, and a critical current density which is, however, a function of both magnetic field and temperature.*

ML22 'Technology'

Specific information necessary for the 'development', 'production' or operation, installation, maintenance (checking), repair, overhaul or refurbishing of a product. The information takes the form of 'technical data' or 'technical assistance'. Specified "technology" for the EU Common Military List is defined in ML22.

Technical Notes:

1. '*Technical data*' *may take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read-only memories.*

2. '*Technical assistance*' *may take forms such as instruction, skills, training, working knowledge, consulting services.* '*Technical assistance*' *may involve transfer of* '*technical data*'*.*

ML 10 'Unmanned aerial vehicle' ('UAV')

Any "aircraft" capable of initiating flight and sustaining controlled flight and navigation without any human presence on board.

PART 2: DUAL-USE ITEMS LIST

This List implements internationally agreed dual-use controls including the Wassenaar Arrangement, the Missile Technology Control Regime (MTCR), the Nuclear Suppliers' Group (NSG), the Australia Group (AG) and the Chemical Weapons Convention (CWC).

CONTENTS

GENERAL NOTES TO PART 2

1. For control of goods which are designed or modified for military use, see the Military Items List in Part 1 of this Schedule. References in Part 2 that state "SEE ALSO MILITARY ITEMS LIST" refer to the same list.

2. The object of the controls contained in Part 2 should not be defeated by the export of any non-controlled goods (including plant) containing one or more controlled components when the controlled component or components are the principal element of the goods and can feasibly be removed or used for other purposes.

   N.B.: In judging whether the controlled component or components are to be considered the principal element, it is necessary to weigh the factors of quantity, value and technological know-how involved and other special circumstances which might establish the controlled component or components as the principal element of the goods being procured.

3. Goods specified in Part 2 include both new and used goods.

4. In some instances, chemicals are listed by name and CAS number. The list applies to chemicals of the same structural formula (including hydrates) regardless of name or CAS number. CAS numbers are shown to assist in identifying a particular chemical or mixture, irrespective of nomenclature. CAS numbers cannot be used as unique identifiers because some forms of the listed chemical have different CAS numbers, and mixtures containing a listed chemical may also have different CAS numbers.

NUCLEAR TECHNOLOGY NOTE (NTN)

(To be read in conjunction with Section E of Category 0.)

The "technology" directly associated with any goods controlled in Category 0 is controlled according to the provisions of Category 0.

"Technology" for the "development", "production" or "use" of goods under control remains under control even when applicable to non-controlled goods.

The approval of goods for export also authorizes the export to the same end-user of the minimum "technology" required for the installation, operation, maintenance and repair of the goods.

Controls on "technology" transfer do not apply to information "in the public domain" or to "basic scientific research".

GENERAL TECHNOLOGY NOTE (GTN)

(To be read in conjunction with Section E of Categories 1 to 9.)

The export of "technology" which is "required" for the "development", "production" or "use" of goods controlled in Categories 1 to 9, is controlled according to the provisions of Categories 1 to 9.

"Technology" "required" for the "development", "production" or "use" of goods under control remains under control even when applicable to non-controlled goods.

Controls do not apply to that "technology" which is the minimum necessary for the installation, operation, maintenance (checking) and repair of those goods which are not controlled or whose export has been authorised.

N.B.: This does not release such "technology" specified in 1E002.e., 1E002.f., 8E002.a. and 8E002.b.

Controls on "technology" transfers do not apply to information "in the public domain", to "basic scientific research" or to the minimum necessary information for patent applications.

GENERAL SOFTWARE NOTE (GSN)

(This note overrides any control within Section D of Categories 0 to 9.)

Categories 0 to 9 of this list do not control "software" which any of the following:

a. Generally available to the public by being:

    1. Sold from stock at retail selling points, without restriction, by means of:

        a. Over-the-counter transactions;

        b. Mail order transactions;

        c. Electronic transactions; or

        d. Telephone order transactions; and

    2. Designed for installation by the user without further substantial support by the supplier;

N.B.: Entry a. of the General Software Note does not release "software" specified in Category 5 - Part 2 ("Information Security").

b. "In the public domain"; or

c. The minimum necessary "object code" for the installation, operation, maintenance (checking) or repair of those items whose export has been authorised.

N.B.: Entry c. of the General Software Note does not release "software" specified in Category 5 - Part 2 ("Information Security").

ACRONYMS AND ABBREVIATIONS USED IN PART 2

An acronym or abbreviation, when used as a defined term, will be found in "Definitions of Terms used in Part 2".

Acronym or meaning abbreviation	
ABEC	Annular Bearing Engineers Committee
ADC	Analogue - to- Digital Converter
AGMA	American Gear Manufacturers' Association
AHRS	Attitude and Heading Reference Systems
AISI	American Iron and Steel Institute
ALE	Atomic Layer Epitaxy
ALU	Arithmetic Logic Unit
ANSI	American National Standards Institute
APP	Adjusted Peak Performance
APU	Auxiliary Power Unit
ASTM	American Society for Testing and Materials
ATC	Air Traffic Control
BJT	Bipolar Junction Transistors
BPP	Beam Parameter Product
BSC	Base Station Controller
CAD	Computer-Aided-Design
CAS	Chemical Abstracts Service
CCD	Charge Coupled Device
CDU	Control and Display Unit
CEP	Circular Error Probable
CMM	Coordinate Measuring Machine
CMOS	Complementary Metal Oxide Semiconductor
CNTD	Controlled Nucleation Thermal Deposition
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
CVD	Chemical Vapour Deposition
CW	Chemical Warfare
CW (for lasers)	Continuous Wave
DAC	Digital - to - Analogue Converter
DANL	Displayed Average Noise Level
DBRN	Data - Base Referenced Navigation

Acronym or meaning abbreviation	
DDS	Direct Digital Synthesizer
DMA	Dynamic Mechanical Analysis
DME	Distance Measuring Equipment
DMOSFET	Diffused Metal Oxide Semiconductor Field Effect Transistor
DS	Directionally Solidified
EB	Exploding Bridge
EB-PVD	Electron Beam Physical Vapour Deposition
EBW	Exploding Bridge Wire
ECM	Electro-Chemical Machining
EDM	Electrical Discharge Machines
EEPROMS	Electrically Erasable Programmable Read Only Memory
EFI	Exploding Foil Initiators
EIRP	Effective Isotropic Radiated Power
ENOB	Effective Number of Bits
ERF	Electrorheological Finishing
ERP	Effective Radiated Power
ETO	Emitter Turn-Off Thyristor
ETT	Electrical Triggering Thyristor
EUV	Extreme Ultra Violet
FADEC	Full Authority Digital Engine Control
FFT	Fast Fourier Transform
FPGA	Field Programmable Gate Array
FPIC	Field Programmable Interconnect
FPLA	Field Programmable Logic Array
FPO	Floating Point Operation
FWHM	Full-Width Half-Maximum
GSM	Global System For Mobile Communication
GLONASS	Global Navigation Satellite System
GPS	Global Positioning System
GNSS	Global Navigation Satellite System
GISN	General “Information Security” Note
GTO	Gate Turn-Off Thyristor
HBT	Hetero-Bipolar Transistors
HEMT	High Electron Mobility Transistors

Acronym or meaning abbreviation	
ICAO	International Civil Aviation Organisation
IEC	International Electro-Technical Commission
IED	Improvised Exposive Device
IEEE	Institute of Electrical and Electronic Engineers
IFOV	Instantaneous-Field-of-View
IGBT	Insulated Gate Bipolar Transistor
IGCT	Integrated Gate Commutated Thyristor
IHO	International Hydrographic Organisation
ILS	Instrument Landing System
IMU	Inertial Measurement Unit
INS	Inertial Navigation System
IP	Internet Protocol
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISA	International Standard Atmosphere
ISAR	Inverse Synthetic Aperture Radar
ISO	International Organisation for Standardisation
ITU	International Telecommunication Union
JT	Joule-Thomson
LIDAR	Light Detection and Ranging
LIDT	Laser Induced Damage Threshold
LOA	Length Overall
LRU	Line Replaceable Unit
MLS	Microwave Landing Systems
MMIC	Monolithic Microwave Integrated Circuit
MOCVD	Metal Organic Chemical Vapour Deposition
MOSFET	Metal Oxide Semiconductor Field Effect Transistor
MPM	Microwave Power Module
MRAM	Magnetic Random Access Memory
MRF	Magnetorheological Finishing
MRF	Minimum Resolvable Feature Size
MRI	Magnetic Resonance Imaging
MTBF	Mean-Time-Between-Failure
MTTF	Mean-Time-To-Failure
NA	Numerical Aperture
NDT	Non-Destructive Test

Acronym or meaning abbreviation	
NEQ	Net Explosive Quantity
OAM	Operation, Administration or Maintenance
OSI	Open Systems Interconnection
PAI	Polyamide-imides
PAR	Precision Approach Radar
PCL	Passive Coherent Location
PDK	Process Design Kit
PIN	Personal Identification Number
PMR	Private Mobile Radio
PVD	Physical Vapour Deposition
ppm	parts per million
QAM	Quadrature-Amplitude-Modulation
QE	Quantum Efficiency
RAP	Reactive Atom Plasmas
RF	Radio Frequency
rms	root mean square
RNC	Radio Network Controller
RNSS	Regional Navigation Satellite System
ROIC	Read-out Integrated Circuit
S-FIL	Step and Flash Imprint Lithography
SAR	Synthetic Aperture Radar
SAS	Synthetic Aperture Sonar
SC	Single Crystal
SCR	Silicon Controlled Rectifier
SFDR	Spurious Free Dynamic Range
SHPL	Super High Powered Laser
SLAR	Side Looking Airborne Radar
SOI	Silicon-on-Insulator
SPLD	Simple Programmable Logic Device
SQUID	Superconducting Quantum Interference Device
SRA	Shop Replaceable Assembly
SRAM	Static Random Access Memory
SSB	Single Sideband
SSR	Secondary Surveillance Radar
SSS	Side Scan Sonar
TIR	Total Indicated Reading

Acronym or meaning abbreviation	
TVR	Transmitting Voltage Response
u	atomic mass unit
UPR	Unidirectional Positioning Repeatability
UV	Ultra Violet
UTS	Ultimate Tensile Strength
VJFET	Vertical Junction Field Effect Transistor
VOR	Very High Frequency Omni-Directional Range
WLAN	Wireless Local Area Network

DEFINITIONS OF TERMS USED IN PART 2

Definitions of terms between 'single quotation marks' are given in a Technical Note to the relevant item.

Definitions of terms between "double quotation marks" are as follows:

N.B.: Category references are given in brackets after the defined term.

"Accuracy" (2 6), usually measured in terms of inaccuracy, means the maximum deviation, positive or negative, of an indicated value from an accepted standard or true value.

"Active flight control systems" (7) are systems that function to prevent undesirable "aircraft" and missile motions or structural loads by autonomously processing outputs from multiple sensors and then providing necessary preventive commands to effect automatic control.

"Active pixel" (6 8) is a minimum (single) element of the solid state array which has a photoelectric transfer function when exposed to light (electromagnetic) radiation.

"Adapted for use in war" (1) means any modification or selection (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) designed to increase the effectiveness in producing casualties in humans or animals, degrading equipment or damaging crops or the environment.

"Adjusted Peak Performance" (4) is an adjusted peak rate at which "digital computers" perform 64-bit or larger floating point additions and multiplications, and is expressed in Weighted TeraFLOPS (WT) with units of 10^{12} adjusted floating point operations per second.

N.B.: See Category 4, Technical Note.

"Aircraft" (1 7 9) means a fixed wing, swivel wing, rotary wing (helicopter), tilt rotor or tilt-wing airborne vehicle.

N.B.: See also "civil aircraft".

"Airship" (9) means a power-driven airborne vehicle that is kept buoyant by a body of gas (usually helium, formerly hydrogen) which is lighter than air.

"All compensations available" (2) means after all feasible measures available to the manufacturer to minimise all systematic positioning errors for the particular machine-tool model or measuring errors for the particular coordinate measuring machine are considered.

"Allocated by the ITU" (3 5) means the allocation of frequency bands according to the current edition of the ITU Radio Regulations for primary, permitted and secondary services.

N.B.: Additional and alternative allocations are not included.

"Angular position deviation" (2) means the maximum difference between angular position and the actual, very accurately measured angular position after the workpiece mount of the table has been turned out of its initial position.

"Angle random walk" (7) means the angular error build up with time that is due to white noise in angular rate. (IEEE STD 528-2001)

"APP" (4) is equivalent to "Adjusted Peak Performance".

"Asymmetric algorithm" (5) means a cryptographic algorithm using different, mathematically-related keys for encryption and decryption.

N.B.: A common use of "asymmetric algorithms" is key management.

"Authentication" (5) means verifying the identity of a user, process or device, often as a prerequisite to allowing access to resources in an information system. This includes verifying the origin or content of a message or other information, and all aspects of access control where there is no encryption of files or text except as directly related to the protection of passwords, Personal Identification Numbers (PINs) or similar data to prevent unauthorized access.

"Automatic target tracking" (6) means a processing technique that automatically determines and provides as output an extrapolated value of the most probable position of the target in real time.

"Average output power" (6) means the total "laser" output energy, in joules, divided by the period over which a series of consecutive pulses is emitted, in seconds. For a series of uniformly spaced pulses it is equal to the total "laser" output energy in a single pulse, in joules, multiplied by the pulse frequency of the "laser", in Hertz.

"Basic gate propagation delay time" (3) means the propagation delay time value corresponding to the basic gate used in a "monolithic integrated circuit". For a 'family' of "monolithic integrated circuits", this may be specified either as the propagation delay time per typical gate within the given 'family' or as the typical propagation delay time per gate within the given 'family'.

N.B. 1: "Basic gate propagation delay time" is not to be confused with the input/output delay time of a complex "monolithic integrated circuit".

N.B. 2: 'Family' consists of all integrated circuits to which all of the following are applied as their manufacturing methodology and specifications except their respective functions:

a. The common hardware and software architecture;

b. The common design and process technology; and

c. *The common basic characteristics.*

"Basic scientific research" (GTN NTN) means experimental or theoretical work undertaken principally to acquire new knowledge of the fundamental principles of phenomena or observable facts, not primarily directed towards a specific practical aim or objective.

"Bias" (accelerometer) (7) means the average over a specified time of accelerometer output, measured at specified operating conditions, that has no correlation with input acceleration or rotation. "Bias" is expressed in g or in metres per second squared (g or m/s2) (IEEE Std 528-2001) (Micro g equals 1x10-6 g).

"Bias" (gyro) (7) means the average over a specified time of gyro output measured at specified operating conditions that has no correlation with input rotation or acceleration. "Bias" is typically expressed in degrees per hour (deg/hr). (IEEE Std 528-2001).

"Biological agents" (1) are pathogens or toxins, selected or modified (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) to produce casualties in humans or animals, degrade equipment or damage crops or the environment.

"Camming" (2) means axial displacement in one revolution of the main spindle measured in a plane perpendicular to the spindle faceplate, at a point next to the circumference of the spindle faceplate (Reference: ISO 230/1 1986, paragraph 5.63).

"Carbon fibre preforms" (1) means an ordered arrangement of uncoated or coated fibres intended to constitute a framework of a part before the "matrix" is introduced to form a "composite".

"CEP" (circle of equal probability) (7) is a measure of accuracy; the radius of the circle centred at the target, at a specific range, in which 50 % of the payloads impact.

"Chemical laser" (6) means a "laser" in which the excited species is produced by the output energy from a chemical reaction.

"Chemical mixture" (1) means a solid, liquid or gaseous product made up of two or more components which do not react together under the conditions under which the mixture is stored.

"Circulation-controlled anti-torque or circulation controlled direction control systems" (7) are systems that use air blown over aerodynamic surfaces to increase or control the forces generated by the surfaces.

"Civil aircraft" (1 3 4 7) means those "aircraft" listed by designation in published airworthiness certification lists by the civil aviation authorities of one or more EU Member States or Wasssenaar Arrangement Participating States to fly commercial civil internal and external routes or for legitimate civil, private or business use.

N.B.: See also "aircraft".

"Commingled" (1) means filament to filament blending of thermoplastic fibres and reinforcement fibres in order to produce a fibre reinforcement "matrix" mix in total fibre form.

"Comminution" (1) means a process to reduce a material to particles by crushing or grinding.

"Communications channel controller" (4) means the physical interface which controls the flow of synchronous or asynchronous digital information. It is an assembly that can be integrated into computer or telecommunications equipment to provide communications access.

"Compensation systems" (6) consist of the primary scalar sensor, one or more reference sensors (e.g. vector magnetometers) together with software that permit reduction of rigid body rotation noise of the platform.

"Composite" (1 2 6 8 9) means a "matrix" and an additional phase or additional phases consisting of particles, whiskers, fibres or any combination thereof, present for a specific purpose or purposes.

"Compound rotary table" (2) means a table allowing the workpiece to rotate and tilt about two non-parallel axes, which can be coordinated simultaneously for "contouring control".

"III/V compounds" (3 6) means polycrystalline or binary or complex monocrystalline products consisting of elements of groups IIIA and VA of Mendeleyev's periodic classification table (e.g. gallium arsenide, gallium-aluminium arsenide, indium phosphide).

"Contouring control" (2) means two or more "numerically controlled" motions operating in accordance with instructions that specify the next required position and the required feed rates to that position. These feed rates are varied in relation to each other so that a desired contour is generated (Reference: ISO/DIS 2806 - 1980).

"Critical temperature" (1 3 5) (sometimes referred to as the transition temperature) of a specific "superconductive" material means the temperature at which the material loses all resistance to the flow of direct electrical current.

"Cryptographic activation" (5) means any technique that activates or enables cryptographic capability of an item, by means of a secure mechanism implemented by the manufacturer of the item, where this mechanism is uniquely bound to any of the following:

7. A single instance of the item; or

8. One customer, for multiple instances of the item.

Technical Notes:

1. *"Cryptographic activation" techniques and mechanisms may be implemented as hardware, "software" or "technology".*

2. *Mechanisms for "cryptographic activation" can, for example, be serial number-based licence keys or authentication instruments such as digitally signed certificates.*

"Cryptography" (5) means the discipline which embodies principles, means and methods for the transformation of data in order to hide its information content, prevent its undetected modification or prevent its unauthorized use. "Cryptography" is limited to the transformation of information using one or more 'secret parameters' (e.g. crypto variables) or associated key management.

Notes:

1. *"Cryptography" does not include "fixed" data compression or coding techniques;*

2. *"Cryptography" includes decryption.*

Technical Notes:

1. *"Secret parameter": a constant or key kept from the knowledge of others or shared only within a group.*

2. *"Fixed parameter": the coding or compression algorithm cannot accept externally supplied parameters (e.g. cryptographic or key variables) and cannot be modified by the user.*

"CW laser" (6) means a "laser" that produces a nominally constant output energy for greater than 0.25 seconds.

"Data-Based Referenced Navigation" ("DBRN") (7) Systems means systems which use various sources of previously measured geo-mapping data integrated to provide accurate navigation information under dynamic conditions. Data sources include bathymetric maps, stellar maps, gravity maps, magnetic maps or 3-D digital terrain maps.

"Deformable mirrors" (6) (also known as adaptive optic mirrors) means mirrors having:

a. A single continuous optical reflecting surface which is dynamically deformed by the application of individual torques or forces to compensate for distortions in the optical waveform incident upon the mirror; or

b. Multiple optical reflecting elements that can be individually and dynamically repositioned by the application of torques or forces to compensate for distortions in the optical waveform incident upon the mirror.

"Depleted uranium" (0) means uranium depleted in the isotope 235 below that occurring in nature.

"Development" (GTN NTN All) is related to all phases prior to serial production, such as: design, design research, design analyses, design concepts, assembly and testing of prototypes, pilot production schemes, design data, process of transforming design data into a product, configuration design, integration design, layouts.

"Diffusion bonding" (1 2 9) means a solid state joining of at least two separate pieces of metals into a single piece with a joint strength equivalent to that of the weakest material, wherein the principal mechanism is interdiffusion of atoms across the interface.

"Digital computer" (4 5) means equipment which can, in the form of one or more discrete variables, perform all of the following:

a. Accept data;

b. Store data or instructions in fixed or alterable (writable) storage devices;

c. Process data by means of a stored sequence of instructions which is modifiable; and

d. Provide output of data.

N.B.: Modifications of a stored sequence of instructions include replacement of fixed storage devices, but not a physical change in wiring or interconnections.

"Digital transfer rate" (def) means the total bit rate of the information that is directly transferred on any type of medium.

N.B.: See also "total digital transfer rate".

"Direct-acting hydraulic pressing" (2) means a deformation process which uses a fluid-filled flexible bladder in direct contact with the workpiece.

"Drift rate" (gyro) (7) means the component of gyro output that is functionally independent of input rotation. It is expressed as an angular rate. (IEEE STD 528-2001)

"Effective gramme" (0 1) of "special fissile material" means:

a. For plutonium isotopes and uranium-233, the isotope weight in grammes;

b. For uranium enriched 1 per cent or greater in the isotope uranium-235, the element weight in grammes multiplied by the square of its enrichment expressed as a decimal weight fraction;

c. For uranium enriched below 1 per cent in the isotope uranium-235, the element weight in grammes multiplied by 0.0001;

"Electronic assembly" (2 3 4 5) means a number of electronic components (i.e., 'circuit elements', 'discrete components', integrated circuits, etc.) connected together to perform (a) specific function(s), replaceable as an entity and normally capable of being disassembled.

N.B. 1: 'Circuit element': a single active or passive functional part of an electronic circuit, such as one diode, one transistor, one resistor, one capacitor, etc.

N.B. 2: 'Discrete component': a separately packaged 'circuit element' with its own external connections.

"Electronically steerable phased array antenna" (5 6) means an antenna which forms a beam by means of phase coupling, i.e. the beam direction is controlled by the complex excitation coefficients of the radiating elements and the direction of that beam can be varied in azimuth or in elevation, or both, by application, both in transmission and reception, of an electrical signal.

"Energetic materials" (1) means substances or mixtures that react chemically to release energy required for their intended application. "Explosives", "pyrotechnics" and "propellants" are subclasses of energetic materials.

"End-effectors" (2) means grippers, 'active tooling units' and any other tooling that is attached to the baseplate on the end of a "robot" manipulator arm.

N.B.: 'Active tooling unit' means a device for applying motive power, process energy or sensing to the workpiece.

"Equivalent Density" (6) means the mass of an optic per unit optical area projected onto the optical surface.

"Explosives" (1) means solid, liquid or gaseous substances or mixtures of substances which, in their application as primary, booster, or main charges in warheads, demolition and other applications, are required to detonate.

"FADEC Systems" (7 9) means Full Authority Digital Engine Control Systems — A digital electronic control system for a gas turbine engine that is able to autonomously control the engine throughout its whole operating range from demanded engine start until demanded engine shut-down, in both normal and fault conditions.

"Fibrous or filamentary materials" (0 1 8) include:

a. Continuous "monofilaments";

b. Continuous "yarns" and "rovings";

b. "Tapes", fabrics, random mats and braids;

c. Chopped fibres, staple fibres and coherent fibre blankets;

d. Whiskers, either monocrystalline or polycrystalline, of any length;

e. Aromatic polyamide pulp

"Film type integrated circuit" (3) means an array of 'circuit elements' and metallic interconnections formed by deposition of a thick or thin film on an insulating "substrate".

N.B.: 'Circuit element' is a single active or passive functional part of an electronic circuit, such as one diode, one transistor, one resistor, one capacitor, etc.

"Fixed" (5) means that the coding or compression algorithm cannot accept externally supplied parameters (e.g. cryptographic or key variables) and cannot be modified by the user.

"Flight control optical sensor array" (7) is a network of distributed optical sensors, using "laser" beams, to provide real-time flight control data for on-board processing.

“Flight path optimisation” (7) is a procedure that minimizes deviations from a four-dimensional (space and time) desired trajectory based on maximising performance or effectiveness for mission tasks.

"Fly-by-light system" (7) means a primary digital flight control system employing feedback to control the aircraft during flight, where the commands to the effectors/actuators are optical signals.

"Fly-by-wire system" (7) means a primary digital flight control system employing feedback to control the aircraft during flight, where the commands to the effectors/actuators are electrical signals.

“Focal plane array” (6 8) means a linear or two-dimensional planar layer, or combination of planar layers, of individual detector elements, with or without readout electronics, which work in the focal plane.

N.B.: This is not intended to include a stack of single detector elements or any two, three or four element detectors provided time delay and integration is not performed within the element.

“Fractional bandwidth” (3 5) means the “instantaneous bandwidth” divided by the centre frequency, expressed as a percentage.

“Frequency hopping” (5) means a form of “spread spectrum” in which the transmission frequency of a single communication channel is made to change by a random or pseudo-random sequence of discrete steps.

"Frequency mask trigger" (3) for "signal analysers" is a mechanism where the trigger function is able to select a frequency range to be triggered on as a subset of the acquisition bandwidth while ignoring other signals that may also be present within the same acquisition bandwidth. A "frequency mask trigger" may contain more than one independent set of limits.

‘“Frequency switching time (3)” means the time (i.e. delay) taken by a signal when switched from an initial specified output frequency, to arrive at or within any of the following:

a. ±100 Hz of a final specified output frequency of less than 1 GHz; or

b. ±0.1 part per million of a final specified output frequency equal to or greater than 1 GHz.

“Frequency synthesiser” (3) means any kind of frequency source, regardless of the actual technique used, providing a multiplicity of simultaneous or alternative output frequencies, from one or more outputs, controlled by, derived from or disciplined by a lesser number of standard (or master) frequencies.

“Fuel cell” (8) is an electrochemical device that converts chemical energy directly into Direct Current (DC) electricity by consuming fuel from an external source.

“Fusible” (1) means capable of being cross-linked or polymerized further (cured) by the use of heat, radiation, catalysts, etc., or that can be melted without pyrolysis (charring).

"Gas Atomisation" (1) means a process to reduce a molten stream of metal alloy to droplets of 500 micrometre diameter or less by a high pressure gas stream.

"Geographically dispersed" (6) is where each location is distant from any other more than 1,500m in any direction. Mobile sensors are always considered "geographically dispersed".

"Guidance set" (7) means systems that integrate the process of measuring and computing a vehicles position and velocity (i.e. navigation) with that of computing and sending commands to the vehicles flight control systems to correct the trajectory.

"Hot isostatic densification" (2) means the process of pressurising a casting at temperatures exceeding 375K (102°C) in a closed cavity through various media (gas, liquid, solid particles, etc.) to create equal force in all directions to reduce or eliminate internal voids in the casting.

"Hybrid integrated circuit" (3) means any combination of integrated circuit(s), or integrated circuit with 'circuit elements' or 'discrete components' connected together to perform (a) specific function(s), and having all of the following characteristics:

a. Containing at least one unencapsulated device;

b. Connected together using typical IC production methods;

b. Replaceable as an entity; and

c. Not normally capable of being disassembled.

N.B. 1: 'Circuit element': a single active or passive functional part of an electronic circuit, such as one diode, one transistor, one resistor, one capacitor, etc.

N.B. 2: 'Discrete component': a separately packaged 'circuit element' with its own external connections.

"Image enhancement" (4) means the processing of externally derived information-bearing images by algorithms such as time compression, filtering, extraction, selection, correlation, convolution or transformations between domains (e.g. fast Fourier transform or Walsh transform). This does not include algorithms using only linear or rotational transformation of a single image, such as translation, feature extraction, registration or false coloration.

"Immunotoxin" (1) is a conjugate of one cell specific monoclonal antibody and a "toxin" or "sub-unit of toxin", that selectively affects diseased cells.

"In the public domain" (GTN NTN GSN), as it applies herein, means "technology" or "software" which has been made available without restrictions upon its further dissemination (copyright restrictions do not remove "technology" or "software" from being "in the public domain").

“Information security” (4 5) is all the means and functions ensuring the accessibility, confidentiality or integrity of information or communications, excluding the means and functions intended to safeguard against malfunctions. This includes “cryptography”, “cryptographic activation”, ‘cryptanalysis’, protection against compromising emanations and computer security.

N.B.: ‘Cryptanalysis’: analysis of a cryptographic system or its inputs and outputs to derive confidential variables or sensitive data, including clear text.

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Technical Note:

‘Cryptanalysis’: analysis of a cryptographic system or its inputs and outputs to derive confidential variables or sensitive data, including clear text.

“Instantaneous bandwidth” (3 5 7) means the bandwidth over which output power remains constant within 3 dB without adjustment of other operating parameters.

“Instrumented range” (6) means the specified unambiguous display range of a radar.

“Insulation” (9) is applied to the components of a rocket motor, i.e. the case, nozzle, inlets, case closures, and includes cured or semi-cured compounded rubber sheet stock containing an insulating or refractory material. It may also be incorporated as stress relief boots or flaps.

“Interior lining” (9) is suited for the bond interface between the solid propellant and the case or insulating liner. Usually a liquid polymer based dispersion of refractory or insulating materials, e.g. carbon filled hydroxyl terminated polybutadiene (HTPB) or other polymer with added curing agents sprayed or screeded over a case interior.

“Interleaved Analogue-to-Digital Converter (ADC)” (3) means devices that have multiple ADC units that sample the same analogue input at different times such that when the outputs are aggregated, the analogue input has been effectively sampled and converted at a higher sampling rate.

“Intrinsic Magnetic Gradiometer” (6) is a single magnetic field gradient sensing element and associated electronics the output of which is a measure of magnetic field gradient.

N.B.: See also “magnetic gradiometer”.

"Intrusion software" (4) means "software" specially designed or modified to avoid detection by 'monitoring tools', or to defeat 'protective countermeasures', of a computer or network-capable device, and performing any
of the following:

a. The extraction of data or information, from a computer or network-capable device, or the modification of system or user data; or

b. The modification of the standard execution path of a program or process in order to allow the execution of externally provided instructions.

Notes:

1. *"Intrusion software" does not include any of the following:*

   a. *Hypervisors, debuggers or Software Reverse Engineering (SRE) tools;*

   a. *Digital Rights Management (DRM) "software"; or*

   b. *"Software" designed to be installed by manufacturers, administrators or users, for the purposes of asset tracking or recovery.*

2. *Network-capable devices include mobile devices and smart meters.*

Technical Notes:

1. *'Monitoring tools': "software" or hardware devices, that monitor system behaviours or processes running on a device. This includes antivirus (AV) products, end point security products, Personal Security Products (PSP), Intrusion Detection Systems (IDS), Intrusion Prevention Systems (IPS) or firewalls.*

2. *'Protective countermeasures': techniques designed to ensure the safe execution of code, such as Data Execution Prevention (DEP), Address Space Layout Randomisation (ASLR) or sandboxing.*

"Isolated live cultures" (1) includes live cultures in dormant form and in dried preparations.

"Isostatic presses" (2) mean equipment capable of pressurising a closed cavity through various media (gas, liquid, solid particles, etc.) to create equal pressure in all directions within the cavity upon a workpiece or material.

"Laser" (0 1 2 3 5 6 7 8 9) is an assembly of components which produce both spatially and temporally coherent light that is amplified by stimulated emission of radiation.

N.B.: See also: "Chemical laser";
"CW laser";
"Pulsed laser";
"Super High Power Laser".

"Library" (1) (parametric technical database) means a collection of technical information, reference to which may enhance the performance of relevant systems, equipment or components.

"Lighter-than-air vehicles" (9) means balloons and airships that rely on hot air or other lighter-than-air gases such as helium or hydrogen for their lift.

"Linearity" (2) (usually measured in terms of non-linearity) means the maximum deviation of the actual characteristic (average of upscale and downscale readings), positive or negative, from a straight line so positioned as to equalise and minimise the maximum deviations.

"Local area network" (4 5) is a data communication system having all of the following characteristics:

a. Allows an arbitrary number of independent 'data devices' to communicate directly with each other; and

b. Is confined to a geographical area of moderate size (e.g. office building, plant, campus, warehouse).

N.B.: 'Data device' means equipment capable of transmitting or receiving sequences of digital information.

"Magnetic Gradiometers" (6) are instruments designed to detect the spatial variation of magnetic fields from sources external to the instrument. They consist of multiple "magnetometers" and associated electronics the output of which is a measure of magnetic field gradient.

N.B.: See also "intrinsic magnetic gradiometer".

"Magnetometers" (6) are instruments designed to detect magnetic fields from sources external to the instrument. They consist of a single magnetic field sensing element and associated electronics the output of which is a measure of the magnetic field.

"Main storage" (4) means the primary storage for data or instructions for rapid access by a central processing unit. It consists of the internal storage of a "digital computer" and any hierarchical extension thereto, such as cache storage or non-sequentially accessed extended storage.

"Materials resistant to corrosion by UF_6" (0) include copper, copper alloys, stainless steel, aluminium, aluminium oxide, aluminium alloys, nickel or alloys containing 60% or more nickel by weight and fluorinated hydrocarbon polymers.

"Matrix" (1 2 8 9) means a substantially continuous phase that fills the space between particles, whiskers or fibres.

"Measurement uncertainty" (2) is the characteristic parameter which specifies in what range around the output value the correct value of the measurable variable lies with a confidence level of 95 %. It includes the uncorrected systematic deviations, the uncorrected backlash and the random deviations (ref. ISO 10360-2).

"Melt Extraction" (1) means a process to 'solidify rapidly' and extract a ribbon-like alloy product by the insertion of a short segment of a rotating chilled block into a bath of a molten metal alloy.

N.B.: 'Solidify rapidly': solidification of molten material at cooling rates exceeding 1,000 K/s.

"Melt Spinning" (1) means a process to 'solidify rapidly' a molten metal stream impinging upon a rotating chilled block, forming a flake, ribbon or rod-like product.

N.B.: 'Solidify rapidly': solidification of molten material at cooling rates exceeding 1,000 K/s.

"Microcomputer microcircuit" (3) means a "monolithic integrated circuit" or "multichip integrated circuit" containing an arithmetic logic unit (ALU) capable of executing general purpose instructions from an internal storage, on data contained in the internal storage.

N.B.: The internal storage may be augmented by an external storage.

"Microprocessor microcircuit" (3) means a "monolithic integrated circuit" or "multichip integrated circuit" containing an arithmetic logic unit (ALU) capable of executing a series of general purpose instructions from an external storage.

N.B. 1: The "microprocessor microcircuit" normally does not contain integral user-accessible storage, although storage present on-the-chip may be used in performing its logic function.

N.B. 2: This includes chip sets which are designed to operate together to provide the function of a "microprocessor microcircuit".

"Microorganisms" (1 2) means bacteria, viruses, mycoplasms, rickettsiae, chlamydiae or fungi, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures.

"Missiles" (1 3 6 7 9) means complete rocket systems and unmanned aerial vehicle systems, capable of delivering at least 500 kg payload to a range of at least 300km.

"Monofilament" (1) or filament is the smallest increment of fibre, usually several micrometres in diameter.

"Monolithic integrated circuit" (3) means a combination of passive or active 'circuit elements' or both which:

a. Are formed by means of diffusion processes, implantation processes or deposition processes in or on a single semiconducting piece of material, a so-called 'chip';

b. Can be considered as indivisibly associated; and

c. Perform the function(s) of a circuit.

N.B.: 'Circuit element' is a single active or passive functional part of an electronic circuit, such as one diode, one transistor, one resistor, one capacitor, etc.

"Monolithic Microwave Integrated Circuit" ('MMIC') (3 5) means a 'monolithic integrated circuit' that operates at microwave or millimeter wave frequencies.

"Monospectral imaging sensors" (6) are capable of acquisition of imaging data from one discrete spectrl band.

"Multichip integrated circuit" (3) means two or more "monolithic integrated circuits" bonded to a common "substrate".

“Multiple channel Analogue-to-Digital Converter (ADC)” (3) means devices that integrate more than one ADC, designed so that each ADC has a separate analogue input.

“Multispectral imaging sensors” (6) are capable of simultaneous or serial acquisition of imaging data from two or more discrete spectral bands. Sensors having more than twenty discrete spectral bands are sometimes referred to as hyper-spectral imaging sensors.

“Natural uranium” (0) means uranium containing the mixtures of isotopes occurring in nature.

“Network access controller” (4) means a physical interface to a distributed switching network. It uses a common medium which operates throughout at the same “digital transfer rate” using arbitration (e.g. token or carrier sense) for transmission. Independently from any other, it selects data packets or data groups (e.g. IEEE 802) addressed to it. It is an assembly that can be integrated into computer or telecommunications equipment to provide communications access.

“Neural computer” (4) means a computational device designed or modified to mimic the behaviour of a neuron or a collection of neurons, i.e. a computational device which is distinguished by its hardware capability to modulate the weights and numbers of the interconnections of a multiplicity of computational components based on previous data.

“Nuclear reactor” (0) means a complete reactor capable of operation so as to maintain a controlled self-sustaining fission chain reaction. A “nuclear reactor” includes all the items within or attached directly to the reactor vessel, the equipment which controls the level of power in the core, and the components which normally contain, come into direct contact with or control the primary coolant of the reactor core.

“Numerical control” (2) means the automatic control of a process performed by a device that makes use of numeric data usually introduced as the operation is in progress (Reference: ISO 2382).

“Object code” (GSN) means an equipment executable form of a convenient expression of one or more processes (“source code” (source language)) which has been compiled by programming system.

“Operations, Administration or Maintenance” ("OAM") (5) means performing one or more of the following tasks:

a. Establishing or managing any of the following:

    1. Accounts or privileges of users or administrators;

    1. Settings of an item; or

    2. Authentication data in support of the tasks described in paragraphs a.1. or a.2.;

b. Monitoring or managing the operating condition or performance of an item; or

c. Managing logs or audit data in support of any of the tasks described in paragraphs a. or b.

Note: "OAM" does not include any of the following tasks or their associated key management functions:

a. Provisioning or upgrading any cryptographic functionality that is not directly related to establishing or managing authentication data in support of the tasks described in paragraphs a.1. or a.2. above; or

b. Performing any cryptographic functionality on the forwarding or data plane of an item.

"Optical amplification" (5), in optical communications, means an amplification technique that introduces a gain of optical signals that have been generated by a separate optical source, without conversion to electrical signals, i.e. using semiconductor optical amplifiers, optical fibre luminescent amplifiers.

"Optical computer" (4) means a computer designed or modified to use light to represent data and whose computational logic elements are based on directly coupled optical devices.

"Optical integrated circuit" (3) means a "monolithic integrated circuit" or a "hybrid integrated circuit", containing one or more parts designed to function as a photosensor or photoemitter or to perform (an) optical or (an) electro-optical function(s).

"Optical switching" (5) means the routing of or switching of signals in optical form without conversion to electrical signals.

"Overall current density" (3) means the total number of ampere-turns in the coil (i.e., the sum of the number of turns multiplied by the maximum current carried by each turn) divided by the total cross-section of the coil (comprising the superconducting filaments, the metallic matrix in which the superconducting filaments are embedded, the encapsulating material, any cooling channels, etc.).

"Participating State" (7 9) is a state participating in the Wassenaar Arrangement.
(see www.wassenaar.org)

"Peak power" (6), means the highest power attained in the "pulse duration".

"Personal area network" (5) means a data communication system having all of the following characteristics:

a. Allows an arbitrary number of independent or interconnected 'data devices' to communicate directly with each other; and

b. Is confined to the communication between devices within the immediate vicinity of an individual person or device controller (e.g. single room, office, or automobile, and their nearby surrounding spaces).

Technical Note:

'Data device' means equipment capable of transmitting or receiving sequences of digital information.

"Plasma atomisation" (1) means a process to reduce a molten stream or solid metal to droplets of 500 μm diameter or less, using plasma torches in an inert gas environment.

“Power management” (7) means changing the transmitted power of the altimeter signal so that received power at the “aircraft” altitude is always at the minimum necessary to determine the altitude.

“Previously separated” (0 1) means the application of any process intended to increase the concentration of the controlled isotope.

“Primary flight control” (7) means an “aircraft” stability or manoeuvring control using force/moment generators, i.e., aerodynamic control surfaces or propulsive thrust vectoring.

“Principal element” (4), as it applies in Category 4, is a “principal element” when its replacement value is more than 35 % of the total value of the system of which it is an element. Element value is the price paid for the element by the manufacturer of the system, or by the system integrator. Total value is the normal international selling price to unrelated parties at the point of manufacture or consolidation of shipment.

“Production” (GTN NTN All) means all production phases, such as: construction, production engineering, manufacture, integration, assembly (mounting), inspection, testing, quality assurance.

“Production equipment” (1 7 9) means tooling, templates, jigs, mandrels, moulds, dies, fixtures, alignment mechanisms, test equipment, other machinery and components therefor, limited to those specially designed or modified for “development” or for one or more phases of “production”.

“Production facilities” (7 9) means “production equipment” and specially designed software therefor integrated into installations for “development” or for one or more phases of “production”.

“Programme” (2 6) means a sequence of instructions to carry out a process in, or convertible into, a form executable by an electronic computer.

“Pulse compression” (6) means the coding and processing of a radar signal pulse of long time duration to one of short time duration, while maintaining the benefits of high pulse energy.

“Pulse duration” (6) is the duration of a “laser” pulse and means the time between the half-power points on the leading edge and trailing edge of an individual pulse.

“Pulsed laser” (6) means a “laser” having a “pulse duration” that is less than or equal to 0.25 seconds.

“Quantum cryptography” (5) means a family of techniques for the establishment of shared key for “cryptography” by measuring the quantum-mechanical properties of a physical system (including those physical properties explicitly governed by quantum optics, quantum field theory or quantum electrodynamics).

“Radar frequency agility” (6) means any technique which changes, in a pseudo-random sequence, the carrier frequency of a pulsed radar transmitter between pulses or between groups of pulses by an amount equal to or larger than the pulse bandwidth.

“Radar spread spectrum” (6) means any modulation technique for spreading energy originating from a signal with a relatively narrow frequency band, over a much wider band of frequencies, by using random or pseudo-random coding.

“Radiant sensitivity” (6) is Radiant sensitivity (mA/W) = 0.807 × (wavelength in nm) × Quantum Efficiency (QE).

Technical Note:

QE is usually expressed as a percentage; however, for the purposes of this formula QE is expressed as a decimal number less than one, e.g. 78 % is 0.78.

"Real-time bandwidth" (3) for "signal analysers" is the widest frequency range for which the analyser can continuously transform time-domain data entirely into frequency-domain results, using a Fourier or other discrete time transformation that processes every incoming time point without gaps or windowing effects that causes a reduction of measured amplitude of more than 3 dB below the actual signal amplitude, while outputting or displaying the transformed data.

“Real-time processing” (2 6 7) means the processing of data by a computer system providing a required level of service, as a function of available resources, within a guaranteed response time, regardless of the load of the system, when stimulated by an external event.

“Repeatability” (7) means the closeness of agreement among repeated measurements of the same variable under the same operating conditions when changes in conditions or non-operating periods occur between measurements (Reference: IEEE STD 528-2001 (one sigma standard deviation))

“Required” (GTN 1-9), as applied to “technology”, refers to only that portion of “technology” which is peculiarly tindak balassible for achieving or extending the controlled performance levels, characteristics or functions. Such “required” “technology” may be shared by different goods.

“Resolution” (2) means the least increment of a measuring device; on digital instruments, the least significant bit (Reference: ANSI B-89.1.12).

“Riot control agent” (1) means substances which, under the expected conditions of use for riot control purposes, produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure.

Technical Note:

Tear gases are a subset of “riot control agents”.

"Robot" (2 8) means a manipulation mechanism, which may be of the continuous path or of the point-to-point variety, may use sensors, and has all the following characteristics:

a. multifunctional;

b. capable of positioning or orienting material, parts, tools or special devices through variable movements in three dimensional space;

c. incorporates three or more closed or open loop servo-devices which may include stepping motors; and

d. "user accessible programmability" by means of teach/playback method or by means of an electronic computer which may be a programmable logic controller, i.e., without mechanical intervention.

N.B.: The above definition does not include the following devices:

1. *Manipulation mechanisms which are only manually/ teleoperator controllable;*

2. *Fixed sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed stops, such as pins or cams. The sequence of motions and the selection of paths or angles are not variable or changeable by mechanical, electronic or electrical means;*

3. *Mechanically controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed, but adjustable stops, such as pins or cams. The sequence of motions and the selection of paths or angles are variable within the fixed programme pattern. Variations or modifications of the programme pattern (e.g., changes of pins or exchanges of cams) in one or more motion axes are accomplished only through mechanical operations;*

4. *Non-servo-controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is variable but the sequence proceeds only by the binary signal from mechanically fixed electrical binary devices or adjustable stops;*

5. *Stacker cranes defined as Cartesian coordinate manipulator systems manufactured as an integral part of a vertical array of storage bins and designed to access the contents of those bins for storage or retrieval.*

"Rotary atomisation" (1) means a process to reduce a stream or pool of molten metal to droplets to a diameter of 500 micrometer or less by centrifugal force.

"Roving" (1) is a bundle (typically 12-120) of approximately parallel 'strands'.

N.B.: 'Strand' is a bundle of "monofilaments" (typically over 200) arranged approximately parallel.

"Run-out" (2) (out-of-true running) means radial displacement in one revolution of the main spindle measured in a plane perpendicular to the spindle axis at a point on the external or internal revolving surface to be tested (Reference: ISO 230/1 1986, paragraph 5.61).

"Sample rate" (3) for an Analogue-to-Digital Converter (ADC) means the maximum number of samples that are measured at the analogue input over a period of one second, except for oversampling ADCs. For oversampling ADCs the 'sample rate' is taken to be its output word rate. 'Sample rate' may also be referred to as sampling rate, usually specified in Mega Samples Per Second (MSPS) or Giga Samples Per Second (GSPS), or conversion rate, usually specified in Hertz (Hz).

"Satellite navigation system (5 7)" means a system consisting of ground stations, a constellation of satellites, and receivers, that enables receiver locations to be calculated on the basis of signals received from the satellites. It includes Global Navigation Satellite Systems (GNSS) and Regional Navigation Satellite Systems (RNSS).

"Scale factor" (gyro or accelerometer) (7) means the ratio of change in output to a change in the input intended to be measured. Scale factor is generally evaluated as the slope of the straight line that can be fitted by the method of least squares to input-output data obtained by varying the input cyclically over the input range.

"Settling time" (3) means the time required for the output to come within one-half bit of the final value when switching between any two levels of the converter.

"SHPL" is equivalent to "super high power laser".

"Signal analysers" (3) means apparatus capable of measuring and displaying basic properties of the single-frequency components of multi-frequency signals.

"Signal processing" (3 4 5 6) means the processing of externally derived information-bearing signals by algorithms such as time compression, filtering, extraction, selection, correlation, convolution or transformations between domains (e.g. fast Fourier transform or Walsh transform).

"Software" (GSN All) means a collection of one or more "programmes" or 'microprogrammes' fixed in any tangible medium of expression.

N.B.: 'Microprogramme' means a sequence of elementary instructions, maintained in a special storage, the execution of which is initiated by the introduction of its reference instruction into an instruction register.

"Source code" (or source language) (6 7 9) is a convenient expression of one or more processes which may be turned by a programming system into equipment executable form ("object code" (or object language)).

"Spacecraft" (7 9) means active and passive satellites and space probes.

"Spacecraft bus" (9) means equipment that provides the support infrastructure of the "spacecraft" and location for the "spacecraft payload".

"Spacecraft payload" (9) means equipment, attached to the "spacecraft bus", designed to perform a mission in space (e.g., communications, observation, science).

"Space-qualified" (3 6 7) means designed, manufactured or qualified through successful testing, for operation at altitudes greater than 100 km above the surface of the Earth.

N.B.: A determination that a specific item is "Space-qualified" by virtue of testing does not mean that other items in the same production run or model series are "Space-qualified" if not individually tested.

“Special fissile material” (0) means plutonium-239, uranium-233, “uranium enriched in the isotopes 235 or 233”, and any material containing the foregoing.

“Specific modulus” (0 1 9) is Young’s modulus in pascals, equivalent to N/m^2 divided by specific weight in N/m^3, measured at a temperature of (296 ± 2) K ((23 ± 2) °C) and a relative humidity of (50 ± 5) %.

“Specific tensile strength” (0 1 9) is ultimate tensile strength in pascals, equivalent to N/m^2 divided by specific weight in N/m^3, measured at a temperature of (296 ± 2) K ((23 ± 2) °C) and a relative humidity of (50 ± 5) %.

"Spinning mass gyros" (7) means gyros which use a continually rotating mass to sense angular motion.

“Splat Quenching” (1) means a process to ‘solidify rapidly’ a molten metal stream impinging upon a chilled block, forming a flake-like product.

N.B.: ‘Solidify rapidly’ solidification of molten material at cooling rates exceeding 1,000 K/s.

“Spread spectrum” (5) means the technique whereby energy in a relatively narrow-band communication channel is spread over a much wider energy spectrum.

“Spread spectrum” radar (6) — see “Radar spread spectrum”

“Stability” (7) means the standard deviation (1 sigma) of the variation of a particular parameter from its calibrated value measured under stable temperature conditions. This can be expressed as a function of time.

“States (not) Party to the Chemical Weapon Convention” (1) are those states for which the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons has (not) entered into force. (see www.opcw.org)

“Steady State Mode (9)” defines engine operation conditions, where the engine parameters, such as thrust/power, rpm and others, have no appreciable fluctuations, when the ambient air temperature and pressure at the engine inlet are constant.

"Substrate" (3) means a sheet of base material with or without an interconnection pattern and on which or within which 'discrete components' or integrated circuits or both can be located.

N.B. 1: ' Discrete component': a separately packaged 'circuit element' with its own external connections.

N.B. 2: 'Circuit element': a single active or passive functional part of an electronic circuit, such as one diode, one transistor, one resistor, one capacitor, etc.

"Substrate blanks" (6) means monolithic compounds with dimensions suitable for the production of optical elements such as mirrors or optical windows.

"Sub-unit of toxin" (1) is a structurally and functionally discrete component of a whole "toxin".

"Superalloys" (2 9) means nickel-, cobalt- or iron-base alloys having strengths superior to any alloys in the AISI 300 series at temperatures over 922 K (649°C) under severe environmental and operating conditions.

"Superconductive" (1 3 5 6 8) means materials, i.e. metals, alloys or compounds, which can lose all electrical resistance, i.e., which can attain infinite electrical conductivity and carry very large electrical currents without Joule heating.

N.B.: The "superconductive" state of a material is individually characterised by a "critical temperature", a critical magnetic field, which is a function of temperature, and a critical current density which is, however, a function of both magnetic field and temperature.

"Super High Power Laser" ("SHPL") (6) means a "laser" capable of delivering (the total or any portion of) the output energy exceeding 1kJ within 50ms or having an average or CW power exceeding 20kW.

"Superplastic forming" (1 2) means a deformation process using heat for metals that are normally characterised by low values of elongation (less than 20 %) at the breaking point as determined at room temperature by conventional tensile strength testing, in order to achieve elongations during processing which are at least 2 times those values.

"Symmetric algorithm" (5) means a cryptographic algorithm using an identical key for both encryption and decryption.

N.B.: A common use of "symmetric algorithms" is confidentiality of data.

"System tracks" (6) means processed, correlated (fusion of radar target data to flight plan position) and updated aircraft flight position report available to the Air Traffic Control centre controllers.

"Systolic array computer" (4) means a computer where the flow and modification of the data is dynamically controllable at the logic gate level by the user.

"Tape" (1) is a material constructed of interlaced or unidirectional "monofilaments", 'strands', "rovings", "tows", or "yarns", etc., usually preimpregnated with resin.

N.B.: 'Strand' is a bundle of "monofilaments" (typically over 200) arranged approximately parallel.

"Technology" (GTN NTN All) means specific information necessary for the "development", "production" or "use" of goods. This information takes the form of 'technical data' or 'technical assistance'.

N.B. 1: 'Technical assistance' may take forms such as instructions, skills, training, working knowledge and consulting services and may involve the transfer of 'technical data'.

N.B. 2: 'Technical data' may take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read-only memories.

"Three dimensional integrated circuit" (3) means a collection of semiconductor die, intergrated together, and having vias passing completely through at least one die to establish interconnections between die.

"Tilting spindle" (2) means a tool-holding spindle which alters, during the machining process, the angular position of its centre line with respect to any other axis.

"Time constant" (6) is the time taken from the application of a light stimulus for the current increment to reach a value of 1-1/e times the final value (i.e., 63% of the final value).

"Time-to-steady-state registration (6) (also referred to as the gravimeter's response time)" is the time over which the disturbing effects of platform induced accelerations (high frequency noise) are reduced.

"Tip shroud" (9) means a stationary ring component (solid or segmented) attached to the inner surface of the engine turbine casing or a feature at the outer tip of the turbine blade, which primarily provides a gas seal between the stationary and rotating components.

"Total control of flight" (7) means an automated control of "aircraft" state variables and flight path to meet mission objectives corresponding to real-time changes in data regarding objectives, hazards or other "aircraft".

"Total digital transfer rate" (5) means the number of bits, including line coding, overhead and so forth per unit time passing between corresponding equipment in a digital transmission system.

N.B.: See also "digital transfer rate".

"Tow" (1) is a bundle of "monofilaments", usually approximately parallel.

"Toxins" (1 2) means toxins in the form of deliberately isolated preparations or mixtures, no matter how produced, other than toxins present as contaminants of other materials such as pathological specimens, crops, foodstuffs or seed stocks of "microorganisms".

“Transfer laser” (6) means a “laser” in which the lasing species is excited through the transfer of energy by collision of a non-lasing atom or molecule with a lasing atom or molecule species.

“Tunable” (6) means the ability of a “laser” to produce a continuous output at all wavelengths over a range of several “laser” transitions. A line selectable “laser” produces discrete wavelengths within one “laser” transition and is not considered “tunable”.

"Unidirectional positioning repeatability" (2) means the smaller of values R↑ and R↓ (forward and backward), as defined by 3.21 of ISO 230-2:2014 or national equivalents, of an individual machine tool axis.

“Unmanned Aerial Vehicle” (“UAV”) (9) means any aircraft capable of initiating flight and sustaining controlled flight and navigation without any human presence on board.

“Uranium enriched in the isotopes 235 or 233” (0) means uranium containing the isotopes 235 or 233, or both, in an amount such that the abundance ratio of the sum of these isotopes to the isotope 238 is more than the ratio of the isotope 235 to the isotope 238 occurring in nature (isotopic ratio 0.71 per cent).

“Use” (GTN NTN All) means operation, installation (including on-site installation), maintenance (checking), repair, overhaul and refurbishing.

“User accessible programmability” (6) means the facility allowing a user to insert, modify or replace “programmes” by means other than:

a. A physical change in wiring or interconnections; or

b. The setting of function controls including entry of parameters.

“Vaccine” (1) is a medicinal product in a pharmaceutical formulation licensed by, or having marketing or clinical trial authorisation from, the regulatory authorities of either the country of manufacture or of use, which is intended to stimulate a protective immunological response in humans or animals in order to prevent disease in those to whom or to which it is administered.

“Vacuum Atomisation” (1) means a process to reduce a molten stream of metal to droplets of a diameter of 500 micrometre or less by the rapid evolution of a dissolved gas upon exposure to a vacuum.

“Variable geometry airfoils” (7) means the use of trailing edge flaps or tabs, or leading edge slats or pivoted nose droop, the position of which can be controlled in flight.

“Vacuum electronic devices (3)” means electronic devices based on the interaction of an electron beam with an electromagnetic wave propagating in a vacuum circuit or interacting with radio-frequency vacuum cavity resonators. "Vacuum electronic devices" include klystrons, travelling-wave tubes, and their derivatives.

“Yarn” (1) is a bundle of twisted ‘strands’.

N.B.: ‘Strand’ is a bundle of “monofilaments” (typically over 200) arranged approximately parallel.

CATEGORY 0

NUCLEAR MATERIALS, FACILITIES AND EQUIPMENT

Category Code	*Items Description*	*Note*	*Relevant Authority*
CATEGORY 0 - NUCLEAR MATERIALS, FACILITIES, AND EQUIPMENT			
0A	**Systems, Equipment and Components**		
0A001	"Nuclear reactors" and specially designed or prepared equipment and components therefor, as follows: a. "Nuclear reactors"; b. Metal vessels, or major shop-fabricated parts therefor, including the reactor vessel head for a reactor pressure vessel, specially designed or prepared to contain the core of a "nuclear reactor"; c. Manipulative equipment specially designed or prepared for inserting or removing fuel in a "nuclear reactor"; d. Control rods specially designed or prepared for the control of the fission process in a "nuclear reactor", support or suspension structures therefor, rod drive mechanisms and rod guide tubes; e. Pressure tubes specially designed or prepared to contain both fuel elements and the primary coolant in a "nuclear reactor"; f. Zirconium metal tubes or zirconium alloy tubes (or assembles of tubes) specially designed or	N.B.: For zirconium pressure tubes see 0A001.e. and for calandria tubes see 0A001.h.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	prepared for use as fuel cladding in a "nuclear reactor", and in quantities exceeding 10kg; g. Coolant pumps or circulators specially designed or prepared for circulating the primary coolant of "nuclear reactors"; h. 'Nuclear reactor internals' specially designed or prepared for use in a "nuclear reactor", including support columns for the core, fuel channels, calandria tubes, thermal shields, baffles, core grid plates, and diffuser plates; i. Heat exchangers as follows: 1. Steam generators specially designed or prepared for the primary, or intermediate, coolant circuit of a "nuclear reactor"; 2. Other heat exchangers specially designed or prepared for use in the primary coolant circuit of a "nuclear reactor"; j. Neutron detectors specially designed or prepared for determining neutron flux levels within the core of a "nuclear reactor";	Technical Note: In 0A001.h. 'nuclear reactor internals' means any major structure within a reactor vessel which has one or more functions such as supporting the core, maintaining fuel alignment, directing primary coolant flow, providing radiation shields for the reactor vessel, and guiding in-core instrumentation. Note: 0A001.i. does not control heat exchangers for the supporting systems of the reactor, e.g., the emergency cooling system or the decay heat cooling system.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	k. 'External thermal shields' specially designed or prepared for use in a "nuclear reactor" for the reduction of heat loss and also for the containment vessel protection.	Technical Note: In 0A001.k. 'external thermal shields' means major structures placed over the reactor vessel which reduce heat loss from the reactor and reduce temperature within the containment vessel.	
0B	**Test, Inspection and Production Equipment**		
0B001	Plant for the separation of isotopes of "natural uranium", "depleted uranium" or "special fissile materials", and specially designed or prepared equipment and components therefor, as follows: a. Plant specially designed for separating isotopes of "natural uranium", "depleted uranium", and "special fissile materials", as follows: 1. Gas centrifuge separation plant; 2. Gaseous diffusion separation plant; 3. Aerodynamic separation plant; 4. Chemical exchange separation plant; 5. Ion-exchange separation plant; 6. Atomic vapour "laser" isotope separation plant; 7. Molecular "laser" isotope separation plant;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	8. Plasma separation plant; 9. Electro magnetic separation plant; b. Gas centrifuges and assemblies and components, specially designed or prepared for gas centrifuge separation process, as follows: 1. Gas centrifuges; 2. Complete rotor assemblies; 3. Rotor tube cylinders with a wall thickness of 12mm or less, a diameter of between 75mm and 650 mm, made from 'high strength-to-density ratio materials'; 4. Rings or bellows with a wall thickness of 3mm or less and a diameter of between 75mm and 650mm and designed to give local support to a rotor tube or to join a number together, made from 'high strength-to-density ratio materials'; 5. Baffles of between 75mm and 650mm diameter for mounting inside a rotor tube, made from 'high strength-to-density ratio materials'. 6. Top or bottom caps of between 75mm and 650mm diameter to fit the ends of a rotor tube, made from 'high strength-to-density ratio materials';	Technical Note: In 0B001.b. 'high strength-to-density ratio material' means any of the following: 1. Maraging steel capable of an ultimate tensile strength of 1.95GPa or more; 2. Aluminium alloys capable of an ultimate tensile strength of 0.46GPa or more; or 3."Fibrous or filamentary materials" with a "specific modulus" of more than 3.18×10^6 m and a "specific tensile strength" greater than 7.62×10^4 m;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	7. Magnetic suspension bearings as follows: a. Bearing assemblies consisting of an annular magnet suspended within a housing made of or protected by "materials resistant to corrosion by UF_6" containing a damping medium and having the magnet coupling with a pole piece or second magnet fitted to the top cap of the rotor; b. Active magnetic bearings specially designed or prepared for use with gas centrifuges. 8. Specially prepared bearings comprising a pivot-cup assembly mounted on a damper; 9. Molecular pumps comprised of cylinders having internally machined or extruded helical grooves and internally machined bores; 10. Ring-shaped motor stators for multiphase AC hysteresis (or reluctance) motors for synchronous operation within a vacuum at a frequency of 600Hz or more and a power of 40VA or more; 11. Centrifuge housing/recipients to contain the rotor tube assembly of a gas centrifuge, consisting of a rigid cylinder of wall thickness up to 30mm with precision machined ends that are parallel to each other and		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	perpendicular to the cylinder's longitudinal axis to within 0.05 degrees or less; 12. Scoops consisting of specially designed or prepared tubes for the extraction of UF_6 gas from within the rotor tube by a Pitot tube action and capable of being fixed to the central gas extraction system; 13. Frequency changers (converters or inverters) specially designed or prepared to supply motor stators for gas centrifuge enrichment, having all of the following characteristics, and specially designed components therefor: a. A multiphase frequency output of 600Hz or greater; and b. High stability (with frequency control better than 0.2%); 14. Shut-off and control valves as follows: a. Shut-off valves specially designed or prepared to act on the feed, product or tails UF_6 gaseous streams of an individual gas centrifuge; b. Bellows-sealed valves, shut-off or control, made of or protected by "materials resistant to corrosion by UF_6", with an inside diameter of 10mm to 160mm, specially designed or prepared		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	for use in main or auxiliary systems of gas centrifuge enrichment plants; c. Equipment and components, specially designed or prepared for gaseous diffusion separation process, as follows: 1. Gaseous diffusion barriers made of porous metallic, polymer or ceramic "materials resistant to corrosion by UF_6" with a pore size of 10 to 100nm, a thickness of 5 mm or less, and, for tubular forms, a diameter of 25 mm or less; 2. Gaseous diffuser housings made of or protected by "materials resistant to corrosion by UF_6"; 3. Compressors or gas blowers with a suction volume capacity of 1 m^3/min or more of UF_6, discharge pressure up to 500kPa and having a pressure ratio of 10:1 or less, and made of or protected by "materials resistant to corrosion by UF_6"; 4. Rotary shaft seals for compressors or blowers specified in 0B001.c.3. and designed for a buffer gas in-leakage rate of less than 1,000cm^3/min.; 5. Heat exchangers made of or protected by "materials resistant to corrosion by UF_6", and designed for a leakage pressure rate of less		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	than 10Pa per hour under a pressure differential of 100kPa; 6. Bellows-sealed valves, manual or automated, shut-off or control, made of or protected by "materials resistant to corrosion by UF_6"; d. Equipment and components, specially designed or prepared for aerodynamic separation process, as follows: 1. Separation nozzles consisting of slit-shaped, curved channels having a radius of curvature less than 1mm, resistant to corrosion by UF_6 , and having a knife-edge contained within the nozzle which separates the gas flowing through the nozzle into two streams; 2. Cylindrical or conical tubes, (vortex tubes), made of or protected by "materials resistant to corrosion by UF_6" and with one or more tangential inlets; 3. Compressors or gas blowers made of or protected by "materials resistant to corrosion by UF_6", and rotary shaft seals therefor; 4. Heat exchangers made of or protected by "materials resistant to corrosion by UF_6"; 5. Separation element housings, made of or protected by "materials resistant to		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	corrosion by UF_6" to contain vortex tubes or separation nozzles; 6. Bellows-sealed valves, manual or automated, shut-off or control, made of or protected by "materials resistant to corrosion by UF_6", with a diameter of 40mm or more; 7. Process systems for separating UF_6 from carrier gas (hydrogen or helium) to 1ppm UF_6 content or less, including: a. Cryogenic heat exchangers and cryoseparators capable of temperatures of 153K (-120°C) or less; b. Cryogenic refrigeration units capable of temperatures of 153K (-120°C) or less; c. Separation nozzle or vortex tube units for the separation of UF_6 from carrier gas; d. UF_6 cold traps capable of freezing out UF_6; e. Equipment and components, specially designed or prepared for chemical exchange separation process, as follows: 1. Fast-exchange liquid-liquid pulse columns with stage residence time of 30 seconds or less and resistant to concentrated hydrochloric acid (e.g. made of or protected		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	by suitable plastic materials such as fluorinated hydrocarbon polymers or glass); 2. Fast-exchange liquid-liquid centrifugal contactors with stage residence time of 30 seconds or less and resistant to concentrated hydrochloric acid (e.g. made of or protected by suitable plastic materials such as fluorinated hydrocarbon polymers or glass); 3. Electrochemical reduction cells resistant to concentrated hydrochloric acid solutions, for reduction of uranium from one valence state to another; 4. Electrochemical reduction cells feed equipment to take U^{+4} from the organic stream and, for those parts in contact with the process stream, made of or protected by suitable materials (e.g. glass, fluorocarbon polymers, polyphenyl sulphate, polyether sulfone and resin-impregnated graphite); 5. Feed preparation systems for producing high purity uranium chloride solution consisting of dissolution, solvent extraction and/or ion exchange equipment for purification and electrolytic cells for reducing the uranium U^{+6} or U^{+4} to U^{+3}; 6. Uranium oxidation systems for oxidation of U^{+3} to U^{+4};		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	f. Equipment and components, specially designed or prepared for ion-exchange separation process, as follows: 1. Fast reacting ion-exchange resins, pellicular or porous macro-reticulated resins in which the active chemical exchange groups are limited to a coating on the surface of an inactive porous support structure, and other composite structures in any suitable form, including particles or fibres, with diameters of 0.2mm or less, resistant to concentrated hydrochloric acid and designed to have an exchange rate half-time of less than 10 seconds and capable of operating at temperatures in the range of 373K (100°C) to 473K (200°C); 2. Ion exchange columns (cylindrical) with a diameter greater than 1,000mm, made of or protected by materials resistant to concentrated hydrochloric acid (e.g. titanium or fluorocarbon plastics) and capable of operating at temperatures in the range of 373K (100°C) to 473K (200°C) and pressures above 0.7MPa; 3. Ion exchange reflux systems (chemical or electrochemical oxidation or reduction systems) for regeneration of the chemical reducing or oxidizing agents used in ion exchange enrichment cascades;	N.B.: SEE ALSO 2A225.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	g. Equipment and components, specially designed or prepared for laser-based separation processes using atomic vapour laser isotope separation, as follows: 1. Uranium metal vaporization systems designed to achieve a delivered power of 1 kW or more on the target for use in laser enrichment; 2. Liquid or vapour uranium metal handling systems specially designed or prepared for handling molten uranium, molten uranium alloys or uranium metal vapour for use in laser enrichment, and specially designed components therefor; 3. Product and tails collector assemblies for uranium metal in liquid or solid form, made of or protected by materials resistant to the heat and corrosion of uranium metal vapour or liquid, such as yttria-coated graphite or tantalum; 4. Separator module housings (cylindrical or rectangular vessels) for containing the uranium metal vapour source, the electron beam gun and the product and tails collectors; 5. "Lasers" or "laser" systems specially designed or prepared for the separation of uranium isotopes with a spectrum frequency	N.B.: SEE ALSO 6A005 AND 6A205.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	stabilisation for operation over extended periods of time; h. Equipment and components, specially designed or prepared for laser-based separation processes using molecular laser isotope separation, as follows: 1. Supersonic expansion nozzles for cooling mixtures of UF_6 and carrier gas to 150K (-123°C) or less and made from "materials resistant to corrosion by UF_6"; 2. Product or tails collector components or devices specially designed or prepared for collecting uranium material or uranium tails material following illumination with laser light, made of "materials resistant to corrosion by UF_6"; 3. Compressors made of or protected by "materials resistant to corrosion by UF_6", and rotary shaft seals therefor; 4. Equipment for fluorinating UF_5 (solid) to UF_6 (gas); 5. Process systems for separating UF_6 from carrier gas (e.g. nitrogen, argon or other gas) including: a. Cryogenic heat exchangers and cryoseparators capable of temperatures of 153K (-120°C) or less;	N.B.: SEE ALSO 6A005 AND 6A205.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Cryogenic refrigeration units capable of temperatures of 153K (-120°C) or less; c. UF_6 cold traps capable of freezing out UF_6; 6. "Lasers" or "laser" systems specially designed or prepared for the separation of uranium isotopes with a spectrum frequency stabilisation for operation over extended periods of time; i. Equipment and components, specially designed or prepared for plasma separation process, as follows: 1. Microwave power sources and antennae for producing or accelerating ions, with an output frequency greater than 30GHz and mean power output greater than 50kW; 2. Radio frequency ion excitation coils for frequencies of more than 100kHz and capable of handling more than 40kW mean power; 3. Uranium plasma generation systems; 4. Not used; 5. Product and tails collector assemblies for uranium metal in solid form, made of or protected by materials resistant to the heat		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	and corrosion of uranium vapour such as yttria-coated graphite or tantalum; 6. Separator module housings (cylindrical) for containing the uranium plasma source, radio-frequency drive coil and the product and tails collectors and made of a suitable non-magnetic material (e.g. stainless steel); j. Equipment and components, specially designed or prepared for electromagnetic separation process, as follows: 1. Ion sources, single or multiple, consisting of a vapour source, ioniser, and beam accelerator made of suitable non-magnetic materials (e.g. graphite, stainless steel, or copper) and capable of providing a total ion beam current of 50 mA or greater; 2. Ion collector plates for collection of enriched or depleted uranium ion beams, consisting of two or more slits and pockets and made of suitable non-magnetic materials (e.g. graphite or stainless steel); 3. Vacuum housings for uranium electromagnetic separators made of non-magnetic materials (e.g. stainless steel) and designed to operate at pressures of 0.1Pa or lower; 4. Magnet pole pieces with a diameter greater than 2m;	N.B.: SEE ALSO 3A227. N.B.: SEE ALSO 3A226.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	5. High voltage power supplies for ion sources, having all of the following characteristics: a. Capable of continuous operation; b. Output voltage of 20,000V or greater; c. Output current of 1A or greater; and d. Voltage regulation of better than 0.01% over a period of 8 hours; 6. Magnet power supplies (high power, direct current) having all of the following characteristics: a. Capable of continuous operation with a current output of 500A or greater at a voltage of 100V or greater; and b. Current or voltage regulation better than 0.01% over a period of 8 hours.		
0B002	Specially designed or prepared auxiliary systems, equipment and components, as follows, for isotope separation plant specified in 0B001, made of or protected by "materials resistant to corrosion by UF_6": a. Feed autoclaves, ovens or systems used for passing UF_6 to the enrichment process; b. Desublimers or cold traps, used to remove UF_6 from the enrichment process for subsequent transfer upon heating;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Product and tails stations for transferring UF_6 into containers; d. Liquefaction or solidification stations used to remove UF_6 from the enrichment process by compressing, cooling and converting UF_6 to a liquid or solid form; e. Piping systems and header systems specially designed or prepared for handling UF_6 within gaseous diffusion, centrifuge or aerodynamic cascades; f. Vacuum systems and pumps as follows: 1. Vacuum manifolds, vacuum headers or vacuum pumps having a suction capacity of $5m^3$/minute or more; 2. Vacuum pumps specially designed for use in UF_6 bearing atmospheres made of, or protected by, "materials resistant to corrosion by UF_6"; or 3. Vacuum systems consisting of vacuum manifolds, vacuum headers and vacuum pumps, and designed for service in UF_6-bearing atmospheres; g. UF_6 mass spectrometers/ion sources capable of taking on-line samples from UF_6 gas streams and having all of the following:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Capable of measuring ions of 320 atomic mass units or greater and having a resolution of better than 1 part in 320; 2. Ion sources constructed of or protected by nickel, nickel-copper alloys with a nickel content of 60% or more by weight, or nickel-chrome alloys; 3. Electron bombardment ionisation sources; and 4. Having a collector system suitable for isotopic analysis.		
0B003	Plant for the conversion of uranium and equipment specially designed or prepared therefor, as follows: a. Systems for the conversion of uranium ore concentrates to UO_3; b. Systems for the conversion of UO_3 to UF_6; c. Systems for the conversion of UO_3 to UO_2; d. Systems for the conversion of UO_2 to UF_4; e. Systems for the conversion of UF_4 to UF_6; f. Systems for the conversion of UF_4 to uranium metal; g. Systems for the conversion of UF_6 to UO_2;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	h. Systems for the conversion of UF_6 to UF_4; i. Systems for the conversion of UO_2 to UCl_4.		
0B004	Plant for the production or concentration of heavy water, deuterium and deuterium compounds and specially designed or prepared equipment and components therefor, as follows: a. Plant for the production of heavy water, deuterium or deuterium compounds, as follows: 1. Water-hydrogen sulphide exchange plants; 2. Ammonia-hydrogen exchange plants; b. Equipment and components, as follows: 1. Water-hydrogen sulphide exchange towers with diameters of 1.5m or more, capable of operating at pressures greater than or equal to 2MPa; 2. Single stage, low head (i.e. 0.2MPa) centrifugal blowers or compressors for hydrogen sulphide gas circulation (i.e. gas containing more than 70% H_2S) with a throughput capacity greater than or equal to $56m^3$/second when operating at pressures greater than or equal to 1.8MPa suction and having seals designed for wet H_2S service; 3. Ammonia-hydrogen exchange towers greater than or equal to 35m in height with		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	diameters of 1.5m to 2.5m capable of operating at pressures greater than 15MPa; 4. Tower internals, including stage contactors, and stage pumps, including those which are submersible, for heavy water production utilizing the ammonia-hydrogen exchange process; 5. Ammonia crackers with operating pressures greater than or equal to 3MPa for heavy water production utilizing the ammonia-hydrogen exchange process; 6. Infrared absorption analysers capable of on-line hydrogen/deuterium ratio analysis where deuterium concentrations are equal to or greater than 90%; 7. Catalytic burners for the conversion of enriched deuterium gas into heavy water utilizing the ammonia-hydrogen exchange process; 8. Complete heavy water upgrade systems, or columns therefor, for the upgrade of heavy water to reactor-grade deuterium concentration; 9. Ammonia synthesis converters or synthesis units specially designed or prepared for heavy water production utilizing the ammonia-hydrogen exchange process.		

Category Code	*Items Description*	*Note*	*Relevant Authority*
0B005	Plant specially designed for the fabrication of "nuclear reactor" fuel elements and specially designed or prepared equipment therefor.	Technical Note: Specially designed or prepared equipment for the fabrication of "nuclear reactor" fuel elements includes equipment which: 1. normally comes into direct contact with or directly processes or controls the production flow of nuclear materials; 2. seals the nuclear materials within the cladding; 3. checks the integrity of the cladding or the seal; 4. checks the finish treatment of the sealed fuel; or 5. is used for assembling reactor elements.	Atomic Energy Licensing Board (AELB)
0B006	Plant for the reprocessing of irradiated "nuclear reactor" fuel elements, and specially designed or prepared equipment and components therefor.	Note: 0B006 includes: a. Plant for the reprocessing of irradiated "nuclear reactor" fuel elements including equipment and components which normally come into direct contact with and directly control the irradiated fuel and the major nuclear material and fission product processing streams;	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		b. Fuel element chopping or shredding machines, i.e. remotely operated equipment to cut, chop or shear irradiated "nuclear reactor" fuel assemblies, bundles or rods; c. Dissolvers, critically safe tanks (e.g. small diameter, annular or slab tanks) specially designed or prepared for the dissolution of irradiated "nuclear reactor" fuel, which are capable of withstanding hot, highly corrosive liquids, and which can be remotely loaded and maintained; d. Solvent extractors, such as packed or pulsed columns, mixer settlers or centrifugal contractors, resistant to the corrosive effects of nitric acid and specially designed or prepared for use in a plant for the reprocessing of irradiated "natural uranium", "depleted uranium" or "special fissile materials"; e. Holding or storage vessels specially designed to be critically safe and resistant to the corrosive effects of nitric acid; Technical Note: Holding or storage vessels may have the following features:	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		1. Walls or internal structures with a boron equivalent (calculated for all constituent elements as defined in the note to 0C004) of at least two per cent; 2. A maximum diameter of 175mm for cylindrical vessels; or 3. A maximum width of 75mm for either a slab or annular vessel. f. Neutron measurement systems specially designed or prepared for integration and use with automated process control systems in a plant for the reprocessing of irradiated "natural uranium", "depleted uranium" or "special fissile materials".	
0B007	Plant for the conversion of plutonium and equipment specially designed or prepared therefor, as follows: a. Systems for the conversion of plutonium nitrate to oxide; b. Systems for plutonium metal production.		Atomic Energy Licensing Board (AELB)
0C	**Materials**		
0C001	"Natural uranium" or "depleted uranium" or thorium in the form of metal, alloy, chemical	Note: 0C001 does not control the following:	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	compound or concentrate and any other material containing one or more of the foregoing;	a. Four grammes or less of "natural uranium" or "depleted uranium" when contained in a sensing component in instruments; b. "Depleted uranium" specially fabricated for the following civil non-nuclear applications: 1. Shielding; 2. Packaging; 3. Ballasts having a mass not greater than 100kg; 4. Counter-weights having a mass not greater than 100kg; c. Alloys containing less than 5% thorium; d. Ceramic products containing thorium, which have been manufactured for non-nuclear use.	
0C002	"Special fissile materials"	Note: 0C002 does not control four "effective grammes" or less when contained in a sensing component in instruments.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
0C003	Deuterium, heavy water (deuterium oxide) and other compounds of deuterium, and mixtures and solutions containing deuterium, in which the isotopic ratio of deuterium to hydrogen exceeds 1:5,000.		Atomic Energy Licensing Board (AELB)
0C004	Graphite having a purity level better than 5 parts per million 'boron equivalent' and with a density greater than 1.50g/cm^3 for use in a "nuclear reactor", in quantities exceeding 1 kg.	N.B.: SEE ALSO 1C107 Note 1: For the purpose of export control, the relevant Authority and/or the Atomic Energy Licensing Board (AELB) will determine whether or not the exports of graphite meeting the above specifications are for "nuclear reactor" use. Note 2: In 0C004, 'boron equivalent' (BE) is defined as the sum of BE_z for impurities (excluding BE_{carbon} since carbon is not considered an impurity) including boron, where: BE_Z (ppm) = CF x concentration of element Z in ppm; where CF is the conversion factor $= \frac{\sigma_Z A_B}{\sigma_B A_Z}$ and σ_B and σ_Z are the thermal neutron capture cross sections (in barns) for naturally occurring boron and element Z respectively; and A_B	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		and A_Z are the atomic masses of naturally occurring boron and element Z respectively.	
0C005	Specially prepared compounds or powders for the manufacture of gaseous diffusion barriers, resistant to corrosion by UF_6 (e.g. nickel or alloy containing 60 weight per cent or more nickel, aluminium oxide and fully fluorinated hydrocarbon polymers), having a purity of 99.9% by weight or more and a particle size less than 10 μm measured by American Society for Testing and Materials (ASTM) B330 standard and a high degree of particle size uniformity.		Atomic Energy Licensing Board (AELB)
0D	**Software**		
0D001	"Software" specially designed or modified for the "development", "production" or "use" of goods specified in this Category.		Atomic Energy Licensing Board (AELB)
0E	**Technology**		
0E001	"Technology" according to the Nuclear Technology Note for the "development", "production" or "use" of goods specified in this Category.		Atomic Energy Licensing Board (AELB)

CATEGORY 1

SPECIAL MATERIALS AND RELATED EQUIPMENT

Category Code	Items Description	Note	Relevant Authority
CATEGORY 1 - SPECIAL MATERIALS AND RELATED EQUIPMENT			
1A	**Systems, Equipment and Components**		
1A001	Components made from fluorinated compounds, as follows: a. Seals, gaskets, sealants or fuel bladders, specially designed for "aircraft" or aerospace use, made from more than 50% by weight of any of the materials specified in 1C009.b. or 1C009.c.; b. Not used; c. Not used;		Atomic Energy Licensing Board (AELB)
1A002	"Composite" structures or laminates as follows: a. Made from any of the following; or 1. An organic "matrix" and "fibrous or filamentary materials" specified in 1C010.c. or 1C010.d.; or 2. Prepregs or preforms specified in 1C010.e.; b. Made from a metal or carbon "matrix", and any of the following: 1. Carbon "fibrous or filamentary materials" having all of the following:	N.B. SEE ALSO 1A202, 9A010 and 9A110 Note 1: 1A002 does not control composite structures or laminates made from epoxy resin impregnated carbon "fibrous or filamentary materials" for the repair of "civil aircraft" structures or laminates, having all of the following: a. An area not exceeding $1m^2$; b. A length not exceeding 2.5m; and c. A width exceeding 15mm.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	a. A "specific modulus" exceeding 10.15 x 10^6m; and b. A "specific tensile strength" exceeding 17.7 x 10^4m; or 2. Materials specified in 1C010.c.	Note 2: 1A002 does not control semi-finished items, specially designed for purely civilian applications as follows: a. Sporting goods; b. Automotive industry; c. Machine tool industry; d. Medical applications. Note 3: 1A002.b.1. does not control semi-finished items containing a maximum of two dimensions of interwoven filaments and specially designed for applications as follows: a. Metal heat-treatment furnaces for tempering metals; b. Silicon boule production equipment. Note 4: 1A002 does not control finished items specially designed for a specific application.	
1A003	Manufactures of non-"fusible" aromatic polyimides in film, sheet, tape or ribbon form having any of the following: a. a thickness exceeding 0.254mm; or	Note: 1A003 does not control manufactures when coated or laminated with copper and designed for the production of electronic printed circuit boards. N.B. For "fusible" aromatic polyimides in any form, see 1C008.a.3.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	b. coated or laminated with carbon, graphite, metals or magnetic substances.		
1A004	Protective and detection equipment and components, not specially designed for military use, as follows: a. Full face masks, filter canisters and decontamination equipment therefor, designed or modified for defence against any of the following, and specially designed components therefor: 1. "Biological agents"; 2. 'Radioactive materials'; 3. Chemical warfare (CW) agents; or 4. "Riot control agents", including: a. α-Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8); b. [(2-chlorophenyl) methylene] propanedinitrile, (o-Chlorobenzylidenemalononitrile) (CS) (CAS 2698-41-1); c. 2-Chloro-1-phenylethanone, Phenylacyl chloride (ω-hloroacetophenone) (CN) (CAS 532-27-4);	N.B. SEE ALSO MILITARY ITEMS LIST, 2B351 AND 2B352. Note: 1A004.a. includes Powered Air Purifying Respirators (PAPR) that are designed or modified for defence against agents or materials, listed in 1A004.a. Technical Note: For the purposes of 1A004.a: 1. Full face masks are also known as gas masks. 2. Filter canisters include filter cartridges. Technical Note: 'Trace detection' is defined as the capability to detect less than 1ppm vapour, or 1mg solid or liquid. Note 1: 1A004.d. does not control equipment specially designed for laboratory use.	Controller

Category Code	Items Description	Note	Relevant Authority
	d. Dibenz-(b,f)-1,4-oxazephine (CR) (CAS 257-07-8); e. 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9); f. N-Nonanoylmorpholine, (MPA) (CAS 5299-64-9); b. Protective suits, gloves and shoes, specially designed or modified for defence against any of the following: 1. "Biological agents"; 2. "Radioactive materials"; or 3. Chemical warfare (CW) agents; c. Detection systems, specially designed or modified for detection or identification of any of the following, and specially designed components therefor: 1. "Biological agents"; 2. "Radioactive materials"; 3. Chemical warfare (CW) agents.		

Category Code	Items Description	Note	Relevant Authority
	d. Electronic equipment designed for automatically detecting or identifying the presence of "explosives" residues and utilising 'trace detection' techniques (e.g., surface acoustic wave, ion mobility spectrometry, differential mobility spectrometry, mass spectrometry).	Note 2: 1A004.d. does not control non-contact walk-through security portals. Note: 1A004 does not control: a. Personal radiation monitoring dosimeters; b. Occupational health or safety equipment limited by design or function to protect against hazards specific to residential safety or civil industries, including: 1. mining; 2. quarrying; 3. agriculture; 4. pharmaceutical; 5. medical; 6. veterinary; 7. environmental; 8. waste management; 9. food industry. Technical Notes: 1. 1A004 includes equipment and components that have been identified, successfully tested to national standards	

Category Code	Items Description	Note	Relevant Authority
		or otherwise proven effective, for the detection of or defence against 'radioactive materials', "biological agents", chemical warfare agents, 'simulants' or "riot control agents", even if such equipment or components are used in civil industries such as mining, quarrying, agriculture, pharmaceuticals, medical, veterinary, environmental, waste management, or the food industry. 2. 'Simulant' is a substance or material that is used in place of toxic agent (chemical or biological) in training, research, testing or evaluation. 3. For the purposes of 1A004, 'radioactive materials' are those selected or modified to increase their effectiveness in producing casualties in humans or animals, degrading equipment or damaging crops or the environment.	
1A005	Body armour and components therefor, as follows: a. Soft body armour not manufactured to military standards or specifications, or to their equivalents, and specially designed components therefor; b. Hard body armour plates providing ballistic protection equal to or less than level IIIA (NIJ 0101.06, July 2008) or national equivalents.	N.B. SEE ALSO MILITARY ITEMS LIST. N.B. For "fibrous or filamentary materials" used in the manufacture of body armour, see 1C010. Note 1: 1A005 does not control body armour when accompanying its user for the user's own personal protection.	Controller

Category Code	Items Description	Note	Relevant Authority
		Note 2: 1A005 does not control body armour designed to provide frontal protection only from both fragment and blast from non-military explosive devices. Note 3: 1A005 does not control body armour designed to provide protection only from knife, spike, needle or blunt trauma.	
1A006	Equipment, specially designed or modified for the disposal of improvised explosive devices, as follows, and specially designed components and accessories therefor: a. Remotely operated vehicles; b. 'Disruptors'.	N.B. SEE ALSO MILITARY ITEMS LIST. Note: 1A006 does not control equipment when accompanying its operator. Technical Note: 'Disruptors' are devices specially designed for the purpose of preventing the operation of an explosive device by projecting a liquid, solid or frangible projectile.	Controller
1A007	Equipment and devices, specially designed to initiate charges and devices containing "energetic materials", by electrical means, as follows: a. Explosive detonator firing sets designed to drive explosive detonators specified in 1A007.b.;	N.B. SEE ALSO MILITARY ITEMS LIST, 3A229 AND 3A232. Technical Notes: 1.The word initiator or igniter is sometimes used in place of the word detonator.	Controller

Category Code	Items Description	Note	Relevant Authority
	b.Electrically driven explosive detonators as follows: 1. Exploding bridge (EB); 2. Exploding bridge wire (EBW); 3. Slapper; 4. Exploding foil initiators (EFI).	2. For the purpose of 1A007.b. the detonators of concern all utilise a small electrical conductor (bridge, bridge wire, or foil) that explosively vaporises when a fast, high-current electrical pulse is passed through it. In non-slapper types, the exploding conductor starts a chemical detonation in a contacting high explosive material such as PETN (pentaerythritoltetranitrate). In slapper detonators, the explosive vaporization of the electrical conductor drives a flyer or slapper across a gap and the impact of the slapper on an explosive starts a chemical detonation. The slapper in some designs is driven by magnetic force. The term exploding foil detonator may refer to either an EB or a slapper-type detonator.	
1A008	Charges, devices and components, as follows: a. 'Shaped charges' having all of the following: 1. Net Explosive Quantity (NEQ) greater than 90g; and 2. Outer casing diameter equal to or greater than 75mm; b. Linear shaped cutting charges having all of the following, and specially designed components therefor: 1. An explosive load greater than 40g/m; and	Technical Note: 'Shaped charges' are explosive charges shaped to focus the effects of the explosive blast.	Controller

Category Code	Items Description	Note	Relevant Authority
	2. A width of 10mm or more; c. Detonating cord with explosive core load greater than 64g/m; d. Cutters, other than those specified in 1A008.b., and severing tools, having a Net Explosive Quantity (NEQ) greater than 3.5kg.		
1A102	Resaturated pyrolized carbon-carbon components designed for space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.		Atomic Energy Licensing Board (AELB)
1A202	Composite structures, other than those specified in 1A002, in the form of tubes and having both of the following characteristics: a. An inside diameter of between 75mm and 400mm; and b. Made with any of the "fibrous or filamentary materials" specified in 1C010.a. or b. or 1C210.a. or with carbon prepreg materials specified in 1C210.c.	N.B. SEE ALSO 9A010 AND 9A110.	Atomic Energy Licensing Board (AELB)
1A225	Platinized catalysts specially designed or prepared for promoting the hydrogen isotope exchange reaction between hydrogen and water for the recovery of tritium from heavy water or for the production of heavy water.		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
1A226	Specialized packings which may be used in separating heavy water from ordinary water, having both of the following characteristics: a. Made of phosphor bronze mesh chemically treated to improve wettability; and b. Designed to be used in vacuum distillation towers.		Atomic Energy Licensing Board (AELB)
1A227	High-density (lead glass or other) radiation shielding windows, having all of the following characteristics, and specially designed frames therefor: a. A 'cold area' greater than 0.09m^2; b. A density greater than 3g/cm^3; and c. A thickness of 100mm or greater.	Technical Note: In 1A227 the term 'cold area' means the viewing area of the window exposed to the lowest level of radiation in the design application.	Atomic Energy Licensing Board (AELB)
1B	**Test, Inspection and Production Equipment**		
1B001	Equipment for the production or inspection of "composite" structures or laminates specified in 1A002 or "fibrous or filamentary materials" specified in 1C010, as follows, and specially designed components and accessories therefor: a. Filament winding machines, of which the motions for positioning, wrapping and winding fibres are coordinated and programmed in three or more 'primary servo positioning' axes, specially designed for the manufacture of “composite” structures or	N.B. SEE ALSO 1B101 AND 1B201. Technical Note: 1. For the purpose of 1B001, 'primary servo positioning' axes control, under computer program direction, the position of the end effector (i.e., head) in space relative to the work piece at the correct orientation and direction to achieve the desired process.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	laminates, from “fibrous or filamentary materials”;	2. For the purposes of 1B001., a 'filament band' is a single continuous width of fully or partially resin-impregnated tape, tow or fibre. Note: In 1B001.b, 'missile' means complete rocket systems and unmanned aerial vehicle systems.	
	b. ‘Tape-laying machines’, of which the motions for positioning and laying tape are coordinated and programmed in five or more 'primary servo positioning' axes, specially designed for the manufacture of “composite” airframe or ‘missile’ structures;	Technical Note: For the purposes of 1B001.b., 'tape-laying machines' have the ability to lay one or more 'filament bands' limited to widths greater than 25.4mm and less than or equal to 304.8mm, and to cut and restart individual 'filament band' courses during the laying process.	
	c. Multidirectional, multidimensional weaving machines or interlacing machines, including adapters and modification kits, specially designed or modified for weaving, interlacing or braiding fibres, for "composite" structures;	Technical Note: For the purposes of 1B001.c., the technique of interlacing includes knitting.	
	d. Equipment specially designed or adapted for the production of reinforcement fibres, as follows: 1. Equipment for converting polymeric fibres (such as polyacrylonitrile, rayon, pitch or polycarbosilane) into carbon fibres or silicon carbide fibres, including		

Category Code	Items Description	Note	Relevant Authority
	special equipment to strain the fibre during heating; 2. Equipment for the chemical vapour deposition of elements or compounds, on heated filamentary substrates, to manufacture silicon carbide fibres; 3. Equipment for the wet-spinning of refractory ceramics (such as aluminium oxide); 4. Equipment for converting aluminium containing precursor fibres into alumina fibres by heat treatment; e. Equipment for producing prepregs specified in 1C010.e. by the hot melt method; f. Non-destructive inspection equipment specially designed for "composite" materials, as follows: 1. X-ray tomography systems for three dimensional defect inspection; 2. Numerically controlled ultrasonic testing machines of which the motions for positioning transmitters or receivers are simultaneously coordinated and programmed in four or more axes to follow the three dimensional contours of the component under inspection;		

Category Code	Items Description	Note	Relevant Authority
	g. 'Tow-placement machines', of which the motions for positioning and laying tows are coordinated and programmed in two or more 'primary servo positioning' axes, specially designed for the manufacture of "composite" airframe or 'missile' structures.	Technical Note: For the purposes of 1B001.g., 'tow-placement machines' have the ability to place one or more 'filament bands' having widths less than or equal to 25.4mm, and to cut and restart individual 'filament band' courses during the placement process. Technical Notes: 1. For the purpose of 1B001, 'primary servo positioning' axes control, under computer program direction, the position of the end effector (i.e., head) in space relative to the work piece at the correct orientation and direction to achieve the desired process. 2. For the purposes of 1B001, a 'filament band' is a single continuous width of fully or partially resin-impregnated tape, tow or fibre. Fully or partially resin-impregnated 'filament bands' include those coated with dry powder that tacks upon heating.	
1B002	Equipment for producing metal alloys, metal alloy powder or alloyed materials, specially designed to avoid contamination and specially designed for use in one of the processes specified in 1C002.c.2.	N.B. SEE ALSO 1B102.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
1B003	Tools, dies, moulds or fixtures, for "superplastic forming" or "diffusion bonding" titanium, aluminium or their alloys, specially designed for the manufacture of any of the following: a. Airframe or aerospace structures; b."Aircraft" or aerospace engines; or c. Specially designed components for structures specified in 1B003.a. or for engines specified in 1B003.b.		Controller
1B101	Equipment, other than that specified in 1B001, for the "production" of structural composites as follows; and specially designed components and accessories therefor: a. Filament winding machines or fibre placement machines, of which the motions for positioning, wrapping and winding fibres can be coordinated and programmed in three or more axes, designed to fabricate composite structures or laminates from fibrous or filamentary materials, and coordinating and programming controls; b. Tape-laying machines of which the motions for positioning and laying tape and sheets can be coordinated and programmed in two or more axes, designed for the manufacture of composite airframe and "missile" structures;	N.B. SEE ALSO 1B201. Note: Components and accessories specified in 1B101 include moulds, mandrels, dies, fixtures and tooling for the preform pressing, curing, casting, sintering or bonding of composite structures, laminates and manufactures thereof.	Controller

Category Code	Items Description	Note	Relevant Authority
	c. Equipment designed or modified for the "production" of "fibrous or filamentary materials" as follows: 1. Equipment for converting polymeric fibres (such as polyacrylonitrile, rayon or polycarbosilane) including special provision to strain the fibre during heating; 2. Equipment for the vapour deposition of elements or compounds on heated filament substrates; 3. Equipment for the wet-spinning of refractory ceramics (such as aluminium oxide); d. Equipment designed or modified for special fibre surface treatment or for producing prepregs and preforms specified in entry 9C110.	Note: 1B101.d. includes rollers, tension stretchers, coating equipment, cutting equipment and clicker dies.	
1B102	Metal powder “production equipment”, other than that specified in 1B002, and components as follows: a. Metal powder "production equipment" usable for the "production", in a controlled environment, of spherical, spheroidal or atomised materials specified in 1C011.a., 1C011.b., 1C111.a.1., 1C111.a.2. or in the Military Items List.	N.B. SEE ALSO 1B115.b. Note: 1B102 includes: a. Plasma generators (high frequency arc-jet) usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment;	Controller

Category Code	Items Description	Note	Relevant Authority
	b. Specially designed components for "production equipment" specified in 1B002 or 1B102.a.	b. Electroburst equipment usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment; c. Equipment usable for the "production" of spherical aluminium powders by powdering a melt in an inert medium (e.g. nitrogen).	
1B115	Equipment, other than that specified in 1B002 or 1B102, for the production of propellant and propellant constituents, as follows, and specially designed components therefor: a. "Production equipment" for the "production", handling or acceptance testing of liquid propellants or propellant constituents specified in 1C011.a., 1C011.b., 1C111 or in the Military Items List; b. "Production equipment" for the "production", handling, mixing, curing, casting, pressing, machining, extruding or acceptance testing of solid propellants or propellant constituents specified in 1C011.a., 1C011.b., 1C111 or in the Military Items List.	Note 1: For equipment specially designed for the production of military items, see the Military Items List. Note 2: 1B115 does not control equipment for the "production", handling and acceptance testing of boron carbide. Note: 1B115.b. does not control batch mixers, continuous mixers or fluid energy mills. For the control of batch mixers, continuous mixers and fluid energy mills see 1B117, 1B118 and 1B119.	Controller
1B116	Specially designed nozzles for producing pyrolitically derived materials formed on a mould, mandrel or other substrate from precursor gases which decompose in the 1,573K		Controller

Category Code	Items Description	Note	Relevant Authority
	(1,300°C) to 3,173K (2,900°C) temperature range at pressures of 130Pa to 20kPa.		
1B117	Batch mixers with having all of the following, and specifically designed components therefor: a. Designed or modified for mixing under vacuum in the range of zero to 13.326kPa; b. Capable of controlling the temperature of the mixing chamber; c. A total volumetric capacity of 110 litres or more; and d. At least one "mixing/kneading shaft" mounted off centre.	Note: In 1B117.d. the term 'mixing/kneading shaft' does not refer to deagglomerators or knife-spindles.	Controller
1B118	Continuous mixers having any of the following, and specially designed components therefor: a. Designed or modified for mixing under vacuum in the range of zero to 13,326 kPa; b. Capable of controlling the temperature of the mixing chamber; c. Any of the following; 1. Two or more mixing/kneading shafts; or 2. All of the following: a. A single rotating and oscillating shaft with kneading teeth/pins; and		Controller

Category Code	Items Description	Note	Relevant Authority
	b. Kneading teeth/pins inside the casing of the mixing chamber.		
1B119	Fluid energy mills usable for grinding or milling substances specified in 1C011.a., 1C011.b., 1C111 or in the Military Items List, and specially designed components therefor.		Controller
1B201	Filament winding machines, other than those specified in 1B001 or 1B101, and related equipment, as follows: a. Filament winding machines having all of the following characteristics: 1. Having motions for positioning, wrapping, and winding fibres coordinated and programmed in two or more axes; 2. Specially designed to fabricate composite structures or laminates from "fibrous or filamentary materials"; and 3. Capable of winding cylindrical tubes with an internal diameter between 75 and 650mm and lengths of 300mm or greater; b. Coordinating and programming controls for the filament winding machines specified in 1B201.a.;		Controller

Category Code	Items Description	Note	Relevant Authority
	c. Precision mandrels for the filament winding machines specified in 1B201.a.		
1B225	Electrolytic cells for fluorine production with an output capacity greater than 250g of fluorine per hour.		Atomic Energy Licensing Board (AELB)
1B226	Electromagnetic isotope separators designed for, or equipped with, single or multiple ion sources capable of providing a total ion beam current of 50mA or greater.	Note: 1B226 includes separators: a. Capable of enriching stable isotopes; b. With the ion sources and collectors both in the magnetic field and those configurations in which they are external to the field.	Atomic Energy Licensing Board (AELB)
1B228	Hydrogen-cryogenic distillation columns having all of the following characteristics: a. Designed for operation with internal temperature of 35K (-238°C) or less; b. Designed for operation at an internal pressure of 0.5 to 5Mpa; c. Constructed of either: 1. Stainless steel of the Society of Automotive Engineers International (SAE) 300 series with low sulphur content and with an austenitic ASTM (or equivalent standard) grain size number of 5 or greater; or		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	2. Equivalent materials which are both cryogenic and hydrogen (H_2)-compatible; and d. With internal diameters of 30cm or greater and 'effective lengths' of 4m or greater.	Technical Note: In 1B228 'effective length' means the active height of packing material in a packed-type column, or the active height of internal contactor plates in a plate-type column.	
1B229	Deleted		
1B230	Pumps capable of circulating solutions of concentrated or dilute potassium amide catalyst in liquid ammonia (KNH_2/NH_3), having all of the following characteristics: a. Airtight (i.e., hermetically sealed); b. A capacity greater than 8.5m^3/h; and c. Either of the following characteristics: 1. For concentrated potassium amide solutions (1% or greater), an operating pressure of 1.5 to 60MPa; or 2. For dilute potassium amide solutions (less than 1%), an operating pressure of 20 to 60MPa.		Atomic Energy Licensing Board (AELB)
1B231	Tritium facilities or plants, and equipment therefor, as follows: a. Facilities or plants for the production, recovery, extraction, concentration, or handling of tritium;		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	b. Equipment for tritium facilities or plants, as follows: 1. Hydrogen or helium refrigeration units capable of cooling to 23K (- 250°C) or less, with heat removal capacity greater than 150W; 2. Hydrogen isotope storage or purification systems using metal hydrides as the storage or purification medium.		
1B232	Turboexpanders or turboexpander-compressor sets having both of the following characteristics: a. Designed for operation with an outlet temperature of 35K (- 238°C) or less; and b. Designed for a throughput of hydrogen gas of 1,000kg/h or greater.		Atomic Energy Licensing Board (AELB)
1B233	Lithium isotope separation facilities or plants, and systems and equipment therefor, as follows: a. Facilities or plants for the separation of lithium isotopes; b. Equipment for the separation of lithium isotopes based on the lithium-mercury amalgam process, as follows: 1. Packed liquid-liquid exchange columns specially designed for lithium amalgams;		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	2. Mercury or lithium amalgam pumps; 3. Lithium amalgam electrolysis cells; 4. Evaporators for concentrated lithium hydroxide solution; c. Ion exchange systems specially designed for lithium isotope separation, and specially designed components therefor; d. Chemical exchange systems (employing crown ethers, cryptands, or lariat ethers), specially designed for lithium isotope separation, and specially designed components therefor.		
1B234	High explosive containment vessels, chambers, containers and other similar containment devices designed for the testing of high explosives or explosive devices and having both of the following characteristics: a. Designed to fully contain an explosion equivalent to 2kg of trinitrotoluene (TNT) or greater; and b. Having design elements or features enabling real time or delayed transfer of diagnostic or measure information.	N.B. SEE ALSO MILITARY ITEMS LIST.	Controller
1B235	Target assemblies and components for the production of tritium as follows:		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	a. Target assemblies made of or containing lithium enriched in the lithium-6 isotope specially designed for the production of tritium through irradiation, including insertion in a nuclear reactor; b. Components specially designed for the target assemblies specified in 1B235a.	Technical Note: Components specially designed for target assemblies for the production of tritium may include lithium pellets, tritium getters, and specially-coated cladding.	
1C	**Materials**	Technical Note: Metals and alloys: Unless provision to the contrary is made, the words 'metals' and 'alloys' in 1C001 to 1C012 cover crude and semi-fabricated forms, as follows: Crude forms: Anodes, balls, bars (including notched bars and wire bars), billets, blocks, blooms, brickets, cakes, cathodes, crystals, cubes, dice, grains, granules, ingots, lumps, pellets, pigs, powder, rondelles, shot, slabs, slugs, sponge, sticks; Semi-fabricated forms (whether or not coated, plated, drilled or punched): a. Wrought or worked materials fabricated by rolling, drawing, extruding, forging, impact extruding, pressing, graining, atomising, and grinding, i.e.: angles, channels, circles,	

Category Code	Items Description	Note	Relevant Authority
		discs, dust, flakes, foils and leaf, forging, plate, powder, pressings and stampings, ribbons, rings, rods (including bare welding rods, wire rods, and rolled wire), sections, shapes, sheets, strip, pipe and tubes (including tube rounds, squares, and hollows), drawn or extruded wire; b. Cast material produced by casting in sand, die, metal, plaster or other types of moulds, including high pressure castings, sintered forms, and forms made by powder metallurgy. The object of the control should not be defeated by the export of non-listed forms alleged to be finished products but representing in reality crude forms or semi-fabricated forms.	
1C001	Materials specially designed for absorbing electromagnetic radiation, or intrinsically conductive polymers, as follows: a. Materials for absorbing frequencies exceeding 2 x 10^8 Hz but less than 3 x 10^{12} Hz;	N.B.: SEE ALSO 1C101. Note 1: 1C001.a. does not control: a. Hair type absorbers, constructed of natural or synthetic fibres, with non-magnetic loading to provide absorption; b. Absorbers having no magnetic loss and whose incident surface is	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
		non-planar in shape, including pyramids, cones, wedges and convoluted surfaces; c. Planar absorbers, having all of the following: 1. Made from any of the following: a. Plastic foam materials (flexible or non-flexible) with carbon-loading, or organic materials, including binders, providing more than 5% echo compared with metal over a bandwidth exceeding ±15% of the centre frequency of the incident energy, and not capable of withstanding temperatures exceeding 450K (177 °C); or b. Ceramic materials providing more than 20% echo compared with metal over a bandwidth exceeding ±15% of the centre frequency of the incident energy, and not capable of withstanding temperatures exceeding 800K (527°C);	

Category Code	Items Description	Note	Relevant Authority
		Technical Note: Absorption test samples for 1C001.a. Note: 1.c.1. should be a square at least 5 wavelengths of the centre frequency on a side and positioned in the far field of the radiating element. 2. Tensile strength less than 7 x 10^6 N/m^2 ; and 3. Compressive strength less than 14 x 10^6 N/m^2 ; d. Planar absorbers made of sintered ferrite, having all of the following: 1. A specific gravity exceeding 4.4; and 2. A maximum operating temperature of 548K (275 °C). e. Planar absorbers having no magnetic loss and fabricated from 'open-cell foam' plastic material with a density of 0.15 g/cm3 or less. Technical Note: "Open-cell foams" are flexible and porous materials, having an inner structure open to	

Category Code	Items Description	Note	Relevant Authority
		the atmosphere. "Open-cell foams" are also known as reticulated foams. Note 2: Nothing in Note 1 to 1C001.a. releases magnetic materials to provide absorption when contained in paint.	
	b. Materials not transparent to visible light and specially designed for absorbing near-infrared radiation having a wavelength exceeding 810 nm but less than 2,000 nm (frequencies exceeding 150 THz but less than 370 THz); c. Intrinsically conductive polymeric materials with a 'bulk electrical conductivity' exceeding 10,000 S/m (Siemens per metre) or a 'sheet (surface) resistivity' of less than 100 ohms/square based on any of the following polymers: 1. Polyaniline; 2. Polypyrrole; 3. Polythiophene; 4. Poly phenylene-vinylene; or 5. Poly thienylene-vinylene.	Note: 1C001.b. does not control materials, specially designed or formulated for any of the following applications: a. Laser marking of polymers; or b. Laser welding of polymers. Note: 1C001.c. does not control materials in a liquid form. Technical Note: 'Bulk electrical conductivity' and 'sheet (surface) resistivity' should be determined using ASTM D-257 or national equivalents.	
1C002	Metal alloys, metal alloy powder and alloyed materials, as follows:	N.B. SEE ALSO 1C202.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	a. Aluminides, as follows: 1. Nickel aluminides containing a minimum of 15% by weight aluminium, a maximum of 38% by weight aluminium and at least one additional alloying element; 2. Titanium aluminides containing 10% by weight or more aluminium and at least one additional alloying element; b. Metal alloys, as follows, made from the powder or particulate material specified in 1C002.c.: 1. Nickel alloys having any of the following: a. A 'stress-rupture life' of 10,000 hours or longer at 923K (650°C) at a stress of 676MPa; or b. A 'low cycle fatigue life' of 10,000 cycles or more at 823K (550°C) at a maximum stress of 1,095MPa; 2. Niobium alloys having any of the following: a. A 'stress-rupture life' of 10,000 hours or longer at 1,073K (800°C) at a stress of 400MPa; or	Note: 1C002 does not control metal alloys, metal alloy powder and alloyed materials for coating substrates. Technical Notes: 1. The metal alloys in 1C002 are those containing a higher percentage by weight of the stated metal than of any other element. 2. 'Stress-rupture life' should be measured in accordance with ASTM standard E-139 or national equivalents. 3. 'Low cycle fatigue life' should be measured in accordance with ASTM Standard E-606 'Recommended Practice for Constant-Amplitude Low-Cycle Fatigue Testing' or national equivalents. Testing should be axial with an average stress ratio equal to 1 and a stress-concentration factor (K_t) equal to 1. The average stress is defined as maximum stress minus minimum stress divided by maximum stress.	

Category Code	Items Description	Note	Relevant Authority
	b. A 'low cycle fatigue life' of 10,000 cycles or more at 973K (700°C) at a maximum stress of 700MPa; 3. Titanium alloys having any of the following: a. A 'stress-rupture life' of 10,000 hours or longer at 723K (450°C) at a stress of 200MPa; or b. A 'low cycle fatigue life' of 10,000 cycles or more at 723K (450°C) at a maximum stress of 400MPa; 4. Aluminium alloys having any of the following: a. A tensile strength of 240MPa or more at 473K (200°C); or b. A tensile strength of 415MPa or more at 298K (25°C); 5. Magnesium alloys having all of the following: a. A tensile strength of 345MPa or more; and b. A corrosion rate of less than 1 mm/year in 3 % sodium chloride aqueous solution measured in		

Category Code	Items Description	Note	Relevant Authority
	accordance with ASTM standard G-31 or national equivalents; c. Metal alloy powder or particulate material, having all of the following: 1. Made from any of the following composition systems: a. Nickel alloys (Ni-Al-X, Ni-X-Al) qualified for turbine engine parts or components, i.e. with less than 3 non-metallic particles (introduced during the manufacturing process) larger than 100μm in 10^9 alloy particles; b. Niobium alloys (Nb-Al-X or Nb-X-Al, Nb-Si-X or Nb-X-Si, Nb-Ti-X or Nb-X-Ti); c. Titanium alloys (Ti-Al-X or Ti-X-Al); d. Aluminium alloys (Al-Mg-X or Al-X-Mg, Al-Zn-X or Al-X-Zn, Al-Fe-X or Al-X-Fe); or e. Magnesium alloys (Mg-Al-X or Mg-X-Al); 2. Made in a controlled environment by any of the following processes: a. "Vacuum atomisation";	Technical Note: X in the following equals one or more alloying elements. Technical Notes: 1. "Vacuum atomization" is a process to reduce a molten stream of metal to droplets of a diameter of 500 μm or less by the rapid evolution of a dissolved gas upon exposure to a vacuum. 2. "Gas atomization" is a process to reduce a molten stream of metal alloy to droplets of 500 μm diameter or less by a high-pressure gas stream. 3. "Rotary atomization" is a process to reduce a stream or pool of molten metal to droplets to a diameter of 500 μm or less by centrifugal force. 4. "Splat quenching" is a process to "solidify rapidly" a molten metal stream impinging upon a chilled block, forming a flake-like product. 5. "Melt spinning" is a process to "solidify rapidly" a molten metal stream impinging upon a rotating chilled block, forming a flake, ribbon or rod-like product.	

Category Code	Items Description	Note	Relevant Authority
	b. "Gas atomisation"; c. "Rotary atomisation"; d. "Splat quenching"; e. "Melt spinning" and "comminution"; f. "Melt extraction" and "comminution"; g. "Mechanical alloying"; or h. "Plasma atomisation"; and 3. Capable of forming materials specified in 1C002.a. or 1C002.b.; d. Alloyed materials having all of the following: 1. Made from any of the composition systems specified in 1C002.c.1.; 2. In the form of uncomminuted flakes, ribbons or thin rods; and 3. Produced in a controlled environment by any of the following: a. "Splat quenching"; b. "Melt spinning"; or c. "Melt extraction".	6. "Comminution" is a process to reduce a material to particles by crushing or grinding. 7. "Melt extraction" is a process to "solidify rapidly" and extract a ribbon-like alloy product by the insertion of a short segment of a rotating chilled block into a bath of a molten metal alloy. 8. "Mechanical alloying" is an alloying process resulting from the bonding, fracturing and rebonding of elemental and master alloy powders by mechanical impact. Non-metallic particles may be incorporated in the alloy by addition of the appropriate powders. 9. "Plasma atomization" is a process to reduce a molten stream or solid metal to droplets of 500 µm diameter or less, using plasma torches in an inert gas environment. 10. "Solidify rapidly" is a process involving the solidification of molten material at cooling rates exceeding 1,000 K/sec.	
1C003	Magnetic metals, of all types and of whatever form, having any of the following:		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	a. Initial relative permeability of 120,000 or more and a thickness of 0.05mm or less; b. Magnetostrictive alloys having any of the following: 1. A saturation magnetostriction of more than 5×10^{-4} ; or 2. A magnetomechanical coupling factor (k) of more than 0.8; or c. Amorphous or 'nanocrystalline' alloy strips, having all of the following: 1. A composition having a minimum of 75% by weight of iron, cobalt or nickel; 2. A saturation magnetic induction (B_s) of 1.6 T or more; and 3. Any of the following: a. A strip thickness of 0.02mm or less; or b. An electrical resistivity of 2×10^{-4} ohm cm or more.	Technical Note: Measurement of initial relative permeability must be performed on fully annealed materials. Technical Note: 'Nanocrystalline' materials in 1C003.c. are those materials having a crystal grain size of 50 nm or less, as determined by X-ray diffraction.	
1C004	Uranium titanium alloys or tungsten alloys with a "matrix" based on iron, nickel or copper, having all of the following: a. A density exceeding $17.5 g/cm^3$;		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	b. An elastic limit exceeding 880MPa; c. An ultimate tensile strength exceeding 1,270MPa; and d. An elongation exceeding 8%.		
1C005	"Superconductive" "composite" conductors in lengths exceeding 100m or with a mass exceeding 100g, as follows: a. "Superconductive" "composite" conductors containing one or more niobium-titanium 'filaments', having all of the following: 1. Embedded in a "matrix" other than a copper or copper-based mixed "matrix"; and 2. Having a cross-section area less than $0.28 \times 10^{-4} mm^2$ (6μm in diameter for circular 'filaments'); b. "Superconductive" "composite" conductors consisting of one or more "superconductive" 'filaments' other than niobium-titanium, having all of the following: 1. A "critical temperature" at zero magnetic induction exceeding 9.85K (- 263.31°C); and 2. Remaining in the "superconductive" state at a temperature of 4.2K	Technical Note: For the purpose of 1C005 'filaments' may be in wire, cylinder, film, tape or ribbon form.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	(- 268.96°C) when exposed to a magnetic field oriented in any direction perpendicular to the longitudinal axis of conductor and corresponding to a magnetic induction of 12T with critical current density exceeding 1,750A/mm^2 on overall cross-section of the conductor; c. "Superconductive" "composite" conductors consisting of one or more "superconductive" 'filaments' which remain "superconductive" above 115K (- 158.16°C)		
1C006	Fluids and lubricating materials, as follows:	Technical Note: For the purpose of 1C006: 1. 'Flash point' is determined using the Cleveland Open Cup Method described in ASTM D-92 or national equivalents; 2. 'Pour point' is determined using the method described in ASTM D-97 or national equivalents; 3. 'Viscosity index' is determined using the method described in ASTM D-2270 or national equivalents; 4. 'Thermal stability' is determined by the following test procedure or national equivalents:	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
		Twenty ml of the fluid under test is placed in a 46ml type 317 stainless steel chamber containing one each of 12.5mm (nominal) diameter balls of M-10 tool steel, 52100 steel and naval bronze (60% Cu, 39% Zn, 0.75% Sn); The chamber is purged with nitrogen, sealed at atmospheric pressure and the temperature raised to and maintained at 644 ± 6K (371 ± 6 °C) for six hours; The specimen will be considered thermally stable if, on completion of the above procedure, all of the following conditions are met: a. The loss in weight of each ball is less than 10mg/mm^2 of ball surface; b. The change in original viscosity as determined at 311K (38°C) is less than 25%; and c. The total acid or base number is less than 0.40; 5. 'Autogenous ignition' temperature is determined using the method described in ASTM E-659 or national equivalents.	

Category Code	Items Description	Note	Relevant Authority
	a. Hydraulic fluids containing, as their principal ingredients, any of the following: 1. Synthetic 'silahydrocarbon oils' having all of the following: a. A 'flash point' exceeding 477K (204°C); b. A 'pour point' at 239K (- 34°C) or less; c. A 'viscosity index' of 75 or more; and d. A 'thermal stability' at 616K (343°C); or 2. 'Chlorofluorocarbons' having all of the following: a. No 'flash point'; b. An 'autogenous ignition temperature' exceeding 977K (704 °C); c. A 'pour point' at 219K (- 54 °C) or less; d. A 'viscosity index' of 80 or more; and e. A boiling point at 473K (200 °C) or higher;	Technical Note: For the purpose of 1C006.a.1., 'silahydrocarbon oils' contain exclusively silicon, hydrogen and carbon. Technical Note: For the purpose of 1C006.a.2., 'chlorofluorocarbons' contain exclusively carbon, fluorine and chlorine.	

Category Code	Items Description	Note	Relevant Authority
	b. Lubricating materials containing, as their principal ingredients, any of the following: 1. Phenylene or alkylphenylene ethers or thio-ethers, or their mixtures, containing more than two ether or thio-ether functions or mixtures thereof; or 2. Fluorinated silicone fluids with a kinematic viscosity of less than 5,000mm^2/s (5,000centistokes) measured at 298K (25°C); c. Damping or flotation fluids having all of the following: 1. Purity exceeding 99.8%; 2. Containing less than 25 particles of 200μm or larger in size per 100ml; and 3. Made from at least 85% of any of the following: a. Dibromotetrafluoroethane (CAS 25497-30-7, 124-73-2, 27336-23-8); b. Polychlorotrifluoroethylene (oily and waxy modifications only); or c. Polybromotrifluoroethylene;		

Category Code	Items Description	Note	Relevant Authority
	d. Fluorocarbon electronic cooling fluids having all of the following: 1. Containing 85% by weight or more of any of the following, or mixtures thereof: a. Monomeric forms of perfluoropolyalkylether-triazines or perfluoroaliphatic-ethers; b. Perfluoroalkylamines; c. Perfluorocycloalkanes; or d. Perfluoroalkanes; 2. Density at 298K (25°C) of 1.5g/ml or more; 3. In a liquid state at 273K (0 °C); and 4. Containing 60% or more by weight of fluorine.	Note: 1C006.d. does not control materials specified and packaged as medical products.	
1C007	Ceramic powders, ceramic-"matrix", "composite" materials and 'precursor materials', as follows: a. Ceramic powders of titanium diboride (TiB_2) (CAS 12045-63-5) having total metallic impurities, excluding intentional additions, of less than 5,000ppm, an average particle size equal to or less than 5μm and no more than 10% of the particles larger than 10μm;	N.B.: SEE ALSO 1C107.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	b. Not used; c. Ceramic-“matrix” "composite" materials as follows: 1. Ceramic-ceramic "composite" materials with a glass or oxide-"matrix" and reinforced with any of the following: a. Continuous fibres made from any of the following materials: 1. Al_2O_3 (CAS 1344-28-1); or 2. Si-C-N; or b. Fibres being all of the following: 1. Made from any of the following materials: a. Si-N; b. Si-C; c. Si-Al-O-N; or d. Si-O-N; and	Note: 1C007.c.1.a. does not apply to "composites" containing fibres with a tensile strength of less than 700MPa at 1,273K (1,000°C) or tensile creep resistance of more than 1% creep strain at 100MPa load and 1,273 K (1,000°C) for 100 hours.	

Category Code	Items Description	Note	Relevant Authority
	2. Having a "specific tensile strength" exceeding 12.7×10^3 m; 3. Ceramic “matrix” "composite" materials, with a carbides or nitrides of silicon, zirconium or boron; d. Not used; e. 'Precursor materials' specially designed for the "production" of materials specified in 1C007.c., as follows: 1. Polydiorganosilanes 2. Polysilazanes 3. Polycarbosilazanes f. Not used	Technical Note: For the purposes of 1C007, 'precursor materials' are special purpose polymeric or metallo-organic materials used for the "production" of silicon carbide, silicon nitride, or ceramics with silicon, carbon and nitrogen.	
1C008	Non-fluorinated polymeric substances as follows: a. Imides, as follows: 1. Bismaleimides; 2. Aromatic polyamide-imides (PAI) having a 'glass transition temperature (T_g) 'exceeding 563K (290 °C);	Note: 1C008.a. controls substances in liquid or solid "fusible" form, including resin, powder, pellet, film, sheet, tape or ribbon. N.B. For non-"fusible" aromatic polyimides in film, sheet, tape or ribbon form, see 1A003. Technical Notes:	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	3. Aromatic polyimides having a 'glass transition temperature (T_g)' exceeding 505K (232 °C); 4. Aromatic polyetherimides having a 'glass transition temperature (T_g)' exceeding 563K (290 °C); b. Not used; c. Not used; d. Polyarylene ketones; e. Polyarylene sulphides, where the arylene group is biphenylene, triphenylene or combinations thereof; f. Polybiphenylenethersulphone having a 'glass transition temperature (T_g)' exceeding 563K (290°C).	1. The 'glass transition temperature (T_g)' for 1C008.a.2. thermoplastic materials and 1C008.a.4. materials is determined using the method described in ISO 11357-2 (1999) or national equivalents 2. The 'glass transition temperature (T_g)' for 1C008.a.2. thermosetting materials and 1C008.a.3. materials is determined using the 3-point bend method described in ASTM D 7028-07 or equivalent national standard. The test is to be performed using a dry test specimen which has attained a minimum of 90% degree of cure as specified in ASTM E 2160-04 or equivalent national standard, and was cured using the combination of standard and post-cure processes that yield the highest T_g.	
1C009	Unprocessed fluorinated compounds as follows: a. Not used; b. Fluorinated polyimides containing 10% by weight or more of combined fluorine; c. Fluorinated phosphazene elastomers containing 30% by weight or more of combined fluorine.		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
1C010	"Fibrous or filamentary materials", as follows: a. Organic "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding 12.7 x 10^6m; and 2. "Specific tensile strength" exceeding 23.5 x 10^4m; b. Carbon "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding 14.65 x 10^6m; and 2. "Specific tensile strength" exceeding 26.82 x 10^4m;	N.B. SEE ALSO 1C210 AND 9C110. Technical Notes: 1. For the purpose of calculating 'specific tensile strength', 'specific modulus' or specific weight of 'fibrous or filamentary materials' in 1C010.a., 1C010.b., 1C010.c. or 1C010.e.1.b., the tensile strength and modulus should be determined by using Method A described in ISO 10618:2004 or national equivalents. 2. Assessing the 'specific tensile strength', 'specific modulus' or specific weight of non-unidirectional 'fibrous or filamentary materials' (e.g. fabrics, random mats or braids) in 1C010 is to be based on the mechanical properties of the constituent unidirectional monofilaments (e.g. monofilaments, yarns, rovings or tows) prior to processing into the non-unidirectional 'fibrous or filamentary materials'. Note: 1C010.a. does not control polyethylene. Note: 1C010.b. does not control: a. 'Fibrous or filamentary materials', for the repair of 'civil aircraft' structures or laminates, having all of the following:	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	c. Inorganic "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding 2.54 x 10^6m; and 2. Melting, softening, decomposition or sublimation point exceeding 1,922K (1,649 °C) in an inert environment; d. "Fibrous or filamentary materials", having any of the following: 1. Composed of any of the following: a. Polyetherimides specified in 1C008.a.; or b. Materials specified in 1C008.d. to 1C008.f.; or	1. An area not exceeding 1m^2; 2. A length not exceeding 2.5m; and 3. A width exceeding 15mm. b. Mechanically chopped, milled or cut carbon 'fibrous or filamentary materials' 25.0 mm or less in length. Note: 1C010.c. does not control: a. Discontinuous, multiphase, polycrystalline alumina fibres in chopped fibre or random mat form, containing 3% by weight or more silica, with a 'specific modulus' of less than 10 x 10^6m; b. Molybdenum and molybdenum alloy fibres; c. Boron fibres; d. Discontinuous ceramic fibres with a melting, softening, decomposition or sublimation point lower than 2,043K (1,770°C) in an inert environment.	

Category Code	Items Description	Note	Relevant Authority
	2. Composed of materials specified in 1C010.d.1.a. or 1C010.d.1.b. and "commingled" with other fibres specified in 1C010.a., 1C010.b. or 1C010.c.; e. Fully or partially resin-impregnated or pitch-impregnated "fibrous or filamentary materials" (prepregs), metal or carbon-coated "fibrous or filamentary materials" (preforms) or "carbon fibre preforms", having all of the following: 1. Having any of the following: a. Inorganic "fibrous or filamentary materials" specified in 1C010.c.; or b. Organic or carbon "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding 10.15×10^6m; and 2. "Specific tensile strength" exceeding 17.7×10^4m; and 2. Having any of the following: a. Resin or pitch, specified in 1C008 or 1C009.b.; b. 'Dynamic Mechanical Analysis glass transition temperature (DMA T_g)'	Technical Notes: "Commingled" is filament to filament blending of thermoplastic fibres and reinforcement fibres in order to produce a fibre reinforcement "matrix" mix in total fibre form. Note 1: Metal or carbon-coated "fibrous or filamentary materials" (preforms) or "carbon fibre preforms, not impregnated with resin or pitch, are specified in "fibrous or filamentary materials" in 1C010.a., 1C010.b. or 1C010.c. Note 2: 1C010.e. does not control: a. Epoxy resin "matrix" impregnated carbon "fibrous or filamentary materials" (prepregs) for the repair of "civil aircraft" structures or laminates, having all the following; 1. An area not exceeding $1m^2$; 2. A length not exceeding 2.5m; and 3. A width exceeding 15mm. b. Fully or partially resin-impregnated or pitch-impregnated mechanically chopped, milled or cut carbon "fibrous or filamentary	

Category Code	Items Description	Note	Relevant Authority
	equal to or exceeding 453K (180 ºC) and having a phenolic resin; or c. 'Dynamic Mechanical Analysis glass transition temperature (DMA Tg)' equal to or exceeding 505K (232°C) and having a resin or pitch, not specified in 1C008 or 1C009.b., and not being a phenolic resin;	materials" 25.0mm or less in length when using a resin or pitch other than those specified in 1C008 or 1C009.b. Technical Note: 1. "Carbon fibre preforms" are an ordered arrangement of uncoated or coated fibres intended to constitute a framework of a part before the 'matrix' is introduced to form a "composite"; 2. The "Dynamic Mechanical Analysis glass transition temperature (DMA Tg)" for materials specified in 1C010.e. is determined using the method described in ASTM D 7028-07, or equivalent national standard, on a dry test specimen. In the case of thermoset materials, degree of cure of a dry test specimen shall be a minimum of 90% as defined by ASTM E 2160-04 or equivalent national standard.	
1C011	Metals and compounds, as follows: a. Metals in particle sizes of less than 60µm whether spherical, atomised, spheroidal, flaked or ground, manufactured from material consisting of 99% or more of zirconium, magnesium and alloys thereof;	N.B. SEE ALSO MILITARY ITEMS LIST and 1C111. Technical Note: The natural content of hafnium in the zirconium (typically 2% to 7%) is counted with the zirconium	Controller

Category Code	Items Description	Note	Relevant Authority
	b. Boron or boron alloys, with a particle size of 60μm or less, as follows: 1. Boron with a purity of 85% by weight or more; 2. Boron alloys with a boron content of 85% by weight or more; c. Guanidine nitrate (CAS 506-93-4); d. Nitroguanidine (NQ) (CAS 556 88-7).	Note: The metals or alloys specified in 1C011.a. are controlled whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium or beryllium. Note: The metals or alloys specified in 1C011.b. are controlled whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium or beryllium. N.B. See also Military Items List for metal powders mixed with other substances to form a mixture formulated for military purposes.	
1C012	Materials as follows: a. Plutonium in any form with a plutonium isotopic assay of plutonium-238 of more than 50% by weight; b. "Previously separated" neptunium-237 in any form.	Technical Note: These materials are typically used for nuclear heat sources. Note : 1C012.a. does not control: a. Shipments with a plutonium content of 1g or less; b. Shipments of 3 "effective grammes" or less when contained in a sensing component in instruments.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
		Note: 1C012.b. does not control shipments with a neptunium-237 content of 1g or less.	
1C101	Materials and devices for reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures, other than those specified in 1C001, usable in 'missiles', "missile" subsystems or unmanned aerial vehicles specified in 9A012 or 9A112.a.	Note 1: 1C101 includes: a. Structural materials and coatings specially designed for reduced radar reflectivity; b. Coatings, including paints, specially designed for reduced or tailored reflectivity or emissivity in the microwave, infrared or ultraviolet regions of the electromagnetic spectrum. Note 2: 1C101 does not include coatings when specially used for the thermal control of satellites. Technical Note: In 1C101 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	Controller
1C102	Resaturated pyrolized carbon-carbon materials designed for space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.		Controller
1C107	Graphite and ceramic materials, other than those specified in 1C007, as follows:		Controller

Category Code	Items Description	Note	Relevant Authority
	a. Fine grain graphites with a bulk density of 1.72g/cm^3 or greater, measured at 288K (15°C), and having a grain size of 100µm or less, usable for rocket nozzles and re-entry vehicle nose tips, which can be machined to any of the following products: 1. Cylinders having a diameter of 120mm or greater and a length of 50mm or greater; 2. Tubes having an inner diameter of 65mm or greater and a wall thickness of 25mm or greater and a length of 50mm or greater; or 3. Blocks having a size of 120mm x 120mm x 50mm or greater;	N.B.: SEE ALSO 0C004.	
	b. Pyrolytic or fibrous reinforced graphites, usable for rocket nozzles and reentry vehicle nose tips usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;	N.B.: SEE ALSO 0C004.	
	c. Ceramic composite materials (dielectric constant less than 6 at any frequency from 100 MHz to 100 GHz) for use in radomes usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;		
	d. Bulk machinable silicon-carbide reinforced unfired ceramic, usable for nose tips usable in "missiles", space launch vehicles specified		

Category Code	Items Description	Note	Relevant Authority
	in 9A004 or sounding rockets specified in 9A104; e. Reinforced silicon-carbide ceramic composites, usable for nose tips, reentry vehicles and nozzle flaps usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104. f. Bulk machinable ceramic composite materials consisting of an 'Ultra High Temperature Ceramic (UHTC)' matrix with a melting point equal to or greater than 3,000°C and reinforced with fibres or filaments, usable for missile components (such as nose-tips, re-entry vehicles, leading edges, jet vanes, control surfaces or rocket motor throat inserts) in "missiles", space launch vehicles specified in 9A004, sounding rockets specified in 9A104 or 'missiles'.	Note: 1C107.f. does not control 'Ultra High Temperature Ceramic (UHTC)' materials in non-composite form. Technical Note 1: In 1C107.f. 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km. Technical Note 2: *'Ultra High Temperature Ceramics (UHTC)'* includes*:* *1. Titanium diboride (TiB_2);* *2. Zirconium diboride (ZrB_2);* *3. Niobium diboride (NbB_2);* *4. Hafnium diboride (HfB_2);* *5. Tantalum diboride (TaB_2);* *6. Titanium carbide (TiC);*	

Category Code	Items Description	Note	Relevant Authority
		7. Zirconium carbide (ZrC); *8. Niobium carbide (NbC);* *9. Hafnium carbide (HfC);* *10. Tantalum carbide (TaC).*	
1C111	Propellants and constituent chemicals for propellants, other than those specified in 1C011, as follows: a. Propulsive substances: 1. Spherical spheroidal aluminium powder other than that specified in the Military Items List, in particle size of less than 200µm and an aluminium content of 97% by weight or more, if at least 10% of the total weight is made up of particles of less than 63µm, according to ISO 2591-1:1988 or national equivalents; 2. Metal powders, other than that specified in the Military Items List, as follows: a. Metal powders of zirconium, beryllium or magnesium, or alloys of these metals, if at least 90% of the total particles by particle volume or weight are made up of particles of less than 60µm (determined by measurement techniques such as using a sieve, laser diffraction or optical scanning), whether spherical, atomized, spheroidal, flaked or	Note: For propellants and constituent chemicals for propellants not specified in 1C111, see the Military Items List. Technical Note: A particle size of 63µm (ISO R-565) corresponding to 250mesh (Tyler) or 230mesh (ASTM standard E-11). Technical Note: The natural content of hafnium in the zirconium (typically 2% to 7%) is counted with the zirconium. Note: 1C111a.2.a. and 1C111a.2.b. controls powder mixtures with a multimodal particle distribution (e.g. mixtures of different grain sizes) if one or more modes are controlled.	Controller

Category Code	Items Description	Note	Relevant Authority
	ground, consisting 97% by weight or more of any of the following: 1. Zirconium; 2. Beryllium; or 3. Magnesium; b. Metal powders of either boron or boron alloys with a boron content of 85% or more by weight, if at least 90% of the total particles by particle volume or weight are made up of particles of less than 60μm (determined by measurement techniques such as using a sieve, laser diffraction or optical scanning), whether spherical, atomised, spheroidal, flaked or ground; 3. Oxidiser substances usable in liquid propellant rocket engines as follows: a. Dinitrogen trioxide (CAS 10544-73-7); b. Nitrogen dioxide (CAS 10102-44-0)/dinitrogen tetroxide (CAS 10544-72-6); c. Dinitrogen pentoxide (CAS 10102-03-1); d. Mixed Oxides of Nitrogen (MON);	Technical Note: Mixed Oxides of Nitrogen (MON) are solutions of Nitric Oxide (NO) in Dinitrogen	

Category Code	Items Description	Note	Relevant Authority
		Tetroxide/Nitrogen Dioxide (N_2O_4/NO_2) that can be used in missile systems. There are a range of compositions that can be denoted as MONi or MONij, where i and j are integers representing the percentage of Nitric Oxide in the mixture (e.g., MON3 contains 3% Nitric Oxide, MON25 25% Nitric Oxide. An upper limit is MON40, 40% by weight).	
	e. SEE MILITARY ITEMS LIST for Inhibited Red Fuming Nitric Acid (IRFNA);	N.B.: SEE ALSO MILITARY ITEMS LIST.	
	f. SEE MILITARY ITEMS LIST AND 1C238 for compounds composed of fluorine and one or more of other halogens, oxygen or nitrogen;		
	4. Hydrazine derivatives as follows:		
	a. Trimethylhydrazine (CAS 1741-01-1);		
	b. Tetramethylhydrazine (CAS 6415-12-9);		
	c. N,N diallylhydrazine (CAS 5164-11-4);		
	d. Allylhydrazine (CAS 7422-78-8);		
	e. Ethylene dihydrazine;		
	f. Monomethylhydrazine dinitrate;		
	g. Unsymmetrical dimethylhydrazine nitrate;		

Category Code	Items Description	Note	Relevant Authority
	h. Hydrazinium azide (CAS 14546-44-2); i. Dimethylhydrazinium azide; j. Hydrazinium dinitrate (CAS 13464-98-7); k. Diimido oxalic acid dihydrazine (CAS 3457-37-2); l. 2-hydroxyethylhydrazine nitrate (HEHN); m. See the Military Items List for Hydrazinium perchlorate; n. Hydrazinium diperchlorate (CAS 13812-39-0); o. Methylhydrazine nitrate (MHN) (CAS 29674-96-2); p. Diethylhydrazine nitrate (DEHN); q. 3,6-dihydrazino tetrazine nitrate (1,4-dihydrazine nitrate) (DHTN); 5. High energy density materials, other than that specified in the Military Items List, usable in 'missiles' or unmanned aerial vehicles specified in 9A012 or 9A112.a.; a. Mixed fuel that incorporate both solid and liquid fuels, such as boron	Technical Note: In 1C111.a.5. 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	

Category Code	Items Description	Note	Relevant Authority
	slurry, having a mass-based energy density of 40 x 10^6J/kg or greater; b. Other high energy density fuels and fuel additives (e.g., cubane, ionic solutions, JP-10) having a volume-based energy density of 37.5 x 10^9 J/m^3 or greater, measured at 20˚C and one atmosphere (101.325 kPa) pressure; 6. Hydrazine replacement fuels as follows: a. 2-Dimethylaminoethylazide (DMAZ) (CAS 86147-04-8); b. Polymeric substances: 1. Carboxy-terminated polybutadiene (including carboxyl-terminated polybutadiene) (CTPB); 2. Hydroxy-terminated polybutadiene (including hydroxyl-terminated polybutadiene) (HTPB) (CAS 69102-90-5), other than that specified in the Military Items List; 3. Polybutadiene-acrylic acid (PBAA); 4. Polybutadiene-acrylic acid-acrylonitrile (PBAN);	Note: 1C111.a.5.b. does not control fossil refined fuels and biofuels produced from vegetables, including fuels for engines certified for use in civil aviation, unless specially formulated for 'missiles' or unmanned aerial vehicles specified in 9A012 or 9A112.a.	

Category Code	Items Description	Note	Relevant Authority
	5. Polytetrahydrofuran polyethylene glycol (TPEG); 6. Polyglycidyl nitrate (PGN or poly-GLYN) (CAS 27814-48-8). c. Other propellant additives and agents: 1. SEE MILITARY ITEMS LIST FOR Carboranes, decaboranes, pentaboranes and derivatives thereof; 2. Triethylene glycol dinitrate (TEGDN) (CAS 111-22-8); 3. 2-Nitrodiphenylamine (CAS 119-75-5); 4. Trimethylolethane trinitrate (TMETN) (CAS 3032-55-1); 5. Diethylene glycol dinitrate (DEGDN) (CAS 693-21-0); 6. Ferrocene derivatives as follows: a. See Military Items List for catocene; b. See Military Items List for Ethyl ferrocene;	Technical Note: Polytetrahydrofuran polyethylene glycol (TPEG) is a block co-polymer of poly 1,4-Butanediol (CAS 110-63-4) and polyethylene glycol (PEG) (CAS 25322-68-3).	

Category Code	Items Description	Note	Relevant Authority
	c. See Military Items List for Propyl ferrocene; d. See Military Items List for n-butyl ferrocene; e. See Military Items List for Pentyl ferrocene (CAS 1274-00-6); f. See Military Items List for Dicyclopentyl ferrocene; g. See Military Items List for Dicyclohexyl ferrocene; h. See Military Items List for Diethyl ferrocene (CAS 1273-97-8); i. See Military Items List for Dipropyl ferrocene; j. See Military Items List for Dibutyl ferrocene (CAS 1274-08-4); k. See Military Items List for Dihexyl ferrocene (CAS 93894-59-8); l. See Military Items List for Acetyl ferrocene (CAS 1271-55-2) / 1,1'-diacetyl ferrocene (CAS 1273-94-5); m. See Military Items List for ferrocene Carboxylic acids;		

Category Code	Items Description	Note	Relevant Authority
	n. See Military Items List for butacene; o. Other ferrocene derivatives usable as rocket propellant burning rate modifiers, other than those specified in the Military Items List. 7. 4,5 diazidomethyl-2-methyl-1,2,3-triazole (iso- DAMTR) , other than that specified in the Military Items List. d. 'Gel propellants', other than that specified in the Military Goods Controls,specifically formulated for use in 'missiles'.	Note: 1C111.c.6.o. does not control ferrocene derivatives that contain a six carbon aromatic functional group attached to the ferrocene molecule. Technical Notes: 1. In 1C111.d. a 'gel propellant' is a fuel or oxidiser formulation using a gellant such as silicates, kaolin (clay), carbon or any polymeric gellant. 2. In 1C111.d. a 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	
1C116	Maraging steels, useable in 'missiles', having all of the following: a. Having an ultimate tensile strength, measured at 293K (20°C), equal to or greater than: 1. 0.9GPa in the solution annealed stage; or 2. 1.5GPa in the precipitation hardened stage; and	N.B. SEE ALSO 1C216. Technical Note 1: Maraging steels are iron alloy: 1. Generally characterised by high nickel, very low carbon content and the use of substitutional elements or precipitates to produce strengthening and age-hardening of the alloy;and	Controller

Category Code	Items Description	Note	Relevant Authority
	b. Any of the following forms: 1. Sheet, plate or tubing with a wall or plate thickness equal to or less than 5.0mm; 2. Tubular forms with a wall thickness equal to or less than 50mm and having an inner diameter equal to or greater than 270mm.	2. Subjected to heat treatment cycles to facilitate the martensitic transformation process (solution annealed stage) and subsequently age hardened (precipitation hardened stage). Technical Note 2: In 1C116, 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	
1C117	Materials for the fabrication of 'missiles' components as follows: a. Tungsten and alloys in particulate form with a tungsten content of 97% by weight or more and a particle size of 50 x 10^{-6}m (50μm) or less; b. Molybdenum and alloys in particulate form with a molybdenum content of 97% by weight or more and a particle size of 50 x 10^{-6}m (50μm) or less; c. Tungsten materials in solid form having all of the following: 1. Any of the following material compositions: a. Tungsten and alloys containing 97% by weight or more of tungsten;	Technical Note: In 1C117 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	Controller

Category Code	Items Description	Note	Relevant Authority
	b. Copper infiltrated tungsten containing 80% by weight or more of tungsten; or c. Silver infiltrated tungsten containing 80% by weight or more of tungsten; and 2. Able to be machined to any of the following products: a. Cylinders having a diameter of 120mm or greater and a length of 50mm or greater; b. Tubes having an inner diameter of 65mm or greater and a wall thickness of 25mm or greater and a length of 50mm or greater; or c. Blocks having a size of 120mm X 120mm X 50mm or greater.		
1C118	Titanium-stabilised duplex stainless steel (Ti-DSS) having all of the following: a. Having all of the following characteristics: 1. Containing 17.0 - 23.0 weight percent chromium and 4.5 - 7.0 weight percent nickel;		Controller

Category Code	Items Description	Note	Relevant Authority
	2. Having a titanium content of greater than 0.10 weight percent; and 3. A ferritic-austenitic microstructure (also referred to as a two-phase microstructure) of which at least 10 percent is austenite by volume (according to ASTM E-1181-87 or national equivalents); and b. Having any of the following forms: 1. Ingots or bars having a size of 100mm or more in each dimension; 2. Sheets having a width of 600mm or more and a thickness of 3mm or less; or 3. Tubes having an outer diameter of 600mm or more and a wall thickness of 3mm or less.		
1C202	Alloys, other than those specified in 1C002.b.3. or .b.4., as follows: a. Aluminium alloys having both of the following characteristics: 1. 'Capable of' an ultimate tensile strength of 460MPa or more at 293K (20°C); and 2. In the form of tubes or cylindrical solid forms (including forgings) with an outside diameter of more than 75mm;	Technical Note: The phrase alloys 'capable of' encompasses alloys before or after heat treatment.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	b. Titanium alloys having both of the following characteristics: 1. 'Capable of' an ultimate tensile strength of 900MPa or more at 293K (20°C); and 2. In the form of tubes or cylindrical solid forms (including forgings) with an outside diameter of more than 75mm.		
1C210	'Fibrous or filamentary materials' or prepregs, other than those specified in 1C010.a., b. or e., as follows: a. Carbon or aramid 'fibrous or filamentary materials' having either of the following characteristics: 1. A "specific modulus" of 12.7 x 10^6 m or greater; or 2. A "specific tensile strength" of 23.5 x 10^4 m or greater; b. Glass 'fibrous or filamentary materials' having both of the following characteristics: 1. A "specific modulus" of 3.18 x 10^6 m or greater; and 2. A "specific tensile strength" of 7.62 x 10^4 m or greater;	Note: 1C210.a. does not control aramid 'fibrous or filamentary materials' having 0.25% by weight or more of an ester based fibre surface modifier; Technical Note: The resin forms the matrix of the composite. Note: In 1C210, 'fibrous or filamentary materials' is restricted to continuous "monofilaments", "yarns", "rovings", "tows" or "tapes".	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	c. Thermoset resin impregnated continuous "yarns", "rovings", "tows" or "tapes" with a width of 15mm or less (prepregs), made from carbon or glass 'fibrous or filamentary materials' specified in 1C210.a. or b.		
1C216	Maraging steel, other than that specified in 1C116, 'capable of' an ultimate tensile strength of 1,950MPa or more, at 293K (20°C).	Note: 1C216 does not control forms in which all linear dimensions are 75mm or less. Technical Note: The phrase maraging steel 'capable of' encompasses maraging steel before or after heat treatment.	Atomic Energy Licensing Board (AELB)
1C225	Boron enriched in the boron-10 (^{10}B) isotope to greater than its natural isotopic abundance, as follows: elemental boron, compounds, mixtures containing boron, manufactures thereof, waste or scrap of any of the foregoing.	Note: In 1C225 mixtures containing boron include boron loaded materials. Technical Note: The natural isotopic abundance of boron-10 is approximately 18.5 weight per cent (20 atom per cent).	Atomic Energy Licensing Board (AELB)
1C226	Tungsten, tungsten carbide, and alloys containing more than 90% tungsten by weight, other than that specified in 1C117, having both of the following characteristics: a. In forms with a hollow cylindrical symmetry (including cylinder segments) with an inside diameter between 100mm and 300mm; and b. A mass greater than 20kg.	Note: 1C226 does not control manufactures specially designed as weights or gamma-ray collimators.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
1C227	Calcium having both of the following characteristics: a. Containing less than 1,000 parts per million by weight of metallic impurities other than magnesium; and b. Containing less than 10 parts per million by weight of boron.		Atomic Energy Licensing Board (AELB)
1C228	Magnesium having both of the following characteristics: a. Containing less than 200 parts per million by weight of metallic impurities other than calcium; and b. Containing less than 10 parts per million by weight of boron.		Atomic Energy Licensing Board (AELB)
1C229	Bismuth having both of the following characteristics: a. A purity of 99.99% or greater by weight; and b. Containing less than 10ppm (parts per million) by weight of silver.		Pharmaceutical Services Division, MOH
1C230	Beryllium metal, alloys containing more than 50% beryllium by weight, beryllium compounds, manufactures thereof, and waste or scrap of any of the foregoing, other than that specified in the Military Items List	N.B. SEE ALSO MILITARY ITEMS LIST. Note: 1C230 does not control the following: a. Metal windows for X-ray machines, or for bore-hole logging devices;	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
		b. Oxide shapes in fabricated or semi-fabricated forms specially designed for electronic component parts or as substrates for electronic circuits; c. Beryl (silicate of beryllium and aluminium) in the form of emeralds or aquamarines.	
1C231	Hafnium metal, alloys containing more than 60% hafnium by weight, hafnium compounds containing more than 60% hafnium by weight, manufactures thereof, and waste or scrap of any of the foregoing.		Atomic Energy Licensing Board (AELB)
1C232	Helium-3 (^{3}He), mixtures containing helium-3, and products or devices containing any of the foregoing.	Note: 1C232 does not control a product or device containing less than 1g of helium-3.	Atomic Energy Licensing Board (AELB)
1C233	Lithium enriched in the lithium-6 (^{6}Li) isotope to greater than its natural isotopic abundance, and products or devices containing enriched lithium, as follows: elemental lithium, alloys, compounds, mixtures containing lithium, manufactures thereof, waste or scrap of any of the foregoing.	Note: 1C233 does not control thermoluminescent dosimeters. Technical Note: The natural isotopic abundance of lithium-6 is approximately 6.5 weight per cent (7.5 atom per cent).	Atomic Energy Licensing Board (AELB)
1C234	Zirconium with a hafnium content of less than 1 part hafnium to 500 parts zirconium by weight, as follows: metal, alloys containing more than 50% zirconium by weight, compounds, manufactures thereof, waste or scrap of any of	Note: 1C234 does not control zirconium in the form of foil having a thickness of 0.10mm or less.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	the foregoing, other than those specified in 0A001.f.		
1C235	Tritium, tritium compounds, mixtures containing tritium in which the ratio of tritium to hydrogen atoms exceeds 1 part in 1,000, and products or devices containing any of the foregoing.	Note: 1C235 does not control a product or device containing less than 1.48×10^3 GBq (40 Ci) of tritium.	Atomic Energy Licensing Board (AELB)
1C236	'Radionuclides' appropriate for making neutron sources based on alpha-n reaction, other than those specified in 0C001 and 1C012.a., in the following forms: a. Elemental; b. Compounds having a total activity of 37 GBq/kg (1 Ci/kg) or greater; c. Mixtures having a total activity of 37GBq/kg (1 Ci/kg) or greater; d. Products or devices containing any of the foregoing.	Note: 1C236 does not control a product or device containing less than 3.7GBq (100 millicuries) of activity. Technical Note: In 1C236 'radionuclides' are any of the following: - Actinium-225 (Ac-225) - Actinium-227 (Ac-227) - Californium-253 (Cf-253) - Curium-240 (Cm-240) - Curium-241 (Cm-241) - Curium-242 (Cm-242) - Curium-243 (Cm-243) - Curium-244 (Cm-244) - Einsteinium-253 (Es-253) - Einsteinium-254 (Es-254) - Gadolinium-148 (Gd-148)	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
		- Plutonium-236 (Pu-236) - Plutonium-238 (Pu-238) - Polonium-208 (Po-208) - Polonium-209 (Po-209) - Polonium-210 (Po-210) - Radium-223 (Ra-223) - Thorium-227 (Th-227) - Thorium-228 (Th-228) - Uranium-230 (U-230) - Uranium-232 (U-232)	
1C237	Radium-226 (^{226}Ra), radium-226 alloys, radium-226 compounds, mixtures containing radium-226, manufactures thereof, and products or devices containing any of the foregoing.	Note: 1C237 does not control the following: a. Medical applicators; b. A product or device containing less than 0.37GBq (10 millicuries) of radium-226.	Atomic Energy Licensing Board (AELB)
1C238	Chlorine trifluoride (ClF_3).		Atomic Energy Licensing Board (AELB)
1C239	High explosives, other than those specified in the Military Items List, or substances or mixtures containing more than 2% by weight thereof, with a crystal density greater than 1.8g/cm^3 and having a detonation velocity greater than 8,000m/s.		Controller

Category Code	Items Description	Note	Relevant Authority
1C240	Nickel powder and porous nickel metal, other than those specified in 0C005, as follows: a. Nickel powder having both of the following characteristics: 1. A nickel purity content of 99.0% or greater by weight; and 2. A mean particle size of less than 10μm measured by American Society for Testing and Materials (ASTM) B330 standard; b. Porous nickel metal produced from materials specified in 1C240.a.	Note: 1C240 does not control the following: a. Filamentary nickel powders; b. Single porous nickel sheets with an area of 1,000cm^2 per sheet or less. Technical Note: 1C240.b. refers to porous metal formed by compacting and sintering the materials in 1C240.a. to form a metal material with fine pores interconnected throughout the structure.	Atomic Energy Licensing Board (AELB)
1C241	Rhenium, and alloys containing 90% by weight or more rhenium; and alloys of rhenium and tungsten containing 90% by weight or more of any combination of rhenium and tungsten, other than those specified in 1C226, having both of the following characteristics: a. In forms with a hollow cylindrical symmetry (including cylinder segments) with an inside diameter between 100 and 300mm; and		Controller

Category Code	Items Description	Note	Relevant Authority
	b. A mass greater than 20kg.		
1C350	Chemicals, which may be used as precursors for toxic chemical agents, as follows, and "chemical mixtures" containing one or more thereof: 1. Thiodiglycol (111-48-8); 2. Phosphorus oxychloride (10025-87-3); 3. Dimethyl methylphosphonate (756-79-6); 4. SEE MILITARY ITEMS LIST for Methyl phosphonyl difluoride (676-99-3); 5. Methyl phosphonyl dichloride (676-97-1); 6. Dimethyl phosphite (DMP) (868-85-9); 7. Phosphorus trichloride (7719-12-2); 8. Trimethyl phosphite (TMP) (121-45-9);	N.B. SEE ALSO MILITARY ITEMS LIST AND 1C450. Note 1: For exports to 'States not Party to the Chemical Weapons Convention', 1C350 does not control 'chemical mixtures' containing one or more of the chemicals specified in entries 1C350.1, .3, .5, .11, .12, .13, .17, .18, .21, .22, .26, .27, .28, .31, .32, .33, .34, .35, .36, .54, .55, .56, .57, .63 and .65 in which no individually specified chemical constitutes more than 10% by the weight of the mixture. Note 2: For exports to "States Party to the Chemical Weapons Convention", 1C350 does not control "chemical mixtures" containing one or more of the chemicals specified in entries 1C350.1, .3, .5, .11, .12, .13, .17, .18, .21, .22, .26, .27, .28, .31, .32, .33, .34, .35, .36, .54, .55, .56, .57, .63 and .65 in which no individually specified chemical constitutes more than 30% by the weight of the mixture. Note 3: 1C350 does not control "chemical mixtures" containing one or more of the chemicals specified in entries 1C350.2, .6, .7, .8, .9, .10, .14, .15, .16,	Controller
	9. Thionyl chloride (7719-09-7);		Pharmaceutical Services Division, MOH
	10. 3-Hydroxy-1-methylpiperidine (3554-74-3); 11. N,N-Diisopropyl-(beta)-aminoethyl chloride (96-79-7); 12. N,N-Diisopropyl-(beta)-aminoethane thiol (5842-07-9);		Controller

Category Code	Items Description	Note	Relevant Authority
	13. 3-Quinuclidinol (1619-34-7); 14. Potassium fluoride (7789-23-3); 15. 2-Chloroethanol (107-07-3); 16. Dimethylamine (124-40-3); 17. Diethyl ethylphosphonate (78-38-6); 18. Diethyl-N,N-dimethylphosphoramidate (2404-03-7); 19. Diethyl phosphite (762-04-9); 20. Dimethylamine hydrochloride (506-59-2); 21. Ethyl phosphinyl dichloride (1498-40-4); 22. Ethyl phosphonyl dichloride (1066-50-8); 23. SEE MILITARY ITEMS LIST for Ethyl phosphonyl difluoride (753-98-0);	.19, .20, .24, .25, .30, .37, .38, .39, .40, .41, .42, .43, .44, .45, .46, .47, .48, .49, .50, .51, .52, .53, .58, .59, .60, .61 and .62 in which no individually specified chemical constitutes more than 30% by the weight of the mixture. Note 4: 1C350 does not control products identified as consumer goods packaged for retail sale for personal use or packaged for individual use.	
	24. Hydrogen fluoride (7664-39-3);		Pharmaceutical Services Division, MOH

Category Code	Items Description	Note	Relevant Authority
	25. Methyl benzilate (76-89-1); 26. Methyl phosphinyl dichloride (676-83-5); 27. N,N-Diisopropyl-(beta)-amino ethanol (96-80-0); 28. Pinacolyl alcohol (464-07-3); 29. SEE MILITARY ITEMS LIST for O-Ethyl O-2-diisopropylaminoethyl methyl phosphonite (QL) (57856-11-8); 30. Triethyl phosphite (122-52-1);		Controller
	31. Arsenic trichloride (7784-34-1);		Pharmaceutical Services Division, MOH
	32. Benzilic acid (76-93-7); 33. Diethyl methylphosphonite (15715-41-0); 34. Dimethyl ethylphosphonate (6163-75-3); 35. Ethyl phosphinyl difluoride (430-78-4); 36. Methyl phosphinyl difluoride (753-59-3); 37. 3-Quinuclidone (3731-38-2); 38. Phosphorus pentachloride (10026-13-8); 39. Pinacolone (75-97-8);		Controller

Category Code	Items Description	Note	Relevant Authority
	40. Potassium cyanide (151-50-8);		Pharmaceutical Services Division, MOH
	41. Potassium bifluoride (7789-29-9); 42. Ammonium hydrogen fluoride or ammonium bifluoride (1341-49-7);		Controller
	43. Sodium fluoride (7681-49-4);		Pharmaceutical Services Division, MOH
	44. Sodium bifluoride (1333-83-1);		Controller
	45. Sodium cyanide (143-33-9);		Pharmaceutical Services Division, MOH
	46. Triethanolamine (102-71-6); 47. Phosphorus pentasulphide (1314-80-3); 48. Di-isopropylamine (108-18-9); 49. Diethylaminoethanol (100-37-8); 50. Sodium sulphide (1313-82-2); 51. Sulphur monochloride (10025-67-9); 52. Sulphur dichloride (10545-99-0);		Controller

Category Code	Items Description	Note	Relevant Authority
	53. Triethanolamine hydrochloride (637-39-8); 54. N,N-Diisopropyl-(Beta)-aminoethyl chloride hydrochloride (4261-68-1); 55. Methylphosphonic acid (993-13-5); 56. Diethyl methylphosphonate (683-08-9); 57. N,N-Dimethylaminophosphoryl dichloride (677-43-0); 58. Triisopropyl phosphite (116-17-6); 59. Ethyldiethanolamine (139-87-7); 60. O,O-Diethyl phosphorothioate (2465-65-8); 61. O,O-Diethyl phosphorodithioate (298-06-6);		
	62. Sodium hexafluorosilicate (16893-85-9);		Pharmaceutical Services Division, MOH
	63. Methylphosphonothioic dichloride (676-98-2);		Controller
	64. Diethylamine (109-89-7); 65. N,N-Diisopropylaminoethanethiol hydrochloride (41480-75-5).		Controller

Category Code	Items Description	Note	Relevant Authority
1C351	Human and animal pathogens and "toxins", as follows: a. Viruses, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows: 1. African horse sickness virus; 2. African swine fever virus; 3. Andes virus; 4. Avian influenza virus, which are: a. Uncharacterised; or b. Defined in Annex I(2) EC Directive 2005/94/EC (O.J. L.10 14.1.2006 p.16) as having high pathogenicity, as follows: 1. Type A viruses with an IVPI (intravenous pathogenicity index) in 6 week old chickens of greater than 1.2; or 2. Type A viruses of the subtypes H5 or H7 with genome sequences codified for multiple basic amino acids at the cleavage site of the haemagglutinin molecule similar	Note: 1C351 does not control "vaccines" or "immunotoxins".	Controller

Category Code	Items Description	Note	Relevant Authority
	to that observed for other HPAI viruses, indicating that the haemagglutinin molecule can be cleaved by a host ubiquitous protease; 5. Bluetongue virus; 6. Chapare virus; 7. Chikungunya virus; 8. Choclo virus; 9. Congo-Crimean haemorrhagic fever virus; 10. Not used; 11. Dobrava-Belgrade virus; 12. Eastern equine encephalitis virus; 13. Ebolavirus: all members of the Ebolavirus genus; 14. Foot and mouth disease virus; 15. Goat pox virus; 16. Guanarito virus; 17. Hantaan virus;		

Category Code	Items Description	Note	Relevant Authority
	18. Hendra virus (Equine morbillivirus); 19. Suid herpesvirus 1 (Pseudorabies virus; Aujeszky's disease); 20. Classical swine fever virus (Hog cholera virus); 21. Japanese encephalitis virus; 22. Junin virus; 23. Kyasanur Forest virus; 24. Laguna Negra virus; 25. Lassa virus; 26. Louping ill virus; 27. Lujo virus; 28. Lumpy skin disease virus; 29. Lymphocytic choriomeningitis virus; 30. Machupo virus; 31. Marburg virus; all members of the Marburgvirus genus; 32. Monkey pox virus; 33. Murray Valley encephalitis virus;		

Category Code	Items Description	Note	Relevant Authority
	34. Newcastle disease virus; 35. Nipah virus; 36. Omsk hemorrhagic fever virus; 37. Oropouche virus; 38. Peste-des-petits-ruminants virus; 39. Swine vesicular disease virus; 40. Powassan virus; 41. Rabies virus and all other members of the Lyssavirus genus; 42. Rift Valley fever virus; 43. Rinderpest virus; 44. Rocio virus; 45. Sabia virus; 46. Seoul virus; 47. Sheep pox virus; 48. Sin nombre virus; 49. St Louis encephalitis virus; 50. Porcine Teschovirus;		

Category Code	Items Description	Note	Relevant Authority
	51. Tick-borne encephalitis virus (Far Eastern subtype); 52. Variola virus; 53. Venezuelan equine encephalitis virus; 54. Vesicular stomatitis virus; 55. Western equine encephalitis virus; 56. Yellow fever virus; 57. Severe acute respiratory syndrome-related coronavirus (SARS-related coronavirus); 58. Reconstructed 1918 influenza virus; b. Not used; c. Bacteria, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows: 1. Bacillus anthracis; 2. Brucella abortus; 3. Brucella melitensis;		

Category Code	Items Description	Note	Relevant Authority
	4. Brucella suis; 5. Burkholderia mallei (Pseudomonas mallei); 6. Burkholderia pseudomallei (Pseudomonas pseudomallei); 7. Chlamydia psittaci (Chlamydophila psittaci); 8. Clostridium argentinense (formerly known as Clostridium botulinum Type G), botulinum neurotoxin producing strains; 9. Clostridium baratii, botulinum neurotoxin producing strains; 10. Clostridium botulinum; 11. Clostridium butyricum, botulinum neurotoxin producing strains; 12. Clostridium perfringens epsilon toxin producing types; 13. Coxiella burnetii; 14. Francisella tularensis; 15. Mycoplasma capricolum subspecies capripneumoniae (strain F38);		

Category Code	Items Description	Note	Relevant Authority
	16. Mycoplasma mycoides subspecies mycoides SC (small colony); 17. Rickettsia prowazeckii; 18. Salmonella enterica subspecies enterica serovar Typhi (Salmonella typhi); 19. Shiga toxin producing Escherichia coli (STEC) of serogroups O26, O45, O103, O104, O111, O121, O145, O157, and other shiga toxin producing serogroups; 20. Shigella dysenteriae; 21. Vibrio cholerae; 22. Yersinia pestis; d. "Toxins", as follows, and "sub-unit of toxins" thereof: 1. Botulinum toxins; 2. Clostridium perfringens alpha, beta 1, beta 2, epsilon and iota toxins; 3. Conotoxins; 4. Ricin; 5. Saxitoxin;	Technical Note: Shiga toxin producing Escherichia coli (STEC) is also known as enterohaemorrhagic E. coli (EHEC) or verocytotoxin producing E. coli (VTEC). Note: Shiga toxin producing Escherichia coli (STEC) includes inter alia enterohaemorrhagic E. coli (EHEC) , verotoxin producing E. coli (VTEC) or verocytotoxin producing E. coli (VTEC). Note: 1C351.d. does not control botulinum toxins or conotoxins in product form meeting all of the following criteria: 1. Are pharmaceutical formulations designed for human administration in the treatment of medical conditions; 2. Are pre-packaged for distribution as medical products; 3. Are authorised by the Government to be marketed as medical products.	

Category Code	Items Description	Note	Relevant Authority
	6. Shiga toxins (shiga-like toxins, verotoxins and verocytotoxins) 7. Staphylococcus aureus enterotoxins, hemolysin alpha toxin, and toxic shock syndrome toxin (formerly known as Staphylococcus enterotoxin F); 8. Tetrodotoxin; 9. Not used; 10. Microcystins (Cyanginosins); 11. Aflatoxins; 12. Abrin; 13. Cholera toxin; 14. Diacetoxyscirpenol; 15. T-2 toxin; 16. HT-2 toxin; 17. Modeccin; 18. Volkensin; 19. Viscumin (Viscum Album Lectin 1; e. Fungi, whether natural, enhanced or modified, either in the form of "isolated live		

Category Code	Items Description	Note	Relevant Authority
	cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows: 1. Coccidioides immitis; 2. Coccidioides posadasii.		
1C352	Not used		
1C353	Genetic elements and genetically modified organisms, as follows: a. Any "genetically modified organism" which contains, or "genetic element" that codes for, any of the following: 1.Any gene or genes specific to any viruses specified in 1C351.a. or 1C354. 2.Any gene or genes specific to bacterium specified in 1C351.c. or 1C3524.b. or fungus specified in 1C351.e. or 1C354.c., and which is any of the following: a. In itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; or b. Could "endow or enhance pathogenicity"; or	Technical Notes: 1."Genetically-modified organisms" include organisms in which the nucleic acid sequences have been created or altered by deliberate molecular manipulation 2. "Genetic elements" include inter alia chromosomes, genomes, plasmids, transposons, vectors and inactivated organisms containing recoverable nucleic acid fragments, whether genetically modified or unmodified, or chemically synthesized in whole or in part. For the purposes of the genetic elements control, nucleic acids from an inactivated organism, virus, or sample are considered recoverable if the inactivation and preparation of the material is intended or known to facilitate	Controller

Category Code	Items Description	Note	Relevant Authority
	3. Any “toxins” specified in 1C351.d. or “sub-units of toxins” therefor. b. Not used.	isolation, purification, amplification, detection, or identification of nucleic acids. 3.“Endow or enhance pathogenicity” is defined as when the insertion or integration of the nucleic acid sequence or sequences is/are likely to enable or increase a recipient organism’s ability to be used to deliberately cause disease or death. This might include alterations to, inter alia: virulence, transmissibility, stability, route of infection, host range, reproducibility, ability to evade or suppress host immunity, resistance to medical countermeasures, or detectability Note: 1C353 does not control nucleic acid sequences of shiga toxin producing Escherichiacoli, of serogroups O26, O45, O103, O104, O111, O121, O145, O157, and other shiga toxin producing serogroups, other than those genetic elements coding for shiga toxin, or for its sub-units.	
1C354	Plant pathogens, as follows: a. Viruses, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:		Controller

Category Code	Items Description	Note	Relevant Authority
	1. Andean potato latent virus (Potato Andean latent tymovirus); 2. Potato spindle tuber viroid; b. Bacteria, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material which has been deliberately inoculated or contaminated with such cultures, as follows: 1. Xanthomonas albilineans; 2. Xanthomonas axonopodis pv. citri (Xanthomonas campestris pv. citri A) [Xanthomonas campestris pv. citri]; 3. Xanthomonas oryzae pv. oryzae (Pseudomonas campestris pv. oryzae); 4. Clavibacter michiganensis subsp. sepedonicus (Corynebacterium michiganensis subsp. sepedonicum or Corynebacterium sepedonicum); 5. Ralstonia solanacearum, race 3, biovar 2; c. Fungi, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material which has been deliberately inoculated or contaminated with such cultures, as follows: 1. Colletotrichum kahawae (Colletotrichum coffeanum var. virulans);		

Category Code	Items Description	Note	Relevant Authority
	2. Cochliobolus miyabeanus (Helminthosporium oryzae); 3. Microcyclus ulei (syn. Dothidella ulei); 4. Puccinia graminis ssp. graminis var. graminis/Puccinia graminis ssp. graminis var. stakmanii (Puccinia graminis [syn. Puccinia graminis f. sp. tritici]); 5. Puccinia striiformis (syn. Puccinia glumarum); 6. Magnaporthe oryzae (Pyricularia oryzae); 7. Peronosclerospora philippinensis (Peronosclerospora sacchari); 8. Sclerophthora rayssiae var. zeae; 9. Synchytrium endobioticium; 10. Tilletia indica; 11. Thecaphora solani.		
1C450	Toxic chemicals and toxic chemical precursors, as follows, and "chemical mixtures" containing one or more thereof: a. Toxic chemicals, as follows: 1. Amiton: O,O-Diethyl S-[2-(diethylamino)ethyl] phosphorothiolate	N.B.: SEE ALSO ENTRY 1C350, 1C351.d. AND MILITARY ITEMS LIST. Note 1: For exports to "States not Party to the Chemical Weapons Convention", 1C450 does not control "chemical mixtures" containing one or more of	Controller

Category Code	Items Description	Note	Relevant Authority
	(78-53-5) and corresponding alkylated or protonated salts; 2. PFIB: 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-1-propene (382-21-8); 3. SEE MILITARY ITEMS LIST for BZ: 3-Quinuclidinyl benzilate (6581-06-2); 4. Phosgene: Carbonyl dichloride (75-44-5); 5. Cyanogen chloride (506-77-4);	the chemicals specified in entries 1C450.a.1. and .a.2. in which no individually specified chemical constitutes more than 1 % by the weight of the mixture. Note 2: For exports to "States Party to the Chemical Weapons Convention", 1C450 does not control "chemical mixtures" containing one or more of the chemicals specified in entries 1C450.a.1. and .a.2. in which no individually specified chemical constitutes more than 30 % by the weight of the mixture. Note 3: 1C450 does not control "chemical mixtures" containing one or more of the chemicals specified in entries 1C450.a.4., .a.5., .a.6. and .a.7. in which no individually specified chemical constitutes more than 30% by the weight of the mixture. Note 4: 1C450 does not control products identified as consumer goods packaged for retail sale for personal use or packaged for individual use. Note: 1C450.b.1 does not control Fonofos: O-Ethyl S-phenyl ethylphosphonothiolothionate (944-22-9);	
	6. Hydrogen cyanide (74-90-8);		Pharmaceutical Services Division, MOH
	7. Chloropicrin: Trichloronitromethane (76-06-2); b. Toxic chemical precursors, as follows: 1. Chemicals, other than those specified in the Military Items List or in 1C350, containing a phosphorus atom to which is bonded one methyl, ethyl or propyl (normal or iso) group but not further carbon atoms; 2. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] phosphoramidic dihalides, other than N,N-Dimethylaminophosphoryl dichloride;		Controller

Category Code	Items Description	Note	Relevant Authority
	3. Dialkyl [methyl, ethyl or propyl (normal or iso)] N,N-dialkyl [methyl, ethyl or propyl (normal or iso)]-phosphoramidates, other than Diethyl-N,N-dimethylphosphoramidate which is specified in 1C350; 4. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethyl-2-chlorides and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethyl chloride or N,N-Diisopropyl-(beta)-aminoethy chloride hydrochloride which are specified in 1C350; 5. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethane-2-ols and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethanol (96-80-0) and N,N-Diethylaminoethanol (100-37-8) which are specified in 1C350; 6. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethane-2-thiols and corresponding protonated salts, other than N,N-Diisopropyl-(beta) aminoethanethiol (5842-07-9) and N,N Diisopropylaminoethanethiol hydrochloride (41480-75-5) which are specified in 1C350;	N.B.: See 1C350.57. for N,N Dimethylaminophosphoryl dichloride. Note 5: 1C450.b.5. does not control the following: a. N,N-Dimethylaminoethanol (108-01-0) and corresponding protonated salts; b. Protonated salts of N,N Diethylaminoethanol (100-37-8); Note 1: For exports to "States not Party to the Chemical Weapons Convention", 1C450 does not control "chemical mixtures" containing one or more of the chemicals specified in entries 1C450.b.1., .b.2., .b.3., .b.4., .b.5. and .b.6. in which no individually specified	

Category Code	Items Description	Note	Relevant Authority
	7. See 1C350 for ethyldiethanolamine (139-87-7); 8. Methyldiethanolamine (105-59-9).	chemical constitutes more than 10% by the weight of the mixture. Note 2: For exports to "States Party to the Chemical Weapons Convention", 1C450 does not control "chemical mixtures" containing one or more of the chemicals specified in entries 1C450.b.1., .b.2., .b.3., .b.4., .b.5. and .b.6. in which no individually specified chemical constitutes more than 30% by the weight of the mixture. Note 3: 1C450 does not control "chemical mixtures" containing one or more of the chemicals specified in entry 1C450.b.8. in which no individually specified chemical constitutes more than 30% by the weight of the mixture. Note 4: 1C450 does not control products identified as consumer goods packaged for retail sale for personal use or packaged for individual use.	
1D	**Software**		
1D001	"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in 1B001 to 1B003.		Atomic Energy Licensing Board (AELB)
1D002	"Software"for the "development"of organic "matrix", metal "matrix"or carbon "matrix" laminates or "composites".		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
1D003	"Software" specially designed or modified to enable equipment to perform the functions of equipment specified in 1A004.c. or 1A004.d.		Atomic Energy Licensing Board (AELB)
1D101	"Software" specially designed or modified for the operation or maintenance of goods specified in 1B101, 1B102, 1B115, 1B117, 1B118 or 1B119.		Atomic Energy Licensing Board (AELB)
1D103	"Software" specially designed for analysis of reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures.		Controller
1D201	"Software" specially designed for the "use" of goods specified in 1B201.		Atomic Energy Licensing Board (AELB)
1E	**Technology**		
1E001	"Technology" according to the General Technology Note for the "development" or "production" of equipment or materials specified in 1A001.b., 1A001.c., 1A002 to 1A005, 1A006.b., 1A007, 1B or 1C.		Controller
1E002	Other "technology" as follows: a. "Technology" for the "development" or "production" of polybenzothiazoles or polybenzoxazoles; b. "Technology" for the "development" or "production" of fluoroelastomer compounds containing at least one vinylether monomer;		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	c. "Technology" for the design or "production" of the following ceramic powders or non-"composite" ceramic materials: 1. Ceramic powders having all of the following: a. Any of the following compositions: 1. Single or complex oxides of zirconium and complex oxides of silicon or aluminium; 2. Single nitrides of boron (cubic crystalline forms); 3. Single or complex carbides of silicon or boron; or 4. Single or complex nitrides of silicon; b. Any of the following total metallic impurities (excluding intentional additions): 1. Less than 1,000ppm for single oxides or carbides; or 2. Less than 5,000ppm for complex compounds or single nitrides; and c. Being any of the following:		

Category Code	Items Description	Note	Relevant Authority
	1. Zirconia (CAS 1314-23-4) with an average particle size equal to or less than 1 μm and no more than 10% of the particles larger than 5μm; or 2. Other ceramic powders with an average particle size equal to or less than 5μm and no more than 10% of the particles larger than 10μm; or 2. Non-“composite” ceramic materials composed of the materials specified in 1E002.c.1; d. Not used; e. “Technology” for the installation, maintenance or repair of materials specified in 1C001; f. “Technology” for the repair of "composite" structures, laminates or materials specified in 1A002 or 1C007.c.; g. "Libraries" specially designed or modified to enable equipment to perform the functions of equipment specified in 1A004.c. or 1A004.d.	Note: 1E002.c.2. does not control “technology” for abrasives. Note: 1E002.f. does not control "technology" for the repair of "civil aircraft" structures using carbon "fibrous or filamentary materials" and epoxy resins, contained in aircraft manufacturers' manuals.	
1E101	“Technology” according to the General Technology Note for the "use" of goods specified in 1A102, 1B001, 1B101, 1B102, 1B115 to		Controller

Category Code	Items Description	Note	Relevant Authority
	1B119, 1C001, 1C101, 1C107, 1C111 to 1C118, 1D101 or 1D103.		
1E102	"Technology" according to the General Technology Note for the "development" of "software" specified in 1D001, 1D101 or 1D103.		Controller
1E103	"Technology" for the regulation of temperature, pressure or atmosphere in autoclaves or hydroclaves, when used for the "production" of "composites" or partially processed "composites".		Controller
1E104	"Technology" relating to the "production" of pyrolytically derived materials formed on a mould, mandrel or other substrate from precursor gases which decompose in the 1,573K (1,300°C) to 3,173K (2,900°C) temperature range at pressures of 130Pa to 20kPa.	Note: 1E104 includes "technology" for the composition of precursor gases, flow-rates and process control schedules and parameters.	Controller
1E201	"Technology" according to the General Technology Note for the "use" of items specified in 1A002, 1A007, 1A202, 1A225 to 1A227, 1B201, 1B225 to 1B234, 1C002.b.3. or .b.4., 1C010.b., 1C202, 1C210, 1C216, 1C225 to 1C241 or 1D201.		Atomic Energy Licensing Board (AELB)
1E202	"Technology" according to the General Technology Note for the "development" or "production" of goods specified in 1A007, 1A202 or 1A225 to 1A227.		Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
1E203	"Technology" according to the General Technology Note for the "development" of "software" specified in 1D201.		Atomic Energy Licensing Board (AELB)

CATEGORY 2

MATERIALS PROCESSING

Category Code	*Items Description*	*Note*	*Relevant Authority*
Category 2 - MATERIALS PROCESSING			
2A	**Systems, Equipment and Components**	N.B.: For quiet running bearings, see the Military Items List.	
2A001	Anti-friction bearings and bearing systems, as follows, and components therefor: a. Ball bearings and solid roller bearings, having all tolerances specified by the manufacturer in accordance with ISO 492 Tolerance Class 4 or Class 2 (or national equivalents), or better and having both "rings" and "rolling elements" made from monel or beryllium; b. Not used; c. Active magnetic bearing systems using any of the following:	N.B.: SEE ALSO 2A101. Note: 2A001 does not control balls with tolerances specified by the manufacturer in accordance with ISO 3290:2001 as grade G5 (or national equivalents) or worse. Note: 2A001.a. does not control tapered roller bearings. Technical Notes: 1. 'Ring' – annular part of a radial rolling bearing incorporating one or more raceways (ISO 5593:1997) 2. 'Rolling element' – ball or roller which rolls between raceways (ISO 5593:1997)	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Materials with flux densities of 2.0T or greater and yield strengths greater than 414MPa; 2. All-electromagnetic 3D homopolar bias designs for actuators; or 3. High temperature (450K (177°C) and above) position sensors.		
2A101	Radial ball bearings, other than those specified in 2A001, having all tolerances specified in accordance with ISO 492 Tolerance Class 2 (or ANSI/ABMA Std 20 Tolerance Class ABEC-9 or other national equivalents), or better and having all the following characteristics: a. An inner ring bore diameter between 12mm and 50mm; b. An outer ring outside diameter between 25mm and 100mm; and c. A width between 10mm and 20mm.		Atomic Energy Licensing Board (AELB)
2A225	Crucibles made of materials resistant to liquid actinide metals, as follows: a. Crucibles having both of the following characteristics: 1. A volume of between 150cm^3 and 8,00 cm^3; and		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Made of or coated with any of the following materials, or combination of the following materials, having an overall impurity level of 2% or less by weight: a. Calcium fluoride (CaF_2); b. Calcium zirconate (metazirconate) ($CaZrO_3$); c. Cerium sulphide (Ce_2S_3); d. Erbium oxide (erbia) (Er_2O_3); e. Hafnium oxide (hafnia) (HfO_2); f. Magnesium oxide (MgO); g. Nitrided niobium-titanium-tungsten alloy (approximately 50% Nb, 30% Ti, 20% W); h. Yttrium oxide (yttria) (Y_2O_3); or i. Zirconium oxide (zirconia) (ZrO_2); b. Crucibles having both of the following characteristics: 1. A volume of between 50cm^3 and 2,000cm^3; and		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Made of or lined with tantalum, having a purity of 99.9% or greater by weight; c. Crucibles having all of the following characteristics: 1. A volume of between 50cm^3 and 2,000cm^3; 2. Made of or lined with tantalum, having a purity of 98% or greater by weight; and 3. Coated with tantalum carbide, nitride, boride, or any combination thereof.		
2A226	Valves having all of the following characteristics: a. A 'nominal size' of 5mm or greater; b. Having a bellows seal; and c. Wholly made of or lined with aluminium, aluminium alloy, nickel, or nickel alloy containing more than 60% nickel by weight.	Technical Note: For valves with different inlet and outlet diameters, the 'nominal size' in 2A226 refers to the smallest diameter.	Atomic Energy Licensing Board (AELB)
2B	**Test, Inspection and Production Equipment**	Technical Notes: 1. Secondary parallel contouring axes, (e.g., the w-axis on horizontal boring mills or a secondary rotary axis the centre line of which is parallel to the primary rotary axis) are not counted in the total number of contouring	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		axes. Rotary axes need not rotate over 360°. A rotary axis can be driven by a linear device (e.g., a screw or a rack-and-pinion). 2. For the purposes of 2B, the number of axes which can be co-ordinated simultaneously for "contouring control" is the number of axes along or around which, during processing of the workpiece, simultaneous and interrelated motions are performed between the workpiece and a tool. This does not include any additional axes along or around which other relative movement within the machine are performed such as: a. Wheel-dressing systems in grinding machines; b. Parallel rotary axes designed for mounting of separate workpieces; c. Co-linear rotary axes designed for manipulating the same workpiece by holding it in a chuck from different ends. 3. Axis nomenclature shall be in accordance with International Standard ISO 8412001, Industrial	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		automation systems and integration - Numerical Control - of machines Coordinate system and motion nomenclature'. 4. For the purposes of 2B001 to 2B009 a "tilting spindle" is counted as a rotary axis. 5. 'Stated "unidirectional positioning repeatability"' may be used for each machine tool model as an alternative to individual machine tests and is determined as follows: a. Select five machines of a model to be evaluated; b. Measure the linear axis repeatability (R↑,R↓) according to ISO 2302:2014 and evaluate "unidirectional positioning repeatability" for each axis of each of the five machines; c. Determine the arithmetic mean value of the "unidirectional positioning repeatability"-values for each axis of all five machines together. These arithmetic mean values of "unidirectional positioning repeatability" $\overline{UPR}$ become the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		stated value of each axis for the model $\left(\overline{\mathrm{UPR}_x}, \overline{\mathrm{UPR}_y}, \ldots\right)$; d. Since the Category 2 list refers to each linear axis there will be as many 'stated "unidirectional positioning repeatability" values as there are linear axes; e. If any axis of a machine model not controlled by 2B001.a. to 2B001.c. has a 'stated "unidirectional positioning repeatability" equal to or less than the specified "unidirectional positioning repeatability" of each machine tool model plus 0.7μm, the builder should be required to reaffirm the accuracy level once every eighteen months. 6. For the purposes of 2B001.a. to 2B001.c., measurement uncertainty for the "unidirectional positioning repeatability" of machine tools, as defined in the International Standard ISO 230/2:2014 or national equivalents, shall not be considered.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		7. For the purpose of 2B001.a. to 2B001.c., the measurement of axes shall be made according to test procedures in 5.3.2. of ISO 230-2:2014. Tests for axes longer than 2 meters shall be made over 2m segments. Axes longer than 4m require multiple tests (e.g., two tests for axes longer than 4 m and up to 8m, three tests for axes longer than 8m and up to 12m), each over 2m segments and distributed in equal intervals over the axis length. Test segments are equally spaced along the full axis length, with any excess length equally divided at the beginning, in between, and at the end of the test segments. The smallest "unidirectional positioning repeatability"-value of all test segments is to be reported.	
2B001	Machine tools and any combination thereof, for removing (or cutting) metals, ceramics or "composites", which, according to the manufacturer's technical specification, can be equipped with electronic devices for "numerical control", as follows:	N.B.: SEE ALSO 2B201. Note 1: 2B001 does not control special purpose machine tools limited to the manufacture of gears. For such machines see 2B003. Note 2: 2B001 does not control special purpose machine tools limited to the manufacture of any of the following:	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		a. Crankshafts or camshafts; b. Tools or cutters; c. Extruder worms; d. Engraved or facetted jewellery parts; or e. Dental prostheses. Note 3: A machine tool having at least two of the three turning, milling or grinding capabilities (e.g., a turning machine with milling capability), must be evaluated against each applicable entry 2B001.a., b. or c. N.B.: For optical finishing machines, see 2B002.	
	a. Machine tools for turning having all of the following: 1. "Unidirectional positioning repeatability" equal to or less (better) than 1.1 µm along one or more linear axis; and	Note 1: 2B001.a. does not control turning machines specially designed for producing contact lenses, having all of the following: a. Machine controller limited to using ophthalmic based software for part programming data input; and b. No vacuum chucking.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Two or more axes which can be coordinated simultaneously for "contouring control"; b. Machine tools for milling having any of the following: 1. Having all of the following: a. "Unidirectional positioning repeatability" equal to or less (better) than 1.1µm along one or more linear axis; and b. Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control"; 2. Five or more axes which can be coordinated simultaneously for "contouring control" having any of the following; a. "Unidirectional positioning repeatability" equal to or less (better) than 1.1µm along one or more linear axis with a travel length less than m; b. "Unidirectional positioning repeatability" equal to or less (better) than 1.4µm along one or more linear	Note 2: 2B001.a. does not control bar machines (Swissturn), limited to machining only bar feed thru, if maximum bar diameter is equal to or less than 42 mm and there is no capability of mounting chucks. Machines may have drilling or milling capabilities for machining parts with diameters less than 42 mm.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	axis with a travel length equal to or greater than 1m and less than 4m; or c. "Unidirectional positioning repeatability" equal to or less (better) than 6,0µm (along one or more linear axis with a travel length equal to or greater than 4m; d. Not used 3. A "unidirectional positioning repeatability" for jig boring machines, equal to or less (better) than 1.1µm along one or more linear axis; or 4. Fly cutting machines having all of the following: a. Spindle "run-out" and "camming" less (better) than 0.0004mm TIR; and b. Angular deviation of slide movement (yaw, pitch and roll) less (better) than 2 seconds of arc, TIR over 300mm of travel; c. Machine tools for grinding having any of the following: 1. Having all of the following:	Note: 2B001.c. does not control grinding machine as follows: a. Cylindrical external, internal, and external-internal grinding	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. "Unidirectional positioning repeatability" equal to or less (better) than 1.1µm along one or more linear axis; and b. Three or four axes which can be coordinated simultaneously for 'contouring control'; or 2. Five or more axes which can be coordinated simultaneously for "contouring control" having any of the following: c. "Unidirectional positioning repeatability" equal to or less (better) than 1.1µm along one or more linear axis with a travel length less than 1 m; d. "Unidirectional positioning repeatability" equal to or less (better) than 1.4µm along one or more linear axis with a travel length equal to or greater than 1m and less than 4m; or e. "Unidirectional positioning repeatability" equal to or less (better) than 6.0µm along one or more linear axis with a travel length equal to or greater than 4m.	machines, having all of the following: 1. Limited to cylindrical grinding; and 2. Limited to a maximum workpiece capacity of 150mm outside diameter or length. b. Machines designed specifically as jig grinders that do not have a z-axis or a w-axis, with a "unidirectional positioning repeatability" less (better) than 1.1µm. c. Surface grinders.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Electrical discharge machines (EDM) of the non-wire type which have two or more rotary axes which can be coordinated simultaneously for "contouring control"; e. Machine tools for removing metals, ceramics or "composites", having all of the following: 1. Removing material by means of any of the following: a. Water or other liquid jets, including those employing abrasive additives; b. Electron beam; or c. "Laser" beam; and 2. At least two rotary axes having all of the following: a. Can be coordinated simultaneously for "contouring control"; and b. A positioning "accuracy" of less (better) than 0.003°; f. Deep-hole-drilling machines and turning machines modified for deep-hole-drilling, having a maximum depth-of-bore capability exceeding 5m.		

Category Code	*Items Description*	*Note*	*Relevant Authority*
2B002	Numerically controlled optical finishing machine tools equipped for selective material removal to produce non-spherical optical surfaces having all of the following characteristics: a. Finishing the form to less (better) than 1.0μm; b. Finishing to a roughness less (better) than 100nm rms; c. Four or more axes which can be coordinated simultaneously for "contouring control"; and d. Using any of the following processes: 1. Magnetorheological finishing ('MRF'); 2. Electrorheological finishing ('ERF'); 3. 'Energetic particle beam finishing'; 4. 'Inflatable membrane tool finishing'; or 5. 'Fluid jet finishing'.	Technical Notes: For the purposes of 2B002: 1. 'MRF' is a material removal process using an abrasive magnetic fluid whose viscosity is controlled by a magnetic field. 2. 'ERF' is a removal process using an abrasive fluid whose viscosity is controlled by an electric field. 3. 'Energetic particle beam finishing' uses Reactive Atom Plasmas (RAP) or ion-beams to selectively remove material. 4. 'Inflatable membrane tool finishing' is a process that uses a pressurized membrane that deforms to contact the workpiece over a small area. 5. 'Fluid jet finishing' makes use of a fluid stream for material removal.	Controller
2B003	"Numerically controlled" machine tools, specially designed for the shaving, finishing, grinding or honing of hardened (R_c=40 or more) spur, helical and double-helical gears having all of the following: a. A pitch diameter exceeding 1,250 mm;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. A face width of 15% of pitch diameter or larger; and c. finished quality of AGMA 14 or better (equivalent to ISO 1328 class 3).		
2B004	Hot "isostatic presses" having all of the following, and specially designed components and accessories therefor: a. A controlled thermal environment within the closed cavity and a chamber cavity with an inside diameter of 406mm or more; and b. Having any of the following: 1. A maximum working pressure exceeding 207MPa; 2. A controlled thermal environment exceeding 1,773K (1,500°C); or 3. A facility for hydrocarbon impregnation and removal of resultant gaseous degradation products.	N.B.: SEE ALSO 2B104 and 2B204. Technical Note: The inside chamber dimension is that of the chamber in which both the working temperature and the working pressure are achieved and does not include fixtures. That dimension will be the smaller of either the inside diameter of the pressure chamber or the inside diameter of the insulated furnace chamber, depending on which of the two chambers is located inside the other. N.B.: For specially designed dies, moulds and tooling, see 1B003, 9B009 and the Military Items List.	Atomic Energy Licensing Board (AELB)
2B005	Equipment specially designed for the deposition, processing and in-process control of inorganic overlays, coatings and surface modifications, as follows, for substrates specified in column 2, by processes shown in column 1 in the Table following 2E003.f., and specially designed	Note: 2B005 does not control chemical vapour deposition, cathodic arc, sputter deposition, ion plating or ion implantation equipment, specially designed for cutting or machining tools.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	automated handling, positioning, manipulation and control components therefor: a. Chemical vapour deposition (CVD) production equipment having all of the following: 1. A process modified for one of the following: a. Pulsating CVD; b. Controlled nucleation thermal deposition (CNTD); or c. Plasma enhanced or plasma assisted CVD; and 2. Having any of the following: a. Incorporating high vacuum (equal to or less than 0.01Pa) rotating seals; or b. Incorporating *in situ* coating thickness control; b. Ion implantation production equipment having beam currents of 5mA or more; c. Electron beam physical vapour deposition (EB-PVD) production equipment incorporating power systems rated for over 80kW and having any of the following:	N.B.: SEE ALSO 2B105. Note: 2B005 does not control chemical vapour deposition, cathodic arc, sputter deposition, ion plating or ion implantation equipment, specially designed for cutting or machining tools.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. A liquid pool level "laser" control system which regulates precisely the ingots feed rate; or 2. A computer controlled rate monitor operating on the principle of photo-luminescence of the ionised atoms in the evaporant stream to control the deposition rate of a coating containing two or more elements; d. Plasma spraying production equipment having any of the following: 1. Operating at reduced pressure controlled atmosphere (equal to or less than 10kPa measured above and within 300mm of the gun nozzle exit) in a vacuum chamber capable of evacuation down to 0.01Pa prior to the spraying process; or 2. Incorporating *in situ* coating thickness control; e. Sputter deposition production equipment capable of current densities of 0.1mA/mm^2 or higher at a deposition rate of 15μm/h or more; f. Cathodic arc deposition production equipment incorporating a grid of electromagnets for steering control of the arc spot on the cathode;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	g. Ion plating production equipment capable of the *in situ* measurement of any of the following: 1. Coating thickness on the substrate and rate control; or 2. Optical characteristics.		
2B006	Dimensional inspection or measuring systems, equipment position feedback units and 'electronic assemblies', as follows: a. Computer controlled or "numerically controlled" Coordinate Measuring Machines (CMM), having a three dimensional (volumetric) maximum permissible error of length measurement ($E_{0,MPE}$) at any point within the operating range of the machine (i.e. within the length of the axes) equal to or less (better) than (1.7 + L/1,000) µm (L is the measured length in mm), according to ISO 10360-2:2009; b. Linear displacement measuring instruments or systems, linear position feedback units, and "electronic assemblies", as follows:	Note: 2B006 includes machine tools, other than those specified in 2B001, that can be used as measuring machines if they meet or exceed the criteria specified for the measuring machine function. Technical Note: The $E_{0,\ MPE}$ of the most accurate configuration of the CMM specified in the manufacturer (e.g. best of the following: probe, stylus length, motion parameters, environment) and with "all compensations available" shall be compared to the 1.7+L/1,000 µm threshold. N.B SEE ALSO 2B206. Note: Interferometer and optical-encoder measuring systems containing a 'laser' are only specified in 2B006.b.3 and 2B206.c.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. "Non-contact type measuring systems" with a "resolution" equal to or less (better) than 0.2 μm within 0 to 0.2 mm of the "measuring range"; 2. Linear position feedback units specifically design for machine tools and having an overall 'accuracy' less (better) than (800 + (600 x L/1,000)) nm (L equals effective length in mm); 3. Measuring systems having all of the following: a. Containing a "laser"; b. A "resolution" over their full scale of 0.200 nm or less (better); and c. Capable of achieving a "measurement uncertainty" equal to or less (better) than (1.6 + L/2,000) nm (L is the measured length in mm) at any point within a measuring range, when compensated for the refractive index of air and measured over a period of 30 seconds at at temperature of 2020 ± 0.01°C; or	Technical Note: For the purpose of 2B006.b.1.: 1. 'non-contact type measuring systems' are designed to measure the distance between the probe and measured object along a single vector, where the probe or measured object is in motion. 2. 'measuring range' means the distance between the minimum and maximum working distance.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. "Electronic assemblies" specially designed to provide feedback capability in systems specified in 2B006.b.3.; c. Rotary position feedback units specially designed for machine tools or angular displacement measuring instruments, having an angular position 'accuracy' equal to or less (better) than 0.9 second of arc; d. "Equipment for measuring surface roughness (including surface defects), by measuring optical scatter with a sensitivity of 0.5 nm or less (better).	Note: 2B006.c. does not control optical instruments, such as autocollimators, using collimated light (e.g. 'laser' light) to detect angular displacement of a mirror. Note: 2B006 includes machine tools, other than those specified in 2B001, that can be used as measuring machines if they meet or exceed the criteria specified for the measuring machine function.	
2B007	"Robots" having any of the following characteristics and specially designed controllers and "end-effectors" therefor: a. Not used; b. Specially designed to comply with national safety standards applicable to potentially explosive munitions environments; c. Specially designed or rated as radiation-hardened to withstand a total radiation dose greater than 5×10^3 Gy (silicon) without operational degradation; or		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Specially designed to operate at altitudes exceeding 30,000 m.		
2B008	"Compound rotary tables" and "tilting spindles" specially designed for machine tools as follows: a. Not used; b. Not used; c. 'Compound rotary tables' having all of the following: 1. Designed for machine tools for turning, milling or grinding; and 2. Two rotary axes designed to be coordinated simultaneously for 'contouring control'. d. 'Tilting spindles' having all of the following: 1. Designed for machine tools for turning, milling or grinding; and 2. Designed to be coordinated simultaneously for 'contouring control'.	Technical Note: A 'compound rotary table' is a table allowing the workpiece to rotate and tilt about two non-parallel axes.	Atomic Energy Licensing Board (AELB)
2B009	Spin-forming machines and flow-forming machines which, according to the manufacturer's technical specification, can be equipped with "numerical control" units or a computer control and having all of the following:	N.B.: SEE ALSO 2B109 AND 2B209.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Three or more axes which can be coordinated simultaneously for "contouring control"; and b. A roller force more than 60kN.	Technical Note: For the purpose of 2B009, machines combining the function of spin-forming and flow-forming are regarded as flow-forming machines.	
2B104	"Isostatic presses", other than those specified in 2B004, having all of the following: a. Maximum working pressure of 69MPa or greater; b. Designed to achieve and maintain a controlled thermal environment of 873K (600°C) or greater; and c. Possessing a chamber cavity with an inside diameter of 254mm or greater.	N.B.: SEE ALSO 2B204.	Controller
2B105	Chemical Vapour Deposition (CVD) furnaces, other than those specified in 2B005.a., designed or modified for the densification of carbon-carbon composites.		Controller
2B109	Flow-forming machines, other than those specified in 2B009, usable in the “production” of propulsion components and equipment (e.g. motor cases and inter-stages) for “missiles” and specially designed components as follows: a. Flow-forming machines having all of the following:	N.B.: SEE ALSO 2B209.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Equipped with, or according to the manufacturer's technical specification, are capable of being equipped with 'numerical control' units computer control; and 2. With more than two axes which can be coordinated simultaneously for 'contouring control'. b. Specially designed components for flow-forming machines specified in 2B009 or 2B109.a.	Technical Note: Machines combining the function of spin-forming and flow-forming are for the purpose of 2B109 regarded as flow-forming machines.	
2B116	Vibration test systems, equipment and components therefor, as follows: a. Vibration test systems employing feedback or closed loop techniques and incorporating a digital controller, capable of vibrating a system at an acceleration equal to or greater than 1g rms between 20Hz and 2kHz while imparting forces equal to or greater than 50kN, measured 'bare table'; b. Digital controllers, combined with specially designed vibration test software, with a 'real-time control bandwidth' greater than 5kHz designed for use with vibration test systems specified in 2B116.a.; c. Vibration thrusters (shaker units), with or without associated amplifiers, capable of imparting a force equal to or greater than	Technical Note: In 2B116.b., 'real-time control bandwidth' means the maximum rate at which a controller can execute complete cycles of sampling, processing data and transmitting control signals.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	50kN, measured 'bare table', and usable in vibration test systems specified in 2B116.a.; d. Test piece support structures and electronic units designed to combine multiple shaker units in a system capable of providing an effective combined force equal to or greater than 50kN, measured 'bare table', and usable in vibration systems specified in 2B116.a.	Technical Note: In 2B116, 'bare table' means a flat table, or surface, with no fixture or fittings.	
2B117	Equipment and process controls, other than those specified in 2B004, 2B005.a., 2B104 or 2B105, designed or modified for densification and pyrolysis of structural composite rocket nozzles and reentry vehicle nose tips.		Controller
2B119	Balancing machines and related equipment, as follows: a. Balancing machines having all the following characteristics: 1. Not capable of balancing rotors/assemblies having a mass greater than 3kg; 2. Capable of balancing rotors/assemblies at speeds greater than 12,500rpm; 3. Capable of correcting unbalance in two planes or more; and 4. Capable of balancing to a residual specific unbalance of 0.2g mm per kg of rotor mass;	N.B.: SEE ALSO 2B219. Note: 2B119.a. does not control balancing machines designed or modified for dental or other medical equipment.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Indicator heads designed or modified for use with machines specified in 2B119.a.	Technical Note: Indicator heads are sometimes known as balancing instrumentation.	
2B120	Motion simulators or rate tables having all of the following characteristics: a. Two axes or more; b. Designed or modified to incorporate slip rings or integrated non-contact devices capable of transferring electrical power, signal information, or both; and c. Having any of the following characteristics: 1. For any single axis having all of the following: a. Capable of rates of 400 degrees/s or more, or 30 degrees/s or less; and b. A rate resolution equal to or less than 6 degrees/s and an accuracy equal to or less than 0.6 degrees/s; 2. Having a worst-case rate stability equal to or better (less) than plus or minus 0.05% averaged over 10 degrees or more; or 3. A positioning "accuracy" equal to or less (better) than 5 arc second.	Note 1: 2B120 does not control rotary tables designed or modified for machine tools or for medical equipment. For controls on machine tool rotary tables, see 2B008. Note 2: Motion simulators or rate tables specified in 2B120 remain controlled whether or not slip rings or integrated non-contact devices are fitted at time of export.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
2B121	Positioning tables (equipment capable of precise rotary positioning in any axes), other than those specified in 2B120, having all the following characteristics: a. Two axes or more; and b. A positioning "accuracy" equal to or less (better) than 5 arc second.	Note: 2B121 does not control rotary tables designed or modified for machine tools or for medical equipment. For controls on machine tool rotary tables see 2B008.	Controller
2B122	Centrifuges capable of imparting accelerations above 100g and designed or modified to incorporate slip rings or integrated non-contact devices capable of transferring electrical power, signal information, or both.	Note: Centrifuges specified in 2B122 remain controlled whether or not slip rings or integrated non-contact devices are fitted at time of export.	Controller
2B201	Machine tools and any combination thereof, other than those specified in 2B001, as follows, for removing or cutting metals, ceramics or "composites", which, according to the manufacturer's technical specification, can be equipped with electronic devices for simultaneous "contouring control" in two or more axes:	Note 1: 2B201 does not control special purpose machine tools limited to the manufacture of any of the following parts: a. Gears; b. Crankshafts or camshafts; c. Tools or cutters; d. Extruder worms. Note 2: A machine tool having at least two of the three turning, milling or grinding capabilities (e.g., a turning machine with milling capability),	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		must be evaluated against each applicable entry 2B201.a., b. or c. Note 3:2B201.a.3. and 2B201.b.3. include machines based on a parallel linear kinematic design (e.g. hexapods) that have 5 or more axes none of which is a rotary axis. Technical Note: Stated 'positioning accuracy' levels derived under the following procedures from measurements made according to ISO 230/2 (1988)([1]) or national equivalents may be used for each machine tool model if provided to, and accepted by, national authorities instead of individual machine tests. Determination of 'Stated'positioning accuracy: a. Select five machines of a model to be evaluated; b. Measure the linear axis accuracies according to ISO 230/2 (1988 ([1])); c. Determine the accuracy values (A) for each axis of each machine. The method of calculating the accuracy value is described in the ISO 230/2 (1988 ([1])) 1 standard;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		d. Determine the average accuracy value of each axis. This average value becomes the stated 'positioning accuracy' of each axis for the model (Âx Ây...); e. Since Item 2B201 refers to each linear axis, there will be as many stated 'positioning accuracy' values as there are linear axes; f. If any axis of a machine tool not controlled by 2B201.a., 2B201.b. or 2B201.c.. has a stated 'positioning accuracy' of 6µm or better (less) for grinding machines, and 8µm or better (less) for milling and turning machines, both according to ISO 230/2 (1988)([1]), then the builder should be required to reaffirm the accuracy level once every eighteen months.	
	a. Machine tools for milling, having any of the following characteristics: 1. Positioning accuracies with "all compensations available" equal to or less (better) than 6 µm according to ISO 230/2 (1988)([1]) or national equivalents along any linear axis; 2. Two or more contouring rotary axes; or	Note: 2B201.a. does not control milling machines having the following characteristics: a. X-axis travel greater than 2m; and b. Overall 'positioning accuracy' on the x-axis more (worse) tha 30µm.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Five or more axes which can be coordinated simultaneously for "contouring control"; b. Machine tools for grinding, having any of the following characteristics: 1. 'Positioning accuracies' with "all compensations available" equal to or less (better) than 4 µm according to ISO 230/2 (1988)([1]) or national equivalents along any linear axis; 2. Two or more contouring rotary axes; or 3. Five or more axes which can be coordinated simultaneously for "contouring control"; c. Machine tools for turning, that have 'positioning accuracies' with "all compensations available" better (less) than 6µm according to ISO 230/2 (1988) along any linear axis (overall positioning) for machines capable of machining diameters greater than 35mm;	Note: 2B201.b. does not control grinding machines as follows: a. Cylindrical external, internal, and external-internal grinding machines having all of the following characteristics: 1. Limited to a maximum workpiece capacity of 150mm outside diameter or length; and 2. Axes limited to x, z and c; b. Jig grinders that do not have a z-axis or a w-axis with an overall 'positioning accuracy' less (better) than 4µm according to ISO 230/2 (1988) or national equivalents. Note: 2B201.c. does not control bar machines (Swissturn), limited to machining only bar feed thru, if maximum bar diameter is equal to or less than 42mm and there is no capability of mounting chucks. Machines may have drilling and/or	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		milling capabilities for machining parts with diameters less than 42mm.	
2B204	"Isostatic presses", other than those specified in 2B004 or 2B104, and related equipment, as follows: a. "Isostatic presses" having both of the following characteristics: 1. Capable of achieving a maximum working pressure of 69MPa or greater; and 2. A chamber cavity with an inside diameter in excess of 152mm; b. Dies, moulds and controls, specially designed for "isostatic presses", specified in 2B204.a.	Technical Note: In 2B204, the inside chamber dimension is that of the chamber in which both the working temperature and the working pressure are achieved and does not include fixtures. That dimension will be the smaller of either the inside diameter of the pressure chamber or the inside diameter of the insulated furnace chamber, depending on which of the two chambers is located inside the other.	Atomic Energy Licensing Board (AELB)
2B206	Dimensional inspection machines, instruments or systems, other than those specified in 2B006, as follows: a. Computer controlled or numerically controlled coordinate measuring machines (CMM) having either of the following characteristics: 1. Having only two axes and having a maximum permissible error of length measurement along any axis (one dimensional), identified as any combination of $E_{0x,MPE}$, $E_{0y,MPE}$, or $E_{0z,MPE}$,	Technical Note: The $E_{0,MPE}$ of the most accurate configuration of the CMM specified according to ISO 10360-2(2009) by the manufacturer (e.g., best of the following: probe, stylus, length, motion parameters, environments) and with all compensations	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	equal to or less (better) than (1.25 + L/1000) μm (where L is the measured length in mm) at any point within the operating range of the machine (i.e., within the length of the axis), according to ISO 10360-2(2009); or 2. Three or more axes and having a three dimensional (volumetric) maximum permissible error of length measurement ($E_{0,MPE}$) equal to or less (better) than (1.7 + L/800) μm (where L is the measured length in mm) at any point within the operating range of the machine (i.e., within the length of the axis), according to ISO 10360-2(2009); b. Systems for simultaneous linear-angular inspection of hemishells, having both of the following characteristics: 1. "Measurement uncertainty" along any linear axis equal to or less (better) than 3.5μm per 5mm; and 2. "Angular position deviation" equal to or less than 0.02°. c. 'Linear displacement' measuring systems having all of the following characteristics: 1. Containing a "laser"; and	available shall be compared to the 1.7 + L/800 μm threshold. Technical Note: For the purpose of 2B206.c. 'linear displacement' means the change of distance	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Maintaining, for at least 12 hours, at a temperature of ± 1 K around a standard temperature and standard pressure, all of the following: a. A "resolution' over their full scale of 0.1 µm or better; and b. With a "measurement uncertainty" equal to or better (less) than (0,2 + L/2000) µm (L is measured length in milimeters).	between the measuring probe and the measured object. Note: 2B206.c. does not control measuring interferometersystems, without closed or open loop feedback, containing a laser to measure slide movement errors of machine tools, dimensional inspection machines, or similar equipment. Note 1: Machine tools that can be used as measuring machines are controlled if they meet or exceed the criteria specified for the machine tool function or the measuring machine function. Note 2: A machine specified in 2B206 is controlled if it exceeds the control threshold anywhere within its operating range. Technical notes: All parameter of measurement values in 2B206 represent plus/minus i.e., not total band.	
2B207	"Robots", "end-effectors" and control units, other than those specified in 2B007, as follows:		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. "Robots" or "end-effectors" specially designed to comply with national safety standards applicable to handling high explosives (for example, meeting electrical code ratings for high explosives); b. Control units specially designed for any of the "robots" or "end-effectors" specified in 2B207.a.		
2B209	Flow forming machines, spin forming machines capable of flow forming functions, other than those specified in 2B009 or 2B109, and mandrels, as follows: a. Machines having both of the following characteristics: 1. Three or more rollers (active or guiding); and 2. Which, according to the manufacturer's technical specification, can be equipped with "numerical control" units or a computer control; b. Rotor-forming mandrels designed to form cylindrical rotors of inside diameter between 75mm and 400mm.	Note: 2B209.a. includes machines which have only a single roller designed to deform metal plus two auxiliary rollers which support the mandrel, but do not participate directly in the deformation process.	Atomic Energy Licensing Board (AELB)
2B219	Centrifugal multiplane balancing machines, fixed or portable, horizontal or vertical, as follows:		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Centrifugal balancing machines designed for balancing flexible rotors having a length of 600mm or more and having all of the following characteristics: 1. Swing or journal diameter greater than 75mm; 2. Mass capability of from 0.9 to 23kg ; and 3. Capable of balancing speed of revolution greater than 5,000 r.p.m.; b. Centrifugal balancing machines designed for balancing hollow cylindrical rotor components and having all of the following characteristics: 1. Journal diameter greater than 75mm; 2. Mass capability of from 0.9 to 23kg; 3. A minimum achievable residual specific unbalance equal to or less than 10g mm/kg per plane; and 4. Belt drive type.		
2B225	Remote manipulators that can be used to provide remote actions in radiochemical separation operations or hot cells, having either of the following characteristics:	Technical Note: Remote manipulators provide translation of human operator actions to a remote operating arm and terminal fixture. They	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. A capability of penetrating 0.6m or more of hot cell wall (through-the-wall operation); or b. A capability of bridging over the top of a hot cell wall with a thickness of 0.6m or more (over-the-wall operation).	may be of 'master/slave' type or operated by joystick or keypad.	
2B226	Controlled atmosphere (vacuum or inert gas) induction furnaces, other than those specified in 9B001 and 3B001 and power supplies therefor, as follows: a. Furnaces having all of the following characteristics: 1. Capable of operation above 1,123K (850°C); 2. Induction coils 600 mm or less in diameter; and 3. Designed for power inputs of 5kW or more; b. Power supplies, with a specified power output of 5kW or more, specially designed for furnaces specified in 2B226.a.	N.B.: SEE ALSO 3B001 and 9B001. Note: 2B226.a. does not control furnaces designed for the processing of semiconductor wafers.	Atomic Energy Licensing Board (AELB)
2B227	Vacuum or other controlled atmosphere metallurgical melting and casting furnaces and related equipment, as follows:		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Arc remelt furnaces, arc melt furnaces and arc melt and casting furnaces having both of the following characteristics: 1. Consumable electrode capacities between 1,000cm^3 and 20,000cm^3; and 2. Capable of operating with melting temperatures above 1,973K (1,700°C); b. Electron beam melting furnaces plasma atomization furnaces and plasma melting furnaces, having both of the following characteristics: 1. A power of 50 kW or greater; and 2. Capable of operating with melting temperatures above 1,473K (1,200°C). c. Computer control and monitoring systems specially configured for any of the furnaces specified in 2B227.a. or 2B227b.; d. Plasma torches specially designed for furnaces specified in 2B227.b. having both of the following characteristics: 1. Operating at a power greater than 50kW; and 2. Capable of operating above 1473K (1200°C);		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Electron beam guns specially designed for the furnaces specified in 2B227.b. operating at a power greater than 50kW.		
2B228	Rotor fabrication or assembly equipment, rotor straightening equipment, bellows-forming mandrels and dies, as follows: a. Rotor assembly equipment for assembly of gas centrifuge rotor tube sections, baffles, and end caps; b. Rotor straightening equipment for alignment of gas centrifuge rotor tube sections to a common axis; c. Bellows-forming mandrels and dies for producing single-convolution bellows.	Note: 2B228.a. includes precision mandrels, clamps, and shrink fit machines. Technical Note: In 2B228.b. such equipment normally consists of precision measuring probes linked to a computer that subsequently controls the action of, for example, pneumatic rams used for aligning the rotor tube sections. Technical Note: In 2B228.c. the bellows have all of the following characteristics: 1. Inside diameter between 75mm and 400mm; 2. Length equal to or greater than 12.7mm;	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		3. Single convolution depth greater than 2mm; and 4. Made of high-strength aluminium alloys, maraging steel or high strength "fibrous or filamentary materials".	
2B230	All types of 'pressure transducers' capable of measuring absolute pressures and having all of the following: a. Pressure sensing elements made of or protected by aluminium, aluminium alloy, aluminum oxide (alumina or sapphire), nickel, nickel alloy with more than 60% nickel by weight, or fully fluorinated hydrocarbon polymers; b. Seals, if any, essential for sealing the pressure sensing element, and in direct contact with the process medium, made of or protected by aluminium, aluminium alloy, aluminum oxide (alumina or sapphire), nickel, nickel alloy with more than 60% nickel by weight, or fully fluorinated hydrocarbon polymers; and c. Having either of the following characteristics: 1. A full scale of less than 13kPa and an 'accuracy' of better than 1% of full-scale; or	Technical Notes: 1. In 2B230 'pressure transducer' means a device that converts a pressure measurement into a signal. 2. For the purposes of 2B230, 'accuracy' includes non-linearity, hysteresis and repeatability at ambient temperature.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. A full scale of 13kPa or greater and an 'accuracy' of better than 130Pa when measured at 13kPa.		
2B231	Vacuum pumps having all of the following characteristics: a. Input throat size equal to or greater than 380mm; b. Pumping speed equal to or greater than 15m^3/s; and c. Capable of producing an ultimate vacuum better than 13mPa.	Technical Notes: 1. The pumping speed is determined at the measurement point with nitrogen gas or air. 2. The ultimate vacuum is determined at the input of the pump with the input of the pump blocked off.	Atomic Energy Licensing Board (AELB)
2B232	High-velocity gun systems (propellant, gas, coil, electromagnetic, and electrothermal types, and other advanced systems) capable of accelerating projectiles to 1.5km/s or greater.	N.B.: SEE ALSO MILITARY ITEMS LIST.	Controller
2B233	Bellows-sealed scroll-type compressors and bellows-sealed scroll-type vacuum pumps having all of the following: a. Capable of an inlet volume flow rate of 50m^3/h or greater; b. Capable of a pressure ratio of 2:1 or greater; and	N.B.: SEE ALSO 2B350.i.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Having all surfaces that come in contact with the process gas made from any of the following materials: 1. Aluminium or aluminium alloy; 2. Aluminium oxide; 3. Stainless steel; 4. Nickel or nickel alloy; 5. Phosphor bronze; or 6. Fluoropolymers.		
2B350	Chemical manufacturing facilities, equipment and components, as follows: a. Reaction vessels or reactors, with or without agitators, with total internal (geometric) volume greater than 0.1m^3 (100 litres) and less than 20m^3 (20,000 litres), where all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight);	Note: For the purposes of 2B350, the materials used for gaskets, packing, seals, screws, washers or other materials performing a sealing function do not determine the status of control, provided that such components are designed to be interchangeable. NB: For prefabricated repair assemblies, see 2B350.k. Technical Notes: 1. 'Carbon graphite' is a composition consisting of amorphous carbon and graphite, in which the graphite content is eight percent or more by weight.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Glass (including vitrified or enamelled coating or glass lining); 4. Nickel or 'alloys' with more than 40% nickel by weight; 5. Tantalum or tantalum 'alloys'; 6. Titanium or titanium 'alloys'; 7. Zirconium or zirconium 'alloys'; or 8. Niobium (columbium) or niobium 'alloys'; b. Agitators designed for use in reaction vessels or reactors specified in 2B350.a.; and impellers, blades or shafts designed for such agitators, where all surfaces of the agitator that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight); 3. Glass (including vitrified or enamelled coatings or glass lining);	2. For the listed materials in the above entries, the term 'alloy' when not accompanied by a specific elemental concentration is understood as identifying those alloys where the identified metal is present in a higher percentage by weight than any other element.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. Nickel or 'alloys' with more than 40% nickel by weight; 5. Tantalum or tantalum 'alloys'; 6. Titanium or titanium 'alloys'; 7. Zirconium or zirconium 'alloys'; or 8. Niobium (columbium) or niobium 'alloys'; c. Storage tanks, containers or receivers with a total internal (geometric) volume greater than 0.1m^3 (100 litres) where all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight); 3. Glass (including vitrified or enamelled coatings or glass lining); 4. Nickel or 'alloys' with more than 40% nickel by weight; 5. Tantalum or tantalum 'alloys';		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	6. Titanium or titanium 'alloys'; 7. Zirconium or zirconium 'alloys'; or 8. Niobium (columbium) or niobium 'alloys'; d. Heat exchangers or condensers with a heat transfer surface area greater than 0.15m^2, and less than 20m^2; and tubes, plates, coils or blocks (cores) designed for such heat exchangers or condensers, where all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight); 3. Glass (including vitrified or enamelled coatings or glass lining); 4. Graphite or 'carbon graphite'; 5. Nickel or 'alloys' with more than 40% nickel by weight; 6. Tantalum or tantalum 'alloys'; 7. Titanium or titanium 'alloys';		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	8. Zirconium or zirconium 'alloys'; 9. Silicon carbide; 10. Titanium carbide; or 11. Niobium (columbium) or niobium 'alloys'; e. Distillation or absorption columns of internal diameter greater than 0.1m; and liquid distributors, vapour distributors or liquid collectors designed for such distillation or absorption columns, where all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight); 3. Glass (including vitrified or enamelled coatings or glass lining); 4. Graphite or 'carbon graphite'; 5. Nickel or 'alloys' with more than 40% nickel by weight;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	6. Tantalum or tantalum 'alloys'; 7. Titanium or titanium 'alloys'; 8. Zirconium or zirconium 'alloys'; or 9. Niobium (columbium) or niobium 'alloys'; f. Remotely operated filling equipment in which all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20 % chromium by weight; or 2. Nickel or 'alloys' with more than 40% nickel by weight; g. Valves and components, as follows: 1. Valves, having both of the following: a. A 'nominal size' greater than 10mm (3/8"); and b. All surfaces that come in direct contact with the chemical(s) being produced, processed, or contained are made from 'corrosion resistant materials';	Technical Notes: 1. For the purposes of 2B350.g., 'corrosion resistant materials' means any of the following materials: a. Nickel or alloys with more than 40% nickel by weight; b. Alloys with more than 25% nickel and 20% chromium by weight;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Valves, other than those specified in 2B350.g.1., having all of the following; a. A 'nominal size' equal to or greater than 25.4mm (1") and equal to or less than 101.6mm (4"); b. Casings (valve bodies) or preformed casing liners; c. A closure element designed to be interchangeable; and d. All surfaces of the casing (valve body) or preformed case liner that come in direct contact with the chemical(s) being produced, processed, or contained are made from 'corrosion resistant materials'; 3. Components, designed for valves specified in 2B350.g.1 or 2B350.g.2., in which all surfaces that come in direct contact with the chemical(s) being produced, processed, or contained are made from 'corrosion resistant materials', as follows: a. Casings (valve bodies); b. Preformed casing liners;	c. Fluoropolymers (polymeric or elastomeric materials with more than 35 % fluorine by weight); d. Glass or glass-lined (including vitrified or enamelled coating); e. Tantalum or tantalum alloys; f. Titanium or titanium alloys; g. Zirconium or zirconium alloys; h. Niobium (columbium) or niobium alloys; or i. Ceramic materials as follows: 1. Silicon carbide with a purity of 80 % or more by weight; 2. Aluminium oxide (alumina) with a purity of 99.9 % or more by weight; 3. Zirconium oxide (zirconia). 2. The 'nominal size' is defined as the smaller of the inlet and outlet diameters.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	h. Multi-walled piping incorporating a leak detection port, in which all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight); 3. Glass (including vitrified or enamelled coatings or glass lining); 4. Graphite or 'carbon graphite'; 5. Nickel or 'alloys'with more than 40% nickel by weight; 6. Tantalum or tantalum 'alloys'; 7. Titanium or titanium 'alloys'; 8. Zirconium or zirconium 'alloys'; or 9. Niobium (columbium) or niobium 'alloys'; i. Multiple-seal and seal-less pumps, with manufacturer's specified maximum flow-rate greater than 0.6m^3/hour, or vacuum pumps with manufacturer's specified maximum	Technical Note: In 2B350.i., the term seal refers to only those seals that come into direct contact	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	flow-rate greater than 5m^3/hour (under standard temperature (273K (0°C)) and pressure (101.3kPa) conditions), other than those specified in 2B233; and casings (pump bodies), preformed casing liners, impellers, rotors or jet pump nozzles designed for such pumps, in which all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials: 1. 'Alloys' with more than 25% nickel and 20% chromium by weight; 2. Ceramics; 3. Ferrosilicon (high silicon iron alloys); 4. Fluoropolymers (polymeric or elastomeric materials with more than 35% fluorine by weight); 5. Glass (including vitrified or enamelled coatings or glass lining); 6. Graphite or 'carbon graphite'; 7. Nickel or 'alloys' with more than 4 % nickel by weight; 8. Tantalum or tantalum 'alloys'; 9. Titanium or titanium 'alloys';	with the chemical(s) being processed (or are designed to), and provide a sealing function where a rotary or reciprocating drive shaft passes through a pump body.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	10. Zirconium or zirconium 'alloys'; or 11. Niobium (columbium) or niobium 'alloys'; j. Incinerators designed to destroy chemicals specified in entry 1C350, having specially designed waste supply systems, special handling facilities and an average combustion chamber temperature greater than 1,273K (1,000°C), in which all surfaces in the waste supply system that come into direct contact with the waste products are made from or lined with any of the following materials: 1. 'Alloys' with more than 25% nickel and 2% chromium by weight; 2. Ceramics; or 3. Nickel or 'alloys' with more than 40% nickel by weight. k. Prefabricated repair assemblies having metallic surfaces that come in direct contact with the chemical(s) being processed which are made from tantalum or tantalum alloys as follows, and specially designed components therefor: 1. Designed for mechanical attachment to glass-lined reaction vessels or reactors specified in 2B350.a.; or	Note: For the purposes of 2B350, the materials used for gaskets, packing, seals, screws, washers or other materials performing a sealing function do not determine the status of control, provided that such components are designed to be interchangebale. Technical Notes: 1. 'Carbongraphite' is a composition consisting of amorphous carbon and graphite, in which the graphite content is eight percent or more by weight. 2. For the listed materials in the above entries, the term 'alloy' when not accompanied by a specific elemental concentration is understood as identifying those alloys where the identified metal is present in a higher percentage by weight than any other element.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Designed for mechanical attachment to glass-lined storage tanks, containers or receivers specified in 2B350.c.		
2B351	Toxic gas monitors and monitoring systems and their dedicated detecting components, other than those specified in 1A004, as follows: and detectors, sensor devices and replaceable sensor cartridges therefor: a. Designed for continuous operation and usable for the detection of chemical warfare agents or chemicals specified in 1C350, at concentrations of less than 0.3mg/m^3; or b. Designed for the detection of cholinesterase-inhibiting activity.		Controller
2B352	Biological manufacturing and handling as follows: a. Containment facilities and related equipment as follows: 1. Complete containment facilities that meet the criteria for P3 or P4 (BL3, BL4, L3, L4) containment as specified in the WHO Laboratory Biosafety Manual (3rd edition Geneva 2004); 2. Equipment designed for fixed installation in containment facilities controlled in 2B352.a., as follows:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Double-door pass-through decontamination autoclaves; b. Breathing air suit decontamination showers; c. Mechanical-seal or inflatable-seal walkthrough doors; b. Fermenters and components as follows: 1. Fermenters capable of cultivation of "microorganisms" or of live cells for the production of viruses or toxins, without the propagation of aerosols, having a total capacity of 20 litres or more; 2. Components designed for fermenters in 2B352.b.1. as follows: a. Cultivation chambers designed to be sterilised or disinfected in situ; b. Cultivation chamber holding devices; c. Process control units capable of simultaneously monitoring and controlling two or more fermentation system parameters (e.g., temperature, pH, nutrients,	Technical Note: For the purposes of 2B352.b. fermenters include bioreactors, single-use (disposable) bioreactors, chemostats and continuous-flow systems.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	agitation, dissolved oxygen, air flow, foam control); c. Centrifugal separators, capable of continuous separation without the propagation of aerosols, having all the following characteristics: 1. Flow rate exceeding 100 litres per hour; 2. Components of polished stainless steel or titanium; 3. One or more sealing joints within the steam containment area; and 4. Capable of in situ steam sterilisation in a closed state; d. Cross (tangential) flow filtration equipment and components as follows: 1. Cross (tangential) flow filtration equipment capable of separation of "microorganism", viruses, toxins or cell cultures having all of the following characteristics: a. A total filtration area equal to or greater than $1m^2$; and b. Having any of the following characteristics:	Technical Note: Centrifugal separators include decanters. Note: 2B352.d. does not control reverse osmosis and hemodialysis equipment, as specified in the manufacturer. Technical Note: In 2B352.d.1.b. sterilised denotes the elimination of all viable microbes from the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Capable of being sterilised or disinfected in-situ; or 2. Using disposable or single-use filtration components;	equipment through the use of either physical (e.g. steam) or chemical agents. Disinfected denotes the destruction of potential microbial infectivity in the equipment through the use of chemical agents with a germicidal effect. Disinfection and sterilisation are distinct from sanitisation, the latter referring to cleaning procedures designed to lower the microbial content of equipment without necessarily achieving elimination of all microbial infectivity or viability.	
	2. Cross (tangential) flow filtration components (e.g. modules, elements, cassettes, cartridges, units or plates) with filtration area equal to or greater than 0.2m^2 for each component and designed for use in cross (tangential) flow filtration equipment specified in 2B352.d.;		
	e. Steam, gas or vapour sterilisable freeze-drying equipment with a condenser capacity of 10kg of ice in 24 hours and less than 1,000kg of ice in 24 hours;		
	f. Protective and containment equipment, as follows:		
	1. Protective full or half suits, or hoods dependent upon a tethered external air supply and operating under positive pressure;	Note: 2B352.f.1. does not control suits designed to be worn with self-contained breathing apparatus.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Biocontainment chambers, isolators, or biological safety cabinets having all of the following characteristics, for normal operation: a. fully enclosed workspace where the operator is separated from the work by a psychical barrier; b. able to operate at negative pressure; c. Means to safely manipulate items in the workspace; d. supply and exhaust air to and from the workspace is HEPA filtered; g. Aerosol inhalation equipment designed for a aerosol challenge testing with "microorganism", "viruses" or "toxins" as follows: 1. Whole-body exposure chambers having a capacity of $1m^3$ or more; 2. Nose-only exposure apparatus utilising directed aerosol flow and having capacity for exposure of any of the following: a. 12 or more rodents; or b. 2 or more animals other than rodents;	Note 1: 2B352.f.2., includes Class III biosafety cabinets, as described in the latest edition of the WHO Laboratory Biosafety Manual or constructed in accordance with national standards, regulations or guidance. Note 2: 2B352.f.2. does not include isolators specially designed for barrier nursing or transportation of infected patients.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Closed animal restraint tubes designed for use with nose-only exposure apparatus utilising directed aerosol flow; h. Spray drying equipment capable of drying toxins or pathogenic "microorganisms" having all of the following: 1. A water evaporation capacity of ≥ 0.4 kg/h and ≤ 400kg/h; 2. The ability to generate a typical mean product particle size of ≤10μm with existing fittings or by minimal modification of the spray-dryer with atomization nozzles enabling generation of the required particle size; and 3. Capable of being sterilised or disinfected in situ. i. Nucleic acid assemblers and synthesisers, which are partly or entirely automated, and designed to generate continuous nucleic acids greater than 1.5 kilobases in length with error rates less than 5% in a single run.		
2C	**Materials** None.		
2D	**Software**		

Category Code	*Items Description*	*Note*	*Relevant Authority*
2D001	"Software", other than that specified in 2D002, as follows: a. "Software" specially designed or modified for the "development" or "production" of equipment specified in 2A001 or 2B001 b. "Software" specially designed or modified for the "use" of equipment specified in 2A001.c., 2B001 or 2B003 to 2B009.	Note: 2D001 does not control part programming "software" that generates "numerical control" codes for machining various parts.	Atomic Energy Licensing Board (AELB)
2D002	"Software" for electronic devices, even when residing in an electronic device or system**,** enabling such devices or systems to function as a "numerical control" unit, capable of co-ordinating simultaneously more than four axes for "contouring control".	Note 1: 2D002 does not control "software" specially designed or modified for the operation of items not specified in Category 2. Note 2: 2D002 does not control "software" for items specified in 2B002. See 2D001 and 2D003 for "software" for items specified in 2B002. Note 3: 2D002 does not control "software" that is exported with, and the minimum necessary for the operation of, items not specified in Category 2.	Atomic Energy Licensing Board (AELB)
2D003	"Software", designed or modified for the operation of equipment specified in 2B002, that converts optical design, workpiece measurements and material removal functions into "numerical control" commands to achieve the desired workpiece form.		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
2D101	"Software" specially designed or modified for the "use" of equipment specified in 2B104, 2B105, 2B109, 2B116, 2B117 or 2B119 to 2B122.	N.B: SEE ALSO 9D004.	Controller
2D201	"Software" specially designed for the "use" of equipment specified in 2B204, 2B206, 2B207, 2B209, 2B219 or 2B227.		Atomic Energy Licensing Board (AELB)
2D202	"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in 2B201.	Note: 2D202 does not control part programming "software" that generates "numerical control" command codes but does not allow direct use of equipment for machining various parts.	Atomic Energy Licensing Board (AELB)
2D351	"Software", other than that specified in 1D003, specially designed for "use" of equipment specified in 2B351.		Controller
2E	**Technology**		
2E001	"Technology" according to the General Technology Note for the "development" of equipment or "software" specified in 2A, 2B or 2D.	Note: 2E001 includes "technology" for the integration of probe systems into coordinate measurement machines specified in 2B006.a.	Controller
2E002	"Technology" according to the General Technology Note for the "production" of equipment specified in 2A or 2B.		Controller
2E003	Other "technology", as follows: a. Not used;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. "Technology" for metal-working manufacturing processes, as follows: 1. "Technology" for the design of tools, dies or fixtures specially designed for any of the following processes: a. "Superplastic forming"; b. "Diffusion bonding"; or c. "Direct-acting hydraulic pressing"; 2. Technical data consisting of process methods or parameters as listed below used to control: a. "Superplastic forming" of aluminium alloys, titanium alloys or "superalloys": 1. Surface preparation; 2. Strain rate; 3. Temperature; 4. Pressure; b. "Diffusion bonding" of "superalloys" or titanium alloys: 1. Surface preparation; 2. Temperature; 3. Pressure;	Technical Notes: 1. "Direct-acting hydraulic pressing" is a deformation process which uses a fluid-filled flexible bladder in direct contact with the workpiece. 2. "Hot isostatic densification" is a process of pressurising a casting at temperatures exceeding 375 K (102°C) in a closed cavity through various media (gas, liquid, solid particles, etc.) to create equal force in all directions to reduce or eliminate internal voids in the casting.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. "Direct-acting hydraulic pressing" of aluminium alloys or titanium alloys: 1. Pressure; 2. Cycle time; d. "Hot isostatic densification" of titanium alloys, aluminium alloys or "superalloys": 1. Temperature; 2. Pressure; 3. Cycle time; c. "Technology" for the "development" or "production" of hydraulic stretch-forming machines and dies therefor, for the manufacture of airframe structures; d. Not used; e. "Technology" for the "development" of integration "software" for incorporation of expert systems for advanced decision support of shop floor operations into "numerical control" units; f. "Technology" for the application of inorganic overlay coatings or inorganic surface modification coatings (specified in column 3 of	Note: The table and Technical Note appear after entry 2E301. N.B.: This table should be read to specify the "technology" for a particular Coating Process only when the Resultant Coating in column 3 is in a paragraph directly across from the relevant Substrate under column 2. For example, Chemical Vapour Deposition (CVD) coating process technical data are included for the application of silicides to carboncarbon, ceramic and metal "matrix" "composites" substrates, but are not included for the application of silicides to 'cemented tungsten carbide' (16), 'silicon carbide' (18) substrates. In the second case, the resultant coating is not listed in the paragraph under column 3 directly across from the paragraph under column 2 listing 'cemented tungsten carbide' (16), 'silicon carbide' (18).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	the following table) to non-electronic substrates (specified in column 2 of the following table), by processes specified in column 1 of the following table and defined in the Technical Note.		
2E101	"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 2B004, 2B009, 2B104, 2B109, 2B116, 2B119 to 2B122 or 2D101.		Controller
2E201	"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 2A225, 2A226, 2B001, 2B006, 2B007.b., 2B007.c., 2B008, 2B009, 2B201, 2B204, 2B206, 2B207, 2B209, 2B225 to 2B233, 2D201 or 2D202.		Atomic Energy Licensing Board (AELB)
2E301	"Technology" according to the General Technology Note for the "use" of goods specified in 2B350 to 2B352.		Controller

TABLE

DEPOSITION TECHNIQUES

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
A. Chemical Vapour Deposition (CVD)	"Superalloys"	Aluminides for internal passages
	Ceramics (19) and Low expansion glasses (14)	Silicides Carbides Dielectric layers (15) Diamond Diamond-like carbon (17)
	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Silicides Carbides Refractory metals Mixtures thereof (4) Dielectric layers (15) Aluminides Alloyed aluminides (2) Boron nitride
	Cemented tungsten carbide (16), Silicon carbide (18)	Carbides Tungsten Mixtures thereof (4) Dielectric layers (15)

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
	Molybdenum and Molybdenum alloys	Dielectric layers (15)
	Beryllium and Beryllium alloys	Dielectric layers (15) Diamond Diamond-like carbon (17)
	Sensor window materials (9)	Dielectric layers (15) Diamond Diamond-like carbon (17)
Thermal-Evaporation Physical Vapour Deposition (TE-PVD)		
B.1. Physical Vapour Deposition (PVD): Electron Beam (EB-PVD)	"Superalloys"	Alloyed silicides Alloyed aluminides (2) MCrAlX (5) Modified zirconia (12) Silicides Aluminides Mixtures thereof (4)
	Ceramics (19) and Low expansion glasses (14)	Dielectric layers (15)
	Corrosion resistant steel (7)	MCrAlX (5) Modified zirconia (12) Mixtures thereof (4)

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Silicides Carbides Refractory metals Mixtures thereof (4) Dielectric layers (15) Boron nitride
	Cemented tungsten carbide (16), Silicon carbide (18)	Carbides Tungsten Mixtures thereof (4) Dielectric layers (15)
	Molybdenum and Molybdenum alloys	Dielectric layers (15)
	Beryllium and Beryllium alloys	Dielectric layers (15) Borides Beryllium
	Sensor window materials (9)	Dielectric layers (15)
	Titanium alloys (13)	Borides Nitrides
B.2. Ion assisted resistive heating Physical Vapour Deposition (PVD) (Ion Plating)	Ceramics (19) and Low expansion glasses	Dielectric layers (15) Diamond-like carbon (17)

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Dielectric layers (15)
	Cemented tungsten carbide (16), Silicon carbide	Dielectric layers (15)
	Molybdenum and Molybdenum alloys	Dielectric layers (15)
	Beryllium and Beryllium alloys	Dielectric layers (15)
	Sensor window materials (9)	Dielectric layers (15) Diamond-like carbon (17)
B.3. Physical Vapour Deposition (PVD): "Laser" Vaporization	Ceramics (19) and Low expansion glasses (14)	Silicides Dielectric layers (15) Diamond-like carbon (17)
	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Dielectric layers (15)
	Cemented tungsten carbide (16), Silicon carbide	Dielectric layers (15)
	Molybdenum and Molybdenum alloys	Dielectric layers (15)
	Beryllium and Beryllium alloys	Dielectric layers (15)

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
	Sensor window materials (9)	Dielectric layers (15) Diamond-like carbon (17)
B.4. Physical Vapour Deposition (PVD): Cathodic Arc Discharge	"Superalloys"	Alloyed silicides Alloyed aluminides (2) MCrAlX (5)
	Polymers (11) and Organic "matrix" "composites"	Borides Carbides Nitrides Diamond like carbon (17)
C. Pack cementation (see A above for out-of-pack cementation) (10)	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Silicides Carbides Mixtures thereof (4)
	Titanium alloys (13)	Silicides Aluminides Alloyed aluminides (2)
	Refractory metals and alloys (8)	Silicides Oxides
D. Plasma spraying	"Superalloys"	MCrAlX (5) Modified zirconia (12) Mixtures thereof (4) Abradable Nickel-Graphite Abradable materials containing

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
		Ni-Cr-Al Abradable Al-Si-Polyester Alloyed aluminides (2)
	Aluminium alloys (6)	MCrAlX (5) Modified zirconia (12) Silicides Mixtures thereof (4)
	Refractory metals and alloys (8)	Aluminides Silicides Carbides
	Corrosion resistant steel (7)	MCrAlX (5) Modified zirconia (12) Mixtures thereof (4)
	Titanium alloys (13)	Carbides Aluminides Silicides Alloyed aluminides (2) Abradable Nickel-Graphite Abradable materials containing Ni-Cr-Al Abradable Al-Si-Polyester
E. Slurry Deposition	Refractory metals and alloys (8)	Fused silicides

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
		Fused aluminides except for resistance heating elements
	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Silicides Carbides Mixtures thereof (4)
F. Sputter Deposition	"Superalloys"	Alloyed silicides Alloyed aluminides (2) Noble metal modified aluminides (3) MCrAlX (5) Modified zirconia (12) Platinum Mixtures thereof (4)
	Ceramics and Low- expansion glasses (14)	Silicides Platinum Mixtures thereof (4) Dielectic layers (15) Diamond-like carbon (17)
	Titanium alloys (13)	Borides Nitrides Oxides Silicides Aluminides Alloyed aluminides (2)

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
		Carbides
	Carbon-carbon, Ceramic and Metal "matrix" "composites"	Silicides Carbides Refractory metals Mixtures thereof (4) Dielectric layers (15) Boron nitride
	Cemented tungsten carbide (16), Silicon carbide (18)	Carbides Tungsten Mixtures thereof (4) Dielectric layers (15) Boron nitride
	Molybdenum and Molybdenum alloys	Dielectric layers (15)
	Beryllium and Beryllium alloys	Borides Dielectric layers (15) Beryllium
	Sensor window materials (9)	Dielectric layers (15) Diamond like carbon (17)
	Refractory metals and alloys (8)	Aluminides Silicides Oxides Carbides

1. Coating Process (1) (*)	2. Substrate	3. Resultant Coating
G. Ion Implantation	High temperature bearing steels	Additions of Chromium Tantalum or Niobium (Columbium)
	Titanium alloys (13)	Borides Nitrides
	Beryllium and Beryllium alloys	Borides
	Cemented tungsten carbide (16)	Carbides Nitrides

(*) The numbers in parenthesis refer to the Notes following this Table.

TABLE – DEPOSITION TECHNIQUES – NOTES

1. The term 'coating process' includes coating repair and refurbishing as well as original coating.

1. The term 'alloyed aluminide coating' includes single or multiple-step coatings in which an element or elements are deposited prior to or during application of the aluminide coating, even if these elements are deposited by another coating process. It does not, however, include the multiple use of single-step pack cementation processes to achieve alloyed aluminides.

2. The term 'noble metal modified aluminide' coating includes multiple-step coatings in which the noble metal or noble metals are laid down by some other coating process prior to application of the aluminide coating.

3. The term 'mixtures thereof' includes infiltrated material, graded compositions, co-deposits and multilayer deposits and are obtained by one or more of the coating processes specified in the Table.

4. 'MCrAlX' refers to a coating alloy where M equals cobalt, iron, nickel or combinations thereof and X equals hafnium, yttrium, silicon, tantalum in any amount or other intentional additions over 0.01% by weight in various proportions and combinations, except:

   a. CoCrAlY coatings which contain less than 22% by weight of chromium, less than 7% by weight of aluminium and less than 2% by weight of yttrium;

   b. CoCrAlY coatings which contain 22 to 24% by weight of chromium, 10 to 12% by weight of aluminium and 0.5 to 0.7% by weight of yttrium; or

   c. NiCrAlY coatings which contain 21 to 23% by weight of chromium, 10 to 12% by weight of aluminium and 0.9 to 1.1% by weight of yttrium.

5. The term 'aluminium alloys' refers to alloys having an ultimate tensile strength of 190MPa or more measured at 293K (20°C).

6. The term 'corrosion resistant steel' refers to AISI (American Iron and Steel Institute) 300 series or equivalent national standard steels.

7. 'Refractory metals and alloys' include the following metals and their alloys: niobium (columbium), molybdenum, tungsten and tantalum.

8. 'Sensor window materials', as follows: alumina, silicon, germanium, zinc sulphide, zinc selenide, gallium arsenide, diamond, gallium phosphide, sapphire and the following metal halides: sensor window materials of more than 40mm diameter for zirconium fluoride and hafnium fluoride.

9. Category 2 does not include “technology” for single-step pack cementation of solid airfoils.

10. 'Polymers', as follows: polyimide, polyester, polysulphide, polycarbonates and polyurethanes.

11. 'Modified zirconia' refers to additions of other metal oxides (e.g., calcia, magnesia, yttria, hafnia, rare earth oxides) to zirconia in order to stabilise certain crystallographic phases and phase compositions. Thermal barrier coatings made of zirconia, modified with calcia or magnesia by mixing or fusion, are not controlled.

12. 'Titanium alloys' refers only to aerospace alloys having an ultimate tensile strength of 900MPa or more measured at 293K (20 °C).

13. 'Low expansion glasses' refers to glasses which have a coefficient of thermal expansion of 1×10^{-7} K^{-1} or less measured at 293K (20 °C).

14. 'Dielectric layers' are coatings constructed of multi-layers of insulator materials in which the interference properties of a design composed of materials of various refractive indices are used to reflect, transmit or absorb various wavelength bands. Dielectric layers refers to more than four dielectric layers or dielectric/metal "composite" layers.

15. 'Cemented tungsten carbide' does not include cutting and forming tool materials consisting of tungsten carbide/(cobalt, nickel), titanium carbide/(cobalt, nickel), chromium carbide/nickel-chromium and chromium carbide/nickel.

16. "Technology" for depositing diamond like carbon on any of the following is not controlled:

    magnetic disk drives and heads, equipment for the manufacture of disposables, valves for faucets, acoustic diaphragms for speakers, engine parts for automobiles, cutting tools, punching-pressing dies, office automation equipment, microphones or medical devices or moulds, for casting or moulding of plastics, manufactured from alloys containing less than 5% beryllium.

17. 'Silicon carbide' does not include cutting and forming tool materials.

18. Ceramic substrates, as used in this entry, does not include ceramic materials containing 5% by weight, or greater, clay or cement content, either as separate constituents or in combination.

TABLE – DEPOSITION TECHNIQUES – TECHNICAL NOTES

Processes specified in Column 1 of the Table are defined as follows:

a. Chemical Vapour Deposition (CVD) is an overlay coating or surface modification coating process wherein a metal, alloy, "composite", dielectric or ceramic is deposited upon a heated substrate. Gaseous reactants are decomposed or combined in the vicinity of a substrate resulting in the deposition of the desired elemental, alloy or compound material on the substrate. Energy for this decomposition or chemical reaction process may be provided by the heat of the substrate, a glow discharge plasma, or "laser" irradiation.

N.B.1 CVD includes the following processes: directed gas flow out-of-pack deposition, pulsating CVD, controlled nucleation thermal deposition (CNTD), plasma enhanced or plasma assisted CVD processes.

N.B.2 Pack denotes a substrate immersed in a powder mixture.

N.B.3 The gaseous reactants used in the out-of-pack process are produced using the same basic reactions and parameters as the pack cementation process, except that the substrate to be coated is not in contact with the powder mixture.

b. Thermal Evaporation-Physical Vapour Deposition (TE-PVD) is an overlay coating process conducted in a vacuum with a pressure less than 0.1Pa wherein a source of thermal energy is used to vaporize the coating material. This process results in the condensation, or deposition, of the evaporated species onto appropriately positioned substrates.

The addition of gases to the vacuum chamber during the coating process to synthesize compound coatings is an ordinary modification of the process.

The use of ion or electron beams, or plasma, to activate or assist the coating's deposition is also a common modification in this technique. The use of monitors to provide in-process measurement of optical characteristics and thickness of coatings can be a feature of these processes.

Specific TE-PVD processes are as follows:

1. Electron Beam PVD uses an electron beam to heat and evaporate the material which forms the coating;

1. Ion Assisted Resistive Heating PVD employs electrically resistive heating sources in combination with impinging ion beam(s) to produce a controlled and uniform flux of evaporated coating species;

2. "Laser" Vaporization uses either pulsed or continuous wave "laser" beams to vaporize the material which forms the coating;

3. Cathodic Arc Deposition employs a consumable cathode of the material which forms the coating and has an arc discharge established on the surface by a momentary contact of a ground trigger. Controlled motion of arcing erodes the cathode surface creating a highly ionized plasma. The anode can be either a cone attached to the periphery of the cathode, through an insulator, or the chamber. Substrate biasing is used for non line-of-sight deposition.

N.B. This definition does not include random cathodic arc deposition with non-biased substrates.

4. Ion Plating is a special modification of a general TE-PVD process in which a plasma or an ion source is used to ionize the species to be deposited, and a negative bias is applied to the substrate in order to facilitate the extraction of the species from the plasma. The introduction of reactive species, evaporation of solids within the process chamber, and the use of monitors to provide in-process measurement of optical characteristics and thicknesses of coatings are ordinary modifications of the process.

c. Pack Cementation is a surface modification coating or overlay coating process wherein a substrate is immersed in a powder mixture (a pack), that consists of:

1. The metallic powders that are to be deposited (usually aluminium, chromium, silicon or combinations thereof);

2. An activator (normally a halide salt); and

3. An inert powder, most frequently alumina.

The substrate and powder mixture is contained within a retort which is heated to between 1,030K (757°C) and 1,375K (1,102°C) for sufficient time to deposit the coating.

d. Plasma Spraying is an overlay coating process wherein a gun (spray torch) which produces and controls a plasma accepts powder or wire coating materials, melts them and propels them towards a substrate, whereon an integrally bonded coating is formed. Plasma spraying constitutes either low pressure plasma spraying or high velocity plasma spraying.

N.B.1 Low pressure means less than ambient atmospheric pressure.

N.B.2 High velocity refers to nozzle-exit gas velocity exceeding 750m/s calculated at 293K (20°C) at 0,1 MPa.

e. Slurry Deposition is a surface modification coating or overlay coating process wherein a metallic or ceramic powder with an organic binder is suspended in a liquid and is applied to a substrate by either spraying, dipping or painting, subsequent air or oven drying, and heat treatment to obtain the desired coating.

f. Sputter Deposition is an overlay coating process based on a momentum transfer phenomenon, wherein positive ions are accelerated by an electric field towards the surface

of a target (coating material). The kinetic energy of the impacting ions is sufficient to cause target surface atoms to be released and deposited on an appropriately positioned substrate.

N.B.1 The Table refers only to triode, magnetron or reactive sputter deposition which is used to increase adhesion of the coating and rate of deposition and to radio frequency (RF) augmented sputter deposition used to permit vaporisation of non-metallic coating materials.

N.B.2 Low-energy ion beams (less than 5 keV) can be used to activate the deposition.

g. Ion Implantation is a surface modification coating process in which the element to be alloyed is ionized, accelerated through a potential gradient and implanted into the surface region of the substrate. This includes processes in which ion implantation is performed simultaneously with electron beam physical vapour deposition or sputter deposition.

CATEGORY 3

ELECTRONICS

Category Code	*Items Description*	*Note*	*Relevant Authority*
CATEGORY 3 - ELECTRONICS			
3A	**Systems, Equipment and Components**	Note 1: The control status of equipment and components described in 3A001 or 3A002, other than those described in 3A001.a.3. to 3A001.a.10.,or 3A001.a.12. to 3A001.a.14., which are specially designed for or which have the same functional characteristics as other equipment is determined by the control status of the other equipment. Note 2: The control status of integrated circuits described in 3A001.a.3. to 3A001.a.9., or 3A001.a.12. to 3A001.a.14. which are unalterably programmed or designed for a specific function for another equipment is determined by the control status of the other equipment. N.B.: When the manufacturer or applicant cannot determine the control status of the other equipment, the control status of the integrated circuits is determined in 3A001.a.3. to 3A001.a.9., and 3A001.a.12. to 3A001.a.14. Note 3: The status of wafers (finished or unfinished), in which the function has been determined, is to be evaluated against the parameters of 3A001.a., 3A001.b., 3A001.d., 3A001.e.4., 3A001.g., 3A001.h., or 3A001.i.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
3A001	Electronic components and specially designed components therefor, as follows: a. General purpose integrated circuits, as follows: 1. Integrated circuits designed or rated as radiation hardened to withstand any of the following: a. A total dose of 5 x 10^3 Gy (silicon) or higher; b. A dose rate upset of 5 x 10^6 Gy (silicon)/s or higher; or c. A fluence (integrated flux) of neutrons (1 MeV equivalent) of 5 x 10^{13} n/cm^2 or higher on silicon, or its equivalent for other materials; 2. "Microprocessor microcircuits", "microcomputer microcircuits", microcontroller microcircuits, storage integrated circuits manufactured from a compound semiconductor, analogue to digital converters, integrated circuits that contain analogue-to-digital converters and store or process the digitised data, digital to analogue converters, electro	Note : Integrated circuits include the following types: - 'Monolithic integrated circuits'; - 'Hybrid integrated circuits'; - 'Multichip integrated circuits'; - 'Film type integrated circuits', including silicon-on-sapphire integrated circuits; - 'Optical integrated circuits'; - 'Three dimensional integrated circuits'; - 'Monolithic Microwave Integrated Circuits' ('MMICs'). Note: 3A001.a.1.c. does not control Metal Insulator Semiconductors (MIS). Note: 3A001.a.2. does not control integrated circuits for civil automobiles or railway train applications. Technical Note: "Non-volatile Memories" are memories with data retention over a period of time after a power shutdown.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	optical or "optical integrated circuits" designed for "signal processing", field programmable logic devices, custom integrated circuits for which either the function is unknown or the control status of the equipment in which the integrated circuit will be used is unknown, Fast Fourier Transform (FFT) processors, Static Random-Access Memories (SRAMs), or "non-volatile memories", having any of the following: a. Rated for operation at an ambient temperature above 398 K (125°C); b. Rated for operation at an ambient temperature below 218 K (-55°C); or c. Rated for operation over the entire ambient temperature range from 218 K (-55°C) to 398 K (125°C); 3. "Microprocessor microcircuits", "microcomputer microcircuits" and microcontroller microcircuits, manufactured from a compound semiconductor and	Note: 3A001.a.3. includes digital signal processors, digital array processors and digital coprocessors. N.B. SEE ALSO 3A101	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	operating at a clock frequency exceeding 40MHz; 4. Not used; 5. Analogue-to-Digital Converter (ADC) and Digital-to-Analogue Converter (DAC) integrated circuits, as follows: a. ADCs having any of the following: 1. A resolution of 8 bit or more, but less than 10 bit, with a 'sample rate' greater than 1.3 Giga Samples Per Second (GSPS); 2. A resolution of 10 bit or more, but less than 12 bit, with a 'sample rate' greater than 600 mega samples per second (MSPS); 3. A resolution of 12 bit with or more, but less than 14 bit, with a 'sample rate' greater than 400 MSPS;	N.B. For integrated circuits that contain analogue-to-digital converters and store or process the digitized data, see 3A001.a.14. Technical Notes: 1. A resolution of n bit corresponds to a quantisation of 2^n levels. 2. The resolution of the ADC is the number bits of the digital output that represents the measured analogue input. Effective Number of Bits (ENOB) is not used to determine the resolution of the ADC. 3. For 'multiple channel ADCs', the 'sample rate' is not aggregated and the 'sample rate' is the maximum rate of any single channel. 4. For interleaved ADCs or for 'multiple channel ADCs' that are specified to have an interleaved mode of operation, the 'sample rates' are aggregated and the 'sample rate' is the maximum combined total rate of all of the interleaved channels.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. A resolution of 14 bit or more, but less than 16 bit, with a 'sample rate' greater than 250 MSPS; or 5. A resolution of 14 bit or more with an output a 'sample rate' greater than 20 MSPS; b. Digital-to-Analogue Converters (DAC) having any of the following: 1. A resolution of 10 bit or more with an 'adjusted update rate' of greater than 3,500 MSPS; or 2. A resolution of 12 bit or more with an 'adjusted update rate' of equal to or greater than 1,250 MSPS and having any of the following: a. A settling time less than 9ns to 0.024% of full scale from a full scale step; or b. A 'Spurious Free Dynamic Range'	Technical Notes: 1. 'Spurious Free Dynamic Range' (SFDR) is defined as the ratio of the RMS value of the carrier frequency (maximum signal component) at the input of the DAC to the RMS value of the next largest noise or harmonic distortion component at its output. 2. SFDR is determined directly from the specification table or from the characterisation plots of SFDR versus frequency. 3. A signal is defined to be full scale when its amplitude is greater than -3dBfs (full scale). 4. 'Adjusted update rate' for DACs: a. For conventional (non-interpolating) DACs, the 'adjusted update rate' is the rate at which the digital signal is converted to an analogue signal and the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	(SFDR) greater than 68 dBc (carrier) when synthesising a full scale analogue signal of 100MHz or the highest full scale analogue signal frequency specified below 100MHz. 6. Electro-optical and "optical integrated circuits", designed for "signal processing" and having all of the following: a. One or more than one internal "laser" diode; b. One or more than one internal light detecting element; and	output analogue values are changed by the DAC. For DACs where the interpolation mode may be bypassed (interpolation factor of one), the DAC should be considered as a conventional (non-interpolating) DAC. b. For interpolating DACs (oversampling DACs), the 'adjusted update rate' is defined as the DAC update rate divided by the smallest interpolating factor. For interpolating DACs, the 'adjusted update rate' may be referred to by different terms including: - input data rate - input word rate - input sample rate - maximum total input bus rate - maximum DAC clock rate for DAC clock input.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Optical waveguides; 7. Field programmable logic devices having any of the following: a. A maximum number of single-ended digital input/outputs of greater than 700; or b. An 'aggregate one-way peak serial transceiver data rate' of 500 Gb/s or greater;	Note: 3A001.a.7. includes: - Simple Programmable Logic Devices (SPLDs); - Complex Programmable Logic Devices (CPLDs); - Field Programmable Gate Arrays (FPGAs); - Field Programmable Logic Arrays (FPLAs); - Field Programmable Interconnects (FPICs) N.B.: For integrated circuits having field programmable logic devices that are combined with an analogue-to-digital converter, see 3A001.a.14. Technical Notes: 1. Maximum number of digital input/outputs in 3A001.a.7.a. is also referred to as the maximum user input/outputs or maximum available input/outputs, whether the integrated circuit is packaged or bare die. 2. 'Aggregate one-way peak serial transceiver data rate' is the product of the peak serial	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	8. Not used; 9. Neural network integrated circuits; 10. Custom integrated circuits for which the function is unknown, or the control status of the equipment in which the integrated circuits will be used is unknown to the manufacturer, having any of the following: a. More than 1,500 terminals; b. A typical "basic gate propagation delay time" of less than 0.02ns; or c. An operating frequency exceeding 3GHz; 11. Digital integrated circuits, other than those described in 3A001.a.3. to 3A001.a.10. and 3A001.a.12., based upon any compound semiconductor and having any of the following:	one-way transceiver data rate times the number of transceivers on the FPGA.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. An equivalent gate count of more than 3,000 (2 input gates); or b. A toggle frequency exceeding 1.2 GHz; 12. Fast Fourier Transform (FFT) processors having a rated execution time for an N-point complex FFT of less than ($N \log_2 N$) /20,480 ms, where N is the number of points; 13. Direct Digital Synthesizer (DDS) integrated circuits having any of the following: a. A Digital-to-Analogue Converter (DAC) clock frequency of 3.5GHz or more and a DAC resolution of 10 bit or more, but less than 12 bit; or b. A DAC clock frequency of 1.25GHz or more and a DAC resolution of 12 bit or more; 14. Integrated circuits that perform or are programmable to perform all of the following:	Technical Note: When N is equal to 1,024 points, the formula in 3A001.a.12. gives an execution time of 500μs. Technical Note: The DAC clock frequency may be specified as the master clock frequency or the input clock frequency. Technical Notes: 1. A resolution of n bit corresponds to a quantisation of 2n levels. 2. The resolution of the ADC is the number of bits of the digital output of the ADC that represents the measured analogue input. Effective Number of Bits (ENOB) is not used to determine the resolution of the ADC.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Analogue-to-digital conversions meeting any of the following: 1. A resolution of 8 bit or more, but less than 10 bit, with a sample rate greater than 1.3 giga samples per second (GSPS); 2. A resolution of 10 bit or more, but less than 12 bit, with a sample rate greater than 1.0 GSPS; 3. A resolution of 12 bit or more, but less than 14 bit, with a sample rate greater than 1.0 GSPS; 4. A resolution of 14 bit or more, but less than 16 bit, with a sample rate greater than 400 mega samples per second (MSPS); or 5. A resolution of 16 bit or more with a sample rate greater than 180 MSPS; and	3. For integrated circuits with non-interleaving 'multiple channel ADCs', the sample rate is not aggregated and the sample rate is the maximum rate of any single channel. 4. For integrated circuits with 'interleaved ADCs' or with 'multiple channel ADCs' that are specified to have an interleaved mode of operation, the 'sample rates' are aggregated and the 'sample rate' is the maximum combined total rate of all of the interleaved channels. N.B.1. For analogue-to-digital converter integrated circuits see 3A001.a.5.a. N.B.2. For field programmable logic devices see 3A001.a.7.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Any of the following: 1. Storage of digitised data; or 2. Processing of digitised data b. Microwave or millimetre wave items as follows: 1. "Vacuum electronics devices" and cathodes, as follows: a. Travelling wave "vacuum electronic devices", pulsed or continuous wave, as follows: 1. Devices operating at frequencies exceeding 31.8GHz; 2. Devices having a cathode heater with a turn on time to rated RF power of less than 3 seconds; 3. Coupled cavity devices, or derivatives thereof, with a "fractional bandwidth" of more than 7% or a peak power exceeding 2.5 kW;	Technical Notes: For purposes of 3A001.b., the parameter peak saturated power output may also be referred to on product data sheets as output power, saturated power output, maximum power output, peak power output, or peak envelope power output. Note 1: 3A001.b.1. does not control "vacuum electronic devices" designed or rated for operation in any frequency band and having all of the following: a. Does not exceed 31.8GHz; and b. Is "allocated by the ITU" for radio-communications services, but not for radio-determination. Note 2: 3A001.b.1. does not control non-"space-qualified" 'vacuum electronic devices' having all of the following: a. An average output power equal to or less than 50W; and	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. Devices based on helix, folded waveguide, or serpentine waveguide circuits, or derivatives thereof, having any of the following: a. An "instantaneous bandwidth" of more than one octave, and average power (expressed in kW) times frequency (expressed in GHz) of more than 0.5; b. An "instantaneous bandwidth" of one octave or less, and average power (expressed in kW) times frequency (expressed in GHz) of more than 1; c. Being "space-qualified"; or d. Having a gridded electron gun;	b. Designed or rated for operation in any frequency band and having all of the following: 1. Exceeds 31.8GHz but does not exceed 43.5GHz; and 2. Is "allocated by the ITU" for radio-communications services, but not for radio-determination. Note 1: Not used. Note 2: The control status of the MMIC whose rated operating frequency includes frequencies listed in more than one frequency range, as defined by 3A001.b.2.a. to 3A001.b.2.h., is determined by the lowest peak saturated power output threshold. Note 3: Notes 1 and 2 in 3A mean that 3A001.b.2. does not control MMICs if they are specially designed for other applications, e.g., telecommunications, radar, automobiles.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	5. Devices with a "fractional bandwidth" greater than or equal to 10%, with any of the following: a. Crossed-field amplifier 'vacuum electronic devices' with a gain of more than 17dB; b. Thermionic cathodes designed for 'vacuum electronic devices' producing an emission current density at rated operating conditions exceeding 5A/cm^2 or a pulsed (non-continuos) current density at rated operating conditions exceeding 10A/cm^2 c. 'Vacuum electronic devices' with the capability to operate in a 'dual mode'	Technical Note: 'Dual mode' means the 'vacuum electronic device' beam current can be intentionally changed between continuous-wave and pulsed mode operation by use of a grid and produces a peak pulse output power greater than the continuous-wave output power. N.B. For "MMIC" amplifiers that have an integrated phase shifter. See 3A001.b.12.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. "Monolithic Microwave Integrated Circuits" (MMIC) amplifiers that are any of the following: a. Rated for operation at frequencies exceeding 2.7 GHz up to and including 6.8GHz with a "fractional bandwidth" greater than 15%, and having any of the following: 1. A peak saturated power output greater than 7W (48.75 dBm) at any frequency exceeding 2.7GHz up to and including 2.9GHz; 2. A peak saturated power output greater than 55W (47.4 dBm) at any frequency exceeding 2.9GHz up to and including 3.2 GHz; 3. A peak saturated power output greater than 40W (46dBm) at any frequency exceeding 3.2GHz up to and including 3.7GHz; or	Note 1: Not used Note 2: The control status of The MMIC whose rated operating frequency includes frequencies listed in more than one frequency range, as defined by 3A001.b.2.a. to 3A001.b.2.h., is determined by the lowest peak saturated power output threshold. Note 3: Notes 1 and 2 in 3A mean that 3A001.b.2. does not control MMIC's if they are specially designed for other applications, e.g., telecommunications, radar, automobiles. Note 1: The control status of a transistor whose rated operating frequency includes frequencies listed in more than one frequency range, as defined by 3A001.b.3.a. to 3A001.b.3.e., is determined by the lowest peak saturation output threshold. Note 2: 3A001.b.3. includes bare dice, dice mounted on carriers, or dice mounted in packgaes. Some discrete transistors may also be referred to as power amplifiers, but the status of these discrete transistors is determined by 3.A001.b.3. N.B.1. MMIC amplifiers see 3A001.b.2 N.B.2. For 'transmit/receive modules' and 'transmit modules' see 3A001.b.12.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. A peak saturated power output greater than 20W (43dBm) at any frequency exceeding 3.7GHz up to and including 6.8GHz; b. Rated for operation at frequencies exceeding 6.8GHz up to and including 16GHz with a "fractional bandwidth" greater than 10%, and having any of the following: 1. A peak saturated power output greater than 10W (40dBm) at any frequency exceeding 6.8GHz up to and including 8.5GHz; or 2. A peak saturated power output greater than 5W (37dBm) at any frequency exceeding 8.5GHz up to and including 16GHz; c. Rated for operation with a peak saturated power output greater than 3W (34.77dBm) at any frequency exceeding 16GHz up to and including	N.B.3. For converters and harmonic mixers, designed to extend the operating or frequency range of signal analysers, signal generators, network analysers or microwave test receivers, see 3A001.b.7.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	31.8GHz, and with a "fractional bandwidth" of greater than 10%; d. Rated for operation with a peak saturated power output greater than 0.1nW (-70dBm) at any frequency exceeding 31.8GHz up to and including 37GHz; e. Rated for operation with a peak saturated power output greater than 1W (30dBm) at any frequency exceeding 37GHz up to and including 43.5GHz, and with a "fractional bandwidth" of greater than 10%; f. Rated for operation with a peak saturated power output greater than 31.62mW (15dBm) at any frequency exceeding 43.5GHz up to and including 75GHz, and with a "fractional bandwidth" of greater than 10%; g. Rated for operation with a peak saturated power output greater than 10mW (10dBm) at any frequency exceeding		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	75GHz up to and including 90GHz, and with a "fractional bandwidth" of greater than 5%; or h. Rated for operation with a peak saturated power output greater than 0.1nW (-70 dBm) at any frequency exceeding 90GHz; 3. Discrete microwave transistors that are any of the following: a. Rated for operation at frequencies exceeding 2.7GHz up to and including 6.8GHz and having any of the following: 1. A peak saturated power output greater than 400W (56dBm) at any frequency exceeding 2.7GHz up to and including 2.9GHz; 2. A peak saturated power output greater than 205 W (53.12dBm) at any frequency exceeding 2.9GHz up to and including 3.2GHz;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. A peak saturated power output greater than 115 W (50.61dBm) at any frequency exceeding 3.2GHz up to and including 3.7GHz; or 4. A peak saturated power output greater than 60W (47.78dBm) at any frequency exceeding 3.7GHz up to and including 6.8GHz; b. Rated for operation at frequencies exceeding 6.8GHz up to and including 31.8GHz and having any of the following: 1. A peak saturated power output greater than 50W (47dBm) at any frequency exceeding 6.8GHz up to and including 8.5GHz; 2. A peak saturated power output greater than 15W (41.76dBm) at any frequency exceeding 8.5GHz up to and including 12GHz;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. A peak saturated power output greater than 40W (46dBm) at any frequency exceeding 12GHz up to and including 16GHz; or 4. A peak saturated power output greater than 7W (38.45dBm) at any frequency exceeding 16GHz up to and including 31.8GHz; c. Rated for operation with a peak saturated power output greater than 0.5W (27dBm) at any frequency exceeding 31.8GHz up to and including 37GHz; d. Rated for operation with a peak saturated power output greater than 1W (30dBm) at any frequency exceeding 37GHz up to and including 43.5GHz; e. Rated for operation with a peak saturated power output greater than 0.1nW (-70dBm) at any frequency exceeding 43.5GHz;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	f. Other than those specified in 3A001.b.3.a. to 3A001.b.3.e and rated for operation with a peak saturated power output greater than 5 W (37.0 dBm) at all frequencies exceeding 8.5 GHz up to and including 31.8 GHz; 4. Microwave solid state amplifiers and microwave assemblies/ modules containing microwave solid state amplifiers, that are any of the following: a. Rated for operation at frequencies exceeding 2.7GHz up to and including 6.8GHz with a "fractional bandwidth" greater than 15%, and having any of the following: 1. A peak saturated power output greater than 500W (57 Bm) at any frequency exceeding 2.7GHz up to and including 2.9GHz; 2. A peak saturated power output greater than 270W (54.3dBm) at any frequency exceeding		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2.9GHz up to and including 3.2GHz; 3. A peak saturated power output greater than 200W (53dBm) at any frequency exceeding 3.2GHz up to and including 3.7GHz; or 4. A peak saturated power output greater than 90W (49.54dBm) at any frequency exceeding 3.7GHz up to and including 6.8GHz; b. Rated for operation at frequencies exceeding 6.8GHz up to and including 31.8GHz with a "fractional bandwidth" greater than 10 %, and having any of the following: 1. A peak saturated power output greater than 70W (48.54dBm) at any frequency exceeding 6.8GHz up to and including 8.5GHz; 2. A peak saturated power output greater than50W (47 dBm) at any frequency		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	exceeding 8.5GHz up to and including 12GHz; 3. A peak saturated power output greater than 30W (44.77dBm) at any frequency exceeding 12GHz up to and including 16GHz; or 4. A peak saturated power output greater than 20W (43dBm) at any frequency exceeding 16GHz up to and including 31.8GHz; c. Rated for operation with a peak saturated power output greater than 0.5W (27dBm) at any frequency exceeding 31.8GHz up to and including 37GHz; d. Rated for operation with a peak saturated power output greater than 2W (33dBm) at any frequency exceeding 37GHz up to and including 43.5GHz, and with a "fractional bandwidth" of greater than 10%;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Rated for operation at frequencies exceeding 43.5GHz and having any of the following: 1. A peak saturated power output greater than 0.2W (23dBm) at any frequency exceeding 43.5GHz up to and including 75GHz, and with a "fractional bandwidth" of greater than 10%; 2. A peak saturated power output greater than 20mW (13dBm) at any frequency exceeding 75GHz up to and including 90GHz, and with a "fractional bandwidth" of greater than 5%; or 3. A peak saturated power output greater than 0.1nW (-70dBm) at any frequency exceeding 90GHz; or f. Not used 5. Electronically or magnetically tunable band-pass or band-stop filters, having more than 5 tunable resonators capable of tuning		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	across a 1.5:1 frequency band (f_{max}/f_{min}) in less than 10μs and having any of the following: a. A band-pass bandwidth of more than 0.5% of centre frequency; or b. A band-stop bandwidth of less than 0.5% of centre frequency; 6. Not used; 7. Converters and harmonic mixers, that are any of the following: a. Designed to extend the frequency range of "signal analysers" beyond 90GHz; b. Designed to extend the operating range of signal generators as follows: 1. Beyond 90GHz; 2. To an output power greater than 100mW (20dBm) anywhere within the frequency range exceeding 43.5GHz but not exceeding 90GHz;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Designed to extend the operating range of network analysers as follows: 1. Beyond 110GHz; 2. To an output power greater than 31.62mW (15dBm) anywhere within the frequency range exceeding 43.5GHz but not exceeding 90GHz; 3. To an output power greater than 1mW (0dBm) anywhere within the frequency range exceeding 90GHz but not exceeding 110GHz; or d. Designed to extend the frequency range of microwave test receivers beyond 110GHz; 8. Microwave power amplifiers containing 'vacuum electronic devices' specified in 3A001.b.1. and having all of the following: a. Operating frequencies above 3GHz;	Note: 3A001.b.8. does not control equipment designed or rated for operation in any frequency band which is "allocated by the ITU" for radio communications services, but not for radio-determination.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. An average output power to mass ratio exceeding 80W/kg; and c. A volume of less than 400cm^3; 9. Microwave power modules (MPM) consisting of, at least, a travelling wave 'vacuum electronic device', a "monolithic microwave integrated circuit" and an integrated electronic power conditioner and having all of the following: a. A 'turn-on time' from off to fully operational in less than 10 seconds; b. A volume less than the maximum rated power in Watts multiplied by 10cm^3/W; and c. An "instantaneous bandwidth" greater than 1 octave ($f_{max} > 2f_{min}$) and having any of the following: 1. For frequencies equal to or less than 18GHz, an RF output power greater than 100W; or	Technical Notes: 1. To calculate the volume in 3A001.b.9.b., the following example is provided: for a maximum rated power of 20W, the volume would be: 20W x 10cm^3/W = 200 cm^3. 2. The "turn-on time" in 3A001.b.9.a. refers to the time from fully-off to fully operational, i.e., it includes the warm-up time of the MPM.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. A frequency greater than 18GHz; 10. Oscillators or oscillator assemblies, specified to operate with a single sideband (SSB) phase noise, in dBc/Hz, less (better) than - (126 + $20\log_{10}F$ - $20\log_{10}f$) anywhere within the range of 10 Hz ≤ F ≤ 10kHz; 11. "Frequency synthesiser" "electronic assemblies" having a "frequency switching time" as specified in any of the following: a. Less than 143ps; b. Less than 100µs for any frequency change exceeding 2.2GHz within the synthesized frequency range exceeding 4.8GHz but not exceeding 31.8GHz c. Not used; d. Less than 500µs for any frequency change exceeding 550MHz within the synthesized frequency range exceeding 31.8GHz but not exceeding 37GHz;	Technical Note: In 3A001.b.10., F is the offset from the operating frequency in Hz and f is the operating frequency in MHz. Technical Note: A 'frequency synthesiser' is any kind of frequency source, regardless of the actual technique used, providing a multiplicity of simultaneous or alternative output frequencies, from one or more outputs, controlled by, derived from or disciplined by a lesser number of standard (or master) frequencies.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Less than 100µm for any frequency change exceeding 2,2GHz within the synthesized frequency range exceeding 37GHz but not exceeding 90GHz; f. Not used; or g. Less than 1ms within the synthesized frequency range exceeding 90GHz; 12. "Transit/receive modules", "transmit/receive MMICs", "transmit modules", and "transmit MMICs", rated for operation at frequencies above 2.7 GHz and having all of the following: a. A peak saturated power output (in watts), P_{sat}, greater than 505.62 divided by the maximum operating frequency (in GHz) squared [P_{sat}>505.62 W*GHz^2/f_{GHz}^2] for channel; b. A "fractional bandwidth" of 5% or greater for any channel;	N.B.: For general purpose "signal analysers", signal generators, network analysers and microwave test receivers, see 3A002.c., 3A002.d., 3A002.e. and 3A002.f., respectively. Technical Notes: 1. A "transmit/receive module": is a multifunction "electronic assembly" that provides bi-directional amplitude and phase control for transmission and reception of signals. 2. A "transmit module": is an "electronic assembly" that provides amplitude and phase control for transmission of signals. 3. A "transmit/receive MMIC": is a multifunction "MMIC" that provides bi-directional amplitude and phase control for transmission and reception of signals.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Any planar side with length d (cm) equal to or less than 15 divided by the lowest operating frequency in GHz [$d \leq 15cm*GHz*N/f_{GHz}$] where N is the number of transmit or transmit/receive channels; and d. An electronically variable phase shifter per channel. c. Acoustic wave devices as follows and specially designed components therefor: 1. Surface acoustic wave and surface skimming (shallow bulk) acoustic wave devices, having any of the following: a. A carrier frequency exceeding 6GHz; b. A carrier frequency exceeding 1GHz, but not exceeding 6GHz and having any of the following: 1. A 'frequency side-lobe rejection' exceeding 65dB;	4. A "transmit MMIC": is a "MMIC" that provides amplitude and phase control for transmission of signals. 5. 2.7 GHz should be used as the lowest operating frequency (f_{GHz}) in the formula in 3A001.b.12.c. for transmit/receive or transmit modules that have a rated operation range extending downward to 2.7GHz and below [$d \leq 15cm*GHz*N/2.7\ GHz$]. 6. 3A001.b.12. applies to "transmit/receive modules" or "transmit modules" with or without a heat sink. The value of d in 3A001.b.12.c. does not include any portion of the "transmit/receive module" or "transmit module" that functions as a heat sink. 7. "Transmit/receive modules", or "transmit modules", or "transmit/receive MMICs" or "transmit MMICs" may or may not have N integrated radiating antenna elements where N is the number of transmit or transmit/receive channels. Technical Note: 'Frequency side-lobe rejection' is the maximum rejection value specified in data sheet.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. A product of the maximum delay time and the bandwidth (time in μs and bandwidth in MHz) of more than 100; 3. A bandwidth greater than 250MHz; or 4. A dispersive delay of more than 10μs; or c. A carrier frequency of 1GHz or less and having any of the following: 1. A product of the maximum delay time and the bandwidth (time in μs and bandwidth in MHz) of more than 100; 2. A dispersive delay of more than 10 μs; or 3. A 'frequency side-lobe rejection' exceeding 65 dB and a bandwidth greater than 100MHz; 2. Bulk (volume) acoustic wave devices which permit the direct	Note: 3A001.c. does not control acoustic wave devices that are limited to a single band pass, low pass, high pass or notch filtering, or resonating function.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	processing of signals at frequencies exceeding 6GHz; 3. Acoustic-optic "signal processing" devices employing interaction between acoustic waves (bulk wave or surface wave) and light waves which permit the direct processing of signals or images, including spectral analysis, correlation or convolution; d. Electronic devices and circuits containing components, manufactured from "superconductive" materials, specially designed for operation at temperatures below the "critical temperature" of at least one of the "superconductive" constituents and having any of the following: 1. Current switching for digital circuits using "superconductive" gates with a product of delay time per gate (in seconds) and power dissipation per gate (in watts) of less than 10^{-14} J; or 2. Frequency selection at all frequencies using resonant circuits with Q-values exceeding 10,000;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. High energy devices as follows: 1. "Cells" as follows: a. "Primary cells" having any of the following at 20°C; 1. Energy density" exceeding 550 Wh/kg and a "continuous power density" exceeding 50W/kg; or 2. Energy density" exceeding 50Wh/kg and a "continuous power density" exceeding 350W/kg; or b. 'Secondary cells' having an 'energy density' exceeding 350 Wh/kg at 20°C;	Technical Notes: 1. For the purpose of 3A001.e.1.,'energy density' (Wh/kg) is calculated from the nominal voltage multiplied by the nominal capacity in ampere-hours (Ah) divided by the mass in kilograms. If the nominal capacity is not stated, energy density is calculated from the nominal voltage squared then multiplied by the discharge duration in hours divided by the discharge load in ohms and the mass in kilograms. 2. For the purpose of 3A001.e.1., a 'cell' is defined as an electrochemical device, which has positive and negative electrodes, an electrolyte, and is a source of electrical energy. It is the basic building block of a battery. 3. For the purpose of 3A001.e.1.a., a 'primary cell' is a 'cell' that is not designed to be charged by any other source.	Atomic Energy Licensing Board (AELB)
	2. High energy storage capacitors as follows: a. Capacitors with a repetition rate of less than 10 Hz (single shot capacitors) and having all of the following: 1. A voltage rating equal to or more than 5kV;	4. For the purpose of 3A001.e.1.b., a 'secondary cell' is a 'cell' that is designed to be charged by an external electrical source. 5. For the purpose of 3A001.e.1.a., 'continuous power density' (W/kg) is calculated from the nominal voltage multiplied by the specified maximum continuous discharge current in ampere (A) divided by the mass in kilograms. 'Continuous power density' is also referred to as specific power.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. An energy density equal to or more than 250J/kg; and 3. A total energy equal to or more than 25kJ; b. Capacitors with a repetition rate of 10Hz or more (repetition rated capacitors) and having all of the following: 1. A voltage rating equal to or more than 5 kV; 2. An energy density equal to or more than 50J/kg; 3. A total energy equal to or more than 100 J; and 4. A charge/discharge cycle life equal to or more than 10,000; 3. "Superconductive" electromagnets and solenoids, specially designed to be fully charged or discharged in less than one second and having all of the following: a. Energy delivered during the discharge exceeding 10 kJ in the first second;	Note: 3A001.e.1. does not control batteries, including single-cell batteries. N.B. SEE ALSO 3A201.a. and the Military Goods Controls. N.B.: SEE ALSO 3A201.b. Note: 3A001.e.3. does not control "superconductive" electromagnets or solenoids specially designed for Magnetic Resonance Imaging (MRI) medical equipment. Technical Note: "AM0", or "Air Mass Zero", refers to the spectral irradiance of sun light in the earth's outer atmosphere when the distance between the earth and sun is one astronomical unit (AU).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Inner diameter of the current carrying windings of more than 250 mm; and c. Rated for a magnetic induction of more than 8 T or "overall current density" in the winding of more than 300 A/mm^2; 4. Solar cells, cell-interconnect-coverglass (CIC) assemblies, solar panels, and solar arrays, which are "space-qualified", having a minimum average efficiency exceeding 20% at an operating temperature of 301 K (28°C) under simulated 'AM0' illumination with an irradiance of 1,367 watts per square metre (W/m^2); f. Rotary input type absolute position encoders having an “accuracy” equal to or less (better) than ± 1.0 second of arc and specially designed encoder rings, disc or scales therefor; g. Solid-state pulsed power switching thyristor devices and 'thyristor modules', using either electrically, optically, or electron radiation	Note 1: 3A001.g. includes: - Silicon Controlled Rectifiers (SCRs) - Electrical Triggering Thyristors (ETTs)	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	controlled switch methods and having any of the following: 1. A maximum turn-on current rate of rise (di/dt) greater than 30,000A/µs and off-state voltage greater than 1,100 V; or 2. A maximum turn-on current rate of rise (di/dt) greater than 2,000A/µs and having all of the following: a. An off-state peak voltage equal to or greater than 3,000V; and b. A peak (surge) current equal to or greater than 3,000A. h. Solid-state power semiconductor switches, diodes, or 'modules', having all of the following: 1. Rated for a maximum operating junction temperature greater than 488K (215°C); 2. Repetitive peak off-state voltage (blocking voltage) exceeding 300V; and	- Light Triggering Thyristors (LTTs) - Integrated Gate Commutated Thyristors (IGCTs) - Gate Turn-off Thyristors (GTOs) - MOS Controlled Thyristors (MCTs) - Solidtrons Note 2: 3A001.g. does not control thyristor devices and "thyristor modules" incorporated into equipment designed for civil railway or "civil aircraft" applications. Technical Note: For the purposes of 3A001.g., a "thyristor module" contains one or more thyristor devices. Note 1: Repetitive peak off-state voltage in 3A001.h. includes drain to source voltage, collector to emitter voltage, repetitive peak reverse voltage and peak repetitive off-state blocking voltage. Note 2: 3A001.h. includes: - Junction Field Effect Transistors (JFETs) - Vertical Junction Field Effect Transistors (VJFETs) - Metal Oxide Semiconductor Field effect Transistors (MOSFETs)	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Continuous current greater than 1A. i. Intensity, amplitude, or phase electro-optic modulators, designed for analogue signals and having any of the following: 1. A maximum operating frequency of more than 10 GHz but less than 20 GHz, an optical insertion loss equal to or less than 3 dB and having any of the following: a. A 'half-wave voltage' ('Vπ') less than 2.7 V when measured at a frequency of 1 GHz or below; or b. A 'Vπ' of less than 4 V when measured at a frequency of more than 1 GHz; or 2. A maximum operating frequency equal to or greater than 20 GHz, an optical insertion loss equal to or less than 3 dB and having any of the following: a. A 'Vπ' less than 3.3 V when measured at a frequency of 1 GHz or below; or	- Double Diffused Metal Oxide Semiconductor Field Effect Transistor (DMOSFET) - Insulated Gate Bipolar Transistor (IGBT) - High Electron Mobility Transistors (HEMTs) - Bipolar Junction Transistors (BJTs) - Thyristors and Silicon Controlled Rectifiers (SCRs) - Gate Turn-Off Thyristors (GTOs) - Emitter Turn-Off Thyristors (ETOs) - PiN Diodes - Schottky Diodes Note 3: 3A001.h. does not control switches, diodes, or 'modules', incorporated into equipment designed for civil automobile, civil railway or "civil aircraft" applications. Technical Note: For the purposes of 3A001.h., 'modules' contain one or more solid-state power semiconductor switches or diodes. Note: 3A001.i. includes electro-optic modulators having optical input and output connectors (e.g. fibre-optic pigtails).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. A 'Vπ' less than 5 V when measured at a frequency of more than 1 GHz.	Technical Note: For the purposes of 3A001.i., a 'half-wave voltage' ('Vπ') is the applied voltage necessary to make a phase change of 180 degrees in the wavelength of light propagating through the optical modulator.	
3A002	General purpose "electronic assemblies", modules and equipment as follows: a. Recording equipment and oscilloscopes as follows: 1. Not used; 2. Not used; 3. Not used; 4. Not used; 5. Not used; 6. Digital data recorders having all of the following: a. "A sustained continuous throughput" of more than 6.4Gbit/s to disk or solid-state drive memory; and b. A processor that performs analysis of radio frequency	Technical Notes: 1. For recorders with a parallel bus architecture, the "continuous throughput" rate is the highest word rate multiplied by the number of bits in a word. 2. "Continuous throughput" is the fastest data rate the instrument can record to disk or solid-state drive memory without the loss of any	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	signal data while it is being recorded; 7. Real-time oscilloscopes having a vertical root-mean-square (rms) noise voltage of less than 2% of full-scale at the vertical scale setting that provides the lowest noise value for any input 3dB bandwidth of 60 GHz or greater per channel; b. Not used; c. "Signal analysers" as follows: 1. 'Signal analyser' having a 3dB resolution bandwidth (RBW) exceeding 40 MHz anywhere within the frequency range exceeding 31.8 GHz but not exceeding 37 GHz;	information whilst sustaining the input digital data rate ordigitizer conversion rate. 3. For the purposes of 3A002.a.5.c., acquisition can be triggered internally or externally. Technical Note: Digital instrumentation data recorder systems can be configured either with a digitizer integrated within or outside the digital recorder. Note: 3A002.a.7. does not control equivalent-time sampling oscilloscopes.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. "Signal analysers" having Displayed Average Noise Level (DANL) less (better) than -150dBm/Hz anywhere within the frequency range exceeding 43.5GHz but not exceeding 90GHz; 3. "Signal analysers" having a frequency exceeding 90GHz; 4. "Signal analysers" having all of the following: a. "Real-time bandwidth" exceeding 170 MHz; and b. Having any of the following: 1. 100% probability of discovery with less than a 3 dB reduction from full amplitude due to gaps or windowing effects of signals having a duration of 15μs or less; or 2. A "frequency mask trigger" function with 100% probability of trigger (capture) for signals having a duration of 15μs or less;	Note: 3A002.c.4. does not control those "signal analysers" using only constant percentage bandwidth filters (also known as octave or fractional octave filters). Technical Notes: 1. 'Real-time bandwidth' is the widest frequency range for which the analyser can continuously transform time-domain data entirely into frequency-domain results, using a Fourier or other discrete time transform that processes every incoming time point, without a reduction of measured amplitude of more than 3 dB below the actual signal amplitude caused by gaps or windowing effects, while outputting or displaying the transformed data	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	5. Not used; d. Signal generators having any of the following: 1. Specified to generate pulse-modulated signals having all of the following, anywhere within the frequency range exceeding 31.8GHz but not exceeding 37GHz: a. 'Pulse duration' of less than 25ns; and b. On/off ratio equal to or exceeding 65dB; 2. An output power exceeding 100mW (20dBm) anywhere within the frequency range exceeding 43.5GHz but not exceeding 90GHz; 3. A "frequency switching time" as specified in any of the following: a. Not used; b. Less than 100μs for any frequency change exceeding 2.2GHz within the frequency	2. Probability of discovery in 3A002.c.4.b. is also referred to as probability of intercept or probability of capture. 3. For the purposes of 3A002.c.4.b., the duration for 100% probability of discovery is equivalent to the minimum signal duration necessary for the specified level measurement uncertainty. 4. A 'frequency mask trigger' is a mechanism where the trigger function is able to select a frequency range to be triggered on as a subset of the acquisition bandwidth while ignoring other signals that may also be present within the same acquisition bandwidth. A 'frequency mask trigger' may contain more than one independent set of limits.";	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	range exceeding 4.8GHz but not exceeding 31.8GHz; c. Not used. d. Less than 500μs for any frequency change exceeding 550MHz within the frequency range exceeding 31.8GHz but not exceeding 37GHz; e. Less than 100μs for any frequency change exceeding 2.2GHz within the frequency range exceeding 37GHz but not exceeding 90GHz; or f. Not used. 4. Single sideband (SSB) phase noise, in dBc/Hz, specified as being any of the following: a. Less (better) than -(126 + $20\log_{10}F$ - $20\log_{10}f$) anywhere within the range of 10Hz < F < 10kHz anywhere within the frequency range exceeding 3.2GHz but not exceeding 90GHz; or b. Less (better) than –(206- $20\log_{10}f$) anywhere within the	Note: 3A002.c.4. does not control those "signal analysers" using only constant percentage bandwidth filters (also known as octave or fractional octave filers). Technical Note: In 3A002.d.4., F is the offset from the operating frequency in Hz and f is the operating frequency in MHz; Note 1: For the purpose of 3A002.d., signal generators include arbitrary waveform and function generators.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	range of 10kHz < F ≤ 100kHz anywhere within the frequency range exceeding 3.2GHz but not exceeding 90GHz; or	Note 2: 3A002.d. does not control equipment in which the output frequency is either produced by the addition or subtraction of two or more crystal oscillator frequencies, or by an addition or subtraction followed by a multiplication of the result. Technical Notes: 1. The maximum frequency of an arbitrary waveform or function generator is calculated by dividing the sample rate, in samples/second, by a factor of 2.5. 2. For the purposes of 3A002.d.1.a, "pulse duration" is defined as the time interval from the point on the leading edge that is 50% of the pulse amplitude to the point on the trailing edge that is 50% of the pulse amplitude	
	5. 'RF modulation bandwidth' of digital baseband signals as specified by any of the following: a. Exceeding 2.2 GHz within the frequency range exceeding 4.8 GHz but not exceeding 31.8 GHz; b. Exceeding 550 MHz within the frequency range exceeding 31.8 GHz but not exceeding 37 GHz; or	Technical Note: 'RF modulation bandwidth' is the Radio Frequency (RF) bandwidth occupied by a digitally encoded baseband signal modulated onto an RF signal. It is also referred to as information bandwidth or vector modulation bandwidth. I/Q digital modulation is the technical method for producing a vector-modulated RF output signal, and that output signal is typically specified as having an 'RF modulation bandwidth'.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Exceeding 2.2 GHz within the frequency range exceeding 37 GHz but not exceeding 90 GHz.; or 6. A maximum frequency exceeding 90 GHz e. Network analysers having any of the following: 1. An output power exceeding 31.62mW (15dBm) anywhere within the operating frequency range exceeding 43.5GHz but not exceeding 90GHz; 2. An output power exceeding 1mW (0dBm) anywhere within the operating frequency range exceeding 90GHz but not exceeding 110GHz; 3. 'Non-linear vector measurement functionality' at frequencies exceeding 50GHz but not exceeding 110GHz; or 4. A maximum operating frequency exceeding 110GHz; f. Microwave test receivers having all of the following:	Technical Note: 'Non-linear vector measurement functionality' is an instrument's ability to analyse the test results of devices driven into the large-signal domain or the non-linear distortion range. N.B Digital data recorders, oscilloscopes, "signal analysers", signal generators, network analysers and microwave test receivers, are specified in 3A002.a.6., 3A002.a.7., 3A002.c., 3A002.d., 3A002.e. and 3A002.f., respectively. Technical Note: 1. A resolution of n bit corresponds to a quantisation of 2n levels. 2. The resolution of the ADC is the number of bits of the digital output of the ADC that represents the measured analogue input. Effective Number of Bits (ENOB) is not used to determine the resolution of the ADC.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. A maximum operating frequency exceeding 110GHz; and 2. Being capable of measuring amplitude and phase simultaneously;	3. For non-interleaved multiple-channel 'electronic assemblies', modules, or equipment, the sample rate is not aggregated and the sample rate is the maximum rate of any single-channel.	
	g. Atomic frequency standards being any of the following: 1. "Space-qualified"; 2. Non-rubidium and having a long-term stability less (better) than 1 x 10^{-11} /month; or 3. Non-"space-qualified" and having all of the following: a. Being a rubidium standard; b. Long-term stability less (better) than 1 x 10^{-11} /month; and c. Total power consumption of less than 1W.	4. For interleaved channels on multiple-channel 'electronic assemblies', modules, or equipment, the sample rates are aggregated and the sample rate is the maximum combined total rate of all the interleaved channels	Atomic Energy Licensing Board (AELB)
	h. "Electronic assemblies", modules, or equipment, specified to perform all of the following: 1. Analogue-to-digital conversions meeting any of the following:	Note: 3A002.h. includes ADC cards, waveform digitizers, data acquisition cards, signal acquisition boards and transient recorders.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. A resolution of 8 bit or more, but less than 10 bit, with an input sample rate greater than 1,300 million samples per second; b. A resolution of 10 bit or more, but less than 12 bit, with an input sample rate greater than 1000 million samples per second; c. A resolution of 12 bit or more, but less than 14 bit, with an input sample rate greater than 1 000 million samples per second; d. A resolution of 14 bit or more but less than 16 bit, with an input sample rate greater than 400 million samples per second; or e. A resolution of 16 bit or more with an input sample rate greater than 180 million samples per second; and 2. Any of the following: a. Output of digitize data;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Storage of digitized data; or c. Processing of digitized data;		
3A003	Spray cooling thermal management systems employing closed loop fluid handling and reconditioning equipment in a sealed enclosure where a dielectric fluid is sprayed onto electronic components using specially designed spray nozzles that are designed to maintain electronic components within their operating temperature range, and specially designed components therefor.		Atomic Energy Licensing Board (AELB)
3A101	Electronic equipment, devices and components, other than those specified in 3A001, as follows: a. Analogue-to-digital converters, usable in "missiles", designed to meet military specifications for ruggedized equipment; b. Accelerators capable of delivering electromagnetic radiation produced by bremsstrahlung from accelerated electrons of 2 MeV or greater, and systems containing those accelerators.	Note: 3A101.b. above does not specify equipment specially designed for medical purposes.	Controller
3A102	"Thermal batteries" designed or modified for 'missiles'.	Technical Notes:	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		1. In 3A102 “thermal batteries” are single use batteries that contain a solid non-conducting inorganic salt as the electrolyte. These batteries incorporate a pyrolytic material that, when ignited, melts the electrolyte and activates the battery. 2. In 3A102 “missile” means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	
3A201	Electronic components, other than those specified in 3A001, as follows; a. Capacitors having either of the following sets of characteristics: 1. a. Voltage rating greater than 1.4kV; b Energy storage greater than 10J; c. Capacitance greater than 0.5µF; and d. Series inductance less than 50nH; or 2. a. Voltage rating greater than 75 V; b. Capacitance greater		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	than 0.25μF; and c. Series inductance less than 10nH; b. Superconducting solenoidal electromagnets having all of the following characteristics: 1. Capable of creating magnetic fields greater than 2T; 2. A ratio of length to inner diameter greater than 2; 3. Inner diameter greater than 300mm; and 4. Magnetic field uniform to better than 1% over the central 50% of the inner volume; c. Flash X-ray generators or pulsed electron accelerators having either of the following sets of characteristics: 1. a. An accelerator peak electron energy of 500 keV or greater but less than 25 MeV; and	Note: 3A201.b. does not control magnets specially designed for and exported 'as parts of' medical nuclear magnetic resonance (NMR) imaging systems. The phrase 'as part of' does not necessarily mean physical part in the same shipment; separate shipments from different sources are allowed, provided the related export documents clearly specify that the shipments are dispatched 'as part of' the imaging systems. Note: 3A201.c. does not control accelerators that are component parts of devices designed for purposes other than electron beam or X-ray radiation (electron microscopy, for example) nor those designed for medical purposes: Technical Notes: 1. The 'figure of merit' K is defined as: $K = 1.7 \times 10^3 V^{2.65} Q$	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. With a 'figure of merit' (K) of 0.25 or greater; or 2. a. An accelerator peak electron energy of 25 MeV or greater; and b. A 'peak power' greater than 50MW.	V is the peak electron energy in million electron volts. If the accelerator beam pulse duration is less than or equal to 1μs, then Q is the total accelerated charge in Coulombs. If the accelerator beam pulse duration is greater than 1μs, then Q is the maximum accelerated charge in 1μs. Q equals the integral of i with respect to t, over the lesser of 1μs or the time duration of the beam pulse ($Q = \int i dt$), where i is beam current in amperes and t is time in seconds. 2. "Peak power" = (peak potential in volts) x (peak beam current in amperes). 3. In machines based on microwave accelerating cavities, the time duration of the beam pulse is the lesser of 1μs or the duration of the bunched beam packet resulting from one microwave modulator pulse. 4. In machines based on microwave accelerating cavities, the peak beam current is the average current in the time duration of a bunched beam packet.	
3A225	Frequency changers or generators, other than those specified in 0B001.b.13., usable as a variable or fixed frequency	N.B. 1. "Software" specially designed to enhance or release the performance of a frequency changer or generator to meet the	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	motor drive, having all of the following characteristics: a. Multiphase output providing a power of 40 VA or greater; b. Operating at a frequency of 600 Hz or more; and c. Frequency control better (less) than 0.2%.	characteristics of 3A225 is specified in 3D225. N.B. 2. "Technology" in the form of codes or keys to enhance or release the performance of a frequency changer or generator to meet the characteristics of 3A225 is specified in 3E225. Note: 3A225 does not control frequency changers or generators if they have hardware, "software" or "technology" constraints that limit the performance to less than that specified above, provided they meet any of the following: 1. They need to be returned to the original manufacturer to make the enhancements or release the constraints; 2. They require "software" as specified in 3D225 to enhance or release the performance to meet the characteristics of 3A225; or 3. They require "technology" in the form of keys or codes as specified in 3E225 to enhance or release the performance to meet the characteristics of 3A225. Technical Notes: 1. Frequency changers in 3A225 are also known as converters or inverters.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		2. Frequency changers in 3A225 may be marketed as Generators, Electronic Test Equipment, AC Power Supplies, Variable Speed Motors Drives, Variable Speed Drives (VSDs), Variable Frequency Drives (VFDs), Adjustable Frequency Drives (AFDs), or Adjustable Speed Drives (ASDs).	
3A226	High-power direct current power supplies, other than those specified in 0B001.j.6., having both of the following characteristics: a. Capable of continuously producing, over a time period of 8 hours, 100V or greater with current output of 500A or greater; and b. Current or voltage stability better than 0.1% over a time period of 8 hours.		Atomic Energy Licensing Board (AELB)
3A227	High-voltage direct current power supplies, other than those specified in 0B001.j.5., having both of the following characteristics: a. Capable of continuously producing, over a time period of 8 hours, 20kV or greater with current output of 1A or greater; and		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Current or voltage stability better than 0.1% over a time period of 8 hours.		
3A228	Switching devices, as follows: a. Cold-cathode tubes, whether gas filled or not, operating similarly to a spark gap, having all of the following characteristics: 1. Containing three or more electrodes; 2. Anode peak voltage rating of 2.5kV or more; 3. Anode peak current rating of 100A or more; and 4. Anode delay time of 10μs or less; b. Triggered spark-gaps having both of the following characteristics: 1. An anode delay time of 15μs or less; and 2. Rated for a peak current of 500A or more; c. Modules or assemblies with a fast switching function, other than those	Note: 3A228 includes gas krytron tubes and vacuum sprytron tubes.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	specified in 3A001.g. or 3A001.h., having all of the following characteristics: 1. Anode peak voltage rating greater than 2kV; 2. Anode peak current rating of 500A or more; and 3. Turn-on time of 1μs or less.		
3A229	High-current pulse generators as follows: a. Detonator firing sets (initiator systems, firesets), including electronically-charged, explosively-driven and optically-driven firing sets, other than those specified in 1A007.a., designed to drive multiple controlled detonators specified in 1A007.b.; b. Modular electrical pulse generators (pulsers) having all of the following characteristics: 1. Designed for portable, mobile, or ruggedized-use; 2. Capable of delivering their energy in less than 15μs into loads of less than 40ohms;	N.B. SEE ALSO MILITARY GOOD CONTROLS. Note: 3A229.b. includes xenon flash-lamp drivers.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Having an output greater than 100A; 4. No dimension greater than 30cm; 5. Weight less than 30kg; and 6. Specified for use over an extended temperature range 223K (-50°C) to 373K (100°C) or specified as suitable for aerospace applications. c. Micro-firing units having all of the following characteristics: 1. No dimension greater than 35mm; 2. Voltage rating of equal to or greater than 1kV; and 3. Capacitance of equal to or greater than 100nF.		
3A230	High-speed pulse generators, and 'pulse heads' therefor, having both of the following characteristics: a. Output voltage greater than 6V into a resistive load of less than 55ohms, and b. Pulse transition time' less than 500ps.	Technical Notes: 1. In 3A230, 'pulse transition time' is defined as the time interval between 10 % and 90 % voltage amplitude. 2. 'Pulse heads' are impulse forming networks designed to accept a voltage step function and shape it into a variety of pulse forms that can include rectangular, triangular, step, impulse, exponential, or monocycle types.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		'Pulse heads' can be an integral part of the pulse generator, they can be a plug-in module to the device or they can be an externally connected device.	
3A231	Neutron generator systems, including tubes, having both of the following characteristics: a. Designed for operation without an external vacuum system; and b. Utilizing any of the following: 1. Electrostatic acceleration to induce a tritium-deuterium nuclear reaction; or 2. Electrostatic acceleration to induce a deuterium-deuterium nuclear reaction and capable of an output of 3 x 10^9 neutrons/s or greater.		Atomic Energy Licensing Board (AELB)
3A232	Multipoint initiation systems, other than those specified in 1A007, as follows: a. Not used; b. Arrangements using single or multiple detonators designed to nearly simultaneously initiate an explosive surface over greater than 5,000mm^2 from a single firing signal with an	N.B. SEE ALSO MILITARY GOODS CONTROLS. N.B. See 1A007.b. for detonators. Note: 3A232 does not control detonators using only primary explosives, such as lead azide.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	initiation timing spread over the surface of less than 2.5μs.		
3A233	Mass spectrometers, other than those specified in 0B002.g., capable of measuring ions of 230 atomic mass units or greater and having a resolution of better than 2 parts in 230, as follows, and ion sources therefor: a. Inductively coupled plasma mass spectrometers (ICP/MS); b. Glow discharge mass spectrometers (GDMS); c. Thermal ionization mass spectrometers (TIMS); d. Electron bombardment mass spectrometers having both of the following features: 1. A molecular beam inlet system that injects a collimated beam of analyte molecules into a region of the ion source where the molecules are ionized by an electron beam; and 2. One or more 'cold traps' that can be cooled to a temperature of 193K (-80°C);	Technical Notes: 1. Electron bombardment mass spectrometers in 3A233.d. are also known as electron impact mass spectrometers or electron ionization mass spectrometers. 2. In 3A233.d.2., a “cold trap” is a device that traps gas molecules by condensing or freezing them on cold surfaces. For the purposes of 3A233.d.2., a closed-loop gaseous helium cryogenic vacuum pump is not a “cold trap”.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Not used; f. Mass spectrometers equipped with a microfluorination ion source designed for actinides or actinide fluorides.		
3A234	Striplines to provide low inductance path to detonators with the following characteristics: a. Voltage rating greater than 2kV; and b. Inductance of less than 20nH.		Controller
3B	**Test, Inspection and Production Equipment**		
3B001	Equipment for the manufacturing of semiconductor devices or materials, as follows and specially designed components and accessories therefor: a. Equipment designed for epitaxial growth as follows: 1. Equipment designed or modified to produce a layer of any material other than silicon with a thickness uniform to less than ± 2.5% across a distance of 7 mm or more; 2. Metal Organic Chemical Vapour Deposition (MOCVD) reactors designed for compound	N.B. SEE ALSO 2B226 Note: 3B001.a.1. includes Atomic Layer Epitaxy (ALE) equipment.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	semiconductor epitaxial growth of material having two or more of the following elements: aluminium, gallium, indium, arsenic, phosphorus, antimony, or nitrogen; 3. Molecular beam epitaxial growth equipment using gas or solid sources; b. Equipment designed for ion implantation and having any of the following: 1. Not used; 2. Being designed and optimized to operate at a beam energy of 20keV or more and a beam current of 10mA or more for hydrogen, deuterium or helium implant; 3. Direct write capability; 4. A beam energy of 65keV or more and a beam current of 45mA or more for high energy oxygen implant into a heated semiconductor material "substrate"; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	5. Being designed and optimized to operate at a beam energy of 20keV or more and a beam current of 10mA or more for silicon implant into a semiconductor material "substrate" heated to 600°C or greater; c. Not used; d. Not used e. Automatic loading multi-chamber central wafer handling systems having all of the following: 1. Interfaces for wafer input and output, to which more than two functionally different 'semiconductor process tools' specified in 3B001.a., 3B001.b. or 3B001.c. are designed to be connected; and 2. Designed to form an integrated system in a vacuum environment for 'sequential multiple wafer processing'; f. Lithography equipment as follows:	Note: 3B001.e. does not control automatic robotic wafer handling systems specially designed for parallel wafer processing. Technical Notes: 1. For the purpose of 3B001.e., 'semiconductor process tools' refers to modular tools that provide physical processes for semiconductor production that are functionally different, such as deposition, etch, implant or thermal processing. 2. For the purpose of 3B001.e., 'sequential multiple wafer processing' means the capability to process each wafer in different 'semiconductor process tools', such as by transferring each wafer from one tool to a second tool and on to a third tool with the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Align and expose step and repeat (direct step on wafer) or step and scan (scanner) equipment for wafer processing using photo-optical or X-ray methods and having any of the following: a. A light source wavelength shorter than 193nm; or b. Capable of producing a pattern with a 'Minimum Resolvable Feature size' (MRF) of 45nm or less; 2. Imprint lithography equipment capable of producing features of 45 nm or less; 3. Equipment specially designed for mask making or semiconductor device processing using direct writing methods, having all of the following: a. Using deflected focussed electron beam, ion beam or "laser" beam; and b. Having any of the following:	automatic loading multi-chamber central wafer handling systems. Technical Note: The 'Minimum Resolvable Feature size' (MRF) is calculated by the following formula: $MRF = \frac{(\text{an exposure light source wavelength in nm}) \times (\text{K factor})}{\text{numerical aperture}}$ where the K factor = 0.35 Note: 3B001.f.2. includes: - Micro contact printing tools - Hot embossing tools - Nano-imprint lithography tools - Step and flash imprint lithography (S-FIL) tools	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. A full-width half-maximum (FWHM) spot size smaller than 65nm and an image placement less than 17nm (mean + 3 sigma); or 2. Not used; 3. A second-layer overlay error of less than 23nm (mean + 3 sigma) on the mask; 4. Equipment designed for device processing using direct writing methods, having all of the following: a. A deflected focused electron beam; and b. Having any of the following: 1. A minimum beam size equal to or smaller than 15nm; or 2. An overlay error less than 27nm (mean + 3 sigma);		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	g. Masks and reticles, designed for integrated circuits specified in 3A001; h. Multi-layer masks with a phase shift layer not specified in 3B001.g. and designed to be used by lithography equipment having a light source wavelength less than 245 nm; 1. Made on a mask "substrate blank" from glass specified as having less than 7nm/cm birefringence; or 2. Designed to be used by lithography equipment having a light source wavelength less than 245nm; i. Imprint lithography templates designed for integrated circuits specified in 3A001.	Note: 3B001.h. does not control multi-layer masks with a phase shift layer designed for the fabrication of memory devices not controlled by 3A001.	
3B002	Test equipment specially designed for testing finished or unfinished semiconductor devices as follows and specially designed components and accessories therefor: a. For testing S-parameters of item specified in 3A001.b.3.; b. Not used;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. For testing item specified in 3A001.b.2.		
3C	**Materials**		
3C001	Hetero-epitaxial materials consisting of a "substrate" having stacked epitaxially grown multiple layers of any of the following: a. Silicon (Si); b. Germanium (Ge); c. Silicon carbide (SiC); or d. "III/V compounds" of gallium or indium.	Note: 3C001.d. does not control a "substrate" having one or more P-type epitaxial layers of GaN, InGaN, AlGaN, InAlN, InAlGaN, GaP, GaAs, AlGaAs, InP, InGaP, AlInP or InGaAlP, independent of the sequence of the elements, except if the P-type epitaxial layer is between N-type layers.	Atomic Energy Licensing Board (AELB)
3C002	Resist materials as follows and "substrates" coated with the following resists: a. Resists designed for semiconductor lithography as follows: 1. Positive resists adjusted (optimised) for use at wavelengths less than 193nm but equal to or greater than 15nm; 2. Resists adjusted (optimised) for use at wavelengths less than 15nm but greater than 1nm;		Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. All resists designed for use with electron beams or ion beams, with a sensitivity of 0.01 μcoulomb/mm^2 or better; c. Not used; d. All resists optimised for surface imaging technologies; e. All resists designed or optimised for use with imprint lithography equipment specified in 3B001.f.2. that use either a thermal or photo-curable process.		
3C003	Organo-inorganic compounds as follows: a. Organo-metallic compounds of aluminium, gallium or indium, having a purity (metal basis) better than 99.999%; b. Organo-arsenic, organo-antimony and organo-phosphorus compounds, having a purity (inorganic element basis) better than 99.999%.	Note: 3C003 only controls compounds whose metallic, partly metallic or non-metallic element is directly linked to carbon in the organic part of the molecule.	Atomic Energy Licensing Board (AELB)
3C004	Hydrides of phosphorus, arsenic or antimony, having a purity better than 99.999%, even diluted in inert gases or hydrogen.	Note: 3C004 does not control hydrides containing 20% molar or more of inert gases or hydrogen.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
3C005	High resistivity materials as follows: a. Silicon carbide (SiC), gallium nitride (GaN), aluminium nitride (AlN) or aluminium gallium nitride (AlGaN) semiconductor 'substrates', or ingots, boules, or other preforms of those materials, having resistivities greater than 10,000 ohm-cm at 20°C; b. Polycrystalline 'substrates' or polycrystalline ceramic 'substrates', having resistivities greater than 10,000 ohm-cm at 20°C and having at least one non-epitaxial single-crystal layer of silicon (Si), silicon carbide (SiC), gallium nitride (GaN), aluminium nitride (AlN), or aluminium gallium nitride (AlGaN) on the surface of the 'substrate'.		Atomic Energy Licensing Board (AELB)
3C006	Materials, not specified in 3C001, consisting of a 'substrate' specified in 3C005 with at least one epitaxial layer of silicon carbide, gallium nitride, aluminium nitride or aluminium gallium nitride.		Atomic Energy Licensing Board (AELB)
3D	**Software**		
3D001	"Software" specially designed for the "development" or "production" of		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	equipment specified in 3A001.b. to 3A002.g. or 3B.		
3D002	"Software" specially designed for the "use" of equipment specified in 3B001.a. to f., 3B002 or 3A225		Atomic Energy Licensing Board (AELB)
3D003	'Physics-based' simulation "software" specially designed for the "development" of lithographic, etching or deposition processes for translating masking patterns into specific topographical patterns in conductors, dielectrics or semiconductor materials.	Technical Note: 'Physics-based' in 3D003 means using computations to determine a sequence of physical cause and effect events based on physical properties (e.g., temperature, pressure, diffusion constants and semiconductor materials properties). Note: Libraries, design attributes or associated data for the design of semiconductor devices or integrated circuits are considered as "technology".	Atomic Energy Licensing Board (AELB)
3D004	"Software" specially designed for the "development" of the equipment specified in 3A003.		Atomic Energy Licensing Board (AELB)
3D005	'Software' specially designed to restore normal operation of a microcomputer, 'microprocessor microcircuit' or 'microcomputer microcircuit' within 1ms after an Electromagnetic Pulse (EMP) or Electrostatic Discharge (ESD) disruption, without loss of continuation of operation.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
3D101	"Software" specially designed or modified for the "use" of equipment specified in 3A101.b.		Atomic Energy Licensing Board (AELB)
3D225	"Software" specially designed to enhance or release the performance of frequency changers or generators to meet the characteristics of 3A225.		Atomic Energy Licensing Board (AELB)
3E	**Technology**		
3E001	"Technology" according to the General Technology Note for the "development" or "production" of equipment or materials specified in 3A, 3B or 3C;	Note 1: 3E001 does not control "technology" for equipment or components controlled by 3A003. Note 2: 3E001 does not control "technology" for integrated circuits specified in 3A001.a.3. to 3A001.a.12., having all of the following: a. Using "technology" at or above 0.130μm; and b. Incorporating multi-layer structures with three or fewer metal layers. Note 3: 3E001 does not control 'Process Design Kits' ('PDKs') unless they include libraries implementing functions or technologies for item specified in 3A001.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Note: A 'Process Design Kit' ('PDK') is a software tool provided by a semiconductor manufacturer to ensure that the required design practices and rules are taken into account in order to successfully produce a specific integrated circuit design in a specific semiconductor process, in accordance with technological and manufacturing constraints (each semiconductor manufacturing process has its particular 'PDK').	
3E002	"Technology" according to the General Technology Note, other than that specified in 3E001, for the "development" or "production" of a "microprocessor microcircuit", "microcomputer microcircuit" or microcontroller microcircuit core, having an arithmetic logic unit with an access width of 32 bits or more and any of the following features or characteristics: a. A 'vector processor unit' designed to perform more than two calculations on floating-point vectors (one-dimensional arrays of 32-bit or larger numbers) simultaneously; b. Designed to perform more than four 64-bit or larger floating-point operation results per cycle; or	Technical Note: A 'vector processor unit' is a processor element with built-in instructions that perform multiple calculations on floating-point vectors (one-dimensional arrays of 32-bit or larger numbers) simultaneously, having at least one vector arithmetic logic unit.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Designed to perform more than four 16-bit fixed-point multiply-accumulate results per cycle (e.g., digital manipulation of analogue information that has been previously converted into digital form, also known as digital "signal processing").	Note 1: 3E002 does not control "technology" for multimedia extensions. Note 2: 3E002 does not control "technology" for micro-processor cores, having all of the following: a. Using "technology" at or above 0.130μm; and b. Incorporating multi-layer structures with five or fewer metal layers. Note 3: 3E002 includes "technology" for the "development" or "production" of digital signal processors and digital array processors.	
3E003	Other "technology" for the "development" or "production" of the following: a. Vacuum microelectronic devices; b. Hetero-structure semiconductor electronic devices such as high electron mobility transistors (HEMT), hetero-bipolar transistors (HBT), quantum well and super lattice devices; c. "Superconductive" electronic devices;	Note: 3E003.b. does not control "technology" for high electron mobility transistor (HEMT) operating at frequencies lower than 31.8GHz and hetero-junction bipolar transistors (HBT) operating at frequencies lower than 31.8GHz.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Substrates of films of diamond for electronic components. e. Substrates of silicon-on-insulator (SOI) for integrated circuits in which the insulator is silicon dioxide; f. Substrates of silicon carbide for electronic components; g. "Vacuum electronic devices" operating at frequencies of 31.8GHz or higher.		
3E101	"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 3A001.a.1. or 2., 3A101, 3A102 or 3D101.		Controller
3E102	"Technology" according to the General Technology Note for the "development" of "software" specified in 3D101.		Controller
3E201	"Technology" according to the General Technology Note for the "use" of equipment specified in 3A001.e.2., 3A001.e.3., 3A001.g., 3A201, 3A225 to 3A234.		Controller
3E225	"Technology", in the form of codes or keys, to enhance or release the performance of frequency changers or		Atomic Energy Licensing Board (AELB),

Category Code	*Items Description*	*Note*	*Relevant Authority*
	generators to meet the characteristics of 3A225.		

CATEGORY 4

COMPUTERS

Category Code	Items Description	Note	Relevant Authority
CATEGORY 4 - COMPUTERS		Note 1: Computers, related equipment and "software" performing telecommunications or "local area network" functions must also be evaluated against the performance characteristics of Category 5, Part 1 (Telecommunications). Note 2: Control units which directly interconnect the buses or channels of central processing units, "main storage" or disk controllers are not regarded as telecommunications equipment described in Category 5, Part 1 (Telecommunications). N.B.: For the control status of "software" specially designed for packet switching, see 5D001. Note 3: Computers, related equipment and "software" performing cryptographic, cryptanalytic, certifiable multi-level security or certifiable user isolation functions, or which limit electromagnetic compatibility (EMC), must also be evaluated against the performance characteristics in Category 5, Part 2 ("Information Security"). Technical Note: "Main storage" is the primary storage for data or instructions for rapid access by a central processing unit. It consists of the internal storage of a 'digital computer' and any hierarchical extension thereto, such as cache storage or non-sequentially accessed extended storage.	
4A	**Systems, Equipment and Components**		
4A001	Electronic computers and related equipment, having any of the following and "electronic assemblies" and specially designed components therefor:	N.B. SEE ALSO 4A101.	Atomic Energy Licensing Board (AELB)

Category Code	Items Description	Note	Relevant Authority
	a. Specially designed to have any of the following: 1. Rated for operation at an ambient temperature below 228K (-45°C) or above 358K (85°C); or 2. Radiation hardened to exceed any of the following specifications: a. Total Dose 5×10^3 Gy (silicon); b. Dose Rate Upset 5×10^6 Gy (silicon)/s; or c. Single Event Upset 1×10^{-8} Error/bit/day; b. Not used.	Note: 4A001.a.1. does not control computers specially designed for civil automobile, railway train or "civil aircraft" application Note: 4A001.a.2. does not control computers specially designed for "civil aircraft" applications.	
4A003	"Digital computers", "electronic assemblies", and related equipment therefor, as follows and specially designed components therefor:	Note 1: 4A003 includes the following: - 'Vector processors'; - Array processors; - Digital signal processors; - Logic processors;	Malaysian Communications and Multimedia Commission

Category Code	Items Description	Note	Relevant Authority
		- Equipment designed for "image enhancement"; - Equipment designed for "signal processing". Note 2: The control status of the "digital computers" and related equipment described in 4A003 is determined by the control status of other equipment or systems provided: a. The "digital computers" or related equipment are essential for the operation of the other equipment or systems; b. The "digital computers" or related equipment are not a "principal element" of the other equipment or systems; and N.B. 1: The control status of "signal processing" or "image enhancement" equipment specially designed for other equipment with functions limited to those required for the	

Category Code	Items Description	Note	Relevant Authority
		other equipment is determined by the control status of the other equipment even if it exceeds the "principal element" criterion. N.B. 2: For the control status of "digital computers" or related equipment for telecommunications equipment, see Category 5, Part 1 (Telecommunications).	
	a. Not used; b. "Digital computers" having an "Adjusted Peak Performance" ('APP') exceeding 29 Weighted TeraFLOPS (WT); c. "Electronic assemblies" specially designed or modified for enhancing performance by aggregation of processors so that the "APP" of the aggregation exceeds the limit specified in 4A003.b.;	c. The "technology" for the "digital computers" and related equipment is determined by 4E. Note 1: 4A003.c. controls only "electronic assemblies" and programmable interconnections not exceeding the limit specified in 4A003.b. when shipped as unintegrated "electronic assemblies". It does not control "electronic assemblies" inherently limited by nature of their design for use as related equipment specified in 4A003.e.	

Category Code	Items Description	Note	Relevant Authority
		Note 2: 4A003.c. does not control "electronic assemblies" specially designed for a product or family of products whose maximum configuration does not exceed the limit specified in 4A003.b.	
	d. Not used; e. Not used; f. Not used; g. Equipment specially designed for aggregating the performance of "digital computers" by providing external interconnections which allows communications at unidirectional data rates exceeding 2.0 Gbyte/s per link.	Note: 4A003.g. does not control internal interconnection equipment (e.g. backplanes, buses), passive interconnection equipment, "network access controllers" or "communications channel controllers".	
4A004	Computers as follows and specially designed related equipment, "electronic assemblies" and components therefor: a. "Systolic array computers"; b. "Neural computers"; c. "Optical computers".	Technical Notes: 1. "Systolic array computers" are computers where the flow and modification of the data is dynamically controllable at the logic gate level by the user. 2. "Neural computers" are computational devices designed or	Malaysian Communications and Multimedia Commission

Category Code	Items Description	Note	Relevant Authority
		modified to mimic the behaviour of a neuron or a collection of neurons, i.e., computational devices which are distinguished by their hardware capability to modulate the weights and numbers of the interconnections of a multiplicity of computational components based on previous data. 3. "Optical computers" are computers designed or modified to use light to represent data and whose computational logic elements are based on directly coupled optical devices.	
4A005	Systems, equipment, and components therefor, specially designed or modified for the generation, operation or delivery of, or communication with "intrusion software".		Malaysian Communications and Multimedia Commission
4A101	Analogue computers, "digital computers" or digital differential analysers, other than those specified in 4A001.a.1., which are ruggedized and designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.		Malaysian Communications and Multimedia Commission

Category Code	Items Description	Note	Relevant Authority
4A102	"Hybrid computers" specially designed for modelling, simulation or design integration of space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.	Note: This control only applies when the equipment is supplied with "software" specified in 7D103 or 9D103.	Malaysian Communications and Multimedia Commission
4B	**Test, Inspection and Production Equipment** None.		
4C	**Materials** None.		
4D	**Software**	Note: The control status of "software" for equipment described in other Categories is dealt with in the appropriate Category.	
4D001	"Software" as follows: a. "Software" specially designed or modified for the "development" or "production" of equipment or "software" specified in 4A001 to 4A004, or 4D. b. "Software", other than that specified in 4D001.a., specially designed or modified for the		Malaysian Communications and Multimedia Commission

Category Code	Items Description	Note	Relevant Authority
	"development" or "production" of equipment as follows: 1. 'Digital computers' having an 'Adjusted Peak Performance' ('APP') exceeding 15 Weighted TeraFLOPS (WT); 2. "Electronic assemblies" specially designed or modified for enhancing performance by aggregation of processors so that the "APP" of the aggregation exceeds the limit in 4D001.b.1.		
4D002	Not used.		
4D003	Not used.		
4D004	"Software" specially designed or modified for the generation, command and control or delivery of, "intrusion software".	Note: 4D004 does not control to 'software' specially designed and limited to provide 'software' updates or upgrades meeting all the following: a. The update or upgrade operates only with the authorisation of the owner or administrator of the system receiving it; and	Malaysian Communications and Multimedia Commission

Category Code	Items Description	Note	Relevant Authority
		b. After the update or upgrade, the 'software' updated or upgraded is not any of the following: 1. "Software" specified in 4D004; or 2. "Intrusion software".	
4E	**Technology**		
4E001	a. "Technology" according to the General Technology Note, for the "development", "production" or "use" of equipment or "software" specified in 4A or 4D. b. "Technology", according to the General Technology Note, other than that specified in 4E001.a., for the "development" or "production" of equipment as follows: 1. "Digital computers" having an 'Adjusted Peak Performance' ('APP') exceeding 15 Weighted TeraFLOPS (WT); 2. "Electronic assemblies" specially designed or	Note : 4E001.a. and 4E001.c. do not control "vulnerability disclosure" or "cyber incident response". Technical Notes: 1. "Vulnerability disclosure" means the process of identifying, reporting, or communicating a vulnerability to, or analysing a vulnerability with, individuals or organizations responsible for conducting or coordinating remediation for the purpose of resolving the vulnerability. 2. "Cyber incident response" means the process of exchanging necessary information on a cyber security incident with individuals or organizations responsible for conducting or coordinating	Malaysian Communications and Multimedia Commission

Category Code	Items Description	Note	Relevant Authority
	modified for enhancing performance by aggregation of processors so that the "APP" of the aggregation exceeds the limit in 4E001.b.1. c. "Technology" for the "development" of "intrusion software".	remediation to address the cyber security incident.	

TECHNICAL NOTE ON "ADJUSTED PEAK PERFORMANCE" ("APP")

"APP" is an adjusted peak rate at which "digital computers" perform 64-bit or larger floating point additions and multiplications.

"APP" is expressed in Weighted TeraFLOPS (WT), in units of 10^{12} adjusted floating point operations per second.

Abbreviations used in this Technical Note

n	number of processors in the "digital computer"
i	processor number (i,...n)
t_i	processor cycle time ($t_i = 1/F_i$)
F_i	processor frequency
R_i	peak floating point calculating rate
W_i	architecture adjustment factor

Outline of "APP" calculation method

1. For each processor i, determine the peak number of 64-bit or larger floating point operations, FPO_i, performed per cycle for each processor in the "digital computer".

   Note *In determining FPO, include only 64-bit or larger floating point additions and/or multiplications. All floating point operations must be expressed in operations per processor cycle; operations requiring multiple cycles may be expressed in fractional results per cycle. For processors not capable of performing calculations on floating point operands of 64-bit or more, the effective calculating rate R is zero.*

2. Calculate the floating point rate R for each processor Ri = FPOi/ti.

3. Calculate "APP" as "APP" = W1 x R1 + W2 x R2 + … + Wn x Rn.

4. For 'vector processors', Wi = 0.9. For non-'vector processors', Wi = 0.3.

Note 1 *For processors that perform compound operations in a cycle, such as addition and multiplication, each operation is counted.*

Note 2 *For a pipelined processor the effective calculating rate R is the faster of the pipelined rate, once the pipeline is full, or the non-pipelined rate.*

Note 3 *The calculating rate R of each contributing processor is to be calculated at its maximum value theoretically possible before the "APP" of the combination is derived. Simultaneous operations are assumed to exist when the computer manufacturer claims concurrent, parallel, or simultaneous operation or execution in a manual or brochure for the computer.*

Note 4 *Do not include processors that are limited to input/output and peripheral functions (e.g., disk drive, communication and video display) when calculating "APP".*

Note 5 *"APP" values are not to be calculated for processor combinations (inter)connected by "Local Area Networks", Wide Area Networks, I/O shared connections/devices, I/O controllers and any communication interconnection implemented by "software".*

Note 6 *"APP" values must be calculated for processor combinations containing processors specially designed to enhance performance by aggregation, operating simultaneously and sharing memory;*

Technical Note:

1. *Aggregate all processors and accelerators operating simultaneously and located on the same die.*

2. *Processor combinations share memory when any processor is capable of accessing any memory location in the system through the hardware transmission of cache lines or memory words, without the involvement of any software mechanism, which may be achieved using "electronic assemblies" specified in 4A003.c.*

Note 7 *A 'vector processor' is defined as a processor with built-in instructions that perform multiple calculations on floating-point vectors (one-dimensional arrays of 64-bit or larger numbers) simultaneously, having at least 2 vector functional units and at least 8 vector registers of at least 64 elements each.*

CATEGORY 5

TELECOMMUNICATIONS AND "INFORMATION SECURITY"

Category Code	*Items Description*	*Note*	*Relevant Authority*
CATEGORY 5 - TELECOMMUNICATIONS AND "INFORMATION SECURITY"			
PART 1 - TELECOMMUNICATIONS		Note 1: The control status of components, "lasers", test and "production" equipment and "software" therefor which are specially designed for telecommunications equipment or systems is determined in Category 5, Part 1. N.B.: For "lasers" specially designed for telecommunications equipment or systems, see 6A005. Note 2: "Digital computers", related equipment or "software", when essential for the operation and support of telecommunications equipment described in this Category, are regarded as specially designed components, provided they are the standard models customarily supplied by the manufacturer. This includes operation, administration, maintenance, engineering or billing computer systems.	
5A1	**Systems, Equipment and Components**		
5A001	Telecommunications systems, equipment, components and accessories as follows: a. Any type of telecommunications equipment having any of the		Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	following characteristics, functions or features: 1. Specially designed to withstand transitory electronic effects or electromagnetic pulse effects, both arising from a nuclear explosion; 2. Specially hardened to withstand gamma, neutron or ion radiation; or 3. Specially designed to operate outside the temperature range from 218K (-55°C) to 397K (124°C); 4. Specially designed to operate above 397K (124°C). b. Telecommunication systems and equipment, and specially designed components and accessories therefor, having any of the following characteristics, functions or features:	Note 1: 5A001.a.3. and 5A001.a.4. control only electronic equipment. Note 2: 5A001.a.2. 5A001.a.4. do not control equipment designed or modified for use on board satellites.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Being underwater untethered communications systems having any of the following: a. An acoustic carrier frequency outside the range from 20kHz to 60kHz; b. Using an electromagnetic carrier frequency below 30kHz; c. Using electronic beam steering techniques; or d. Using "lasers" or light-emitting diodes (LEDs) with an output wavelength greater than 400nm and less than 700nm, in a "local area network"; 2. Being radio equipment operating in the 1.5MHz to 87.5MHz band and having all of the following:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Automatically predicting and selecting frequencies and "total digital transfer rates" per channel to optimise the transmission; and b. Incorporating a linear power amplifier configuration having a capability to support multiple signals simultaneously at an output power of 1kW or more in the frequency range of 1.5MHz or more but less than 30MHz, or 250W or more in the frequency range of 30MHz or more but not exceeding 87.5MHz, over an "instantaneous bandwidth" of one octave or more and with an output harmonic and distortion content of better than - 80dB;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Being radio equipment employing "spread spectrum" techniques, including "frequency hopping" techniques, other than those specified in 5A001.b.4. and having any of the following: a. User programmable spreading codes; or b. A total transmitted bandwidth which is 100 or more times the bandwidth of any one information channel and in excess of 50kHz; 4. Being radio equipment employing ultra-wideband modulation techniques, having user programmable channelising codes, scrambling codes or network identification codes and having any of the following: a. A bandwidth exceeding 500MHz; or	Note: 5A001.b.3 does not control equipment designed to operate at an output power of 1 W or less. Note: 5A001.b.3.b. does not control radio equipment specially designed for use with any of the following: a. Civil cellular radio-communications systems; or b. Fixed or mobile satellite earth stations for commercial civil telecommunications.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. A "fractional bandwidth" of 20% or more; 5. Being digitally controlled radio receivers having all of the following: a. More than 1,000 channels; b. A 'channel switching time' of less than 1ms; c. Automatic searching or scanning of a part of the electromagnetic spectrum; and d. Identification of the received signals or the type of transmitter; or 6. Employing functions of digital "signal processing" to provide 'voice coding' output at rates of less than 700 bit/s.	Note: 5A001.b.5. does not control radio equipment specially designed for use with civil cellular radio-communications systems. Technical Note: 'Channel switching time' means the time (i.e., delay) to change from one receiving frequency to another, to arrive at or within ± 0.05% of the final specified receiving frequency. Items having a specified frequency range of less than ± 0.05% around their centre frequency are defined to be incapable of channel frequency switching. Technical Notes: 1. For variable rate 'voice coding', 5A001.b.6. applies to the 'voice coding' output of continuous speech. 2. For the purposes of 5A001.b.6., 'voice coding' is defined as the technique to take samples of human voice and then convert these samples	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		into a digital signal, taking into account specific characteristics of human speech. N.B. For underwater umbilical cables, see 8A002.a.3.	
	c. Optical fibres of more than 500m in length and specified in the manufacturer as being capable of withstanding a 'proof test' tensile stress of 2×10^9 N/m^2 or more;	Technical Note: 'Proof Test': on-line or off-line production screen testing that dynamically applies a prescribed tensile stress over a 0.5 to 3m length of fibre at a running rate of 2 to 5m/s while passing between capstans approximately 150mm in diameter. The ambient temperature is a nominal 293K (20°C) and relative humidity 40%. Equivalent national standards may be used for executing the proof test.	
	d. "Electronically steerable phased array antennae" operating above 31.8GHz; 1. Rated for operation above 31.8GHz, but not exceeding 57GHz, and having an Effective Radiated Power (ERP) equal to or greater than +20dBm (22,15dBm Effective Isotropic Radiated Power (EIRP)); 2. Rated for operation above 57GHz, but not exceeding 66GHz, and having an ERP	Note 1: 5A001.d. does not control 'electronically steerable phased array antennae' for landing systems with instruments meeting ICAO standards covering Microwave Landing Systems (MLS). Note 2: 5A001.d. does not control antennae specially designed for any of the following: a. Civil cellular or WLAN radio-communications systems; b. IEEE 802.15 or wireless HDMI; or c. Fixed or mobile satellite earth stations for commercial civil telecommunications.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	equal to or greater than +24dBm (26,15dBm EIRP); 3. Rated for operation above 66GHz, but not exceeding 90GHz, and having an ERP equal to or greater than +20dBm (22,15dBm EIRP); 4. Rated for operation above 90GHz; e. Radio direction finding equipment operating at frequencies above 30MHz and having all of the following, and specially designed components therefor: 1. "Instantaneous bandwidth" of 10MHz or more; and 2. Capable of finding a Line Of Bearing (LOB) to non-cooperating radio transmitters with a signal duration of less than 1ms; f. Mobile telecommunications interception or jamming equipment, and monitoring	Technical Note: For the purposes of 5A001.d. 'electronically steerable phased array antenna' is an antenna which forms a beam by means of phase coupling, i.e., the beam direction is controlled by the complex excitation coefficients of the radiating elements and the direction of that beam can be varied both in transmission and reception in azimuth or in elevation, or both, by application of an electrical signal.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	equipment therefor, as follows, and specially designed components therefor: 1. Interception equipment designed for the extraction of voice or data, transmitted over the air interface; 2. Interception equipment not specified in 5A001.f.1., designed for the extraction of client device or subscriber identifiers (e.g., IMSI, TIMSI or IMEI), signalling, or other metadata transmitted over the air interface; 3. Jamming equipment specially designed or modified to intentionally and selectively interfere with, deny, inhibit, degrade or seduce mobile telecommunication services and performing any of the following: a. Simulate the functions of Radio Access	Note: 5A001.f.1. and 5A001.f.2. do not control any of the following: a. Equipment specially designed for the interception of analogue Private Mobile Radio (PMR), IEEE 802.11 WLAN; b. Equipment designed for mobile telecommunications network operators; or c. Equipment designed for the "development" or "production" of mobile telecommunications equipment or systems. N.B.1. See also MILITARY GOODS CONTROLS. N.B.2. For radio receivers see 5A001.b.5.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	Network (RAN) equipment; b. Detect and exploit specific characteristics of the mobile telecommunications protocol employed (e.g., GSM); or c. Exploit specific characteristics of the mobile telecommunications protocol employed (e.g. GSM); 4. RF monitoring equipment designed or modified to identify the operation of items specified in 5A001.f.1., 5A001.f.2. or 5A001.f.3.; g. Passive Coherent Location (PCL) systems or equipment, specially designed for detecting and tracking moving objects by measuring reflections of ambient radio frequency emissions, supplied by non-radar transmitters;	Technical Note: Non-radar transmitters may include commercial radio, television or cellular telecommunications base stations. Note: 5A001.g. does not control any of the following: a. Radio-astronomical equipment; or	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	h. Counter Improvised Explosive Device (IED) equipment and related equipment, as follows: 1. Radio Frequency (RF) transmitting equipment, not specified in 5A001.f., designed or modified for prematurely activating or preventing the initiation of Improvised Explosive Devices; 2. Equipment using techniques designed to enable radio communications in the same frequency channels on which co-located equipment specified in 5A001.h.1. is transmitting. i. Not used; j. Internet Protocol (IP) network communications surveillance systems or equipment, and specially designed components therefor, having all of the following: 1. Performing all of the following on a carrier class	b. Systems or equipment, that require any radio transmission from the target. N.B. See also MILITARY GOODS CONTROLS. Note: 5A001.j. does not control systems or equipment, specially designed for any of the following: a. Marketing purpose; b. Network Quality of Service (QoS); or c. Quality of Experience (QoE).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	Internet Protocol (IP) network (e.g., national grade IP backbone): a. Analysis at the application layer (e.g., Layer 7 of Open Systems Interconnection (OSI) model (ISO/IEC 7498-1)); b. Extraction of selected metadata and application content (e.g., voice, video, messages, attachments); and c. Indexing of extracted data; and 2. Being specially designed to carry out all of the following: a. Execution of searches on the basis of 'hard selectors'; and b. Mapping of the relational network of	Technical Note: 'Hard selectors' means data or set of data, related to an individual (e.g., family name, given name, e-mail, street address, phone number or group affiliations).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	an individual or of a group of people.		
5A101	Telemetry and telecontrol equipment, including ground equipment, designed or modified for 'missiles'.	Technical Note: In 5A101, 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km. Note: 5A101 does not control: a. Equipment designed or modified for manned aircraft or satellites; b. Ground based equipment designed or modified for terrestrial or marine applications; c. Equipment designed for commercial, civil or 'Safety of Life' (e.g. data integrity, flight safety) GNSS services;	Malaysian Communications and Multimedia Commission
5B1	**Test, Inspection and Production Equipment**		
5B001	Telecommunications test, inspection and production equipment, components and accessories, as follows: a. Equipment and specially designed components or accessories therefor, specially designed for the	Note: 5B001.a. does not control optical fibre characterization equipment.	Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	"development" or "production" of equipment, functions or features, specified in 5A001; b. Equipment and specially designed components or accessories therefor, specially designed for the "development" of any of the following telecommunication transmission or switching equipment: 1. Not used; 2. Equipment employing a "laser" and having any of the following: a. A transmission wavelength exceeding 1,750 nm; or b. Not used; c. Not used; d. Employing analogue techniques and having a bandwidth exceeding 2.5 GHz; or	Note: 5B001.b.2.d. does not control equipment specially designed for the "development" of commercial TV systems.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Not used; 4. Radio equipment employing Quadrature-Amplitude-Modulation (QAM) techniques above level 256; 5. Not used.		
5C1	**Materials** None		
5D1	**Software**		
5D001	"Software" as follows: a. "Software" specially designed or modified for the "development", "production" or "use" of equipment, functions or features, specified in 5A001; b. Not used; c. Specific "software" specially designed or modified to provide characteristics, functions or features of		Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	equipment, specified in 5A001 or 5B001; d. "Software" specially designed or modified for the "development" of any of the following telecommunication transmission or switching equipment: 1. Not used; 2. Equipment employing a "laser" and having any of the following: a. A transmission wavelength exceeding 1,750nm; or b. Employing analogue techniques and having a bandwidth exceeding 2.5GHz; or 3. Not used; 4. Radio equipment employing Quadrature-Amplitude-Modulation (QAM) techniques above level 256.	Note: 5D001.d.2.b. does not control "software" specially designed or modified for the "development" of commercial TV systems.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
5D101	"Software" specially designed or modified for the "use" of equipment specified in 5A101.		Malaysian Communications and Multimedia Commission
5E1	**Technology**		
5E001	"Technology" as follows: a. "Technology" according to the General Technology Note for the "development", "production" or "use" (excluding operation) of equipment, functions or features specified in 5A001 or "software" specified in 5D001.a.; b. Specific "technology" as follows: 1. "Technology" "required" for the "development" or "production" of telecommunications equipment specially designed to be used on board satellites; 2. "Technology" for the "development" or "use" of "laser" communication techniques with the		Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	capability of automatically acquiring and tracking signals and maintaining communications through exoatmosphere or sub-surface (water) media; 3. "Technology" for the "development" of digital cellular radio base station receiving equipment whose reception capabilities that allow multi-band, multi-channel, multi-mode, multi-coding algorithm or multi-protocol operation can be modified by changes in "software"; 4. "Technology" for the "development" of "spread spectrum" techniques, including "frequency hopping" techniques; c. "Technology" according to the General Technology Note for the "development" or "production" of any of the following:	Note: 5E001.b.4. does not control "technology" for the "development" of any of the following: a. Civil cellular radio-communications systems; or b. Fixed or mobile satellite earth stations for commercial civil telecommunications. N.B. For "technology" for the "development" or "production" of non-telecommunications equipment employing a laser, see 6E.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Not used; 2. Equipment employing a "laser" and having any of the following: a. transmission wavelength exceeding 1,750 nm; or b. Not used; c. Not used; d. Employing wavelength division multiplexing techniques of optical carriers at less than 100 GHz spacing; or e. Employing analogue techniques and having a bandwidth exceeding 2.5 GHz; 3. Equipment employing "optical switching" and having a switching time less than 1 ms; 4. Radio equipment having any of the following:	Note: 5E001.c.2.e. does not control "technology" for commercial TV systems.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Quadrature-Amplitude-Modulation (QAM) techniques above level 256; b. Operating at input or output frequencies exceeding 31.8 GHz; or c. Operating in the 1.5 MHz to 87.5 MHz band and incorporating adaptive techniques providing more than 15 dB suppression of an interfering signal; or 5. Not used; 6. Mobile equipment having all of the following: a. Operating at an optical wavelength greater than or equal to 200 nm and less than or equal to 400 nm; and b. Operating as a "local area network";	Note: 5E001.c.4.b. does not control "technology" for equipment designed or modified for operation in any frequency band which is "allocated by the ITU" for radio-communications services, but not for radio-determination.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. "Technology" according to the General Technology Note for the "development" or "production" of "Monolithic Microwave Integrated Circuit ("MMIC") amplifiers specially designed for telecommunications and that are any of the following: 1. Rated for operation at frequencies exceeding 2.7GHz up to and including 6.8GHz with a "fractional bandwidth" greater than 15%, and having any of the following: a. A peak saturated power output greater than 75W (48.75dBm) at any frequency exceeding 2.7GHz up to and including 2.9GHz; b. A peak saturated power output greater than 55W (47.4dBm) at any frequency exceeding 2.9GHz up to and including 3.2GHz;	Technical Note: For purposes of 5E001.d., the parameter peak saturated power output may also be referred to on product data sheets as output power, saturated power output, maximum power output, peak power output, or peak envelope power output.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. A peak saturated power output greater than 40W (46dBm) at any frequency exceeding 3.2GHz up to and including 3.7GHz; or d. A peak saturated power output greater than 20W (43dBm) at any frequency exceeding 3.7GHz up to and including 6.8GHz; 2. Rated for operation at frequencies exceeding 6.8GHz up to and including 16GHz with a "fractional bandwidth" greater than 10%, and having any of the following: a. A peak saturated power output greater than 10W (40dBm) at any frequency exceeding 6.8GHz up to and including 8.5GHz; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. A peak saturated power output greater than 5W (37dBm) at any frequency exceeding 8.5GHz up to and including 16GHz; 3. Rated for operation with a peak saturated power output greater than 3W (34.77dBm) at any frequency exceeding 16GHz up to and including 31.8GHz, and with a "fractional bandwidth" of greater than 10%; 4. Rated for operation with a peak saturated power output greater than 0.1nW (-70dBm) at any frequency exceeding 31.8GHz up to and including 37GHz; 5. Rated for operation with a peak saturated power output greater than 1W (30dBm) at any frequency exceeding 37GHz up to and including 43.5GHz, and with a "fractional		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	bandwidth" of greater than 10%; 6. Rated for operation with a peak saturated power output greater than 31.62mW (15dBm) at any frequency exceeding 43.5GHz up to and including 75GHz, and with a "fractional bandwidth" of greater than 10%; 7. Rated for operation with a peak saturated power output greater than 10mW (10dBm) at any frequency exceeding 75GHz up to and including 90GHz, and with a "fractional bandwidth" of greater than 5%; or 8. Rated for operation with a peak saturated power output greater than 0.1nW (-70dBm) at any frequency exceeding 90GHz; e. "Technology" according to the General Technology Note for the "development" or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	"production" of electronic devices and circuits, specially designed for telecommunications and containing components manufactured from "superconductive" materials, specially designed for operation at temperatures below the "critical temperature" of at least one of the "superconductive" constituents and having any of the following: 1. Current switching for digital circuits using "superconductive" gates with a product of delay time per gate (in seconds) and power dissipation per gate (in watts) of less than 10^{-14} J; or 2. Frequency selection at all frequencies using resonant circuits with Q-values exceeding 10,000.		
5E101	"Technology" according to the General Technology Note for the "development", "production" or		Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	"use" of equipment specified in 5A101.		
PART 2 : "INFORMATION SECURITY"		Note 1: Not used. Note 2: Category 5 – Part 2 does not control products when accompanying their user for the user's personal use. Note 3: Cryptography Note 5A002, 5D002.a.1., 5D002.b. and 5D002.c.1. do not control items as follows: a. Items that meet all of the following: 1. Generally available to the public by being sold, without restriction, from stock at retail selling points by means of any of the following: a. Over-the-counter transactions b. Mail order transactions; c. Electronic transactions; or d. Telephone call transactions; 2. The cryptographic functionality cannot easily be changed by the user; 3. Designed for installation by the user without further substantial support by the supplier; and	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		4. When necessary, details of the goods are accessible and will be provided, upon request, to the competent authorities in which the exporter is established in order to ascertain compliance with conditions described in paragraphs 1. to 3. above; b. Hardware components or 'executable software', of existing items described in paragraph a. of this Note, that have been designed for these existing items, meeting all of the following: 1. "Information security" is not the primary function or set of functions of the component or 'executable software'; 2. The component or 'executable software' does not change any cryptographic functionality of the existing items, or add new cryptographic functionality to the existing items; 3. The feature set of the component or 'executable software' is fixed and is not designed or modified to customer specification; and 4. When necessary as determined by the competent authorities in which the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		exporter is established, details of the component or 'executable software' and details of relevant end-items are accessible and will be provided to the competent authority upon request, in order to ascertain compliance with conditions described above. Technical Note: For the purpose of the Cryptography Note, 'executable software' means "software" in executable form, from an existing hardware component excluded from 5A002 by the Cryptography Note. Note: 'Executable software' does not include complete binary images of the "software" running on an end-item. Note to the Cryptography Note: 1. To meet paragraph a. of Note 3, all of the following must apply: a. The item is of potential interest to a wide range of individuals and businesses; and b. The price and information about the main functionality of the item are available before purchase without the need to consult the vendor or supplier.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		2. In determining eligibility of paragraph a. of Note 3, competent authorities may take into account relevant factors such as quantity, price, required technical skill, existing sales channels, typical customers, typical use or any exclusionary practices of the supplier.	
5A2	**Systems, Equipment and Components**		
5A002	'Information security' systems, equipment and components, as follows: a. Designed or modified to use 'cryptography for data confidentiality' having a 'described security algorithm', where that cryptographic capability is usable, has been activated, or can be activated by means of 'cryptographic activation' not employing a secure mechanism, as follows: 1. Item having 'information security' as a primary function; 2. Digital communication or networking systems, equipment or components, not specified in 5A002.a.1.;	N.B.: For the control of 'satellite navigation system' receiving equipment containing or employing decryption, see 7A005 and for related decryption 'software' and 'technology' see 7D005 and 7E001. N.B.: For operating systems, see also 5D002.a.1. and 5D002.c.1. Technical Notes: 1. For the purposes of 5A002.a., 'cryptography for data confidentiality' means 'cryptography' that employs digital techniques and performs any cryptographic function other than any of the following: a. "Authentication"; b. Digital Signature; c. Data integrity; d. Non-repudiation;	Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Computers, other item having information storage or processing as a primary function, and components therefor, not specified in 5A002.a.1. or 5A002.a.2.; 4. Item, not specified in 5A002.a.1. to 5A002.a.3., where the 'cryptography for data confidentiality' having a 'described security algorithm' meets all of the following: a. It supports a non-primary function of the item; and b. It is performed by incorporated equipment or 'software' that would, as a standalone item, be specified in Category 5 - Part 2. b. Being a 'cryptographic activation token'; c. Designed or modified to use or perform 'quantum cryptography';	e. Digital rights management, including the execution of copy-protected 'software'; f. Encryption or decryption in support of entertainment, mass commercial broadcasts or medical records management; or g. Key management in support of any function described in paragraph a. to f. above. 2. For the purposes of 5A002.a., 'described security algorithm' means any of the following: a. A 'symmetric algorithm' employing a key length in excess of 56 bits, not including parity bits; or b. An 'asymmetric algorithm' where the security of the algorithm is based on any of the following: 1. Factorisation of integers in excess of 512 bits (e.g. RSA); 2. Computation of discrete logarithms in a multiplicative group of a finite field of size greater than 512 bits (e.g. Diffie-Hellman over Z/pZ); or 3. Discrete logarithms in a group other than mentioned in item 5A002.a.1.b.2. in excess of 112 bits (e.g. Diffie-Hellman over an elliptic curve); or	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Designed or modified to use cryptographic techniques to generate channelising codes, scrambling codes or network identification codes, for systems using ultra-wideband modulation techniques and having any of the following: 1. A bandwidth exceeding 500MHz; or 2. A 'fractional bandwidth' of 20% or more; e. Designed or modified to use cryptographic techniques to generate the spreading code for 'spread spectrum' systems, other than those specified in 5A002.d., including the hopping code for 'frequency hopping' systems.	c. An 'asymmetric algorithm' where the security of the algorithm is based on any of the following: 1. Shortest vector or closest vector problems associated with lattices (e.g. NewHope, Frodo, NTRUEncrypt, Kyber, Titanium); 2. Finding isogenies between Supersingular elliptic curves (e.g. Supersingular Isogeny Key Encapsulation); or 3. Decoding random codes (e.g. McEliece, Niederreiter). Technical Note: An algorithm described by Technical Note 2.c. may be referred to as being post-quantum, quantum-safe or quantum-resistant. Note 1: When necessary as determined by the appropriate authority in the exporter's country, details of item must be accessible and provided to the authority upon request, in order to establish any of the following: a. Whether the item meets the criteria of 5A002.a.1. to 5A002.a.4.; or b. Whether the cryptographic capability for data confidentiality specified in 5A002.a.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		is usable without 'cryptographic activation'. Note 2: 5A002.a. does not control any of the following items, or specially designed 'information security' components therefor: a. Smart cards and smart card 'readers/writers' as follows: 1. A smart card or an electronically readable personal document (e.g., token coin, e-passport) that meets any of the following: a. The cryptographic capability meets all of the following: 1. It is restricted for use in any of the following: a. Equipment or systems not described by 5A002.a.1. to 5A002.a.4.; b. Equipment or systems not using 'cryptography for data confidentiality' having a 'described security algorithm'; or c. Equipment or systems, excluded from 5A002.a., by	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		items b. to f. of this Note; and 2. It cannot be reprogrammed for any other use; or b. Having all of the following: 1. It is specially designed and limited to allow protection of 'personal data' stored within; 2. Has been, or can only be, personalised for public or commercial transactions or individual identification; and 3. Where the cryptographic capability is not user-accessible; Technical Note: 'Personal data' includes any data specific to a particular person or entity, such as the amount of money stored and data necessary for "authentication". 2. 'Readers/writers' specially designed or modified, and limited, for items specified in paragraph a.1. of this Note.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Note: 'Readers/writers' include equipment that communicates with smart cards or electronically readable documents through a network. b. Cryptographic equipment specially designed and limited for banking use or 'money transactions'; Technical Note: 'Money transactions' in 5A002.a. Note 2.b. includes the collection and settlement of fares or credit functions. c. Portable or mobile radiotelephones for civil use (e.g., for use with commercial civil cellular radio communication systems) that are not capable of transmitting encrypted data directly to another radiotelephone or equipment (other than Radio Access Network (RAN) equipment), nor of passing encrypted data through RAN equipment (e.g., Radio Network Controller (RNC) or Base Station Controller (BSC)); d. Cordless telephone equipment not capable of end-to-end encryption where the maximum effective range of unboosted cordless operation (i.e. a	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		single, unrelayed hop between terminal and home base station) is less than 400 metres according to the manufacturer's specifications; e. Portable or mobile radiotelephones and similar client wireless devices for civil use, that implement only published or commercial cryptographic standards (except for anti-piracy functions, which may be non-published) and also meet the provisions of paragraphs a.2. to a.4. of the Cryptography Note (Note 3 in Category 5, Part 2), that have been customised for a specific civil industry application with features that do not affect the cryptographic functionality of these original non-customised devices; f. Items, where the 'information security' functionality is limited to wireless 'personal area network' functionality, meeting all of the following: 1. Implement only published or commercial cryptographic standards; and 2. The cryptographic capability is limited to a nominal operating range not exceeding 30 metres according to the manufacturer's specifications, or not exceeding 100	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		metres according to the manufacturer's specifications for equipment that cannot interconnect with more than seven devices; g. Mobile telecommunications Radio Access Network (RAN) equipment designed for civil use, which also meet the provisions of paragraphs a.2. to a.4. of the Cryptography Note (Note 3 in Category 5, Part 2), having an RF output power limited to 0.1W (20 dBm) or less, and supporting 16 or fewer concurrent users. h. Routers, switches or relays, where the 'information security' functionality is limited to the tasks of 'Operations, Administration or Maintenance' ('OAM') implementing only published or commercial cryptographic standards; or i. General purpose computing equipment or servers, where the 'information security' functionality meets all of the following: 1. Uses only published or commercial cryptographic standards; and 2. Is any of the following:	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		a. Integral to a CPU that meets the provisions of Note 3 to Category 5–Part 2; b. Integral to an operating system that is not specified in 5D002; or c. Limited to 'OAM' of the equipment. j. Item specially designed for a 'connected civil industry application', meeting all of the following: 1. Being any of the following: a. A network-capable endpoint device meeting any of the following: 1. The 'information security' functionality is limited to securing 'non-arbitrary data' or the tasks of 'Operations, Administration or Maintenance' ('OAM'); or 2. The device is limited to a specific 'connected civil industry application'; or b. Networking equipment meeting all of the following: 1. Being specially designed to communicate with the devices	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		specified in item j.1.a. above; and 2. The 'information security' functionality is limited to supporting the 'connected civil industry application' of devices specified in item j.1.a. above, or the tasks of 'OAM' of this networking equipment or of other item specified in item j. of this Note; and 2. Where the 'information security' functionality implements only published or commercial cryptographic standards, and the cryptographic functionality cannot easily be changed by the user. Technical Notes: 1. "Connected civil industry application" means a network connected consumer or civil industry application other than "information security", digital communication, general purpose networking or computing. 2. "Non-arbitrary data" means sensor or metering data directly related to the stability, performance or physical measurement of a system (e.g. temperature, pressure, flow rate, mass, volume, voltage, physical location etc.), that cannot be changed by the user of the device.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Note: A 'cryptographic activation token' is an item designed or modified for any of the following: 1. Converting, by means of 'cryptographic activation', an item not specified in Category 5 – Part 2 into an item specified in 5A002.a. or 5D002.c.1., and not released by the Cryptography Note (Note 3 in Category 5 – Part 2); or 2. Enabling, by means of 'cryptographic activation', additional functionality specified in 5A002.a. of an item already specified in Category 5 – Part 2. Technical Note: "Quantum cryptography" is also known as Quantum Key Distribution (QKD).	
5A003	Systems, equipment and components, for non-cryptographic "information security", as follows: a. Communications cable systems designed or modified using mechanical, electrical or	Note: 5A003.a. only controls physical layer security. For the purpose of 5A003.a., the physical layer includes Layer 1 of the Reference Model of Open Systems Interconnection (OSI)(ISO/IEC 7498-1).	Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	electronic means to detect surreptitious intrusion; b. Specially designed or modified to reduce the compromising emanations of information-bearing signals beyond what is necessary for health, safety or electromagnetic interference standards;		
5A004	Systems, equipment and components for defeating, weakening or bypassing "information security", as follows: a. Designed or modified to perform 'cryptanalytic functions'.	Note: 5A004.a. includes systems or equipment, designed or modified to perform 'cryptanalytic functions' by means of reverse engineering. Technical Note: 'Cryptanalytic functions' are functions designed to defeat cryptographic mechanisms in order to derive confidential variables or sensitive data, including clear text, passwords or cryptographic keys.	Malaysian Communications and Multimedia Commission
5B2	**Test, Inspection and Production Equipment**		
5B002	"Information security" test, inspection and "production" equipment, as follows: a. Equipment specially designed for the "development" or "production" of equipment		Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	specified in 5A002 or 5B002.b.; b. Measuring equipment specially designed to evaluate and validate the "information security" functions of the equipment specified in 5A002 or "software" specified in 5D002.a. or 5D002.c.		
5C2	**Materials** None.		
5D2	**Software**		
5D002	"Software" as follows: a. "Software" specially designed or modified for the "development", "production" or "use" of any of the following: 1. Equipment specified in 5A002 or "software" specified in 5D002.c.1.; 2. Equipment specified in 5A003 or "software" specified in 5D002.c.2.; or		Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Equipment specified in 5A004 or "software" specified in 5D002.c.3.; b. "Software" having the characteristics of a "cryptographic activation token" specified in 5A002.b; c. "Software" having the characteristics of, or performing or simulating the functions of, any of the following : 1. Equipment specified in 5A002.a, 5A002.c., 5A002.d. or 5A002.e.; 2. Equipment specified in 5A003; or 3. Equipment specified in 5A004. d. Not used.	Note: 5D002.c.1. does not control "software" limited to the tasks of "OAM" implementing only published or commercial cryptographic standards.	
5E2	**Technology**		
5E002	"Technology" as follows: a. "Technology" according to the General Technology Note for	Note: 5E002 includes "information security" technical data resulting from procedures carried out to evaluate or determine the implementation of	Malaysian Communications and Multimedia Commission

Category Code	*Items Description*	*Note*	*Relevant Authority*
	the "development", "production" or "use" of equipment specified in 5A002, 5A003, 5A004 or 5B002, or of "software" specified in 5D002.a. or 5D002.c. b. "Technology" having the characteristics of a "cryptographic activation token" specified in 5A002.b.	functions, features or techniques specified in Category 5-Part 2.	

CATEGORY 6

SENSORS AND LASERS

Category Code	*Items Description*	*Note*	*Relevant Authority*
CATEGORY 6 - SENSORS AND LASERS			
6A	**Systems, Equipment and Components**		
6A001	Acoustic systems, equipment and components, as follows: a. Marine acoustic systems, equipment and specially designed components therefor, as follows: 1. Active (transmitting or transmitting-and-receiving) systems, equipment and specially designed components therefor, as follows: a. Acoustic seabed survey equipment as follows:	Note: 6A001.a.1. does not control equipment as follows: a. Depth sounders operating vertically below the apparatus, not including a scanning function exceeding ± 20°, and limited to measuring the depth of water, the distance of submerged or buried objects or fish finding; b. Acoustic beacons, as follows: 1. Acoustic emergency beacons; 2. Pingers specially designed for relocating or returning to an underwater position.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Surface vessel survey equipment designed for seabed topographic mapping and having all of the following: a. Designed to take measurements at an angle exceeding 20° from the vertical; b. Designed to measure seabed topography at seabed depths exceeding 600m; c. 'Sounding resolution' less than 2; and d. 'Enhancement' of the depth "accuracy" through compensation for all the following: 1. Motion of the acoustic sensor; 2. In-water propagation from sensor to the seabed and back; and 3. Sound speed at the sensor; 2. Underwater survey equipment designed for seabed topographic mapping and having any of the following:	Technical Notes: 1. 'Sounding resolution' is the swath width (degrees) divided by the maximum number of soundings per swath. 2. 'Enhancement' includes the ability to compensate by external means. Technical Note: The acoustic sensor pressure rating determines the depth rating of the equipment specified in 6A001.a.1.a.2.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Having all of the following: 1. Designed or modified to operate at depths exceeding 300m; and 2. 'Sounding rate' greater than 3,800m/s; or b. Survey equipment, not specified in 6A001.a.1.a.2.a., having all of the following: 1. Designed or modified to operate at depths exceeding 100m; 2. Designed to take measurements at an angle exceeding 20° from the vertical; 3. Having any of the following: a. Operating frequency below 350kHz; or b. Designed to measure seabed topography at a range exceeding 200m from the acoustic sensor; and 4. 'Enhancement' of the depth accuracy through compensation of all of the following: a. Motion of the acoustic sensor;	Technical Note: 'Sounding rate' is the product of the maximum speed (m/s) at which the sensor can operate and the maximum number of soundings per swath assuming 100% coverage. For systems that produce soundings in two directions (3D sonars), the maximum of the 'sounding rate' in either direction should be used.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. In-water propagation from sensor to the seabed and back; and c. Sound speed at the sensor; 3. Side Scan Sonar (SSS) or Synthetic Aperture Sonar (SAS), designed for seabed imaging and having all of the following, and specially designed transmitting and receiving acoustic arrays therefor: a. Designed or modified to operate at depths exceeding 500m; b. An 'area coverage rate' of greater than 570m^2/s while operating at the maximum range that it can operate with an 'along track resolution' of less than 15cm; and c. An 'across track resolution' of less than 15cm;	Technical Notes: 1. 'Area coverage rate' (m^2/s) is twice the product of the sonar range (m) and the maximum speed (m/s) at which the sensor can operate at that range. 2. 'Along track resolution' (cm), for SSS only, is the product of azimuth (horizontal) beamwidth (degrees) and sonar range (m) and 0.873. 3. 'Across track resolution' (cm) is 75 divided by the signal bandwidth (kHz).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Systems or transmitting and receiving arrays, designed for object detection or location, having any of the following: 1. A transmitting frequency below 10kHz; 2. Sound pressure level exceeding 224dB (reference 1μPa at 1m) for equipment with an operating frequency in the band from 10kHz to 24kHz inclusive; 3. Sound pressure level exceeding 235dB (reference 1μPa at 1m) for equipment with an operating frequency in the band between 24kHz and 30kHz; 4. Forming beams of less than 1° on any axis and having an operating frequency of less than 100kHz; 5. Designed to operate with an unambiguous display range exceeding 5,120m; 6. Designed to withstand pressure during normal operation at depths exceeding 1,000m and having transducers with any of the following: a. Dynamic compensation for pressure; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Incorporating other than lead zirconate titanate as the transduction element; c. Acoustic projectors including transducers, incorporating piezoelectric, magnetostrictive, electrostrictive, electrodynamic or hydraulic elements operating individually or in a designed combination, and having any of the following: 1. Operating at frequencies below 10kHz and having any of the following: a. Not designed for continuous operation at 100% duty cycle and having a radiated	Note 1: The control status of acoustic projectors, including transducers, specially designed for other equipment not specified in 6A001 is determined by the control status of the other equipment. Note 2: 6A001.a.1.c. does not control electronic sources which direct the sound vertically only, or mechanical (e.g., air gun or vapour-shock gun) or chemical (e.g., explosive) sources. Note 3: Piezoelectric elements specified in 6A001.a.1.c. include those made from lead-magnesium-niobate/lead-titanate ($Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$, or PMN-PT) single crystals grown from solid solution or lead-indium-niobate/lead-magnesium niobate/lead-titanate ($Pb(In_{1/2}Nb_{1/2})O_3$ -$Pb(Mg_{1/3}Nb_{2/3})O_3$–$PbTiO_3$, or PIN-PMN-PT) single crystals grown from solid solution.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	'free-field Source Level (SL_{RMS})' exceeding (10log(f) + 169.77) dB (reference 1 µPa at 1m) where f is the frequency in Hertz of maximum Transmitting Voltage Response (TVR) below 10kHz; or b. Designed for continuous operation at 100% duty cycle and having a continuously radiated 'free-field Source Level (SLRMS)' at 100% duty cycle exceeding (10log(f) + 159.77) dB (reference 1µPa at 1m) where f is the frequency in Hertz of maximum Transmitting Voltage Response (TVR) below 10kHz; or 2. Not used; 3. Side-lobe suppression exceeding 22dB; d. Acoustic systems and equipment, designed to determine the position of surface vessels or underwater vehicles and having all the following,	Technical Note: The 'free-field Source Level (SLRMS)' is defined along the maximum response axis and in the far field of the acoustic projector. It can be obtained from the Transmitting Voltage Response using the following equation: SLRMS = (TVR + 20log VRMS) dB (ref 1µPa at 1m), where SLRMS is the source level, TVR is the Transmitting Voltage Response and VRMS is the Driving Voltage of the Projector. Note: 6A001.a.1.d. includes: a. Equipment using coherent "signal processing" between two or more beacons and the hydrophone unit	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	and specially designed components therefor: 1. Detection range exceeding 1,000m; and 2. Positioning accuracy of less than 10m rms (root mean square) when measured at a range of 1,000m; f. Active individual sonars, specially designed or modified to detect, locate and automatically classify swimmers or divers, having all of the following, and specially designed transmitting and receiving acoustic arrays therefor: 1. Detection range exceeding 530m; 2. Determined position error of less than 15m rms (root mean square) when measured at a range of 530m; and 3. Transmitted pulse signal bandwidth exceeding 3kHz; 2. Passive systems, equipment and specially designed components therefor, as follows:	carried by the surface vessel or underwater vehicle; b. Equipment capable of automatically correcting speed-of-sound propagation errors for calculation of a point. N.B. For diver detection systems specially designed or modified for military use, see the Military Goods Controls. Note: For 6A001.a.1.e., where multiple detection ranges are specified for various environments, the greatest detection range is used. Note: 6A001.a.2. also controls receiving equipment, whether or not related in normal application to separate active	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Hydrophones having any of the following: 1. Incorporating continuous flexible sensing elements; 2. Incorporating flexible assemblies of discrete sensing elements with either a diameter or length less than 20mm and with a separation between elements of less than 20mm; 3. Having any of the following sensing elements: a. Optical fibres; b. 'Piezoelectric polymer films' other than polyvinylidene-fluoride (PVDF) and its co-polymers {P(VDF-TrFE) and P(VDF-TFE)}; c. 'Flexible piezoelectric composites'; d. Lead-magnesium-niobate/ lead-titanate (i.e., $Pb(Mg_{1/3}Nb_{2/3})O_3$-$PbTiO_3$, or PMN-PT) piezoelectric single crystals grown from solid solution; or e. Lead-indium-niobate/lead-magnesium niobate/lead-titanate (i.e.,$Pb(In_{1/2}Nb_{1/2})O_3$–$Pb(Mg_{1/3}Nb_{2/3})O_3$–$PbTiO_3$, or PIN-	equipment, and specially designed components therefor. Note: The control status of hydrophones specially designed for other equipment is determined by the control status of the other equipment. Technical Note: 1. Hydrophones consist of one or more sensing elements producing a single acoustic output channel. Those that contain multiple elements can be referred to as a hydrophone group. 2. For the purposes of 6A001.a.2.a., underwater acoustic transducers designed to operate as passive receivers are hydrophones. Technical Notes: 1. 'Piezoelectric polymer film' sensing elements consist of polarised polymer film that is stretched over and attached to a supporting frame or spool (mandrel). 2. 'Flexible piezoelectric composite' sensing elements consist of piezoelectric ceramic particles or fibres combined with an electrically insulating, acoustically	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	PMN-PT) piezoelectric single crystals grown from solid solution; 4. A 'hydrophone sensitivity' better than -180dB at any depth with no acceleration compensation; 5. Designed to operate at depths exceeding 35m with acceleration compensation; or 6. Designed for operation at depths exceeding 1,000 m and having a 'hydrophone sensitivity' better than -230 dB below 4 kHz; b. Towed acoustic hydrophone arrays having any of the following: 1. Hydrophone group spacing of less than 12.5m or 'able to be modified' to have hydrophone group spacing of less than 12.5m; 2. Designed or 'able to be modified' to operate at depths exceeding 35m; 3. Heading sensors specified in 6A001.a.2.d.; 4. Longitudinally reinforced array hoses; 5. An assembled array of less than 40mm in diameter;	transparent rubber, polymer or epoxy compound, where the compound is an integral part of the sensing elements. 3. 'Hydrophone sensitivity' is defined as twenty times the logarithm to the base 10 of the ratio of rms output voltage to a 1V rms reference, when the hydrophone sensor, without a pre-amplifier, is placed in a plane wave acoustic field with an rms pressure of 1 µPa. For example, a hydrophone of -160dB (reference 1 V per µPa) would yield an output voltage of 10^{-8}V in such a field, while one of - 180dB sensitivity would yield only 10^{-9}V output. Thus, - 160dB is better than -180dB. Technical Note: Hydrophone arrays consist of a number of hydrophones providing multiple acoustic output channels. Technical Note: 'Able to be modified' in 6A001.a.2.b.1. and 2. means having provisions to allow a change of the wiring or interconnections to alter hydrophone group spacing or operating depth limits. These provisions are: spare wiring exceeding 10% of the number of wires, hydrophone group spacing adjustment blocks or internal depth limiting devices that are	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	6. Not used; 3. Hydrophone characteristics specified in 6A001.a.2.a.; or 4. Accelerometer-based hydro-acoustic sensors specified in 6A001.a.2.g.; c. Processing equipment, specially designed for towed acoustic hydrophone arrays, having "user-accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes; d. Heading sensors having all of the following: 1. An accuracy of better than ±0.5°; and 2. Designed to operate at depths exceeding 35m or having an adjustable or removable depth sensing device in order to operate at depths exceeding 35m; e. Bottom or bay-cable hydrophone arrays, having any of the following: 1. Incorporating hydrophones specified in 6A001.a.2.a.; 2. Incorporating multiplexed hydrophone group signal modules having all of the following characteristics:	adjustable or that control more than one hydrophone group. N.B.: For inertial heading systems, see 7A003.c.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Designed to operate at depths exceeding 35m or having an adjustable or removable depth sensing device in order to operate at depths exceeding 35m; and b. Capable of being operationally interchanged with towed acoustic hydrophone array modules; or 3. Incorporating accelerometer-based hydro-acoustic sensors specified in 6A001.a.2.g.; f. Processing equipment, specially designed for bottom or bay cable systems, having "user-accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes; g. Accelerometer-based hydro-acoustic sensors having all of the following: 1. Composed of three accelerometers arranged along three distinct axes; 2. Having an overall 'acceleration sensitivity' better than 48dB (reference 1,000mV rms per 1g);	Note: 6A001.a.2.g. does not control particle velocity sensors or geophones. Technical Notes: 1. Accelerometer-based hydro-acoustic sensors are also known as vector sensors. 2. 'Acceleration sensitivity' is defined as twenty times the logarithm to the base	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Designed to operate at depths greater than 35 meters; and 4. Operating frequency below 20kHz. b. Correlation-velocity and Doppler-velocity sonar log equipment, designed to measure the horizontal speed of the equipment carrier relative to the sea bed, as follows: 1. Correlation-velocity sonar log equipment having any of the following characteristics: a. Designed to operate at distances between the carrier and the sea bed exceeding 500m; or b. Having speed accuracy better than 1% of speed; 2. Doppler-velocity sonar log equipment having speed accuracy better than 1% of speed. c. Not used.	10 of the ratio of rms output voltage to a 1V rms reference, when the hydro-acoustic sensor, without a preamplifier, is placed in a plane wave acoustic field with an rms acceleration of 1g (i.e., 9.81m/s^2). Note 1: 6A001.b. does not control depth sounders limited to any of the following: a. Measuring the depth of water; b. Measuring the distance of submerged or buried objects; or c. Fish finding. Note 2: 6A001.b. does not control equipment specially designed for installation on surface vessels.	
6A002	Optical sensors or equipment and components therefor, as follows: a. Optical detectors as follows: 1. "Space-qualified" solid-state detectors as follows:	N.B. SEE ALSO 6A102. Note: For the purpose of 6A002.a.1., solid-state detectors include "focal plane arrays".	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. "Space-qualified" solid-state detectors having all of the following: 1. A peak response in the wavelength range exceeding 10nm but not exceeding 300nm; and 2. A response of less than 0.1% relative to the peak response at a wavelength exceeding 400nm; b. "Space-qualified" solid-state detectors having all of the following: 1. A peak response in the wavelength range exceeding 900nm but not exceeding 1,200nm; and 2. A response "time constant" of 95ns or less; c. "Space-qualified" solid-state detectors having a peak response in the wavelength range exceeding 1,200nm but not exceeding 30,000nm; d. "Space-qualified" "focal plane arrays" having more than 2,048 elements per array and having a peak response in the wavelength range exceeding 300nm but not exceeding 900nm.		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Image intensifier tubes and specially designed components therefor, as follows: a. Image intensifier tubes having all of the following: 1. A peak response in the wavelength range exceeding 400nm but not exceeding 1,050nm; 2. Electron image amplification using any of the following: a. A microchannel plate with a hole pitch (centre-to-centre spacing) of 12µm or less; or b. An electron sensing device with a non-binned pixel pitch of 500µm or less, specially designed or modified to achieve 'charge multiplication' other than by a microchannel plate; and 4. Any of the following photocathodes: a. Multialkali photocathodes (e.g., S-20 and S-25) having a luminous sensitivity exceeding 350µA/lm; b. GaAs or GaInAs photocathodes; or c. Other "III/V compound" semiconductor photocathodes having	Note: 6A002.a.2. does not control non-imaging photomultiplier tubes having an electron sensing device in the vacuum space limited solely to any of the following: a. A single metal anode; or b. Metal anodes with a centre to centre spacing greater than 500 µm. Technical Note: 'Charge multiplication' is a form of electronic image amplification and is defined as the generation of charge carriers as a result of an impact ionization gain process. 'Charge multiplication' sensors may take the form of an image intensifier tube, solid state detector or "focal plane array".	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a maximum "radiant sensitivity" exceeding 10mA/W; b. Image intensifier tubes having all of the following: 1. A peak response in the wavelength range exceeding 1,050nm but not exceeding 1,800nm; 2. Electron image amplification using any of the following: a. A microchannel plate with a hole pitch (centre-to-centre spacing) of 12μm or less; or b. An electron sensing device with a non-binned pixel pitch of 500μm or less, specially designed or modified to achieve 'charge multiplication' other than by a microchannel plate; and 3. "III/V compound" semiconductor (e.g., GaAs or GaInAs) photocathodes and transferred electron photocathodes, having a maximum "radiant sensitivity" exceeding 15mA/W; c. Specially designed components as follows:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Microchannel plates having a hole pitch (centre-to-centre spacing) of 12µm or less; 2. An electron sensing device with a non-binned pixel pitch of 500µm or less, specially designed or modified to achieve 'charge multiplication' other than by a microchannel plate; 3. "III/V compound" semiconductor (e.g., GaAs or GaInAs) photocathodes and transferred electron photocathodes; 3. Non-"space-qualified" "focal plane arrays" as follows:	Note: 6A002.a.2.c.3. does not control compound semiconductor photocathodes designed to achieve a maximum 'radiant sensitivity' of any of the following: a. 10mA/W or less at the peak response in the wavelength range exceeding 400nm but not exceeding 1,050nm; or b. 15mA/W or less at the peak response in the wavelength range exceeding 1,050nm but not exceeding 1,800nm. N.B. 'Microbolometer' non-"space-qualified" "focal plane arrays" are only specified in 6A002.a.3.f.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Note: Linear or two-dimensional multi-element detector arrays are referred to as "focal plane arrays"; Note 1: 6A002.a.3. includes photoconductive arrays and photovoltaic arrays. Note 2: 6A002.a.3. does not control: a. Multi-element (not to exceed 16 elements) encapsulated photoconductive cells using either lead sulphide or lead selenide; b. Pyroelectric detectors using any of the following: 1. Triglycine sulphate and variants; 2. Lead-lanthanum-zirconium titanate and variants; 3. Lithium tantalate; 4. Polyvinylidene fluoride and variants; or 5. Strontium barium niobate and variants.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		c. "Focal plane arrays" specially designed or modified to achieve 'charge multiplication' and limited by design to have a maximum "radiant sensitivity" of 10mA/W or less for wavelengths exceeding 760 nm, having all of the following: 1. Incorporating a response limiting mechanism designed not to be removed or modified; and 2. Any of the following: a. The response limiting mechanism is integral to or combined with the detector element; or b. The "focal plane array" is only operable with the response limiting mechanism in place. Technical Note: A response limiting mechanism integral to the detector element is designed not to be removed or modified without rendering the detector inoperable.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Non-"space-qualified" "focal plane arrays" having all of the following: 1. Individual elements with a peak response within the wavelength range exceeding 900nm but not exceeding 1,050 nm; and 2. Any of the following: a. A response "time constant" of less than 0.5ns; or b. Specially designed or modified to achieve 'charge multiplication' and having a" exceeding 10mA/W; b. Non-"space-qualified" "focal plane arrays" having all of the following: 1. Individual elements with a peak response in the wavelength range exceeding 1,050nm but not exceeding 1,200nm; and 2. Any of the following: a. A response "time constant" of 95ns or less; or b. Specially designed or modified to achieve 'charge multiplication' and having a maximum "radiant sensitivity" exceeding 10mA/W;	d. Thermopile arrays having less than 5, 130 elements. Technical Note: 'Charge multiplication' is a form of electronic image amplification and is defined as the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Non-“space-qualified” non-linear (2-dimensional) “focal plane arrays” having individual elements with a peak response in the wavelength range exceeding 1,200nm but not exceeding 30,000nm;	generation of charge carriers as a result of an impact ionization gain process. ‘Charge multiplication’ sensors may take the form of an image intensifier tube, solid state detector or “focal plane array”. N.B.: Silicon and other material based 'microbolometer' non-"space-qualified" "focal plane arrays" are only specified in 6A002.a.3.f.	
	d. Non-“space-qualified” linear (1-dimensional) “focal plane arrays” having all of the following: 1. Individual elements with a peak response in the wavelength range exceeding 1,200nm but not exceeding 3,000nm; and 2. Any of the following: a. A ratio of 'scan direction' dimension of the detector element to the 'cross-scan direction' dimension of the detector element of less than 3,8; or b. Signal processing in the detector elements;	Note: 6A002.a.3.d. does not control "focal plane arrays" (not to exceed 32 elements) having detector elements limited solely to germanium material. Technical Note: For the purposes of 6A002.a.3.d., 'cross-scan direction' is defined as the axis parallel to the linear array of detector elements and the 'scan direction' is defined as the axis perpendicular to the linear array of detector elements.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Non-"space-qualified" linear (1-dimensional) "focal plane arrays" having individual elements with a peak response in the wavelength range exceeding 3,000nm but not exceeding 30,000nm; f. Non-"space-qualified" non-linear (2-dimensional) infrared "focal plane arrays" based on 'microbolometer' material having individual elements with an unfiltered response in the wavelength range equal to or exceeding 8,000nm but not exceeding 14,000nm; g. Non-"space-qualified" "focal plane arrays" having all of the following: 1. Individual detector elements with a peak response in the wavelength range exceeding 400nm but not exceeding 900nm; 2. Specially designed or modified to achieve 'charge multiplication' and having a maximum "radiant sensitivity" exceeding 10mA/W for wavelengths exceeding 760nm; and 3. Greater than 32 elements; b. "Monospectral imaging sensors" and "multispectral imaging sensors", designed for remote sensing applications and having any of the following:	Technical Note: For the purposes of 6A002.a.3.f., 'microbolometer' is defined as a thermal imaging detector that, as a result of a temperature change in the detector caused by the absorption of infrared radiation, is used to generate any usable signal.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. An Instantaneous-Field-Of-View (IFOV) of less than 200μrad (microradians); or 2. Specified for operation in the wavelength range exceeding 400nm but not exceeding 30,000nm and having all the following; a. Providing output imaging data in digital format; and b. Having any of the following characteristics: 1. "Space-qualified"; or 2. Designed for airborne operation, using other than silicon detectors, and having an IFOV of less than 2.5 mrad (milliradians); c. 'Direct view' imaging equipment incorporating any of the following: 1. Image intensifier tubes specified in 6A002.a.2.a. or 6A002.a.2.b.; 2. "Focal plane arrays" specified in 6A002.a.3.; or 3. Solid state detectors specified in 6A002.a.1.; d. Special support components for optical sensors, as follows: 1. "Space-qualified" cryocoolers;	Note: 6A002.b.1. does not control "monospectral imaging sensors" with a peak response in the wavelength range exceeding 300nm but not exceeding 900nm and only incorporating any of the following non-"space-qualified" detectors or non-"space-qualified" "focal plane arrays": 1. Charge Coupled Devices (CCD) not designed or modified to achieve 'charge multiplication'; or 2. Complementary Metal Oxide Semiconductor (CMOS) devices not designed or modified to achieve 'charge multiplication'. Technical Note: 'Direct view' refers to imaging equipment that presents a visual image to a human observer without converting the image into an electronic signal for television display, and that cannot record or store the image photographically, electronically or by any other means. Note: 6A002.c. does not control equipment as follows, when incorporating other than GaAs or GaInAs photocathodes:	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Non-"space-qualified" cryocoolers having a cooling source temperature below 218K (- 55 °C), as follows: a. Closed cycle type with a specified Mean-Time-To-Failure (MTTF) or Mean- Time-Between-Failures (MTBF), exceeding 2,500 hours; b. Joule-Thomson (JT) self-regulating minicoolers having bore (outside) diameters of less than 8mm; 3. Optical sensing fibres specially fabricated either compositionally or structurally, or modified by coating, to be acoustically, thermally, inertially, electromagnetically or nuclear radiation sensitive; e. Not used. f. Read-out integrated circuits' ('ROIC') specially designed for 'focal plane arrays' specified in 6A002.a.3.	a. Industrial or civilian intrusion alarm, traffic or industrial movement control or counting systems; b. Medical equipment; c. Industrial equipment used for inspection, sorting or analysis of the properties of materials; d. Flame detectors for industrial furnaces; e. Equipment specially designed for laboratory use. Note: 6A002.d.3. does not control encapsulated optical sensing fibres specially designed for bore hole sensing applications. Note: 6A002.f. does not control 'read-out integrated circuits' specially designed for civil automotive applications. Technical Note: A 'Read-Out Integrated Circuit' ('ROIC') is an integrated circuit designed to underlie or be	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		bonded to a 'focal plane array' ('FPA') and used to read-out (i.e. extract and register) signals produced by the detector elements. At a minimum the 'ROIC' reads the charge from the detector elements by extracting the charge and applying a multiplexing function in a manner that retains the relative spatial position and orientation information of the detector elements for processing inside or outside the 'ROIC'.	
6A003	Cameras, systems or equipment, and components therefor, as follows: a. Instrumentation cameras and specially designed components therefor, as follows: 1. Not used; 2. Not used; 3. Electronic streak cameras having temporal resolution better than 50 ns; 4. Electronic framing cameras having a speed exceeding 1,000,000 frames/s; 5. Electronic cameras having all of the following: a. An electronic shutter speed (gating capability) of less than 1μs per full frame; and	N.B. SEE ALSO 6A203 Note: Instrumentation cameras, specified in 6A003.a.3. to 6A003.a.5., with modular structures should be evaluated by their maximum capability, using plug-ins available according to the camera manufacturer's specifications. Note: 6A003.a.1. does not control cinema recording cameras designed for civil purposes.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. A read out time allowing a framing rate of more than 125 full frames per second; 6. Plug-ins having all of the following characteristics: a. Specially designed for instrumentation cameras which have modular structures and which are specified in 6A003.a.; and b. Enabling these cameras to meet the characteristics specified in 6A003.a.3., 6A003.a.4., or 6A003.a.5., according to the manufacturer's specifications; b. Imaging cameras as follows: 1. Video cameras incorporating solid state sensors, having a peak response in the wavelength range exceeding 10nm, but not exceeding 30,000nm and having all of the following: a. Having any of the following: 1. More than 4 x 10^6 "active pixels" per solid state array for monochrome (black and white) cameras; 2. More than 4 x 10^6 "active pixels" per solid state array for colour cameras incorporating three solid state arrays; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. More than 12 x 10^6 "active pixels" for solid state array colour cameras incorporating one solid state array; and b. Having any of the following: 1. Optical mirrors specified in 6A004.a.; 2. Optical control equipment specified in 6A004.d.; or 3. The capability for annotating internally generated 'camera tracking data'; 2. Scanning cameras and scanning camera systems, having all of the following: a. A peak response in the wavelength range exceeding 10nm, but not exceeding 30,000nm; b. Linear detector arrays with more than 8,192 elements per array; and c. Mechanical scanning in one direction; 3. Imaging cameras incorporating image intensifier tubes specified in 6A002.a.2.a. or 6A002.a.2.b.; 4. Imaging cameras incorporating "focal plane arrays" having any of the following:	Note: 6A003.b. does not control television or video cameras, specially designed for television broadcasting. Technical Notes: 1. For the purpose of this entry, digital video cameras should be evaluated by the maximum number of "active pixels" used for capturing moving images. 2. For the purpose of this entry, 'camera tracking data' is the information necessary to define camera line of sight orientation with respect to the earth. This includes— 1. The horizontal angle the camera line of sight makes with respect to the earth's magnetic field direction; and 2. The vertical angle between the camera line of sight and the earth's horizon. Note: 6A003.b.2. does not control scanning cameras and scanning camera systems,	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Incorporating "focal plane arrays" specified in 6A002.a.3.a. to 6A002.a.3.e.; b. Incorporating "focal plane arrays" specified in 6A002.a.3.f.; or c. Incorporating "focal plane arrays" specified in 6A002.a.3.g.; 5. Imaging cameras incorporating solid-state detectors specified in 6A002.a.1.	specially designed for any of the following: a. Industrial or civilian photocopiers; b. Image scanners specially designed for civil, stationary, close proximity scanning applications (e.g., reproduction of images or print contained in documents, artwork or photographs); or c. Medical equipment. Note 1: Imaging cameras specified in 6A003.b.4. include "focal plane arrays" combined with sufficient "signal processing" electronics, beyond the read out integrated circuit, to enable as a minimum the output of an analogue or digital signal once power is supplied. Note 2: 6A003.b.4.a. does not control imaging cameras incorporating linear "focal plane arrays" with 12 elements or fewer, not employing time-delay-and-integration within the element and designed for any of the following: a. Industrial or civilian intrusion alarm, traffic or industrial movement control or counting systems;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		b. Industrial equipment used for inspection or monitoring of heat flows in buildings, equipment or industrial processes; c. Industrial equipment used for inspection, sorting or analysis of the properties of materials; d. Equipment specially designed for laboratory use; or e. Medical equipment. Note 3: 6A003.b.4.b. does not control imaging cameras having any of the following: a. A maximum frame rate equal to or less than 9 Hz; b. Having all of the following: 1. Having a minimum horizontal or vertical 'Instantaneous-Field-of-View (IFOV)' of at least 2 mrad (milliradians) 2. Incorporating a fixed focal-length lens that is not designed to be removed; 3. Not incorporating a 'direct view' display; and	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		4. Having any of the following: a. No facility to obtain a viewable image of the detected fieldof-view; or b. The camera is designed for a single kind of application and designed not to be user modified; or c. The camera is specially designed for installation into a civilian passenger land vehicle and having all of the following: 1. The placement and configuration of the camera within the vehicle are solely to assist the driver in the safe operation of the vehicle; 2. Is only operable when installed in any of the following: a. The civilian passenger land vehicle for which it was intended and	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		the vehicle weighs less than 4,500kg (gross vehicle weight); or b. A specially designed, authorized maintenance test facility; and 3. Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended. Technical Notes: 1. 'Instantaneous Field of View (IFOV)' specified in 6A003.b.4. Note 3.b. is the lesser figure of the 'Horizontal IFOV' or the 'Vertical IFOV'. 'Horizontal IFOV' = horizontal Field of View (FOV)/number of horizontal detector elements 'Vertical IFOV' = vertical Field of View (FOV)/number of vertical detector elements.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		2. 'Direct view' in 6A003.b.4. Note 3.b. refers to an imaging camera operating in the infrared spectrum that presents a visual image to a human observer using a near-to-eye micro display incorporating any light-security mechanism. Note 4: 6A003.b.4.c. does not control imaging cameras having any of the following: a. Having all of the following: 1. Where the camera is specially designed for installation as an integrated component into indoor and wall-plug-operated systems or equipment, limited by design for a single kind of application, as follows; a. Industrial process monitoring, quality control, or analysis of the properties of materials; b. Laboratory equipment specially designed for scientific research; c. Medical equipment;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		d. Financial fraud detection equipment; and 2. Is only operable when installed in any of the following: a. The system(s) or equipment for which it was intended; or b. A specially designed, authorised maintenance facility; and 3. Incorporates an active mechanism that forces the camera not to function when it is removed from the system(s) or equipment for which it was intended; b. Where the camera is specially designed for installation into a civilian passenger land vehicle or passenger and vehicle ferries and having all of the following: 1. The placement and configuration of the camera within the vehicle or ferry is solely to assist the driver or operator in the safe operation of the vehicle or ferry;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		2. Is only operable when installed in any of the following: a. The civilian passenger land vehicle for which it was intended; and the vehicle weighs less than 4,500kg (gross vehicle weight); b. The passenger and vehicle ferry for which it was intended and having a length overall (LOA) 65m or greater; or c. A specially designed, authorised maintenance test facility; and 3. Incorporates an active mechanism that forces the camera not to function when it is removed from the vehicle for which it was intended; d. Limited by design to have a maximum "radiant sensitivity" of 10mA/W or less for wavelengths exceeding 760 nm, having all of the following:	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		1. Incorporating a response limiting mechanism designed not to be removed or modified; 2. Incorporates an active mechanism that forces the camera not to function when the response limiting mechanism is removed; and 3. Not specially designed or modified for underwater use: or d. Having all of the following: 1. Not incorporating a 'direct view' or electronic image display; 2. Has no facility to output a viewable image of the detected field of view; 3. The "focal plane array" is only operable when installed in the camera for which it was intended; and 4. The "focal plane array" incorporates an active mechanism that forces it to be permanently inoperable when removed from the camera for which it was intended.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
6A004	Optical equipment and components, as follows: a. Optical mirrors (reflectors) as follows: 1. "Deformable mirrors" having an active optical aperture greater than 10mm and having any of the following, and specially designed components therefor, a. Having all the following: 1. A mechanical resonant frequency of 750Hz or more; and 2. More than 200 actuators; or b. A Laser Induced Damage Threshold (LIDT) being any of the following: 1. Greater than 1kW/ cm^2 using a "CW laser"; or 2. Greater than 2J/cm^2 using 20ns "laser" pulses at 20 Hz repetition rate;	Technical Note: For the purpose of 6A004.a., Laser Induced Damage Threshold (LIDT) is measured according to ISO 21254-1:2011. N.B. For optical mirrors specially designed for lithography equipment, see 3B001. Technical Note: "Deformable mirrors" are mirrors having any of the following: a. A single continuous optical reflecting surface which is dynamically deformed by the application of individual torques or forces to compensate for distortions in the optical waveform incident upon the mirror; or b. Multiple optical reflecting elements that can be individually and dynamically repositioned by the application of torques or forces to compensate for distortions in the optical waveform incident upon the mirror. "Deformable mirrors" are also known as adaptive optic mirrors.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Lightweight monolithic mirrors having an average "equivalent density" of less than 30kg/m^2 and a total mass exceeding 10kg;	Note: 6A004.a.2. does not control mirrors specially designed to direct solar radiation for terrestrial heliostat installations.	
	3. Lightweight "composite" or foam mirror structures having an average "equivalent density" of less than 30kg/m^2 and a total mass exceeding 2kg;	Note: 6A004.a.3. does not control mirrors specially designed to direct solar radiation for terrestrial heliostat installations.	
	4. Mirrors specially designed for beam steering mirror stages specified in 6A004.d.2.a. with a flatness of $\lambda/10$ or better (λ is equal to 633nm) and having any of the following: a. Diameter or major axis length greater than or equal to 100mm; or b. Having all of the following: 1. Diameter or major axis length greater than 50mm but less than 100mm; and 2. A Laser Induced Damage Threshold (LIDT) being any of the following: a. Greater than 10kW/cm^2 using a "CW laser"; or b. Greater than 20J/cm^2 using 20ns "laser" pulses at 20Hz repetition rate;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Optical components made from zinc selenide (ZnSe) or zinc sulphide (ZnS) with transmission in the wavelength range exceeding 3,000nm but not exceeding 25,000nm and having any of the following: 1. Exceeding 100cm^3 in volume; or 2. Exceeding 80mm in diameter or length of major axis and 20mm in thickness (depth); c. "Space-qualified" components for optical systems, as follows: 1. Components lightweighted to less than 20% "equivalent density" compared with a solid blank of the same aperture and thickness; 2. Raw substrates, processed substrates having surface coatings (single-layer or multi-layer, metallic or dielectric, conducting, semiconducting or insulating) or having protective films; 3. Segments or assemblies of mirrors designed to be assembled in space into an optical system with a collecting aperture equivalent to or larger than a single optic 1 m in diameter; 4. Components manufactured from "composite" materials having a coefficient of linear thermal expansion equal to or less than 5 x 10^{-6} in any coordinate direction;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Optical control equipment as follows: 1. Equipment specially designed to maintain the surface figure or orientation of the "space-qualified" components specified in 6A004.c.1. or 6A004.c.3.; 2. Steering, tracking, stabilisation and resonator alignment equipment as follows: a. Beam steering mirror stages designed to carry mirrors having diameter or major axis length greater than 50mm and having all of the following, and specially designed electronic control equipment therefor: 1. A maximum angular travel of ± 26mrad or more; 2. A mechanical resonant frequency of 500Hz or more; and 3. An angular accuracy of 10μrad (microradians) or less; b. Resonator alignment equipment having bandwidths equal to or more than 100Hz and an accuracy of 10μrad or less; 3. Gimbals having all of the following: a. A maximum slew exceeding 5°;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. A bandwidth of 100Hz or more; c. Angular pointing errors of 200µrad (microradians) or less; and d. Having any of the following: 1. Exceeding 0.15m but not exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 2rad (radians)/s^2; or 2. Exceeding 1m in diameter or major axis length and capable of angular accelerations exceeding 0.5rad (radians)/s^2; 4. Not used e. 'Aspheric optical elements' having all of the following: 1. Largest dimension of the optical-aperture greater than 400mm; 2. Surface roughness less than 1nm (rms) for sampling lengths equal to or greater than 1mm; and 3. Coefficient of linear thermal expansion's absolute magnitude less than $3x10^{-6}$/K at 25 °C.	Technical Notes: 1. An 'aspheric optical element' is any element used in an optical system whose imaging surface or surfaces are designed to depart from the shape of an ideal sphere. 2. Manufacturers are not required to measure the surface roughness listed in 6A004.e.2. unless the optical element was designed or manufactured with the intent to meet, or exceed, the control parameter.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	f. Dynamic wavefront measuring equipment having all of the following: 1. 'Frame rates' equal to or more than 1 kHz; and 2. A wavefront accuracy equal to or less (better) than λ/20 at the designed wavelength.	Note 6A004.e. does not control 'aspheric optical elements' having any of the following: a. Largest optical-aperture dimension less than 1 m and focal length to aperture ratio equal to or greater than 4.5:1; b. Largest optical-aperture dimension equal to or greater than 1 m and focal length to aperture ratio equal to or greater than 7:1; c. Designed as Fresnel, flyeye, stripe, prism or diffractive optical elements; d. Fabricated from borosilicate glass having a coefficient of linear thermal expansion greater than 2.5×10^{-6} /K at 25 °C; or e. An x-ray optical element having inner mirror capabilities (e.g., tube-type mirrors). N.B. For 'aspheric optical elements' specially designed for lithography equipment, see 3B001.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Note: For the purposes of 6A004.f., 'frame rate' is a frequency at which all 'active pixels' in the 'focal plane array' are integrated for recording images projected by the wavefront sensor optics.	
6A005	"Lasers", other than those specified in 0B001.g.5. or 0B001.h.6., components and optical equipment, as follows:	N.B. SEE ALSO 6A205. Note 1: Pulsed "lasers" include those that run in a continuous wave (CW) mode with pulses superimposed. Note 2: Excimer, semiconductor, chemical, CO, CO_2, and 'non-repetitive pulsed' Nd:glass "lasers" are only specified in 6A005.d. Technical Note: 'Transfer lasers' are 'lasers' in which the lasing species are excited through the transfer of energy by collision of a non-lasing atom or molecule with a lasing atom or molecule species. Technical Note: 'Non-repetitive pulsed' refers to "lasers" that produce either a single output pulse or that have a time interval between pulses exceeding one minute.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Note 3: 6A005 includes fibre "lasers". Note 4: The control status of "lasers" incorporating frequency conversion (i.e., wavelength change) by means other than one "laser" pumping another "laser" is determined by applying the control parameters for both the output of the source "laser" and the frequency-converted optical output. Note 5: 6A005 does not control "lasers" as follows: a. Ruby with output energy below 20 J; b. Nitrogen; c. Krypton.	
	a. Non-"tunable" continuous wave "(CW) lasers" having any of the following: 1. Output wavelength less than 150nm and output power exceeding 1W;	Note 6: For the purposes of 6A005.a. and 6A005.b., 'single transverse mode' refers to 'lasers' with a beam profile having an M^2-factor of less than 1.3, while 'multiple transverse mode' refers to 'lasers' with a beam profile having an M^2-factor of 1.3 or higher.	
	2. Output wavelength of 150nm or more but not exceeding 510nm and output power exceeding 30W;	Note: 6A005.a.2. does not control Argon "lasers" having an output power equal to or less than 50W.	
	3. Output wavelength exceeding 510nm but not exceeding 540nm and any of the following:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Single transverse mode output and output power exceeding 50W; or b. Multiple transverse mode output and output power exceeding 150W; 4. Output wavelength exceeding 540nm but not exceeding 800nm and output power exceeding 30W; 5. Output wavelength exceeding 800nm but not exceeding 975nm and any of the following: a. Single transverse mode output and output power exceeding 50W; or b. Multiple transverse mode output and output power exceeding 80W; 6. Output wavelength exceeding 975nm but not exceeding 1,150nm and any of the following: a. "Single transverse mode" output and any of the following; 1. Average output power exceeding 1,000 W; or 2. Having all of the following: a. Average output power exceeding 500 W; and	Technical Note: In 6A005 'Wall-plug efficiency' is defined as the ratio of "laser" output power (or "average output power") to total electrical input power required to operate the "laser", including the power supply/conditioning and thermal conditioning/heat exchanger.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Spectral bandwidth less than 40 GHz; or b. "Multiple transverse mode" output and any of the following: 1. "Wall-plug efficiency" exceeding 18% and output power exceeding 1,000 W; or 2. Output power exceeding 2 kW;	Note 1: 6A005.a.6.b. does not control multiple transverse mode, industrial "lasers" with output power exceeding 2kW and not exceeding 6kW with a total mass greater than 1,200kg. For the purpose of this note, total mass includes all components required to operate the "laser", e.g., "laser", power supply, heat exchanger, but excludes external optics for beam conditioning or delivery. Note 2: 6A005.a.6.b. does not control "multiple transverse mode", industrial "lasers" having any of the following: a. Not used: b. Output power exceeding 1kW but not exceeding 1.6kW and having a BPP exceeding 1.25mm•mrad; c. Output power exceeding 1.6kW but not exceeding 2.5kW and having a BPP exceeding 1.7mm•mrad; d. Output power exceeding 2.5kW but not exceeding 3.3kW and having a BPP exceeding 2.5mm•mrad;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	7. Output wavelength exceeding 1,150nm but not exceeding 1,555nm and any of the following: a. Single transverse mode and output power exceeding 50W; or b. Multiple transverse mode and output power exceeding 80W; or	e. Output power exceeding 3.3kW but not exceeding 6kW and having a BPP exceeding 3.5mm•mrad; f. Not used; g. Not used; h. Output power exceeding 6kW but not exceeding 8kW and having a BPP exceeding 12mm•mrad; or i. Output power exceeding 8kW but not exceeding 10kW and having a BPP exceeding 24mm•mrad. Technical Note: For the purpose of 6A005.a.6.b. Note 2.a., 'brightness' is defined as the output power of the "laser" divided by the squared Beam Parameter Product (BPP), i.e., (output power)/BPP^2.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	8. Output wavelength exceeding 1,555nm but not exceeding 1,850nm and output power exceeding 1W; 9. Output wavelength exceeding 1,850nm but not exceeding 2,100nm, and any of the following: a. Single transverse mode output and output power exceeding 1W; or b. Multiple transverse mode output and output power exceeding 120W; or 10. Output wavelength exceeding 2,100nm and output power exceeding 1W; b. Non-“tunable” “pulsed lasers” having any of the following: 1. Output wavelength less than 150nm and any of the following: a. Output energy exceeding 50mJ per pulse and "peak power" exceeding 1W; or b. “Average output power” exceeding 1W; 2. Output wavelength of 150nm or more but not exceeding 510nm and any of the following: a. Output energy exceeding 1.5J per pulse and “peak power” exceeding 30W; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. "Average output power" exceeding 30W; 3. Output wavelength exceeding 510nm but not exceeding 540nm and any of the following: a. Single transverse mode output and any of the following: 1. Output energy exceeding 1.5J per pulse and "peak power" exceeding 50W; or 2. "Average output power" exceeding 50 W; or b. Multiple transverse mode output and any of the following: 1. Output energy exceeding 1.5J per pulse and "peak power" exceeding 150W; or 2. "Average output power" exceeding 150W; 4. Output wavelength exceeding 540nm but not exceeding 800nm and any of the following: a. "Pulse duration" less than 1ps and any of the following: 1. Output energy exceeding 0.005J per pulse and "peak power" exceeding 5GW; or	Note: 6A005.b.2.b. does not control Argon "lasers" having an "average output power" equal to or less than 50W.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. “Average output power” exceeding 20W; or b. “Pulse duration” equal to or exceeding 1ps and any of the following: 1. Output energy exceeding 1.5J per pulse and "peak power" exceeding 30W; or 2. “Average output power” exceeding 30W; 5. Output wavelength exceeding 800nm but not exceeding 975nm and any of the following: a. “Pulse duration” less than 1ps and any of the following: 1. Output energy exceeding 0.005J per pulse and "peak power" exceeding 5GW; or 2. Single transverse mode output and “average output power” exceeding 20W; b. “Pulse duration” equal to or exceeding 1ps and not exceeding 1μs and any of the following: 1. Output energy exceeding 0.5J per pulse and “peak power’ exceeding 50W;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Single transverse mode output and "average output power" exceeding 20W; or 3. Multiple transverse mode output and "average output power" exceeding 50W; or c. "Pulse duration" exceeding 1μs and any of the following: 1. Output energy exceeding 2J per pulse and "peak powe" exceeding 50W; 2. Single transverse mode output and "average output power" exceeding 50W; or 3. Multiple transverse mode output and "average output power" exceeding 80W; 6. Output wavelength exceeding 975nm but not exceeding 1,150nm and any of the following: a. "Pulse duration" of less than 1ps, and any of following: 1. Output "peak power" exceeding 2GW per pulse; 2. "Average output power" exceeding 10W; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Output energy exceeding 0.002J per pulse; b. "Pulse duration" equal to or exceeding 1ps and less than 1ns and any of the following: 1. Output "peak power" exceeding 5GW per pulse; 2. "Average output power" exceeding 10W; or 3. Output energy exceeding 0.1J per pulse; c. "Pulse duration" equal to or exceeding 1ns but not exceeding 1μs, and any of the following: 1. Single transverse mode output and any of the following: a. "Peak power" exceeding 100MW; b. "Average output power" exceeding 20W limited by design to a maximum pulse repetition frequency less than or equal to 1kHz; c. 'Wall-plug efficiency' exceeding 12%, "average output power" exceeding 100W and capable of		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	operating at a pulse repetition frequency greater than 1kHz; d. "Average output power" exceeding 150W and capable of operating at a pulse repetition frequency greater than 1kHz; or e. Output energy exceeding 2J per pulse; or 2. Multiple transverse mode output and any of the following: a. "Peak power" exceeding 400MW; b. 'Wall-plug efficiency' exceeding 18% and "average output power" exceeding 500W; c. "Average output power" exceeding 2kW; or d. Output energy exceeding 4J per pulse; or d. "Pulse duration" exceeding 1μs and any of the following: 1. Single transverse mode output and any of the following: a. "Peak power" exceeding 500kW;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. 'Wall-plug efficiency' exceeding 12% and "average output power" exceeding 100W; or c. "Average output power" exceeding 150W; or 2. Multiple transverse mode output and any of the following: a. "Peak power" exceeding 1MW; b. 'Wall-plug efficiency' exceeding 18% and "average output power" exceeding 500W; or c. "Average output power" exceeding 2kW; 7. Output wavelength exceeding 1,150nm but not exceeding 1,555nm, and any of the following: a. "Pulse duration" not exceeding 1μs and any of the following: 1. Output energy exceeding 0.5J per pulse and "peak power" exceeding 50W; 2. Single transverse mode output and "average output power" exceeding 20W; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Multiple transverse mode output and "average output power" exceeding 50W; or b. "Pulse duration" exceeding 1μs and any of the following: 1. Output energy exceeding 2J per pulse and "peak power" exceeding 50W; 2. Single transverse mode output and "average output power" exceeding 50W; or 3. Multiple transverse mode output and "average output power" exceeding 80W; 8. Output wavelength exceeding 1,555nm but not exceeding 1,850nm, and any of the following: a. Output energy exceeding 100mJ per pulse and "peak power" exceeding 1W; or b. "Average output power" exceeding 1W; 9. Output wavelength exceeding 1,850nm but not exceeding 2,100nm, and any of the following: a. Single transverse mode and any of the following:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Output energy exceeding 100mJ per pulse and "peak power" exceeding 1W; or 2. "Average output power" exceeding 1W; or b. Multiple transverse mode and any of the following: 1. Output energy exceeding 100mJ per pulse and "peak power" exceeding 10 kW; or 2. "Average output power" exceeding 120W; or 10. Output wavelength exceeding 2,100nm and any of the following: a. Output energy exceeding 100mJ per pulse and "peak power" exceeding 1W; or b. "Average output power" exceeding 1W; c. "Tunable" "lasers" having any of the following: 1. Output wavelength less than 600nm and any of the following:	Note: 6A005.c.1. does not control dye lasers or other liquid lasers, having a multimode output and a wavelength of 150nm or	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Output energy exceeding 50mJ per pulse and "peak power" exceeding 1W; or b. Average or CW output power exceeding 1W; 2. Output wavelength of 600nm or more but not exceeding 1,400nm, and any of the following: a. Output energy exceeding 1J per pulse and ""eak power" exceeding 20W; or b. Average or CW output power exceeding 20W; or 3. Output wavelength exceeding 1,400nm and any of the following: a. Output energy exceeding 50mJ per pulse and "peak power" exceeding 1W; or b. Average or CW output power exceeding 1W; d. Other "lasers", not specified in 6A005.a., 6A005.b. or 6A005.c. as follows: 1. Semiconductor "lasers" as follows: a. Individual single-transverse mode semiconductor "lasers" having any of the following:	more but not exceeding 600nm and all of the following: 1. Output energy less than 1.5J per pulse or a "peak power" less than 20W; and 2. Average or CW output power less than 20W. Note 1: 6A005.d.1. includes semiconductor "lasers" having optical output connectors (e.g., fibre optic pigtails). Note 2: The control status of semiconductor "lasers" specially designed for other	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Wavelength equal to or less than 1,510nm and average or CW output power, exceeding 1.5W; or 2. Wavelength greater than 1,510nm and average or CW output power, exceeding 500mW; b. Individual, multiple-transverse mode semiconductor "lasers" having any of the following: 1. Wavelength of less than 1,400nm and average or CW output power, exceeding 15W; 2. Wavelength equal to or greater than 1,400nm and less than 1,900nm and average or CW output power, exceeding 2.5W; or 3. Wavelength equal to or greater than 1,900nm and average or CW output power, exceeding 1W; c. Individual semiconductor "laser" 'bars', having any of the following: 1. Wavelength of less than 1,400nm and average or CW output power, exceeding 100W; 2. Wavelength equal to or greater than 1,400nm and less than 1,900nm and	equipment is determined by the control status of the other equipment.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	average or CW output power, exceeding 25W; or 3. Wavelength equal to or greater than 1,900nm and average or CW output power, exceeding 10W; d. Semiconductor "laser" 'stacked arrays' (two-dimensional arrays) having any of the following: 1. Wavelength less than 1,400nm and having any of the following: a. Average or CW total output power less than 3kW and having average or CW output 'power density' greater than 500W/cm^2; b. Average or CW total output power equal to or exceeding 3kW but less than or equal to 5kW, and having average or CW output 'power density' greater than 350W/cm^2; c. Average or CW total output power exceeding 5kW; d. Peak pulsed 'power density' exceeding 2,500W/cm^2; or	Note: 6A005.d.1.d.1.d. does not control epitaxially-fabricated monolithic devices.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Spatially coherent average or CW total output power, greater than 150W; 2. Wavelength greater than or equal to 1,400nm but less than 1,900nm, and having any of the following: a. Average or CW total output power less than 250W and average or CW output 'power density' greater than 150W/cm^2; b. Average or CW total output power equal to or exceeding 250W but less than or equal to 500W, and having average or CW output 'power density' greater than 50W/cm^2; c. Average or CW total output power exceeding 500W; d. Peak pulsed 'power density' exceeding 500W/cm^2; or e. Spatially coherent average or CW total output power, exceeding 15W; 3. Wavelength greater than or equal to 1,900nm and having any of the following:	Note: 6A005.d.1.d.2.d. does not control epitaxially-fabricated monolithic devices. Technical Note: For the purposes of 6A005.d.1.d., 'power density' means the total "laser" output power divided by the emitter surface area of the 'stacked array'.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Average or CW output 'power density' greater than 50W/cm^2; b. Average or CW output power greater than 10W; or c. Spatially coherent average or CW total output power, exceeding 1.5W; or 4. At least one "laser" 'bar' specified in 6A005.d.1.c.; e. Semiconductor "laser" 'stacked arrays', other than those specified in 6A005.d.1.d., having all of the following: 1. Specially designed or modified to be combined with other 'stacked arrays' to form a larger 'stacked array'; and 2. Integrated connections, common for both electronics and cooling;	Note 1: 'Stacked arrays', formed by combining semiconductor "laser" 'stacked arrays' specified in 6A005.d.1.e., that are not designed to be further combined or modified are specified in 6A005.d.1.d. Note 2: 'Stacked arrays', formed by combining semiconductor "laser" 'stacked arrays' specified in 6A005.d.1.e., that are designed to be further combined or modified are specified in 6A005.d.1.e. Note 3: 6A005.d.1.e. does not control modular assemblies of single 'bars' designed to be fabricated into end-to-end stacked linear arrays.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Carbon monoxide (CO) "lasers" having any of the following: a. Output energy exceeding 2J per pulse and "peak power" exceeding 5kW; or b. Average or CW output power exceeding 5kW; 3. Carbon dioxide (CO_2) "lasers" having any of the following: a. CW output power exceeding 15kW; b. Pulsed output with a "pulse duration" exceeding 10 μs and any of the following: 1. "Average output power' exceeding 10kW; or	Technical Notes: 1. Semiconductor "lasers" are commonly called "laser" diodes. 2. A 'bar' (also called a semiconductor "laser" 'bar', a "laser" diode 'bar' or diode 'bar') consists of multiple semiconductor "lasers" in a one-dimensional array. 3. A 'stacked array' consists of multiple 'bars' forming a two-dimensional array of semiconductor "lasers".	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. "Peak power" exceeding 100kW; or c. Pulsed output with a "pulse duration" equal to or less than 10μs and any of the following: 1. Pulse energy exceeding 5J per pulse; or 2. "Average output power" exceeding 2.5kW; 4. Excimer "lasers" having any of the following: a. Output wavelength not exceeding 150nm and any of the following: 1. Output energy exceeding 50mJ per pulse; or 2. "Average output power" exceeding 1W; b. Output wavelength exceeding 150nm but not exceeding 190nm and any of the following: 1. Output energy exceeding 1.5J per pulse; or 2. "Average output power" exceeding 120W; c. Output wavelength exceeding 190nm but not exceeding 360nm and any of the following:	N.B. For excimer "lasers" specially designed for lithography equipment, see 3B001.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Output energy exceeding 10J per pulse; or 2. "Average output power" exceeding 500W; or d. Output wavelength exceeding 360nm and any of the following: 1. Output energy exceeding 1.5J per pulse; or 2. "Average output power" exceeding 30W; 5. "Chemical lasers" as follows: a. Hydrogen Fluoride (HF) "lasers"; b. Deuterium Fluoride (DF) "lasers"; c. 'Transfer lasers" as follows: 1. Oxygen Iodine (O_2-I) "lasers"; 2. Deuterium Fluoride-Carbon dioxide (DF-CO_2) "lasers"; 6. 'Non-repetitive pulsed' Nd: glass "laser" having any of the following: a. "Pulse duration" not exceeding 1μs and output energy exceeding 50J per pulse; or	Technical Note: 'Transfer lasers' are 'lasers' in which the lasing species are excited through the transfer of energy by collision of a non-lasing atom or molecule with a lasing atom or molecule species. Note: 'Non-repetitive pulse' refers to "lasers" that produce either a single output pulse or that have a time interval between pulses exceeding one minute.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. "Pulse duration" exceeding 1μs and output energy exceeding 100J per pulse; e. Components as follows: 1. Mirrors cooled either by 'active cooling' or by heat pipe cooling; 2. Optical mirrors or transmissive or partially transmissive optical or electro-optical components, other than fused tapered fibre combiners and Multi-Layer Dielectric gratings (MLDs), specially designed for use with specified "lasers"; 3. Fibre laser components as follows: a. Multimode to multimode fused tapered fibre combiners having all of the following: 1. An insertion loss better (less) than or equal to 0.3dB maintained at a rated total average or CW output power (excluding output power transmitted through the single mode core if present) exceeding 1,000W; and 2. Number of input fibres equal to or greater than 3; b. Single mode to multimode fused tapered fibre combiners having all of the following:	Technical Note: 'Active cooling' is a cooling technique for optical components using flowing fluids within the subsurface (nominally less than 1 mm below the optical surface) of the optical component to remove heat from the optic. Note: Fibre combiners and MLDs are specified in 6A005.e.3.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. An insertion loss better (less) than 0.5dB maintained at a rated total average or CW output power exceeding 4,600W; 2. Number of input fibres equal to or greater than 3; and 3. Having any of the following: a. A Beam Parameter Product (BPP) measured at the output not exceeding 1.5mm mrad for a number of input fibres less than or equal to 5; or b. A BPP measured at the output not exceeding 2.5mm mrad for a number of input fibres greater than 5; c. MLDs having all of the following: 1. Designed for spectral or coherent beam combination of 5 or more fibre lasers; and 2. CW Laser Induced Damage Threshold (LIDT) greater than or equal to 10kW/cm^2. f. Optical equipment as follows:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Not used: 2. 'Laser' diagnostic specially designed for dynamic measurement of 'SHPL' system angular beam steering errors and having an angular 'accuracy' of 10 μrad (microradians) or less (better); 3. Optical equipment and components, specially designed for coherent beam combination in a phased-array 'SHPL' system and having any of the following; a. An 'accuracy' of 0.1 μm or less, for wavelengths greater than 1 μm; or b. An 'accuracy' of λ/10 or less (better) at the designed wavelength, for wavelengths equal to or less than 1 μm, whichever is the smaller; 4. Projection telescopes specially designed for use with "SHPL" systems; g. 'Laser acoustic detection equipment' having all of the following: 1. CW laser output power equal to or exceeding 20mW; 2. Laser frequency stability equal to or better (less) than 10MHz;	N.B.: For shared aperture optical elements, capable of operating in "Super-High Power Laser" ("SHPL") applications, see the Military Goods Controls. Technical Note: 'Laser acoustic detection equipment' is sometimes referred to as a "Laser" Microphone or Particle Flow Detection Microphone.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Laser wavelengths equal to or exceeding 1,000nm but not exceeding 2,000nm; 4. Optical system resolution better (less) than 1nm; and 5. Optical Signal to Noise ratio equal to or exceeding 10^3.		
6A006	"Magnetometers", "magnetic gradiometers", "intrinsic magnetic gradiometers" underwater electric field sensors, "compensation systems", and specially designed components therefor, as follows: a. "Magnetometers" and subsystems as follows: 1. "Magnetometers" using "superconductive" (SQUID) "technology" and having any of the following: a. SQUID systems designed for stationary operation, without specially designed subsystems designed to reduce in-motion noise, and having a 'sensitivity' equal to or lower (better) than 50fT (rms) per square root Hz at a frequency of 1Hz; or b. SQUID systems having an in-motion-magnetometer 'sensitivity' lower (better) than 20pT (rms) per square root Hz at a frequency of 1Hz and specially designed to reduce in-motion noise;	N.B. SEE ALSO 7A103.d. Note: 6A006 does not control instruments specially designed for fishery applications or biomagnetic measurements for medical diagnostics.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. "Magnetometers" using optically pumped or nuclear precession (proton/Overhauser) "technology" having a 'sensitivity' lower (better) than 20pT (rms) per square root Hz at a frequency of 1Hz; 3. "Magnetometers" using fluxgate "technology" having a 'sensitivity' equal to or lower (better) than 10pT (rms) per square root Hz at a frequency of 1Hz; 4. Induction coil "magnetometers" having a 'sensitivity' lower (better) than any of the following: a. 0.05nT (rms) per square root Hz at frequencies of less than 1Hz; b. 1×10^{-3} nT (rms) per square root Hz at frequencies of 1Hz or more but not exceeding 10Hz; or c. 1×10^{-4} nT (rms) per square root Hz at frequencies exceeding 10Hz; 5. Fibre optic "magnetometers" having a 'sensitivity' lower (better) than 1nT (rms) per square root Hz; b. Underwater electric field sensors having a 'sensitivity' lower (better) than 8 nanovolt per metre per square root Hz when measured at 1 Hz;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. "Magnetic gradiometers" as follows: 1. "Magnetic gradiometers" using multiple "magnetometers" specified in 6A006.a.; 2. Fibre optic "intrinsic magnetic gradiometers" having a magnetic gradient field 'sensitivity' lower (better) than 0.3nT/m rms per square root Hz; 3. "Intrinsic magnetic gradiometers", using "technology" other than fibre-optic "technology", having a magnetic gradient field sensitivity' lower (better) than 0.015nT/m rms per square root Hz; d. "Compensation systems" for magnetic or underwater electric field sensors resulting in a performance equal to or better than the specified parameters of 6A006.a., 6A006.b. or 6A006.c.; e. Underwater electromagnetic receivers incorporating magnetic field sensors specified in 6A006.a. or underwater electric field sensors specified in 6A006.b.	Technical Note: For the purposes of 6A006 'sensitivity' (noise level) is the root mean square of the device-limited noise floor which is the lowest signal that can be measured.	
6A007	Gravity meters (gravimeters) and gravity gradiometers, as follows:	N.B. SEE ALSO 6A107.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Gravity meters designed or modified for ground use and having a static accuracy of less (better) than 10μGal; b. Gravity meters designed for mobile platforms and having all of the following: 1. A static "accuracy" of less (better) than 0.7mGal; and 2. An in-service (operational) accuracy of less (better) than 0.7mGal having a 'time-to-steady-state registration' of less than 2 minutes under any combination of attendant corrective compensations and motional influences; c. Gravity gradiometers.	Note: 6A007.a. does not control ground gravity meters of the quartz element (Worden) type.	
6A008	Radar systems, equipment and assemblies, having any of the following, and specially designed components therefor: a. Operating at frequencies from 40GHz to 230GHz and having any of the following: 1. An average output power exceeding 100mW; or 2. Locating accuracy of 1m or less (better) in range and 0.2 degree or less (better) in azimuth; b. A tunable bandwidth exceeding ± 6.25% of the 'centre operating frequency';	N.B.: SEE ALSO 6A108. Note: 6A008 does not control: - Secondary surveillance radar (SSR); - Civil Automotive Radar; - Displays or monitors used for air traffic control (ATC); - Meteorological (weather) radar; - Precision approach radar (PAR) equipment conforming to ICAO standards and employing	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. Capable of operating simultaneously on more than two carrier frequencies; d. Capable of operating in synthetic aperture (SAR), inverse synthetic aperture (ISAR) radar mode, or sidelooking airborne (SLAR) radar mode; e. Incorporating electronically scanned array antennae; f. Capable of heightfinding non-cooperative targets; g. Specially designed for airborne (balloon or airframe mounted) operation and having Doppler "signal processing" for the detection of moving targets; h. Employing processing of radar signals and using any of the following: 1. "Radar spread spectrum" techniques; or 2. "Radar frequency agility" techniques; i. Providing ground-based operation with a maximum "instrumented range' exceeding 185km;	electronically steerable linear (1-dimensional) arrays or mechanically positioned passive antennae. Technical Note: Electronically scanned array antennae are also known as electronically steerable array antennae. Technical Note: The 'centre operating frequency' equals one half of the sum of the highest plus the lowest specified operating frequencies. Note: 6A008.i. does not control: a. Fishing ground surveillance radar; b. Ground radar equipment specially designed for enroute air traffic control and having all the following:	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		1. A maximum "instrumented range" of 500 km or less; 2. Configured so that radar target data can be transmitted only one way from the radar site to one or more civil ATC centres; 3. Contains no provisions for remote control of the radar scan rate from the enroute ATC centre; and 4. Permanently installed; c. Weather balloon tracking radars.	
	j. Being "laser" radar or Light Detection and Ranging (LIDAR) equipment and having any of the following: 1. "Space-qualified"; 2. Employing coherent heterodyne or homodyne detection techniques and having an angular resolution of less (better) than 20μrad (microradians); or 3. Designed for carrying out airborne bathymetric littoral surveys to International Hydrographic Organization (IHO) Order 1a Standard (5th Edition February 2008) for Hydrographic Surveys or better, and using one or more lasers with a wavelength exceeding 400nm but not exceeding 600 nm;	Note 1: LIDAR equipment specially designed for surveying is only specified in 6A008.j.3. Note 2: 6A008.j. does not control LIDAR equipment specially designed for meteorological observation. Note 3: Parameters in the IHO Order 1a Standard 5th Edition February 2008 are summarized as follows:	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		- Horizontal Accuracy (95% Confidence Level) = 5m + 5 % of depth. - Depth Accuracy for Reduced Depths (95% confidence level) $= \pm \sqrt{(a^2 + (b * d)^2)}$, where: a = 0.5 m = constant depth error, i.e. the sum of all constant depth errors b = 0.013 = factor of depth dependent error b*d = depth dependent error, i.e. the sum of all depth dependent errors d = depth - Feature Detection = Cubic features > 2 m in depths up to 40 m; 10 % of depth beyond 40 m.	
	k. Having "signal processing" sub-systems using "pulse compression" and having any of the following: 1. A "pulse compression" ratio exceeding 150; or 2. A compressed pulse width of less than 200ns; or	Note: 6A008.k.2. does not control two dimensional 'marine radar' or 'vessel traffic service' radar , having all of the following;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		a. "Pulse compression" ratio not exceeding 150; b. Compressed pulse width of greater than 30ns; c. Single and rotating mechanically scanned antenna; d. Peak output power not exceeding 250W; and e. Not capable of "frequency hopping".	
	l. Having data processing sub-systems and having any of the following: 1. "Automatic target tracking" providing, at any antenna rotation, the predicted target position beyond the time of the next antenna beam passage; or 2. Not used; 3. Not used; 4. Configured to provide superposition and correlation, or fusion, of target data within six seconds from two or more "geographically dispersed" radar sensors to improve the aggregate performance beyond that of any single sensor specified in 6A008.f. or 6A008.i.	Note: 6A008.l.1. does not control conflict alert capability in ATC systems, or 'marine radar'. Technical Note: "Automatic target tracking" is a processing technique that automatically determines and provides as output an extrapolated value of the most probable position of the target in real time. Technical Note: Sensors are considered "geographically dispersed" when each location is distant from any other more than 1500m in any direction. Mobile sensors are always considered "geographically dispersed".	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		N.B. See also the Military Goods Controls. Note: 6A008.l.4. does not control systems, equipment and assemblies used for 'vessel traffic service'. Technical Notes: 1. For the purposes of 6A008, 'marine radar' is a radar that is used to navigate safely at sea, inland waterways or near-shore environments. 2. For the purposes of 6A008, 'vessel traffic service' is a vessel traffic monitoring and control service similar to air traffic control for aircraft.	
6A102	Radiation hardened 'detectors', other than those specified in 6A002, specially designed or modified for protecting against nuclear effects (e.g. electromagnetic pulse (EMP), X-rays, combined blast and thermal effects) and usable for "missiles", designed or rated to withstand radiation levels which meet or exceed a total irradiation dose of 5×10^5 rads (silicon).	Technical Note: In 6A102, a 'detector' is defined as a mechanical, electrical, optical or chemical device that automatically identifies and records, or registers a stimulus such as an environmental change in pressure or temperature, an electrical or electromagnetic signal or radiation from a radioactive material. This includes devices that sense by one time operation or failure.	Controller
6A107	Gravity meters (gravimeters) and components for gravity meters and gravity gradiometers, as follows:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Gravity meters, other than those specified in 6A007.b, designed or modified for airborne or marine use, and having a static or operational accuracy equal to or less (better) than 0.7 milligal (mgal), and having a time-to-steady-state registration of two minutes or less; b. Specially designed components for gravity meters specified in 6A007.b or 6A107.a. and gravity gradiometers specified in 6A007.c.		
6A108	Radar systems, tracking systems and radomes, other than those specified in entry 6A008, as follows: a. Radar and laser radar systems designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104; b. Precision tracking systems, usable for 'missiles', as follows:	Note: 6A108.a. includes the following: a. Terrain contour mapping equipment; b. Scene mapping and correlation (both digital and analogue) equipment; c. Doppler navigation radar equipment; d. Passive interferometer equipment; e. Imaging sensor equipment (both active and passive).	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Tracking systems which use a code translator in conjunction with either surface or airborne references or navigation satellite systems to provide real-time measurements of in-flight position and velocity; 2. Range instrumentation radars including associated optical/infrared trackers with all of the following capabilities: a. Angular resolution better than 1.5milliradians; b. Range of 30km or greater with a range resolution better than 10m rms; c. Velocity resolution better than 3m/s. c. Radomes designed to withstand a combined thermal shock greater than 4.184 x 10^6 J/m2 accompanied by a peak over pressure of greater than 50 kPa, and usable in 'missiles' for protecting against nuclear effects (e.g. electromagnetic pulse (EMP), X-rays, combined blast and thermal effects).	Technical Note: In 6A108.b. 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.	
6A202	Photomultiplier tubes having both of the following characteristics: a. Photocathode area of greater than 20cm^2; and b. Anode pulse rise time of less than 1ns.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
6A203	Cameras and components, other than those specified in 6A003, as follows:	N.B.1. "Software" specially designed to enhance or release the performance of a camera or imaging device to meet the characteristics of 6A203.a., 6A203.b. or 6A203.c. is specified in 6D203. N.B.2. "Technology" in the form of codes or keys to enhance or release the performance of a camera or imaging device to meet the characteristics of 6A203.a., 6A203.b. or 6A203.c is specified in 6E203. Note: 6A203.a. to 6A203.c. does not control cameras or imaging devices if they have hardware, "software" or "technology" constraints that limit the performance to less than that specified above, provided they meet any of the following: 1. They need to be returned to the original manufacturer to make the enhancements or release the constraints; 2. They require "software" as specified in 6D203 to enhance or release the performance to meet the characteristics of 6A203; or 3. They require "technology" in the form of keys or codes as specified in	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Streak cameras, and specially designed components therefor, as follows: 1. Streak cameras with writing speeds greater than 0.5mm/μs; 2. Electronic streak cameras capable of 50ns or less time resolution; 3. Streak tubes for cameras specified in 6A203.a.2.; 4. Plug-ins specially designed for use with streak cameras which have modular structures and that enable the performance specifications in 6A203.a.1. or 6A203.a.2.; 5. Synchronizing electronics units, rotor assemblies consisting of turbines, mirrors and bearings specially designed for cameras specified in 6A203.a.1.; b. Framing cameras, and specially designed components therefor, as follows: 1. Framing cameras with recording rates greater than 225,000 frames per second; 2. Framing cameras capable of 50ns or less frame exposure time;	6E203 to enhance or release the performance to meet the characteristics of 6A203. Technical Note: In 6A203.b., high speed single frame cameras can be used alone to produce a single image of a dynamic event, or several such cameras can be combined in a sequentially-triggered system to produce multiple images of an event.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Framing tubes and solid-state imaging devices having a fast image gating (shutter) time of 50ns or less specially designed for cameras specified in 6A203.b.1 or 6A203.b.2.; 4. Plug-ins specially designed for use with framing cameras which have modular structures and that enable the performance specifications in 6A203.b.1 or 6A203.b.2.; 5. Synchronizing electronics units, rotor assemblies consisting of turbines, mirrors and bearings specially designed for cameras specified in 6A203.b.1 or 6A203.b.2.; c. Solid state or electron tube cameras, and specially designed components therefor, as follows: 1. Solid-state cameras or electron tube cameras with a fast image gating (shutter) time of 50ns or less; 2. Solid-state imaging devices and image intensifiers tubes having a fast image gating (shutter) time of 50ns or less specially designed for cameras specified in 6A203.c.1.; 3. Electro-optical shuttering devices (Kerr or Pockels cells) with a fast image gating (shutter) time of 50ns or less;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. Plug-ins specially designed for use with cameras which have modular structures and that enable the performance specifications in 6A203.c.1. d. Radiation-hardened TV cameras, or lenses therefor, specially designed or rated as radiation hardened to withstand a total radiation dose greater than 50×10^3 Gy(silicon) (5×10^6 rad (silicon) without operational degradation.	Technical Note: The term Gy(silicon) refers to the energy in Joules per kilogram absorbed by an unshielded silicon sample when exposed to ionising radiation.	
6A205	"Lasers", "laser" amplifiers and oscillators, other than those specified in 0B001.g.5., 0B001.h.6. and 6A005; as follows: a. Argon ion "lasers" having both of the following characteristics: 1. Operating at wavelengths between 400nm and 515nm; and 2. An average output power greater than 40W; b. Tunable pulsed single-mode dye laser oscillators having all of the following characteristics: 1. Operating at wavelengths between 300nm and 800nm; 2. An average output power greater than 1W; 3. A repetition rate greater than 1kHz; and	N.B. For copper vapour lasers, see 6A005.b.	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. Pulse width less than 100ns; c. Tunable pulsed dye laser amplifiers and oscillators, having all of the following characteristics: 1. Operating at wavelengths between 300nm and 800nm; 2. An average output power greater than 30W; 3. A repetition rate greater than 1kHz; and 4. Pulse width less than 100ns; d. Pulsed carbon dioxide "lasers" having all of the following characteristics: 1. Operating at wavelengths between 9,000nm and 11,000nm; 2. A repetition rate greater than 250Hz; 3. An average output power greater than 500W; and 4. Pulse width of less than 200ns; e. Para-hydrogen Raman shifters designed to operate at 16μm output wavelength and at a repetition rate greater than 250Hz; f. Neodymium-doped (other than glass) "lasers" with an output wavelength between 1,000 and 1,100nm having either of the following:	Note: 6A205.c. does not control single mode oscillators;	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Pulse-excited and Q-switched with a pulse duration equal to or more than 1ns, and having either of the following: a. A single–transverse mode output with an average output power greater than 40W; or b. A multiple-transverse mode output having an average power greater than 50W; or 2. Incorporating frequency doubling to give an output wavelength between 500 and 550nm with an average output power of more than 40W; g. Pulsed carbon monoxide lasers, other than those specified in 6A005.d.2., having all of the following: 1. Operating at wavelengths between 5,000 and 6,000nm; 2. A repetition rate greater than 250Hz; 3. An average output power greater than 200W; and 4. Pulse width of less than 200ns.		
6A225	Velocity interferometers for measuring velocities exceeding 1km/s during time intervals of less than 10 microseconds.	Note: 6A225 includes velocity interferometers such as VISARs (Velocity Interferometer Systems for Any Reflector), DLIs (Doppler Laser Interferometers) and PDV (Photonic	Atomic Energy Licensing Board (AELB)

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Doppler Velocimeters) also known as Het-V (Heterodyne Velocimeters).	
6A226	Pressure sensors, as follows: a. Shock pressure gauges capable of measuring pressures greater than 10GPa, including gauges made with manganin, ytterbium, and polyvinylidene fluoride (PVDF)/polyvinyl difluoride (PVF_2); b. Quartz pressure transducers for pressures greater than 10GPa.		Atomic Energy Licensing Board (AELB)
6B	**Test, Inspection and Production Equipment**		
6B002	Masks and reticles, specially designed for optical sensors specified in 6A002.a.1.b. or 6A002.a.1.d.		Controller
6B004	Optical equipment as follows: a. Equipment for measuring absolute reflectance to an accuracy of ± 0.1% of the reflectance value; b. Equipment other than optical surface scattering measurement equipment, having an unobscured aperture of more than 10cm, specially designed for the non-contact optical measurement of a non-planar optical surface figure (profile) to an "accuracy" of 2nm or less (better) against the required profile.	Note: 6B004 does not control microscopes.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
6B007	Equipment to produce, align and calibrate land-based gravity meters with a static "accuracy" of better than 0.1mGal.		Controller
6B008	Pulse radar cross-section measurement systems having transmit pulse widths of 100ns or less, and specially designed components therefor.	N.B. SEE ALSO 6B108.	Controller
6B108	Systems, other than those specified in 6B008, specially designed for radar cross section measurement usable for 'missiles' and their subsystems.	Technical Note: In 6B108 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	Controller
6C	**Materials**		
6C002	Optical sensor materials as follows: a. Elemental tellurium (Te) of purity levels of 99.9995% or more; b. Single crystals (including epitaxial wafers) of any of the following: 1. Cadmium zinc telluride (CdZnTe), with zinc 'content of less than 6% by 'mole fraction'; 2. Cadmium telluride (CdTe) of any purity level; or 3. Mercury cadmium telluride (HgCdTe) of any purity level.	Technical Note: 'Mole fraction' is defined as the ratio of moles of ZnTe to the sum of moles of CdTe and ZnTe present in the crystal.	Controller
6C004	Optical materials as follows:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Zinc selenide (ZnSe) and zinc sulphide (ZnS) "substrate blanks", produced by the chemical vapour deposition process and having any of the following: 1. A volume greater than 100cm^3 ; or 2. A diameter greater than 80mm and a thickness of 20mm or more; b. Electro-optic materials and non-linear optical materials, as follows: 1. Potassium titanyl arsenate (KTA) (CAS 59400-80-5); 2. Silver gallium selenide ($AgGaSe_2$, also known as AGSE) (CAS 12002-67-4); 3. Thallium arsenic selenide (Tl_3AsSe_3, also known as TAS) (CAS 16142-89-5); 4. Zinc germanium phosphide ($ZnGeP_2$, also known as ZGP, zinc germanium biphosphide or zinc germanium diphosphide); or 5. Gallium selenide (GaSe) (CAS 12024-11-2); c. Non-linear optical materials, other than those specified in 6C004.b., having any of the following: 1. Having all of the following:		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Dynamic (also known as non-stationary) third order non-linear susceptibility ($x^{(3)}$, chi 3) of $10^{-6}m^2/V^2$ or more; and b. Response time of less than 1ms; or 2. Second order non-linear susceptibility ($x^{(2)}$, chi 2) of 3.3×10^{-11} m/V or more; d. "Substrate blanks" of silicon carbide or beryllium beryllium (Be/Be) deposited materials, exceeding 300mm in diameter or major axis length; e. Glass, including fused silica, phosphate glass, fluorophosphate glass, zirconium fluoride (ZrF_4) (CAS 7783-64-4) and hafnium fluoride (HfF_4) (CAS 13709-52-9) and having all of the following: 1. A hydroxyl ion (OH-) concentration of less than 5ppm; 2. Integrated metallic purity levels of less than 1ppm; and 3. High homogeneity (index of refraction variance) less than 5×10^{-6}; f. Synthetically produced diamond material with an absorption of less than $10^{-5}cm^{-1}$ for wavelengths exceeding 200nm but not exceeding 14,000nm.		
6C005	"Laser" materials as follows:	Technical Notes	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Synthetic crystalline "laser" host material in unfinished form as follows: 1. Titanium doped sapphire; 2. Not used. b. Rare-earth-metal doped double-clad fibres having any of the following: 1. Nominal laser wavelength of 975nm to 1,150nm and having all of the following: a. Average core diameter equal to or greater than 25μm; and b. Core 'Numerical Aperture' ('NA') less than 0.065; or 2. Nominal laser wavelength exceeding 1,530nm and having all of the following: a. Average core diameter equal to or greater than 20μm; and b. Core 'NA' less than 0.1.	1. For the purposes of 6C005, the core 'Numerical Aperture' ('NA') is measured at the emission wavelengths of the fibre. 2. 6C005.b. includes fibres assembled with end caps.	
6D	**Software**		
6D001	"Software" specially designed for the "development" or "production" of equipment specified in 6A004, 6A005, 6A008 or 6B008.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
6D002	"Software" specially designed for the "use" of equipment specified in 6A002.b., 6A008 or 6B008.		Controller
6D003	Other "software" as follows: a. "Software" as follows: 1. "Software" specially designed for acoustic beam forming for the "real time processing" of acoustic data for passive reception using towed hydrophone arrays; 2. "Source code" for the "real-time processing" of acoustic data for passive reception using towed hydrophone arrays; 3. "Software" specially designed for acoustic beam forming for "real time processing" of acoustic data for passive reception using bottom or bay cable systems; 4. "Source code" for "real-time processing" of acoustic data for passive reception using bottom or bay cable systems; 5. "Software" or "source code", specially designed for all of the following: a. "Real-time processing" of acoustic data from sonar systems specified in 6A001.a.1.e.; and	N.B. For diver detection "software" or "source code", specially designed or modified for military use, see the Military Items List.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Automatically detecting, classifying and determining the location of divers or swimmers; b. Not used; c. "Software" designed or modified for cameras incorporating "focal plane arrays" specified in 6A002.a.3.f. and designed or modified to remove a frame rate restriction and allow the camera to exceed the frame rate specified in 6A003.b.4. Note 3.a.; d. "Software" specially designed to maintain the alignment and phasing of segmented mirror systems consisting of mirror segments having a diameter or major axis length equal to or larger than 1 m; e. Not used; f. "Software" as follows: 1. "Software" specially designed for magnetic and electric field "compensation systems" for magnetic sensors designed to operate on mobile platforms; 2. "Software" specially designed for magnetic and electric field anomaly detection on mobile platforms;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. "Software" specially designed for "real time processing" of electromagnetic data using underwater electromagnetic receivers specified in 6A006.e.; 4. "Source code" for "real time processing" of electromagnetic data using underwater electromagnetic receivers specified in 6A006.e; g. "Software" specially designed to correct motional influences of gravity meters or gravity gradiometers; h. "Software" as follows: 1. Air Traffic Control (ATC) "software" application "programs" designed to be hosted on general purpose computers located at Air Traffic Control centres and capable of accepting radar target data from more than four primary radars; 2. "Software" for the design or "production" of radomes having all of the following: a. Specially designed to protect the "electronically scanned array antennae" specified in 6A008.e.; and b. Resulting in an antenna pattern having an 'average side lobe level' more than 40 dB below the peak of the main beam level.	Technical Note: 'Average side lobe level' in 6D003.h.2.b. is measured over the entire array excluding the angular extent of the main beam and the first two side lobes on either side of the main beam.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
6D102	"Software" specially designed or modified for the "use" of goods specified in 6A108.		Controller
6D103	"Software" which processes post-flight, recorded data, enabling determination of vehicle position throughout its flight path, specially designed or modified for 'missiles'.	Technical Note: In 6D103 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	Controller
6D203	"Software" specially designed to enhance or release the performance of cameras or imaging devices to meet the characteristics of 6A203.a. to 6A203.c.		Controller
6E	**Technology**		
6E001	"Technology" according to the General Technology Note for the "development" of equipment, materials or "software" specified in 6A, 6B, 6C or 6D.		Controller
6E002	"Technology" according to the General Technology Note for the "production" of equipment or materials specified in 6A, 6B or 6C.		Controller
6E003	Other "technology" as follows: a. "Technology" as follows: 1. "Technology" "required" for the coating and treatment of optical surfaces to achieve an 'optical thickness' uniformity of 99.5% or better for optical coatings 500mm or more in diameter	N.B. See also 2E003.f. Technical Note:	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	or major axis length and with a total loss (absorption and scatter) of less than 5 x 10^{-3}; 2. "Technology" for the fabrication of optics using single point diamond turning techniques to produce surface finish accuracies of better than 10nm rms on non-planar surfaces exceeding 0.5m^2 ; b. "Technology" "required" for the "development", "production" or "use" of specially designed diagnostic instruments or targets in test facilities for "SHPL" testing or testing or evaluation of materials irradiated by "SHPL" beams;	'Optical thickness' is the mathematical product of the index of refraction and the physical thickness of the coating.	
6E101	"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 6A002, 6A007.b. and c., 6A008, 6A102, 6A107, 6A108, 6B108, 6D102 or 6D103.	Note: 6E101 only controls "technology" for items specified in 6A002, 6A007 and 6A008 if the items were designed for airborne applications and are usable in "missiles".	Controller
6E201	"Technology" according to the General Technology Note for the "use" of equipment specified in 6A003, 6A005.a.2., 6A005.b.2., 6A005.b.3., 6A005.b.4., 6A005.b.6., 6A005.c.2., 6A005.d.3.c., 6A005.d.4.c., 6A202, 6A203, 6A205, 6A225 or 6A226.	Note 1: 6E201 only controls "technology" for cameras specified in 6A003 if the cameras are also specified in any of the control parameters of 6A203. Note 2: 6E201 only controls "technology" for lasers in 6A005.b.6. that are neodymium-doped and specified in any of the control parameters of 6A205.f.	Atomic Energy Licensing Board (AELB)
6E203	"Technology", in the form of codes or keys, to enhance or release the performance of cameras or imaging devices to meet the characteristics of 6A203.a. to 6A203.c.		Controller

CATEGORY 7

NAVIGATION AND AVIONICS

Category Code	*Items Description*	*Note*	*Relevant Authority*
CATEGORY 7 - NAVIGATION AND AVIONICS			
7A	**Systems, Equipment and Components**	N.B. For automatic pilots for underwater vehicles, see Category 8. For radar, see Category 6.	
7A001	Accelerometers as follows and specially designed components therefor: a. Linear accelerometers having any of the following: 1. Specified to function at linear acceleration levels less than or equal to 15 g and having any of the following: a. A "bias" "stability" of less (better) than 130 micro g with respect to a fixed calibration value over a period of one year; or b. A "scale factor" "stability" of less (better) than 130ppm with respect to a fixed calibration value over a period of one year; 2. Specified to function at linear acceleration levels exceeding 15g but less than or equal to 100g and having all of the following:	N.B. SEE ALSO 7A101. N.B. For angular or rotational accelerometers, see 7A001.b. Note: 7A001.a.1. and 7A001.a.2. do not control accelerometers limited to measurement of only vibration or shock.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. A "bias" "repeatability" of less (better) than 1,250 micro g over a period of one year; and b. A "scale factor" "repeatability" of less (better) than 1,250ppm over a period of one year; or 3. Designed for use in inertial navigation or guidance systems and specified to function at linear acceleration levels exceeding 100g; b. Angular or rotational accelerometers, specified to function at linear acceleration levels exceeding 100g.		
7A002	Gyros or angular rate sensors, having any of the following and specially designed components therefor: a. Specified to function at linear acceleration levels less than or equal to 100g and having any of the following: 1. A rate range of less than 500 degrees per second and having any of the following: a. A “bias” “stability” of less (better) than 0.5 degree per hour, when measured in a 1g environment over a period of	N.B. SEE ALSO 7A102. N.B. For angular or rotational accelerometers, see 7A001.b.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	one month, and with respect to a fixed calibration value; or b. An "angle random walk" of less (better) than or equal to 0.0035 degree per square root hour; or 2. A rate range greater than or equal to 500 degrees per second and having any of the following: a. A "bias" "stability" of less (better) than 4 degrees per hour, when measured in a 1g environment over a period of three minutes, and with respect to a fixed calibration value; or b. An "angle random walk" of less (better) than or equal to 0.1 degree per square root hour; or b. Specified to function at linear acceleration levels exceeding 100g.	Note: 7A002.a.1.b. does not control "spinning mass gyros". Note: 7A002.a.2.b. does not control "spinning mass gyros".	
7A003	'Inertial measurement equipment or systems', having any of the following:	N.B. SEE ALSO 7A103. Note 1: 'Inertial measurement equipment or systems' incorporate accelerometers or gyroscopes to measure changes in velocity and orientation in order to	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		determine or maintain heading or position without requiring an external reference once aligned. 'Inertial measurement equipment or systems' include: - Attitude and Heading Reference Systems (AHRSs); - Gyrocompasses; - Inertial Measurement Units (IMUs); - Inertial Navigation Systems (INSs); - Inertial Reference Systems (IRSs); - Inertial Reference Units (IRUs). Note 2: 7A003 does not control 'inertial measurement equipment or systems' which are certified for use on "civil aircraft" by civil aviation authorities of one or more European Union (EU) Member States or Wassenaar Arrangement Participating States. Technical Notes: "Positional aiding references" independently provide position, and include: a. 'Satellite navigation system'; b. 'Data-Based Referenced Navigation' ('DBRN').	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Designed for "aircraft", land vehicles or vessels, providing position without the use of 'positional aiding references', and having any of the following accuracies subsequent to normal alignment: 1. 0.8 nautical miles per hour (nm/hr) 'Circular Error Probable' ('CEP') rate or less (better); 2. 0.5% distanced travelled 'CEP' or less (better); or 3. Total drift of 1 nautical mile 'CEP' or less (better) in a 24 hour period; b. Designed for "aircraft", land vehicles or vessels, with an embedded 'positional aiding reference' and providing position after loss of all 'positional aiding references' for a period of up to 4 minutes, having an accuracy of less (better) than 10 meters 'CEP'; c. Designed for "aircraft", land vehicles or vessels, providing heading or True North determination and having any of the following: 1. A maximum operating angular rate less (lower) than 500deg/s and a heading accuracy without the use	Technical Note: The performance parameters in 7A003.a.1., 7A003.a.2. and 7A003.a.3. typically apply to 'inertial measurement equipment or systems' designed for "aircraft", vehicles and vessels, respectively. These parameters result from the utilisation of specialised non-positional aiding references (e.g., altimeter, odometer, velocity log). As a consequence, the specified performance values cannot be readily converted between these parameters. Equipment designed for multiple platforms are evaluated against each applicable entry 7A003.a.1., 7A003.a.2., or 7A003.a.3. Technical Note: 7A003.b. refers to systems in which 'inertial measurement equipment or systems' and other independent 'positional aiding references' are built into a single unit (i.e., embedded) in order to achieve improved performance.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	of 'positional aiding references' equal to or less (better) than 0.07deg sec(Lat) (equivalent to 6arc minutes rms at 45 degrees latitude); or 2. A maximum operating angular rate equal to or greater (higher) than 500deg/s and a heading accuracy without the use of 'positional aiding references' equal to or less (better) than 0.2deg sec(Lat) (equivalent to 17arc minutes rms at 45 degrees latitude); or d. Providing acceleration measurements or angular rate measurements, in more than one dimension, and having any of the following: 1. Performance specified in 7A001 or 7A002 along any axis, without the use of any aiding references; or 2. Being "space-qualified" and providing angular rate measurements having an "angle random walk" along any axis of less (better) than or equal to 0.1 degree per square root hour.	Note: 7A003.d.2. does not control 'inertial measurement equipment or systems' that contain "spinning mass gyros" as the only type of gyro.	
7A004	'Star trackers' and components therefor, as follows:	N.B. SEE ALSO 7A104.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. 'Star trackers' with a specified azimuth accuracy of equal to or less (better) than 20 seconds of arc throughout the specified lifetime of the equipment; b. Components specially designed for equipment specified in 7A004.a. as follows: 1. Optical heads or baffles; 2. Data processing units.	Technical Note: 'Star trackers' are also referred to as stellar attitude sensors or gyro-astro compasses.	
7A005	"Satellite navigation system" receiving equipment having any of the following and specially designed components therefor: a. Employing a decryption algorithm specially designed or modified for government use to access the ranging code for position and time; or b. Employing 'adaptive antenna systems'.	N.B. SEE ALSO 7A105. N.B. For equipment specially designed for military use, see Military Items List. Note: 7A005.b. does not control satellite navigation system receiving equipment that only uses components designed to filter, switch, or combine signals from multiple omni-directional antennae that do not implement adaptive antenna techniques.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Note: For the purposes of 7A005.b 'adaptive antenna systems' dynamically generate one or more spatial nulls in an antenna array pattern by signal processing in the time domain or frequency domain.	
7A006	Airborne altimeters operating at frequencies other than 4.2 to 4.4GHz inclusive and having any of the following: a. "Power management"; or b. Using phase shift key modulation.	N.B. SEE ALSO 7A106. Technical Note: 'Power management' is changing the transmitted power of the altimeter signal so that received power at the 'aircraft' altitude is always at the minimum necessary to determine the altitude.	Controller
7A008	Underwater sonar navigation systems using doppler velocity or correlation velocity logs integrated with a heading source and having a positioning accuracy of equal to or less (better) than 3% of distance travelled 'Circular Error Probable' ('CEP') and specially designed components therefor.	Note: 7A008 does not control systems specially designed for installation on surface vessels or systems requiring acoustic beacons or buoys to provide positioning data. N.B. See 6A001.a. for acoustic systems, and 6A001.b. for correlation-velocity and Doppler-velocity sonar log equipment. See 8A002 for other marine systems.	Controller
7A101	Linear accelerometers, other than those specified in 7A001, designed for use in	Note: 7A101 does not control accelerometers specially designed and developed as	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	inertial navigation systems or in guidance systems of all types, usable in 'missiles', having all the following characteristics, and specially designed components therefor: a. A "bias" "repeatability" of less (better) than 1,250 micro g; and b. A "scale factor" "repeatability" of less (better) than 1,250ppm;	Measurement While Drilling (MWD) Sensors for use in downhole well service operations. Technical Notes: 1. In 7A101 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km; 2. In 7A101 the measurement of "bias" and "scale factor" refers to a one sigma standard deviation with respect to a fixed calibration over a period of one year;	
7A102	All types of gyros, other than those specified in 7A002, usable in 'missiles', with a rated "drift rate" 'stability' of less than 0.5° (1 sigma or rms) per hour in a 1g environment and specially designed components therefor.	Technical Notes: 1. In 7A102 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km. 2. In 7A102 'stability' is defined as a measure of the ability of a specific mechanism or performance coefficient to remain invariant when continuously exposed to a fixed operating condition (IEEE STD 528-2001 paragraph 2,247).	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
7A103	Instrumentation, navigation equipment and systems, other than those specified in 7A003, as follows; and specially designed components therefor: a. 'Inertial measurement equipment or systems', using accelerometers or gyros as follows: 1. Accelerometers specified in 7A001.a.3., 7A001.b. or 7A101 or gyros specified in 7A002 or 7A102; or 2. Accelerometers specified in 7A001.a.1. or 7A001.a.2., designed for use in inertial navigation systems or in guidance systems of all types, and usable in 'missiles';	Technical Note: In 7A103 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km. Note: 7A103.a.1. does not control equipment containing accelerometers specified in 7A001.a.3. that are designed to measure vibration or shock. Note: 7A103.a. does not specify equipment containing accelerometers specified in 7A001 where such accelerometers are specially designed and developed as MWD (Measurement While Drilling) sensors for use in down-hole well services operations. Technical Note: 'Inertial measurement equipment or systems' specified in 7A103.a. incorporate accelerometers or gyros to measure changes in velocity and orientation in order to determine or maintain heading or position without requiring an external reference once aligned.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Integrated flight instrument systems which include gyrostabilisers or automatic pilots, designed or modified for use in 'missiles'; c. 'Integrated navigation systems', designed or modified for 'missiles' and capable of providing a navigational accuracy of 200m Circle of Equal Probability (CEP) or less;	Note: 'Inertial measurement equipment or systems' in 7A103.a. include: - Attitude and Heading Reference Systems (AHRSs); - Gyrocompasses; - Inertial Measurement Units (IMUs); - Inertial Navigation Systems (INSs); - Inertial Reference Systems (IRSs); - Inertial Reference Units (IRUs). Technical Note: An 'integrated navigation system' typically incorporates the following components: 1. An inertial measurement device (e.g., an attitude and heading reference system, inertial reference unit, or inertial navigation system); 2. One or more external sensors used to update the position and/or velocity, either periodically or continuously throughout the	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Three axis magnetic heading sensors, designed or modified to be integrated with flight control and navigation systems, other than those specified in 6A006, having all the following characteristics, and specially designed components therefor; 1. Internal tilt compensation in pitch (± 90 degrees) and roll (± 180 degrees) axes; 2. Azimuthal accuracy better (less) than 0.5 degrees rms at latitude of ±80 degrees, reference to local magnetic field.	flight (e.g., satellite navigation receiver, radar altimeter, and/or Doppler radar); and 3. Integration hardware and software; Note: Flight control and navigation systems in 7A103.d. include gyrostabilizers, automatic pilots and inertial navigation systems. Technical Note: In 7A103 'missile' means complete rocket systems and unmaned aerial vehicle systems capable of a range exceeding 300km.	
7A104	Gyro-astro compasses and other devices, other than those specified in 7A004, which derive position or orientation by means of automatically tracking celestial bodies or satellites and specially designed components therefor.		Controller
7A105	Receiving equipment for "navigation satellite systems", other than those specified in 7A005, having any of the		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	following characteristics, and specially designed components therefor: a. Designed or modified for use in space launch vehicles specified in 9A004, sounding rockets specified in 9A104 or unmanned aerial vehicles specified in 9A012 or 9A112.a.; or b. Designed or modified for airborne applications and having any of the following: 1. Capable of providing navigation information at speeds in excess of 600m/s; 2. Employing decryption, designed or modified for military or governmental services, to gain access to a "navigation satellite systems" secured signal/data; or 3. Being specially designed to employ anti-jam features (e.g. null steering antenna or electronically steerable antenna) to function in an environment of active or passive countermeasures.	Note: 7A105.b.2. and 7A105.b.3. do not control equipment designed for commercial, civil or 'Safety of Life' (e.g. data integrity, flight safety) a 'navigation satelite systems' services. Technical Note: In 7A105, 'navigation satellite system' includes Global Navigation Satellite Systems (GNSS) (e.g. GPS, GLONASS, Galileo or BeiDou) and Regional Navigation Satellite Systems (RNSS) (e.g. NavIC, QZSS).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
7A106	Altimeters, other than those specified in 7A006, of radar or laser radar type, designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.		Controller
7A115	Passive sensors for determining bearing to specific electromagnetic source (direction finding equipment) or terrain characteristics, designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.	Note: Equipment specified in 7A105, 7A106, and 7A115 includes the following: a. Terrain contour mapping equipment; b. Scene mapping and correlation (both digital and analogue) equipment; c. Doppler navigation radar equipment; d. Passive interferometer equipment; e. Imaging sensor equipment (both active and passive).	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
7A116	Flight control systems and servo valves, as follows; designed or modified for use in space launch vehicles specified in 9A004, sounding rockets specified in 9A104 or 'missiles'. a. Pneumatic, hydraulic, mechanical, electro-optical, or electro-mechanical flight control systems (including fly-by-wire and fly-by-light systems); b. Attitude control equipment; c. Flight control servo valves designed or modified for the systems specified in 7A116.a. or 7A116.b., and designed or modified to operate in a vibration environment greater than 10g rms between 20Hz and 2kHz.	Note: For conversion of manned aircraft to operate as 'missiles', 7A116 includes the systems, equipment and valves designed or modified to enable operation of manned aircraft as unmanned aerial vehicles.	Controller
7A117	"Guidance sets", usable in "missiles" capable of achieving system accuracy of 3.33 % or less of the range (e.g., a "CEP" of 10km or less at a range of 300km).		Controller
7B	**Test, Inspection and Production Equipment**		
7B001	Test, calibration or alignment equipment, specially designed for equipment specified in 7A.	Note: 7B001 does not control test, calibration or alignment equipment for 'Maintenance Level I' or 'Maintenance Level II'.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		Technical Notes: 1. 'Maintenance Level I' The failure of an inertial navigation unit is detected on the "aircraft" by indications from the Control and Display Unit (CDU) or by the status message from the corresponding sub-system. By following the manufacturer's manual, the cause of the failure may be localised at the level of the malfunctioning Line Replaceable Unit (LRU). The operator then removes the LRU and replaces it with a spare. 2. 'Maintenance Level II' The defective LRU is sent to the maintenance workshop (the manufacturer's or that of the operator tindak balassible for level II maintenance). At the maintenance workshop, the malfunctioning LRU is tested by various appropriate means to verify and localise the defective Shop Replaceable Assembly (SRA) module tindak balassible for the failure. This SRA is removed and replaced by an operative spare. The defective SRA (or possibly the complete LRU) is then shipped to the manufacturer. 'Maintenance Level II' does not include	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		the disassembly or repair of controlled accelerometers or gyro sensors.	
7B002	Equipment specially designed to characterize mirrors for ring "laser" gyros, as follows: a. Scatterometers having a measurement accuracy of 10ppm or less (better); b. Profilometers having a measurement accuracy of 0.5nm (5 angstrom) or less (better).	N.B. SEE ALSO 7B102.	Controller
7B003	Equipment specially designed for the "production" of equipment specified in 7A.	Note: 7B003 includes: - Gyro tuning test stations; - Gyro dynamic balance stations; - Gyro run-in/motor test stations; - Gyro evacuation and fill stations; - Centrifuge fixtures for gyro bearings; - Accelerometer axis align stations; - Fibre optic gyro coil winding machines.	Controller
7B102	Reflectometers specially designed to characterise mirrors, for "laser" gyros, having a measurement accuracy of 50ppm or less (better).		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
7B103	"Production facilities" and "production equipment" as follows: "Production facilities" specially designed for equipment specified in 7A117; "Production equipment", and other test, calibration and alignment equipment, other than that specified in 7B001 to 7B003, designed or modified to be used with equipment specified in 7A.		Controller
7C	**Materials** None.		
7D	**Software**		
7D001	"Software" specially designed or modified for the "development" or "production" of equipment specified in 7A. or 7B.		Controller
7D002	"Source code" for the operation or maintenance of any inertial navigation equipment, including inertial equipment not specified in 7A003 or 7A004, or Attitude and Heading Reference Systems ('AHRS').	Note: 7D002 does not control "source code" for the "use" of gimballed 'AHRS'. Technical Note: 'AHRS' generally differ from Inertial Navigation Systems (INS) in that an 'AHRS' provides attitude and heading information and normally does not provide the acceleration, velocity and position information associated with an INS.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
7D003	Other 'software' as follows: a. 'Software' specially designed or modified to improve the operational performance or reduce the navigational error of systems to the levels specified in 7A003, 7A004 or 7A008; b. "Source code" for hybrid integrated systems which improves the operational performance or reduces the navigational error of systems to the level specified in 7A003 or 7A008 by continuously combining heading data with any of the following: 1. Doppler radar or sonar velocity data; 2. Satellite navigation system reference data; or 3. Data from "Data-Based referenced Navigation" ("DBRN") systems; c. Not used; d. Not used; e. Computer-Aided-Design (CAD) 'software' specially designed for the 'development' of "active flight control		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	systems", helicopter multi-axis fly-by-wire or fly-by-light controllers or helicopter "circulation controlled anti-torque or circulation-controlled direction control systems", whose 'technology' is specified in 7E004.b.1., 7E004.b.3. to 7E004.b.5., 7E004.b.7., 7E004.b.8., 7E004.c.1. or 7E004.c.2."		
7D004	"Source code" incorporating "development" "technology" specified in 7E004.a.2, 7E004.a.3., 7E004.a.5., 7E004.a.6. or 7E004.b., for any of the following: a. Digital flight management systems for "total control of flight"; b. Integrated propulsion and flight control systems; c. "Fly-by-wire systems" or "fly-by-light systems"; d. Fault-tolerant or self-reconfiguring "active flight control systems"; e. Not used; f. Air data systems based on surface static data; or g. Three dimensional displays.	Note: 7D004. does not control "source code" associated with common computer elements and utilities (e.g., input signal acquisition, output signal transmission, computer program and data loading, built-in test, task scheduling mechanisms) not providing a specific flight control system function.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
7D005	"Software specially designed to decrypt 'satellite navigation system' ranging code designed for government use.		Controller
7D101	"Software" specially designed or modified for the "use" of equipment specified in 7A001 to 7A006, 7A101 to 7A106, 7A115, 7A116.a., 7A116.b., 7B001, 7B002, 7B003, 7B102 or 7B103.		Controller
7D102	Integration "software" as follows: a. Integration "software" for the equipment specified in 7A103.b.; b. Integration "software" specially designed for the equipment specified in 7A003 or 7A103.a. c. Integration "software" designed or modified for the equipment specified in 7A103.c.	Note: A common form of integration "software" employs Kalman filtering.	Controller
7D103	"Software" specially designed for modelling or simulation of the "guidance sets" specified in 7A117 or for their design integration with the space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.	Note: "Software" specified in 7D103 remains controlled when combined with specially designed hardware specified in 4A102.	Controller
7D104	"Software" specially designed or modified for the operation or maintenance of "guidance sets" specified in 7A117.	Note : 7D104 includes "software", specially designed or modified to enhance the performance of "guidance sets" to	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		achieve or exceed the accuracy specified in 7A117.	
7E	**Technology**		
7E001	"Technology" according to the General Technology Note for the "development" of equipment or "software", specified in 7A, 7B, 7D001, 7D002, 7D003, 7D005 and 7D101 to 7D103.	Note: 7E001 includes key management "technology" exclusively for equipment specified in 7A005.a.	Controller
7E002	"Technology" according to the General Technology Note for the "production" of equipment specified in 7A or 7B.		Controller
7E003	"Technology" according to the General Technology Note for the repair, refurbishing or overhaul of equipment specified in 7A001 to 7A004.	Note: 7E003 does not control "technology" for maintenance, directly associated with calibration, removal or replacement of damaged or unserviceable LRUs and SRAs of a "civil aircraft" as described in 'Maintenance Level I' or 'Maintenance Level II'. N.B. See Technical Notes to 7B001.	Controller
7E004	Other "technology" as follows: a. "Technology" for the "development" or "production" of any of the following: 1. Not used;		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Air data systems based on surface static data only, i.e., which dispense with conventional air data probes; 3. Three dimensional displays for "aircraft"; 4. Not used; 5. Electric actuators (i.e., electromechanical, electrohydrostatic and integrated actuator package) specially designed for "primary flight control"; 6. "Flight control optical sensor array" specially designed for implementing "active flight control systems"; or 7. "DBRN" systems designed to navigate underwater, using sonar or gravity databases, that provide a positioning accuracy equal to or less (better) than 0.4 nautical miles; b. "Development" "technology", as follows, for "active flight control systems" (including "fly-by-wire systems" or "fly-by-light systems"):	Technical Note: 'Primary flight control' is 'aircraft' stability or manoeuvring control using force/moment generators, i.e. aerodynamic control surfaces or propulsive thrust vectoring. Technical Note: A 'flight control optical sensor array' is a network of distributed optical sensors, using 'laser' beams, to provide real-time flight control data for on-board processing.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Photonic-based "technology" for sensing aircraft or flight control component state, transferring flight control data, or commanding actuator movement, "required" for "fly-by-light systems" "active flight control systems"; 2. Not used; 3. Real-time algorithms to analyze component sensor information to predict and preemptively mitigate impending degradation and failures of components within an "active flight control system"; 4. Real-time algorithms to identify component failures and reconfigure force and moment controls to mitigate "active flight control system" degradations and failures; 5. Integration of digital flight control, navigation and propulsion control data, into a digital flight management system for "total control of flight";	Note: 7E004.b.3. does not control algorithms for purpose of off-line maintenance. Note: 7E004.b.4. does not control algorithms for the elimination of fault effects through comparison of redundant data sources, or off-line pre-planned responses to anticipated failures. Note: 7E004.b.5. does not control: a. "Technology" for "integration" of digital flight control, navigation and propulsion control data, into a digital flight management system for "flight path optimisation";	

Category Code	*Items Description*	*Note*	*Relevant Authority*
		b. "Technology" for "aircraft" flight instrument systems integrated solely for VOR, DME, ILS or MLS navigation or approaches.	
	6. Not used;	Technical Note:	
	7. "Technology" "required" for deriving the functional requirements for "fly-by-wire systems" having all of the following:	'Flight path' is a procedure that minimises deviations from a four-dimensional (space and time) desired trajectory based on maximising performance or effectiveness for mission tasks.	
	a. 'Inner-loop' airframe stability controls requiring loop closure rates of 40Hz or greater; and	Technical Note: 'Inner-loop' refers to functions of "active flight control systems" that automate airframe stability controls.	
	b. Having any of the following:		
	1. Corrects an aerodynamically unstable airframe, measured at any point in the design flight envelope, that would lose recoverable control if not corrected within 0.5 seconds;		
	2. Couples controls in two or more axes while compensating for	Technical Note: 'Abnormal changes in aircraft state' include in-flight structural damage, loss of engine thrust,	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	'abnormal changes in aircraft state'; 3. Performs the functions specified in 7E004.b.5.; or 4. Enables aircraft to have stable controlled flight, other than during take-off or landing, at greater than 18 degrees angle of attack, 15 degrees side slip, 15 degrees/second pitch or yaw rate, or 90 degrees/second roll rate; 8. "Technology" "required" for deriving the functional requirements for "fly-by-wire systems" to achieve all of the following: a. No loss of control of the aircraft in the event of a consecutive sequence of any two individual faults within the "fly-by-wire system"; and	disabled control surface, or destabilizing shifts in cargo load. Note: 7E004.b.7.b.3. does not control autopilots. Note : 7E004.b. does not control "technology" associated with common computer elements and utilities (e.g., input signal acquisition, output signal transmission, computer program and data loading, built-in test, task scheduling mechanisms) not providing a specific flight control system function. Technical Note: 'Variable geometry airfoils' use trailing edge flaps or tabs, or leading edge slats or pivoted nose droop, the position of which can be controlled in flight.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Probability of loss of control of the aircraft being less (better) than $1x10^{-9}$ failures per flight hour; c. "Technology" for the "development" of helicopter systems, as follows: 1. Multi-axis fly-by-wire or fly-by-light controllers, which combine the functions of at least two of the following into one controlling element: a. Collective controls; b. Cyclic controls; c. Yaw controls; 2. "Circulation-controlled anti-torque or circulation-controlled directional control systems"; 3. Rotor blades incorporating "variable geometry airfoils", for use in systems using individual blade control.		
7E101	"Technology" according to the General Technology Note for the "use" of equipment specified in 7A001 to 7A006, 7A101 to 7A106, 7A115 to 7A117, 7B001,		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	7B002, 7B003, 7B102, 7B103, 7D101 to 7D103.		
7E102	"Technology" for protection of avionics and electrical subsystems against electromagnetic pulse (EMP) and electromagnetic interference (EMI) hazards, from external sources, as follows: a. Design "technology" for shielding systems; b. Design "technology" for the configuration of hardened electrical circuits and subsystems; c. Design "technology" for the determination of hardening criteria of 7E102.a. and 7E102.b.		Controller
7E104	"Technology" for the integration of the flight control, guidance, and propulsion data into a flight management system for optimization of rocket system trajectory.		Controller

CATEGORY 8

MARINE

Category Code	*Items Description*	*Note*	*Relevant Authority*
Category 8 – MARINE			
8A	**Systems, Equipment and Components**		
8A001	Submersible vehicles and surface vessels, as follows: a. Manned, tethered submersible vehicles designed to operate at depths exceeding 1,000m; b. Manned, untethered submersible vehicles having any of the following: 1. Designed to 'operate autonomously' and having a lifting capacity of all the following: a. 10% or more of their weight in air; and b. 15kN or more;	N.B. For the control status of equipment for submersible vehicles, see: - Category 6 for sensors; - Categories 7 and 8 for navigation equipment; - Category 8A for underwater equipment. Technical Notes: 1. For the purposes of 8A001.b., 'operate autonomously' means fully submerged, without snorkel, all systems working and cruising at minimum speed at which the submersible can safely control its depth dynamically by using its depth planes only, with no need for a support vessel or support base on the surface, sea-bed or shore, and containing a propulsion system for submerged or surface use.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Designed to operate at depths exceeding 1,000m; or 3. Having all of the following: a. Designed to continuously 'operate autonomously' for 10 hours or more; and b. 'Range' of 25 nautical miles or more; c. Unmanned submersible vehicles, as follows: 1. Unmanned submersible vehicles having any of the following; a. Designed for deciding a course relative to any geographical reference without real-time human assistance; b. Acoustic data or command link; or 2. Unmanned submersible vehicles, not specified in 8A001.c.1. having all of the following:	2. For the purposes of 8A001.b., 'range' means half the maximum distance a submersible vehicle can 'operate autonomously'.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Designed to operate with a tether; b. Designed to operate at depths exceeding 1,000m; c. Having any of the following: 1. Designed for self-propelled manoeuvre using propulsion motors or thrusters specified in 8A002.a.2.; or 2. Fibre optic data link. d. Not used. e. Ocean salvage systems with a lifting capacity exceeding 5MN for salvaging objects from depths exceeding 250m and having any of the following: 1. Dynamic positioning systems capable of position keeping within 20m of a given point provided by the navigation system; or 2. Seafloor navigation and navigation integration systems, for depths exceeding 1,000m and		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	with positioning accuracies to within 10m of a predetermined point; f. Not used: g. Not used: h. Not used: i. Not used.		
8A002	Marine systems, equipment and components, as follows: a. Systems, equipment and components, specially designed or modified for submersible vehicles and designed to operate at depths exceeding 1,000m, as follows: 1. Pressure housings or pressure hulls with a maximum inside chamber diameter exceeding 1.5m; 2. Direct current propulsion motors or thrusters; 3. Umbilical cables, and connectors therefor, using optical fibre and having synthetic strength members;	Note: For underwater communications systems, see Category 5, Part 1 - Telecommunications.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. Components manufactured from material specified in 8C001;	Technical Note: The objective of 8A002.a.4. should not be defeated by the export of 'syntactic foam' specified in 8C001 when an intermediate stage of manufacture has been performed and it is not yet in the final component form.	
	b. Systems specially designed or modified for the automated control of the motion of submersible vehicles specified in 8A001, using navigation data, having closed loop servo-controls and having any of the following: 1. Enabling a vehicle to move within 10m of a predetermined point in the water column; 2. Maintaining the position of the vehicle within 10m of a predetermined point in the water column; or 3. Maintaining the position of the vehicle within 10m while following a cable on or under the seabed; c. Fibre optic pressure hull penetrators;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Underwater vision systems specially designed or modified for remote operation with an underwater vehicle, employing techniques to minimise the effects of back scatter and including range-gated illuminators or "laser" systems; e. Not used; f. Not used; g. Light systems specially designed or modified for underwater use, as follows: 1. Stroboscopic light systems capable of a light output energy of more than 300J per flash and a flash rate of more than 5 flashes per second; 2. Argon arc light systems specially designed for use below 1,000m; h. "Robots" specially designed for underwater use, controlled by using a dedicated computer and having any of the following: 1. Systems that control the "robot" using information from sensors which measure force or torque		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	applied to an external object, distance to an external object, or tactile sense between the "robot" and an external object; or 2. The ability to exert a force of 250N or more or a torque of 250Nm or more and using titanium based alloys or "composite" "fibrous or filamentary materials" in their structural members; i. Remotely controlled articulated manipulators specially designed or modified for use with submersible vehicles and having any of the following: 1. Systems which control the manipulator using information from sensors which measure any of the following: a. Torque or force applied to an external object; or b. Tactile sense between the manipulator and an external object; or		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Controlled by proportional master-slave techniques and having 5 degrees of 'freedom of movement' or more; j. Air independent power systems specially designed for underwater use, as follows: 1. Brayton or Rankine cycle engine air independent power systems having any of the following: a. Chemical scrubber or absorber systems, specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust; b. Systems specially designed to use a monoatomic gas; c. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10kHz, or special mounting devices for shock mitigation; or d. Systems having all of the following:	Technical Note: Only functions having proportionally related motion control using positional feedback are counted when determining the number of degrees of 'freedom of movement'.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1. Specially designed to pressurise the products of reaction or for fuel reformation; 2. Specially designed to store the products of the reaction; and 3. Specially designed to discharge the products of the reaction against a pressure of 100kPa or more; 2. Diesel cycle engine air independent systems having all of the following: a. Chemical scrubber or absorber systems, specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust; b. Systems specially designed to use a monoatomic gas; c. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10kHz,		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	or special mounting devices for shock mitigation; and d. Specially designed exhaust systems that do not exhaust continuously the products of combustion; 3. "Fuel cell" air independent power systems with an output exceeding 2kW and having any of the following: a. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10kHz, or special mounting devices for shock mitigation; or b. Systems having all of the following: 1. Specially designed to pressurise the products of reaction or for fuel reformation; 2. Specially designed to store the products of the reaction; and		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	3. Specially designed to discharge the products of the reaction against a pressure of 100kPa or more; 4. Stirling cycle engine air independent power systems having all of the following: a. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10kHz, or special mounting devices for shock mitigation; and b. Specially designed exhaust systems which discharge the products of combustion against a pressure of 100kPa or more k. Not used; l. Not used; m. Not used; n. Not used; o. Propellers, power transmission systems, power generation systems		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	and noise reduction systems, as follows: 1. Not used; 2. Water-screw propeller, power generation systems or transmission systems, designed for use on vessels, as follows: a. Controllable-pitch propellers and hub assemblies, rated at more than 30MW; b. Internally liquid-cooled electric propulsion engines with a power output exceeding 2.5MW; c. "Superconductive" propulsion engines or permanent magnet electric propulsion engines, with a power output exceeding 0.1MW; d. Power transmission shaft systems incorporating "composite" material components and capable of transmitting more than 2MW;		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	e. Ventilated or base-ventilated propeller systems, rated at more than 2.5MW; 3. Noise reduction systems designed for use on vessels of 1,000 tonnes displacement or more, as follows: a. Systems that attenuate underwater noise at frequencies below 500Hz and consist of compound acoustic mounts for the acoustic isolation of diesel engines, diesel generator sets, gas turbines, gas turbine generator sets, propulsion motors or propulsion reduction gears, specially designed for sound or vibration isolation and having an intermediate mass exceeding 30% of the equipment to be mounted; b. 'Active noise reduction or cancellation systems' or magnetic bearings, specially designed for power transmission systems;	Technical Note: 'Active noise reduction or cancellation systems' incorporate electronic control systems capable of actively reducing equipment vibration by the generation of anti-noise or anti-vibration signals directly to the source.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	p. Pumpjet propulsion systems having all of the following: 1. Power output exceeding 2.5MW; and 2. Using divergent nozzle and flow conditioning vane techniques to improve propulsive efficiency or reduce propulsion-generated underwater-radiated noise; q. Underwater swimming and diving equipment as follows: 1. Closed circuit rebreathers; 2. Semi-closed circuit rebreathers; r. Diver deterrent acoustic systems specially designed or modified to disrupt divers and having a sound pressure level equal to or exceeding 190dB (reference 1μPa at 1m) at frequencies of 200Hz and below.	Note: 8A002.q. does not control individual rebreathers for personal use when accompanying their users. N.B. For equipment and devices specially designed for military use, see the Military Items List. Note 1: 8A002.r. does not control diver deterrent systems based on underwater explosive devices, air guns or combustible sources. Note 2: 8A002.r. includes diver deterrent acoustic systems that use spark gap sources, also known as plasma sound sources.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
8B	**Test, Inspection and Production Equipment**		
8B001	Water tunnels having a background noise of less than 100dB (reference 1μPa, 1Hz), in the frequency range from 0 to 500Hz and designed for measuring acoustic fields generated by a hydro-flow around propulsion system models.		Controller
8C	**Materials**		
8C001	'Syntactic foam' designed for underwater use and having all of the following: a. Designed for marine depths exceeding 1,000m; and b. A density less than 561kg/m^3.	N.B. See also 8A002.a.4. Technical Note: 'Syntactic foam' consists of hollow spheres of plastic or glass embedded in a resin "matrix".	Controller
8D	**Software**		
8D001	"Software" specially designed or modified for the "development", "production" or "use" of equipment or materials, specified in 8A, 8B or 8C.		Controller
8D002	Specific "software" specially designed or modified for the "development", "production", repair, overhaul or refurbishing (remachining) of propellers		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	specially designed for underwater noise reduction.		
8E	**Technology**		
8E001	"Technology" according to the General Technology Note for the "development" or "production" of equipment or materials, specified in 8A, 8B or 8C.		Controller
8E002	Other "technology" as follows: a. "Technology" for the "development", "production", repair, overhaul or refurbishing (remachining) of propellers specially designed for underwater noise reduction; b. "Technology" for the overhaul or refurbishing of equipment specified in 8A001, 8A002.b., 8A002.j., 8A002.o. or 8A002.p. c. "Technology" according to the General Technology Note for the "development" or "production" of any of the following: 1. Surface-effect vehicles (fully skirted variety) having all of the following:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Maximum design speed, fully loaded, exceeding 30 knots in a significant wave height of 1.25m or more; b. Cushion pressure exceeding 3,830Pa; and c. Light-ship-to-full-load displacement ratio of less than 0.70; 2. Surface-effect vehicles (rigid sidewalls) with a maximum design speed, fully loaded, exceeding 40 knots in a significant wave height of 3.25m or more; 3. Hydrofoil vessels with active systems for automatically controlling foil systems, with a maximum design speed, fully loaded, of 40 knots or more in a significant wave height of 3.25m or more; or 4. 'Small waterplane area vessels' having any of the following: a. Full load displacement exceeding 500 tonnes with a maximum design speed, fully	Technical Note: A 'small waterplane area vessel' is defined by the following formula: waterplane area at an operational design draft less than 2x (displaced volume at the operational design draft)$^{2/3}$.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	loaded, exceeding 35 knots in a significant wave height of 3.25m or more; or b. Full load displacement exceeding 1,500 tonnes with a maximum design speed, fully loaded, exceeding 25 knots in a significant wave height of 4m or more.		

CATEGORY 9

AEROSPACE AND PROPULSION

Category Code	*Items Description*	*Note*	*Relevant Authority*
CATEGORY 9 - AEROSPACE AND PROPULSION			
9A	**Systems, Equipment and Components**	N.B. For propulsion systems designed or rated against neutron or transient ionizing radiation, see the Military Items List.	
9A001	Aero gas turbine engines having any of the following: a. Incorporating any of the "technologies" specified in 9E003.a., 9E003.h. or 9E003.i.; or	N.B. SEE ALSO 9A101. Note 1: 9A001.a. does not control aero gas turbine engines which meet all of the following: a. Certified by the civil aviation authorities of one or more EU Member States or the Wassenaar Arrangement Participating States; and b. Intended to power non-military manned "aircraft" for which any of the following has been issued by civil aviation authorities of one or more EU Member States or the Wassenaar Arrangement Participating States for the "aircraft" with this specific engine type: 1. A civil type certificate; or	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Designed to power an aircraft to cruise at Mach 1 or higher, for more than thirty minutes.	2. An equivalent document recognized by the International Civil Aviation Organisation (ICAO). Note 2: 9A001.a. does not control aero gas turbine engines designed for Auxiliary Power Units (APUs) approved by the civil aviation authority in a EU Member States or the Wassenaar Arrangement Participating States.	
9A002	"Marine gas turbine engines" with designed to use liquid fuel and having all of the following, and specially designed assemblies and components therefor: a. Maximum continuous power when operating in "steady state mode" at standard reference conditions specified by ISO 3977-2:1997 (or national equivalent) of 24,245kW or more; and b. "Corrected specific fuel consumption" not exceeding 0.219 kg/kWh at 35% of the maximum continuous power when using liquid fuel.	Note: The term 'marine gas turbine engines' includes those industrial, or aero-derivative, gas turbine engines adapted for a ship's electric power generation or propulsion. Technical Note: For the purposes of 9A002, 'corrected specific fuel consumption' is the specific fuel consumption of the engine corrected to a marine distillate liquid fuel having a net specific energy (i.e. net heating value) of 42MJ/kg (ISO 3977-2:1997).	Controller
9A003	Specially designed assemblies or components, incorporating any of the "technologies" specified in 9E003.a., 9E003.h. or 9E003i., for any of the following aero gas turbine engines:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Specified in 9A001; or b. Whose design or production origins are either non-EU Member States or Wassenaar Arrangement Participating States; or unknown to the manufacturer.		
9A004	Space launch vehicles, 'spacecraft', 'spacecraft buses', 'spacecraft payloads', 'spacecraft' on-board systems or equipment, terrestrial equipment, and air-launch platforms as follows: a. Space launch vehicles; b. "Spacecraft"; c. "Spacecraft buses"; d. "Spacecraft payloads" incorporating items specified in 3A001.b.1.a.4., 3A002.g., 5A001.a.1., 5A001.b.3., 5A002.c., 5A002.e., 6A002.a.1., 6A002.a.2., 6A002.b., 6A002.d., 6A003.b., 6A004.c., 6A004.e., 6A008.d., 6A008.e., 6A008.k., 6A008.l. or 9A010.c.; e. On-board systems or equipment, specially designed for "spacecraft" and having any of the following functions: 1. Telemetry and telecommand equipment; specially designed for any	N.B.: SEE ALSO 9A104. Note: For the purpose of 9A004.e.1., 'command and telemetry data handling' includes bus data	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	of the following data processing functions: a. Telemetry data processing of frame synchronisation and error corrections, for monitoring of operational status (also known as health and safe status) of the 'spacecraft bus'; or b. Command data processing for formatting command data being sent to the 'spacecraft' to control the 'spacecraft bus'; 2. 'Payload data handling'; or 3. 'Attitude and orbit control'; f. Terrestrial equipment, specially designed for "spacecraft", as follows: 1. Telemetry and telecommand equipment;	management, storage, and processing. Note: For the purpose of 9A004.e.2., 'payload data handling' includes payload data management, storage, and processing. Note: For the purpose of 9A004.e.3., 'attitude and orbit control' includes sensing and actuation to determine and control the position and orientation of a "spacecraft". N.B. For equipment specially designed for military use, see Military Items List.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. "Simulators" specially designed for "verification of operational procedures" of "spacecraft''. g. 'Aircraft' specially designed or modified to be air-launch platforms for space launch vehicles.	Technical Note: For the purposes of 9A004.f.2., 'verification of operational procedures' is any of the following: 1. Command sequence confirmation; 2. Operational training; 3. Operational rehearsals; or 4. Operational analysis.	
9A005	Liquid rocket propulsion systems containing any of the systems or components, specified in 9A006.	N.B. SEE ALSO 9A105 AND 9A119.	Controller
9A006	Systems and components, specially designed for liquid rocket propulsion systems, as follows: a. Cryogenic refrigerators, flightweight dewars, cryogenic heat pipes or cryogenic systems, specially designed for use in space vehicles and capable of restricting cryogenic fluid losses to less than 30% per year;	N.B. SEE ALSO 9A106, 9A108 AND 9A120.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Cryogenic containers or closed-cycle refrigeration systems, capable of providing temperatures of 100K (-173°C) or less for "aircraft" capable of sustained flight at speeds exceeding Mach 3, launch vehicles or "spacecraft"; c. Slush hydrogen storage or transfer systems; d. High pressure (exceeding 17.5MPa) turbo pumps, pump components or their associated gas generator or expander cycle turbine drive systems; e. High-pressure (exceeding 10.6MPa) thrust chambers and nozzles therefor; f. Propellant storage systems using the principle of capillary containment or positive expulsion (i.e., with flexible bladders); g. Liquid propellant injectors with individual orifices of 0.381mm or smaller in diameter (an area of 1.14×10^{-3} cm^2 or smaller for non-circular orifices) and specially designed for liquid rocket engines; h. One-piece carbon-carbon thrust chambers or one-piece carbon-carbon exit cones, with densities exceeding		

Category Code	*Items Description*	*Note*	*Relevant Authority*
	1.4g/cm^3 and tensile strengths exceeding 48MPa.		
9A007	Solid rocket propulsion systems having any of the following: a. Total impulse capacity exceeding 1.1MNs; b. Specific impulse of 2.4kNs/kg or more, when the nozzle flow is expanded to ambient sea level conditions for an adjusted chamber pressure of 7MPa; c. Stage mass fractions exceeding 88% and propellant solid loadings exceeding 86%; d. Components specified in 9A008; or e. Insulation and propellant bonding systems, using direct-bonded motor designs to provide a 'strong mechanical bond' or a barrier to chemical migration between the solid propellant and case insulation material.	N.B. SEE ALSO 9A107 AND 9A119. Technical Note: 'Strong mechanical bond' means bond strength equal to or more than propellant strength.	Controller
9A008	Components specially designed for solid rocket propulsion systems, as follows: a. Insulation and propellant bonding systems, using liners to provide a 'strong mechanical bond' or a barrier to chemical migration between the solid propellant and case insulation material;	N.B. SEE ALSO 9A108. Technical Note: 'Strong mechanical bond' means bond strength equal to or more than propellant strength.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Filament-wound "composite" motor cases exceeding 0.61m in diameter or having 'structural efficiency ratios (PV/W)' exceeding 25km; c. Nozzles with thrust levels exceeding 45kN or nozzle throat erosion rates of less than 0.075mm/s; d. Movable nozzle or secondary fluid injection thrust vector control systems, capable of any of the following: 1. Omni-axial movement exceeding ± 5°; 2. Angular vector rotations of 20°/s or more; or 3. Angular vector accelerations of 40°/s^2 or more.	Technical Note: 'Structural efficiency ratio (PV/W)' is the burst pressure (P) multiplied by the vessel volume (V) divided by the total pressure vessel weight (W).	
9A009	Hybrid rocket propulsion systems having any of the following: a. Total impulse capacity exceeding 1.1 MNs; or b. Thrust levels exceeding 220kN in vacuum exit conditions.	N.B. SEE ALSO 9A109 AND 9A119.	Controller
9A010	Specially designed components, systems and structures, for launch vehicles, launch vehicle propulsion systems or "spacecraft", as follows:	N.B. SEE ALSO 1A002 AND 9A110.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Components and structures, each exceeding 10 kg and specially designed for launch vehicles manufactured using any of the following: 1. "Composite" materials consisting of 'fibrous or filamentary materials" specified in 1C0010.e. and resins specified in 1C008 or 1C009.b.; 2. Metal "matrix" "composites" reinforced by any of the following: a. Materials specified in 1C007; b. "Fibrous or filamentary materials" specified in 1C010; or c. Aluminides specified in 1C002.a.; or 3. Ceramic "matrix" "composite" materials specified in 1C007; b. Components and structures, specially designed for launch vehicle propulsion systems specified in 9A005 to 9A009 manufactured using any of the following: 1. "Fibrous or filamentary materials" specified in 1C010.e. and resins specified in 1C008 or 1C009.b.;	Note: The weight cut-off is not relevant for nose cones.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	2. Metal "matrix" "composites" reinforced by any of the following: a. Materials specified in 1C007; b. "Fibrous or filamentary materials" specified in 1C010; or c. Aluminides specified in 1C002.a.; or 3. Ceramic "matrix" "composite" materials specified in 1C007; c. Structural components and isolation systems, specially designed to control actively the dynamic response or distortion of "spacecraft" structures; d. Pulsed liquid rocket engines with thrust-to-weight ratios equal to or more than 1 kN/kg and a response time (the time required to achieve 90 % of total rated thrust from start-up) of less than 30 ms.		
9A011	Ramjet, scramjet or combined cycle engines, and specially designed components therefor.	N.B. SEE ALSO 9A111 AND 9A118.	Controller
9A012	"Unmanned aerial vehicle" ("UAVs"), unmanned "airships", related equipment and components, as follows:	N.B. SEE ALSO 9A112.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. "UAVs" or unmanned "airships", designed to have controlled flight out of the direct 'natural vision' of the 'operator' and having any of the following: 1. Having all of the following: a. A maximum 'endurance' greater than or equal to 30 minutes but less than 1 hour; and b. Designed to take-off and have stable controlled flight in wind gusts equal to or exceeding 46.3 km/h (25 knots); or 2. A maximum 'endurance' of 1 hour or greater; b. Related equipment and components, as follows: 1. Not used; 2. Not used; 3. Equipment or components, specially designed to convert a manned "aircraft" or manned "airship", to a "UAV" or unmanned "airship", specified in 9A012.a.;	Technical Notes: 1. For the purposes of 9A012.a., 'operator' is a person who initiates or commands the "UAV" or unmanned "airship" flight. 2. For the purposes of 9A012.a., 'endurance' is to be calculated for ISA conditions (ISO 2533:1975) at sea level in zero wind. 3. For the purposes of 9A012.a., 'natural vision' means unaided human sight, with or without corrective lenses.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	4. Air breathing reciprocating or rotary internal combustion type engines, specially designed or modified to propel "UAVs" or unmanned "airships", at altitudes above 15,240 metres (50,000 feet).		
9A101	Turbojet and turbofan engines, other than those specified in 9A001, as follows: a. Engines having all of the following characteristics: 1. 'Maximum thrust value' greater than 400 N (achieved un-installed) excluding civil certified engines with a 'maximum thrust value' greater than 8,890 N (achieved un-installed), and 2. Specific fuel consumption of 0.15 kg/N/hr or less (at maximum continuous power at sea level static conditions using the ICAO standard atmosphere); 3. Dry weight less than 750 kg; and 4. First-stage rotor diameter less than 1m. b. Engines designed or modified for use in "missiles" or unmanned aerial vehicles specified in 9A012 or 9A112.a.,	Technical Note: 1. For the purpose of 9A101.a.1. 'maximum thrust value' is the manufacturer's demonstrated maximum thrust for the engine type un-installed at sea level static conditions using the ICAO standard atmosphere. The civil type certified thrust value will be equal to or less than the manufacturer's demonstrated maximum thrust for the engine type. 2. Dry weight is the weight of the engine without fluids (fuel, hydraulic fluid, oil, etc.) and does not include the nacelle (housing). 3. First-stage rotor diameter is the diameter of the first rotating stage of the	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		engine, whether a fan or compressor, measured at the leading edge of the blade tips.	
9A102	'Turboprop engine systems' specially designed for unmanned aerial vehicles specified in 9A012 or 9A112.a., and specially designed components therefor, having a 'maximum power' greater than 10 kW.	Note: 9A102 does not control civil certified engines. Technical Notes: 1. For the purposes of 9A102 a 'turboprop engine system' incorporates all of the following: a. Turboshaft engine; and b. Power transmission system to transfer the power to a propeller. 2. For the purposes of 9A102 the 'maximum power' is achieved uninstalled at sea level static conditions using ICAO standard atmosphere.	Controller
9A104	Sounding rockets, capable of a range of at least 300 km.	N.B. SEE ALSO 9A004.	Controller
9A105	Liquid propellant rocket engines, as follows: a. Liquid propellant rocket engines or gel propellant rocket motors, usable in "missiles", other than those specified in	N.B. SEE ALSO 9A119	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	9A005, integrated, or designed or modified to be integrated, into a liquid propellant propulsion system which has a total impulse capacity equal to or greater than 1.1 MNs; b. Liquid propellant rocket engines or gel propellant rocket motors, usable in complete rocket systems or unmanned aerial vehicles, capable of a range of 300 km, other than those specified in 9A005 or 9A105.a., integrated, or designed or modified to be integrated, into a liquid propellant propulsion system which has a total impulse capacity equal to or greater than 0.841 MNs.		
9A106	Systems or components, other than those specified in 9A006 as follows, specially designed for liquid rocket propulsion or gel propellant rocket systems: a. Not used; b. Not used; c. Thrust vector control sub-systems, usable in "missiles";	Technical Note: Examples of methods of achieving thrust vector control specified in 9A106.c. are: 1. Flexible nozzle; 2. Fluid or secondary gas injection;	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Liquid, slurry and gel propellant (including oxidisers) control systems, and specially designed components therefor, usable in "missiles", designed or modified to operate in vibration environments greater than 10 g rms between 20 Hz and 2 kHz; e. Combustion chambers and nozzles, for liquid propellant rocket engines or gel propellant rocket motors specified in 9A005 or 9A105.	3. Movable engine or nozzle; 4. Deflection of exhaust gas stream (jet vanes or probes); or 5. Thrust tabs. Note: The only servo valves, pumps and gas turbines specified in 9A106.d., are the following: a. Servo valves designed for flow rates equal to or greater than 24 litres per minute, at an absolute pressure equal to or greater than 7 MPa, that have an actuator response time of less than 100 ms; b. Pumps, for liquid propellants, with shaft speeds equal to or greater than 8,000 r.p.m. at a maximum operating mode or with discharge pressures equal to or greater than 7 MPa. c. Gas turbines, for liquid propellant turbopumps, with shaft speeds equal to or greater than 8,000 r.p.m. at the maximum operating mode.	
9A107	Solid propellant rocket motors, usable in complete rocket systems or unmanned aerial vehicles, capable of a range of 300km, other	N.B. SEE ALSO 9A119.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	than those specified in 9A007, having total impulse capacity equal to or greater than 0.841 MNs.		
9A108	Components, other than those specified in 9A008, as follows, specially designed for solid and hybrid rocket propulsion systems: a. Rocket motor cases and 'insulation' components therefor, usable in subsystems specified in 9A007, 9A107, 9A009 or 9A109.a.; b. Rocket nozzles, usable in 'missiles', subsystems specified in 9A007, 9A107, 9A009 or 9A109.a.; c. Thrust vector control sub-systems, usable in 'missiles'.	Technical Note: Examples of methods of achieving thrust vector control specified in 9A108.c. are: 1. Flexible nozzle; 2. Fluid or secondary gas injection; 3. Movable engine or nozzle; 4. Deflection of exhaust gas stream (jet vanes or probes); or 5. Thrust tabs.	Controller
9A109	Hybrid rocket motors and specially designed components as follows:	N.B. SEE ALSO 9A009 and 9A119.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Hybrid rocket motors usable in complete rocket systems or unmanned aerial vehicles, capable of 300 km, other than those specified in 9A009, having a total impulse capacity equal to or greater than 0.841 MNs, and specially designed components therefor; b. Specially designed components for hybrid rocket motors specified in 9A009 that are usable in “missiles”.		
9A110	Composite structures, laminates and manufactures thereof, other than those specified in 9A010, specially designed for use in 'missiles' or the subsystems specified in 9A005, 9A007, 9A105, 9A106.c., 9A107, 9A108.c., 9A116 or 9A119.	N.B. SEE ALSO 1A002. Technical Note: In 9A110 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.	Controller
9A111	Pulse jet or detonation engines, usable in ‘missiles’ or unmanned aerial vehicles specified in 9A012 or 9A112.a., and specially designed components therefor.	N.B. SEE ALSO 9A011 AND 9A118. Technical Note: In 9A111 detonation engines utilise detonation to produce a rise in effective pressure across the combustion chamber. Examples of detonation engines include pulse detonation engines, rotating detonation engines or continuous wave detonation engines.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9A112	"Unmanned aerial vehicles" ("UAVs"), other than those specified in 9A012, as follows: a. "Unmanned aerial vehicles" ("UAVs") capable of a range of 300 km; b. "Unmanned aerial vehicles" ("UAVs") having all of the following: 1. Having any of the following: a. An autonomous flight control and navigation capability; or b. Capability of controlled flight out of the direct vision range involving a human operator; and 2. Having any of the following: a. Incorporating an aerosol dispensing system/mechanism with a capacity greater than 20 litres; or b. Designed or modified to incorporate an aerosol dispensing system/mechanism with a capacity greater than 20 litres.	Technical Notes: 1. An aerosol consists of particulate or liquids other than fuel components, by products or additives, as part of the "payload" to be dispersed in the atmosphere. Examples of aerosols include pesticides for crop dusting and dry chemicals for cloud seeding. 2. An aerosol dispensing system/mechanism contains all those devices (mechanical, electrical, hydraulic, etc.), which are necessary for storage and	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
		dispersion of an aerosol into the atmosphere. This includes the possibility of aerosol injection into the combustion exhaust vapour and into the propeller slip stream.	
9A115	Launch support equipment as follows: a. Apparatus and devices for handling, control, activation or launching, designed or modified for space launch vehicles specified in 9A004, sounding rockets specified in 9A104 or 'missiles'; b. Vehicles for transport, handling, control, activation or launching, designed or modified for space launch vehicles specified in 9A004 sounding rockets specified in 9A104 or 'missiles'.	Technical Note: In 9A115.a. 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300km.	Controller
9A116	Reentry vehicles, usable in "missiles", and equipment designed or modified therefor, as follows: a. Reentry vehicles; b. Heat shields and components therefor, fabricated of ceramic or ablative materials; c. Heat sinks and components therefor, fabricated of light-weight, high heat capacity materials;		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. Electronic equipment specially designed for reentry vehicles.		
9A117	Staging mechanisms, separation mechanisms, and interstages, usable in "missiles".	N.B. SEE ALSO 9A121.	Controller
9A118	Devices to regulate combustion usable in engines, which are usable in "missiles" or unmanned aerial vehicles specified in 9A012 or 9A112.a., specified in 9A011 or 9A111.		Controller
9A119	Individual rocket stages, usable in complete rocket systems or unmanned aerial vehicles, capable of a range of 300 km, other than those specified in 9A005, 9A007, 9A009, 9A105, 9A107 and 9A109.		Controller
9A120	Liquid or gel propellant tanks, other than those specified in 9A006, specially designed for propellants specified in 1C111 or 'other liquid or gel propellants', used in rocket systems capable of delivering at least a 500 kg payload to a range of at least 300 km.	Note: In 9A120 'other liquid propellants' includes, but is not limited to, propellants specified in the Military Goods Controls.	Controller
9A121	Umbilical and interstage electrical connectors specially designed for "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.	Technical Note: Interstage connectors referred to in 9A121 also include electrical connectors installed between the "missile", space launch vehicle or sounding rocket and their payload.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9A350	Spraying or fogging systems, specially designed or modified for fitting to aircraft, "lighter-than-air vehicles" or unmanned aerial vehicles, and specially designed components therefor, as follows: a. Complete spraying or fogging systems capable of delivering, from a liquid suspension, an initial droplet 'VMD' of less than 50 µm at a flow rate of greater than two litres per minute; b. Spray booms or arrays of aerosol generating units capable of delivering, from a liquid suspension, an initial droplet 'VMD' of less than 50 µm at a flow rate of greater than two litres per minute; c. Aerosol generating units specially designed for fitting to systems specified in 9A350.a. and b.	Note: 9A350 does not control spraying or fogging systems and components that are demonstrated not to be capable of delivering biological agents in the form of infectious aerosols. Technical Notes: 1. Droplet size for spray equipment or nozzles specially designed for use on aircraft, "lighter-than-air vehicles" or unmanned aerial vehicles should be measured using either of the following: a. Doppler laser method; b. Forward laser diffraction method. 2. In 9A350 'VMD' means Volume Median Diameter and for water-based systems this equates to Mass Median Diameter (MMD). Note: Aerosol generating units are devices specially designed or modified for fitting to aircraft such as nozzles, rotary drum atomizers and similar devices.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9B	**Test, Inspection and Production Equipment**		
9B001	Manufacturing equipment, tooling or fixtures, as follows: a. Directional solidification or single crystal casting equipment; b. Casting tooling, manufactured from refractory metals or ceramics, as follows: 1. Cores 2. Shells (moulds); 3. Combined core and shell (mould) units; c. Directional-solidification or single-crystal additive-manufacturing equipment.	N.B. SEE ALSO 2B226	Controller
9B002	On-line (real time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment, having all of the following: a. Specially designed for the "development" of gas turbine engines, assemblies or components; and b. Incorporating any of the "technologies" specified in 9E003.h. or 9E003.i.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9B003	Equipment specially designed for the "production" or test of gas turbine brush seals designed to operate at tip speeds exceeding 335 m/s and temperatures in excess of 773 K (500 °C), and specially designed components or accessories therefor.		Controller
9B004	Tools, dies or fixtures, for the solid state joining of "superalloy", titanium or intermetallic airfoil-to-disk combinations described in 9E003.a.3. or 9E003.a.6. for gas turbines.		Controller
9B005	On-line (real time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment, specially designed for use with any of the following: a. Wind tunnels designed for speeds of Mach 1.2 or more; b. Devices for simulating flow-environments at speeds exceeding Mach 5, including hot-shot tunnels, plasma arc tunnels, shock tubes, shock tunnels, gas tunnels and light gas guns; or c. Wind tunnels or devices, other than two-dimensional sections, capable of simulating Reynolds number flows exceeding 25 x 10^6.	N.B. SEE ALSO 9B105. Note: 9B005.a. does not control wind tunnels specially designed for educational purposes and having a 'test section size' (measured laterally) of less than 250 mm. Technical Note: 'Test section size' means the diameter of the circle, or the side of the square, or the longest side of the rectangle, at the largest test section location.	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9B006	Acoustic vibration test equipment capable of producing sound pressure levels of 160 dB or more (referenced to 20 μPa) with a rated output of 4 kW or more at a test cell temperature exceeding 1,273 K (1,000 °C), and specially designed quartz heaters therefor.	N.B. SEE ALSO 9B106.	Controller
9B007	Equipment specially designed for inspecting the integrity of rocket motors and using Non-Destructive Test (NDT) techniques other than planar x-ray or basic physical or chemical analysis.		Controller
9B008	Direct measurement wall skin friction transducers specially designed to operate at a test flow total (stagnation) temperature exceeding 833 K (560 °C).		Controller
9B009	Tooling specially designed for producing gas turbine engine powder metallurgy rotor components having all of the following: a. Designed to operate at stress levels of 60% of Ultimate Tensile Strength (UTS) or more measured at a temperature of 873 K (600°C); and b. Designed to operate at 873 K (600°C) or more.	Note: 9B009 does not control tooling for the production of powder.	Controller
9B010	Equipment specially designed for the production of items specified in 9A012.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9B105	'Aerodynamic test facilities' for speeds of Mach 0.9 or more, usable for 'missiles' and their subsystems.	N.B. SEE ALSO 9B005. Note: 9B105 does not control wind tunnels for speeds of Mach 3 or less with dimension of the 'test cross section size' equal to or less than 250 mm. Technical Notes: 1. In 9B105 'aerodynamic test facilities' includes wind tunnels and shock tunnels for the study of airflow over objects. 2. In Note to 9B105, 'test cross section size' means the diameter of the circle, or the side of the square, or the longest side of the rectangle, or the major axis of the ellipse at the largest 'test cross section' location. 'Test cross section' is the section perpendicular to the flow direction. 3. In 9B105 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.	Controller
9B106	Environmental chambers and anechoic chambers, as follows:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. Environmental chambers capable of simulating all the following flight conditions: 1. Capable of simulating any of the following flight conditions: a. Altitude equal to or greater than 15 km; or b. Temperature range from below 223 K (- 50 °C) to above 398 K (+ 125 °C); and 2. Incorporating, or 'designed or modified' to incorporate, a shaker unit or other vibration test equipment to produce vibration environments equal to or greater than 10 g rms, measured 'bare table', between 20 Hz and 2 kHz while imparting forces equal to or greater than 5 kN;	Technical Notes: 1. 9B106.a.2. describes systems that are capable of generating a vibration environment with a single wave (e.g., a sine wave) and systems capable of generating a broad band random vibration (i.e., power spectrum). 2. In 9B106.a.2., 'designed or modified' means the environmental chamber provides appropriate interfaces (e.g., sealing devices) to incorporate a shaker unit or other vibration test equipment as specified in 2B116.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Environmental chambers capable of simulating the following flight conditions: 1. Acoustic environments at an overall sound pressure level of 140 dB or greater (referenced to 20 μPa) or with a total rated acoustic power output of 4 kW or greater; and 2. Altitude equal to or greater than 15 km; or 3. Temperature range from below 223 K (- 50 °C) to above 398 K (+ 125 °C).	3. In 9B106.a.2. 'bare table' means a flat table, or surface, with no fixture or fittings.	
9B107	'Aerothermodynamic test facilities', usable for 'missiles', 'missile' rocket propulsion systems, and reentry vehicles and equipment specified in 9A116, having any of the following characteristics: a. An electrical power supply equal to or greater than 5 MW; or b. A gas supply total pressure equal to or greater than 3 MPa.	Technical Notes: 1. 'Aerothermodynamic test facilities' include plasma arc jet facilities and plasma wind tunnels for the study of thermal and mechanical effects of airflow on objects. 2. In 9B107 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.	Controller
9B115	Specially designed "production equipment" for the systems, sub-systems and components		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	specified in 9A005 to 9A009, 9A011, 9A101, 9A102, 9A105 to 9A109, 9A111, 9A116 to 9A120.		
9B116	Specially designed "production facilities" for the space launch vehicles specified in 9A004, or systems, sub-systems, and components specified in 9A005 to 9A009, 9A011, 9A101, 9A102, 9A104 to 9A109, 9A111, 9A116 to 9A120 or 'missiles'.	Technical Note: In 9B116 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.	Controller
9B117	Test benches and test stands for solid or liquid propellant rockets or rocket motors, having either of the following characteristics: a. The capacity to handle more than 68 kN of thrust; or b. Capable of simultaneously measuring the three axial thrust components.		Controller
9C	**Materials**		
9C108	"Insulation" material in bulk form and "interior lining", other than those specified in 9A008, for rocket motor cases usable in "missiles" or specially designed for solid propellant rocket engines specified in 9A007 or 9A107.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
9C110	Resin impregnated fibre prepregs and metal coated fibre preforms therefor, for composite structures, laminates and manufactures specified in 9A110, made either with organic matrix or metal matrix utilising fibrous or filamentary reinforcements having a "specific tensile strength" greater than 7.62×10^4 m and a "specific modulus" greater than 3.18×10^6 m.	N.B. SEE ALSO 1C010 AND 1C210. Note: The only resin impregnated fibre prepregs specified in entry 9C110 are those using resins with a glass transition temperature (T_g), after cure, exceeding 418 K (145^oC) as determined by ASTM D4065 or equivalent.	Controller
9D	**Software**		
9D001	"Software", not specified in 9D003 or 9D004, specially designed or modified for the 'development' of equipment or 'technology', specified in 9A001 to 9A119, 9B or 9E003.		Controller
9D002	"Software" , not specified in 9D003 or 9D004, specially designed or modified for the "production" of equipment specified in 9A001 to 9A119 or 9B.		Controller
9D003	"Software" incorporating "technology" specified in 9E003.h. and used in "FADEC Systems" for systems specified in 9A or equipment specified in 9B.		Controller
9D004	Other "software" as follows:		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	a. 2D or 3D viscous "software", validated with wind tunnel or flight test data required for detailed engine flow modelling; b. 'Software' for testing aero gas turbine engines, assemblies or components, having all of the following: 1. Specially designed for testing any of the following: a. Aero gas turbine engines, assemblies or components, incorporating 'technology' specified in 9E003.a., 9E003.h. or 9E003.i.; or b. Multi-stage compressors providing either bypass or core flow, specially designed for aero gas turbine engines incorporating 'technology' specified in 9E003.a. or 9E003.h.; and 2. Specially designed for all of the following: a. Acquisition and processing of data, in real time; and b. Feedback control of the test article or test conditions (e.g.	Note: 9D004.b. does not control software for operation of the test facility or operator safety (e.g. overspeed shutdown, fire detection and suppression), or production, repair or maintenance acceptance testing limited to determining if the item has been properly assembled or repaired.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	temperature, pressure, flow rate) while the test is in progress; c. "Software" specially designed to control directional solidification or single-crystal material growth in equipment specified in 9B001.a. or 9B001.c.; d. Not used; e. "Software" specially designed or modified for the operation of items specified in 9A012; f. "Software" specially designed to design the internal cooling passages of aero gas turbine blades, vans and "tip shrouds"; g. "Software" having all of the following: 1. Specially designed to predict aero thermal, aeromechanical and combustion conditions in aero gas turbine engines; and 2. Theoretical modelling predictions of the aero thermal, aeromechanical and combustion conditions, which have been validated with actual aero gas turbine engine (experimental or production) performance data.		

Category Code	*Items Description*	*Note*	*Relevant Authority*
9D005	"Software" specially designed or modified for the operation of items specified in 9A004.e. or 9A004.f.		Controller
9D101	"Software" specially designed or modified for the "use" of goods specified in 9B105, 9B106, 9B116 or 9B117.		Controller
9D103	"Software" specially designed for modelling, simulation or design integration of the space launch vehicles specified in 9A004 or sounding rockets specified in 9A104, or "missiles" or the subsystems specified in 9A005, 9A007, 9A105, 9A106.c., 9A107, 9A108.c., 9A116 or 9A119.	Note: "Software" specified in 9D103 remains controlled when combined with specially designed hardware specified in 4A102.	Controller
9D104	"Software" as follows: a. "Software" specially designed or modified for the "use" of goods specified in 9A001, 9A005, 9A006.d., 9A006.g., 9A007.a., 9A009.a., 9A010.d., 9A011, 9A101, 9A102, 9A105, 9A106.d., 9A107, 9A109, 9A111, 9A115.a., 9A117 or 9A118. b. "Software" specially designed or modified for the operation or maintenance of subsystems or equipment specified in 9A008.d., 9A106.c., 9A108.c. or 9A116.d.		Controller
9D105	"Software" which coordinates the function of more than one subsystem, other than that	Note: 9D105 includes "software" specially designed for a manned "aircraft"	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	specified in 9D003.e., specially designed or modified for "use" in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104 or 'missiles'.	converted to operate as "unmanned aerial vehicle", as follows: a. "Software" specially designed or modified to integrate the conversion equipment with the "aircraft" system functions; and b. "Software" specially designed or modified to operate the "aircraft" as an "unmanned aerial vehicle". Technical Note: In 9D105 'missile' means complete rocket systems and unmanned aerial vehicle systems capable of a range exceeding 300 km.	
9E	**Technology**	Note: "Development" or "production" "technology" specified in 9E001 to 9E003 for gas turbine engines remains controlled when used for repair or overhaul. Excluded from control are: technical data, drawings or documentation for maintenance activities directly associated with calibration, removal or replacement of damaged or unserviceable line replaceable units, including replacement of whole engines or engine modules.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
9E001	"Technology" according to the General Technology Note for the "development" of equipment or "software", specified in 9A001.b., 9A004 to 9A012, 9A350, 9B or 9D.		Controller
9E002	"Technology" according to the General Technology Note for the "production" of equipment specified in 9A001.b., 9A004 to 9A011, 9A350 or 9B.	N.B. For "technology" for the repair of controlled structures, laminates or materials, see 1E002.f.	Controller
9E003	Other "technology" as follows: a. "Technology" "required" for the "development" or "production" of any of the following gas turbine engine components or systems: 1. Gas turbine blades, vanes or "tip shrouds", made from directionally solidified (DS) or single crystal (SC) alloys and having (in the 001 Miller Index Direction) a stress-rupture life exceeding 400 hours at 1,273 K (1,000 °C) at a stress of 200 MPa, based on the average property values; 2. Combustors having any of the following: a. 'Thermally decoupled liners' designed to operate at 'combustor exit temperature' exceeding 1,883K (1,610 °C);	Technical Note: For the purposes of 9E003.a.1., stress-rupture life testing is typically conducted on a test specimen. Note: The "required" "technology" for holes in 9E003.a.2. is limited to the derivation of the geometry and location of the holes. Technical Notes: 1. 'Thermally decoupled liners' are liners that feature at least a support structure	Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. Non-metallic liners; c. Non-metallic shells; or d. Liners designed to operate at 'combustor exit temperature' exceeding 1,883 K (1,610 °C) and having holes that meet the parameters specified in 9E003.c.; 3. Components that are any of the following: a. Manufactured from organic "composite" materials designed to operate above 588 K (315 °C); b. Manufactured from any of the following: 1. Metal "matrix" "composites" reinforced by any of the following: a. Materials specified in 1C007;	designed to carry mechanical loads and a combustion facing structure designed to protect the support structure from the heat of combustion. The combustion facing structure and support structure have independent thermal displacement (mechanical displacement due to thermal load) with respect to one another, i.e. they are thermally decoupled. N.B. See 9E003.c. for "technology" "required" for manufacturing cooling holes.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. "Fibrous or filamentary materials" specified in 1C010; or c. Aluminides specified in 1C002.a.; or 2. Ceramic "matrix" "composites" specified in 1C007.; or c. Stators, vanes, blades, tip seals (shrouds), rotating blings, rotating blisks, or 'splitter ducts', that are all of the following: 1. Not specified in 9E003.a.3.a.; 2. Designed for compressors or fans; and 3. Manufactured from material specified in 1C010.e. with resins specified in 1C008; 4. Uncooled turbine blades, vanes or "tip-shrouds", designed to operate at a 'gas path temperature' of 1,373 K (1,100 °C) or more; 5. Cooled turbine blades, vanes, "tip-shrouds" other than those specified in 9E003.a.1., designed to operate at a	Technical Note: A 'splitter duct' performs the initial separation of the air-mass flow between the bypass and core sections of the engine. Technical Notes: 1. 'Gas path temperature' is the bulk average gas path total (stagnation) temperature at the leading edge plane of the turbine component when the engine is running in a 'steady state mode' of operation at	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	'gas path temperature' of 1,693 K (1,420 °C) or more; 6. Airfoil-to-disk blade combinations using solid state joining; 7. Not used; 8. 'Damage tolerant' gas turbine engine rotor components using powder metallurgy materials specified in 1C002.b.; or 9. Not used; 10. Not used; 11. Hollow fan blades; b. "Technology" "required" for the "development" or "production" of any of the following: 1. Wind tunnel aero-models equipped with non-intrusive sensors capable of transmitting data from the sensors to the data acquisition system; or 2. "Composite" propeller blades or propfans, capable of absorbing more than 2,000 kW at flight speeds exceeding Mach 0.55;	the certificated or specified maximum continuous operating temperature. Technical Note: 'Damage tolerant' components are designed using methodology and substantiation to predict and limit crack growth.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	c. "Technology" "required" for manufacturing cooling holes, in gas turbine engine components incorporating any of the "technologies" specified in 9E003.a.1., 9E003.a.2. or 9E003.a.5., and having any of the following: 1. Having all of the following: a. Minimum 'cross-sectional area' less than 0.45 mm^2; b. 'Hole shape ratio' greater than 4.52; and c. 'Incidence angle' equal to or less than 25°; or 2. Having all of the following: a. Minimum 'cross-sectional area' less than 0.12 mm^2; b. 'Hole shape ratio' greater than 5.65; and c. 'Incidence angle' more than 25°;	Note: 9E003.c. does not control "technology" for manufacturing constant radius cylindrical holes that are straight through and enter and exit on the external surfaces of the component. Technical Notes: 1. For the purposes of 9E003.c., the 'cross-sectional area' is the area of the hole in the plane perpendicular to the hole axis. 2. For the purposes of 9E003.c., 'hole shape ratio is the nominal length of the axis of the hole divided by the square root of its minimum 'cross-sectional area'.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	d. "Technology" "required" for the "development" or "production" of helicopter power transfer systems or tilt rotor or tilt wing "aircraft" power transfer systems; e. "Technology" for the "development" or "production" of reciprocating diesel engine ground vehicle propulsion systems having all of the following: 1. 'Box volume' of 1.2 m^3 or less; 2. An overall power output of more than 750 kW based on 80/1269/EEC, ISO 2534 or national equivalents; and 3. Power density of more than 700 kW/m^3 of 'box volume';	3. For the purposes of 9E003.c., 'incidence angle' is the acute angle measured between the plane tangential to the aerofoil surface and the hole axis at the point where the hole axis enters the aerofoil surface. 4. Methods for manufacturing holes in 9E003.c. include 'laser', beam machining, water jet machining, Electro-Chemical Machining (ECM) or Electrical Discharge Machining (EDM) methods. Technical Note: 'Box volume' in 9E003.e. is the product of three perpendicular dimensions measured in the following way: Length: The length of the crankshaft from front flange to flywheel face; Width: The widest of any of the following: a. The outside dimension from valve cover to valve cover; b. The dimensions of the outside edges of the cylinder heads; or	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	f. “Technology” “required” for the “production” of specially designed components for high output diesel engines, as follows: 1. "Technology" "required" for the "production" of engine systems having all of the following components employing ceramics materials specified in 1C007: a. Cylinder liners; b. Pistons; c. Cylinder heads; and d. One or more other components (including exhaust ports, turbochargers, valve guides, valve assemblies or insulated fuel injectors); 2. “Technology” “required” for the "production" of turbocharger systems	c. The diameter of the flywheel housing; Height: The largest of any of the following: a. The dimension of the crankshaft centre-line to the top plane of the valve cover (or cylinder head) plus twice the stroke; or b. The diameter of the flywheel housing.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	with single-stage compressors and having all of the following: a. Operating at pressure ratios of 4:1 or higher; b. Mass flow in the range from 30 to 130 kg per minute; and c. Variable flow area capability within the compressor or turbine sections; 3. "Technology" "required" for the "production" of fuel injection systems with a specially designed multifuel (e.g., diesel or jet fuel) capability covering a viscosity range from diesel fuel (2.5 cSt at 310.8 K (37.8 °C)) down to gasoline fuel (0.5 cSt at 310.8 K (37.8 °C)) and having all of the following: a. Injection amount in excess of 230 mm^3 per injection per cylinder; and b. Electronic control features specially designed for switching governor characteristics automatically depending on fuel property to provide the same	Technical Note: 'High output diesel engines' are diesel engines with a specified brake mean effective pressure of 1.8 MPa or more at a speed of 2,300 r.p.m., provided the rated speed is 2,300 r.p.m. or more.	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	torque characteristics by using the appropriate sensors; g. "Technology" "required" for the "development" or "production" of 'high output diesel engines' for solid, gas phase or liquid film (or combinations thereof) cylinder wall lubrication and permitting operation to temperatures exceeding 723 K (450 °C), measured on the cylinder wall at the top limit of travel of the top ring of the piston; h. "Technology" for gas turbine engine "FADEC systems" as follows: 1. "Development" "technology" for deriving the functional requirements for the components necessary for the "FADEC system" to regulate engine thrust or shaft power (e.g., feedback sensor time constants and accuracies, fuel valve slew rate); 2. "Development" or "production" "technology" for control and diagnostic components unique to the "FADEC system" and used to regulate engine thrust or shaft power; 3. "Development" "technology" for the control law algorithms, including "source code", unique to the "FADEC	Note: 9E003.h. does not control technical data related to engine"aircraft" integration required by the civil aviation authorities of one or more EU Member States or the Wassenaar Arrangement Participating States to be published for general airline use (e.g., installation manuals, operating instructions, instructions for continued airworthiness) or interface functions (e.g., input/output processing, airframe thrust or shaft power demand).	

Category Code	*Items Description*	*Note*	*Relevant Authority*
	system" and used to regulate engine thrust or shaft power; i. "Technology" for adjustable flow path systems designed to maintain engine stability for gas generator turbines, fan or power turbines, or propelling nozzles, as follows: 1. "Development" "technology" for deriving the functional requirements for the components that maintain engine stability; 2. "Development" or "production" "technology" for components unique to the adjustable flow path system and that maintain engine stability; 3. "Development" "technology" for the control law algorithms, including "source code", unique to the adjustable flow path system and that maintain engine stability. j. "Technology" "required" for the "development" of wing-folding systems designed for fixed-wing aircraft powered by gas turbine engines.	Note: 9E003.i. does not control "technology" for any of the following: a. Inlet guide vanes; b. Variable pitch fans or prop-fans; c. Variable compressor vanes; d. Compressor bleed valves; or e. Adjustable flow path geometry for reverse thrust. N.B. For "technology" "required" for the "development" of wing-folding systems designed for fixed-wing aircraft see also Military Items List.	
9E101	a. "Technology" according to the General Technology Note for the "development" of goods specified in 9A101, 9A102, 9A104 to 9A111, 9A112.a. or 9A115 to 9A121.		Controller

Category Code	*Items Description*	*Note*	*Relevant Authority*
	b. "Technology" according to the General Technology Note for the "production" of 'UAV's specified in 9A012 or goods specified in 9A101, 9A102, 9A104 to 9A111, 9A112.a. or 9A115 to 9A121.	Technical Note: In 9E101.b. 'UAV' means unmanned aerial vehicle systems capable of a range exceeding 300 km.	
9E102	"Technology" according to the General Technology Note for the "use" of space launch vehicles specified in 9A004, goods specified in 9A005 to 9A011, 'UAV's specified in 9A012 or goods specified in 9A101, 9A102, 9A104 to 9A111, 9A112.a., 9A115 to 9A121, 9B105, 9B106, 9B115, 9B116, 9B117, 9D101 or 9D103.	Technical Note: In 9E102 'UAV' means unmanned aerial vehicle systems capable of a range exceeding 300km.	Controller

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