ANNEX II

Goods and technology referred to in points (a) and (c) of Article 3(1) and in Article 7

The notes, acronyms and abbreviations, and the definitions in Annex I to Regulation (EC) No 428/2009 apply for the purpose of this Annex.

PART I

All goods and technology listed in Annex I to Regulation (EC) No 428/2009.

PART II

Other items, materials, equipment, goods and technology which could contribute to DPRK's nuclear-related, other weapons of mass destruction-related or ballistic missile-related programmes.

Unless otherwise stated, reference numbers used in the column entitled 'Description' refer to the descriptions of dual use items and technology set out in Annex I to Regulation (EC) No 428/2009.

A reference number in the column entitled 'Related item from Annex I to Regulation (EC) No 428/2009' means that the characteristics of the item described in the column 'Description' lie outside the parameters set out in the description of the dual use entry referred to.

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

Definitions of terms between "double quotation marks" can be found in Annex I to Regulation (EC) No 428/2009, except the following:

GENERAL NOTES

The object of the prohibitions contained in this Annex should not be defeated by the export of any non-prohibited goods (including plant) containing one or more prohibited components when the prohibited 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 prohibited 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 prohibited component or components as the principal element of the goods being procured.

Goods specified in this Annex include both new and used goods.

GENERAL TECHNOLOGY NOTE (GTN)

(To be read in conjunction with Part C)

The sale, supply, transfer or export of "technology" which is "required" for the "development", "production" or "use" of goods the sale, supply, transfer or export of which is prohibited in Part A (Goods), is prohibited in accordance with the provisions of Part B.

The "technology" "required" for the "development", "production" or "use" of prohibited goods remains under prohibition even when applicable to non-prohibited goods.

Prohibitions 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 prohibited.

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

A. **GOODS**

II.A0. NUCLEAR MATERIALS, FACILITIES, AND EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A0.001	Hollow cathode lamps as follows: a. Iodine hollow cathode lamps with windows in pure silicon or quartz; b. Uranium hollow cathode lamps.	N/A
II.A0.002	Faraday isolators in the wavelength range 500 nm – 650 nm.	N/A
II.A0.003	Optical gratings in the wavelength range 500 nm – 650 nm.	N/A
II.A0.004	Optical fibres in the wavelength range 500 nm – 650 nm coated with anti-reflecting layers in the wavelength range 500 nm – 650 nm and having a core diameter greater than 0,4 mm but not exceeding 2 mm.	N/A
II.A0.005	Nuclear reactor vessel components and testing equipment, other than those specified in 0A001, as follows: a. Seals; b. Internal components; c. Sealing, testing and measurement equipment.	0A001
II.A0.006	Nuclear detection systems, other than those specified in 0A001.j. or 1A004.c., for detection, identification or quantification of radioactive materials or radiation of nuclear origin and specially designed components thereof. N.B: For personal equipment refer to II.A1.004 below.	0A001.j. 1A004.c.
II.A0.007	Bellows-sealed valves other than those specified in 0B001.c.6., 2A226 or 2B350, made of aluminium alloy or stainless steel type 304, 304L or 316L.	0B001.c.6. 2A226 2B350
II.A0.008	Laser mirrors, other than those specified in 6A005.e., consisting of substrates having a thermal expansion coefficient of 10^{-6} K^{-1} or less at 20 °C (e.g. fused silica or sapphire). Note: This item does not cover optical systems specially designed for astronomical applications, except if the mirrors contain fused silica.	0B001.g.5. 6A005.e.
II.A0.009	Laser lenses, other than those specified in 6A005.e.2, consisting of substrates having a thermal expansion coefficient of 10^{-6} K^{-1} or less at 20 °C (e.g. fused silica).	0B001.g. 6A005.e.2.
II.A0.010	Pipes, piping, flanges, fittings made of, or lined with nickel, or nickel alloy containing more than 40 % nickel by weight, other than those specified in 2B350.h.1.	2B350

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A0.011	Vacuum pumps other than those specified in 0B002.f.2. or 2B231, as follows: a. Turbo-molecular pumps having a flow-rate equal to or greater than 400 l/s; b. Roots type vacuum roughing pumps having a volumetric aspiration flow-rate greater than 200 m^3/h; c. Bellows-sealed, scroll, dry compressor, and bellows-sealed, scroll, dry vacuum pumps.	0B002.f.2. 2B231
II.A0.012	Shielded enclosures for the manipulation, storage and handling of radioactive substances (hot cells).	0B006
II.A0.013	'Natural uranium' or 'depleted uranium' or thorium in the form of metal, alloy, chemical compound or concentrate and any other material containing one or more of the foregoing, other than those specified in 0C001.	0C001
II.A0.014	Detonation chambers having a capacity of explosion absorption of more than 2,5 kg TNT equivalent.	N/A

II.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A1.001	Bis(2-ethylhexyl) phosphoric acid (HDEHP or D2HPA) Chemical Abstract Number (CAS): [CAS 298-07-7] solvent in any quantity, with a purity greater than 90 %.	N/A
II.A1.002	Fluorine gas CAS: [7782-41-4], with a purity of at least 95 %.	N/A
II.A1.003	Ring-shaped seals and gaskets, having an inner diameter of 400 mm or less, made of any of the following materials: a. Copolymers of vinylidene fluoride having 75 % or more beta crystalline structure without stretching; 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; d. Polychlorotrifluoroethylene (PCTFE, e.g. Kel-F ®); e. Fluoro-elastomers (e.g. Viton ®, Tecnoflon ®); f. Polytetrafluoroethylene (PTFE).	1A001
II.A1.004	Personal equipment for detecting radiation of nuclear origin, other than that specified in 1A004.c., including personal dosimeters.	1A004.c.
II.A1.005	Electrolytic cells for fluorine production, other than those specified in 1B225, with an output capacity greater than 100 g of fluorine per hour.	1B225

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A1.006	Catalysts, other than those specified in 1A225 or 1B231, containing platinum, palladium or rhodium, usable 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.	1A225 1B231
II.A1.007	Aluminium and its alloys, other than those specified in 1C002.b.4. or 1C202.a., in crude or semi-fabricated form having either of the following characteristics: a. 'Capable of' an ultimate tensile strength of 460 MPa or more at 293 K (20 °C); or b. Having a tensile strength of 415 MPa or more at 298 K (25 °C). Technicalnote: The phrase alloys 'capable of' encompasses alloys before or after heat treatment.	1C002.b.4. 1C202.a.
II.A1.008	Magnetic metals, of all types and of whatever form, other than those specified in 1C003.a. having an 'initial relative permeability' of 120 000 or more and a thickness between 0,05 mm and 0,1 mm. Technicalnote: Measurement of 'initial relative permeability' must be performed on fully annealed materials.	1C003.a.
II.A1.009	'Fibrous or filamentary materials' or prepregs, other than those specified in 1C010.a., 1C010.b., 1C210.a. or 1C210.b., as follows: a. Aramid 'fibrous or filamentary materials' having either of the following characteristics: 1. A 'specific modulus' exceeding 10×10^6 m; or 2. A 'specific tensile strength' exceeding 17×10^4 m; b. Glass 'Gfibrous or filamentary materials' having either of the following characteristics: 1. A 'specific modulus' exceeding $3{,}18 \times 10^6$ m; or 2. A 'specific tensile strength' exceeding $76{,}2 \times 10^3$ m; c. Thermoset resin-impregnated continuous 'yarns', 'rovings', 'tows' or 'tapes' with a width of 15 mm or less (once prepregs), made from glass 'fibrous or filamentary materials' other than those specified in I.A1.010.a. below; d. Carbon 'fibrous or filamentary materials'; e. Thermoset resin-impregnated continuous 'yarns', 'rovings', 'tows', or 'tapes', made from carbon 'fibrous or filamentary materials'; f. Polyacrylonitrile (PAN) continuous 'yarns', 'rovings', 'tows' or 'tapes'; g. Para-aramid 'fibrous or filamentary materials' (Kevlar® and other Kevlar®-like fibres).	1C010.a. 1C010.b. 1C210.a. 1C210.b.
II.A1.010	Resin-impregnated or pitch-impregnated fibres (prepregs), metal or carbon-coated fibres (preforms) or 'carbon fibre preforms', as follows: a. Made from 'fibrous or filamentary materials' specified in II.A1.009 above; b. Epoxy resin 'matrix' impregnated carbon 'fibrous or filamentary materials' (prepregs), specified in 1C010.a., 1C010.b. or 1C010.c., for the repair of aircraft structures or laminates, of which the size of individual sheets does not exceed 50 cm × 90 cm; c. Prepregs specified in 1C010.a., 1C010.b. or 1C010.c., when impregnated with phenolic or epoxy resins having a glass transition temperature (Tg) less than 433 K (160 °C) and a cure temperature lower than the glass transition temperature.	1C010 1C210

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A1.011	Reinforced silicon carbide ceramic composites usable for nose tips, re-entry vehicles, nozzle flaps, usable in 'missiles', other than those specified in 1C107.	1C107
II.A1.012	Not used.	
II.A1.013	Tantalum, tantalum carbide, tungsten, tungsten carbide and alloys thereof, other than those specified in 1C226, having both of the following characteristics: a. In forms having a hollow cylindrical or spherical symmetry (including cylinder segments) with an inside diameter between 50 mm and 300 mm; and b. A mass greater than 5 kg.	1C226
II.A1.014	'Elemental powders' of cobalt, neodymium or samarium or alloys or mixtures thereof containing at least 20 % by weight of cobalt, neodymium or samarium, with a particle size less than 200 μm. Technicalnote: 'Elemental powder' means a high purity powder of one element.	N/A
II.A1.015	Pure tributyl phosphate (TBP) [CAS No 126-73-8] or any mixture having a TBP content of more than 5 % by weight.	N/A
II.A1.016	Maraging steel, other than those specified by 1C116 or 1C216. Technicalnotes: 1. The phrase maraging steel 'capable of' encompasses maraging steel before or after heat treatment. 2. Maraging steels are iron alloys 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.	1C116 1C216
II.A1.017	Metals, metal powders and material as follows: a. Tungsten and tungsten alloys, other than those specified in 1C117, in the form of uniform spherical or atomized particles of 500 μm (micrometre) diameter or less with a tungsten content of 97 % by weight or more; b. Molybdenum and molybdenum alloys, other than those specified in 1C117, in the form of uniform spherical or atomized particles of 500 μm diameter or less with a molybdenum content of 97 % by weight or more; c. Tungsten materials in the solid form, other than those specified in 1C226 having material compositions as follows: 1. Tungsten and alloys containing 97 % by weight or more of tungsten; 2. Copper infiltrated tungsten containing 80 % by weight or more of tungsten; or 3. Silver infiltrated tungsten containing 80 % by weight or more of tungsten.	1C117 1C226
II.A1.018	Soft magnetic alloys, other than those specified in 1C003, having a chemical composition as follows: a. Iron content between 30 % and 60 %; and b. Cobalt content between 40 % and 60 %.	1C003

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A1.019	Not used.	
II.A1.020	Graphite, other than that specified in 0C004 or 1C107.a., designed or specified for use in Electrical Discharge Machining (EDM) machines.	0C004 1C107.a.
II.A1.021	Steel alloys in sheet or plate form, having any of the following characteristics: (a) Steel alloys 'capable of' ultimate tensile strength of 1 200 MPa or more, at 293 K (20 °C); or (b) Nitrogen-stabilised duplex stainless steel. Note: the phrase alloys 'capable of' encompasses alloys before or after heat treatment. Technical note: 'nitrogen-stabilised duplex stainless steel' has a two-phase microstructure consisting of grains of ferritic and austenitic steel with the addition of nitrogen to stabilise the microstructure.	1C116 1C216
II.A1.022	Carbon-Carbon Composite material.	1A002.b.1
II.A1.023	Nickel alloys in crude or semi-fabricated form, containing 60 % by weight or more nickel.	1C002.c.1.a
II.A1.024	Titanium alloys in sheet or plate form 'capable of' an ultimate tensile strength of 900 MPa or more at 293 K (20 °C). Note: the phrase alloys 'capable of' encompasses alloys before or after heat treatment.	1C002.b.3
II.A1.025	Titanium alloys, other than those specified in 1C002 and 1C202.	1C002 1C202
II.A1.026	Zirconium and zirconium alloys, other than those specified in 1C011, 1C111 and 1C234.	1C011 1C111 1C234
II.A1.027	Explosive materials other than those specified in 1C239, or materials or mixtures containing more than 2 % by weight of such explosive materials, with a crystalline density higher than 1,5 g/cm^3 and with a detonation speed higher than 5 000 m/s.	1C239

II.A2. MATERIALS PROCESSING

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A2.001	Vibration test systems, equipment and components thereof, other than those specified in 2B116: 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 0,1 g rms between 0,1 Hz and 2 kHz and imparting forces equal to or greater than 50 kN, measured 'bare table';	2B116

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	b. Digital controllers, combined with specially designed vibration test 'software', with a 'real-time control bandwidth' greater than 5 kHz designed for use with vibration test systems specified in a.; Technicalnote: 'Real-time control bandwidth' is defined as the maximum rate at which a controller can execute complete cycles of sampling, processing data and transmitting control signals. c. Vibration thrusters (shaker units), with or without associated amplifiers, capable of imparting a force equal to or greater than 50 kN, measured 'bare table', and usable in vibration test systems specified in 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 50 kN, measured 'bare table', and usable in vibration systems specified in a. Technicalnote: 'bare table' means a flat table, or surface, with no fixture or fittings.	
II.A2.002	Machine tools, other than those specified in 2B001 or 2B201 and any combination thereof, for removing (or cutting) metals, ceramics, or 'composites' that, according to the manufacturer's technical specification, can be equipped with electronic devices for 'numerical control', having positioning accuracies of equal to or less (better) than 30 μm according to ISO 230/2 (1988) or national equivalents along any linear axis. Technical note: Manufacturers calculating positioning accuracy in accordance with ISO 230/2 (1997) should consult the competent authorities of the Member State in which they are established.	2B001 2B201
II.A2.002a	Components and numerical controls, specially designed for machine tools specified in 2B001, 2B201 or I.A2.002 above.	N/A
II.A2.003	Balancing machines and related equipment as follows: a. Balancing machines, designed or modified for dental or other medical equipment, having all the following characteristics: 1. Not capable of balancing rotors/assemblies having a mass greater than 3 kg; 2. Capable of balancing rotors/assemblies at speeds greater than 12 500 rpm; 3. Capable of correcting unbalance in two planes or more; and 4. Capable of balancing to a residual specific unbalance of 0,2 g × mm per kg of rotor mass; b. 'Indicator heads' designed or modified for use with machines specified in a. above. Technicalnote: 'Indicator heads' are sometimes known as balancing instrumentation.	2B119
II.A2.004	Remote manipulators that can be used to provide remote actions in radiochemical separation operations or hot cells, other than those specified in 2B225, having either of the following characteristics: a. A capability of penetrating a hot cell wall of 0,3 m or more (through the wall operation); or	2B225

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	b. A capability of bridging over the top of a hot cell wall with a thickness of 0,3 m or more (over the wall operation). Technical note: Remote manipulators provide translation of human operator actions to a remote operating arm and terminal fixture. They may be of master/slave type or operated by joystick or keypad.	
II.A2.005	Controlled atmosphere heat treatment furnaces or oxidation furnaces capable of operation at temperatures above 400 °C. Note: This item does not cover tunnel kilns with roller or car conveyance, tunnel kilns with conveyor belt, pusher type kilns or shuttle kilns, specially designed for the production of glass, tableware ceramics or structural ceramics.	2B226 2B227
II.A2.006	Not used.	
II.A2.007	'Pressure transducers', other than those defined in 2B230, capable of measuring absolute pressures at any point in the range 0 to 200 kPa and having both of the following characteristics: a. Pressure sensing elements made of or protected by 'Materials resistant to corrosion by uranium hexafluoride (UF_6)'; and b. Having either of the following characteristics: 1. A full scale of less than 200 kPa and an 'accuracy' of better than ± 1 % of full scale; or 2. A full scale of 200 kPa or greater and an 'accuracy' of better than 2 kPa. Technical note: For the purposes of 2B230 'accuracy' includes non-linearity, hysteresis and repeatability at ambient temperature.	2B230
II.A2.008	Liquid-liquid contacting equipment (mixer-settlers, pulsed columns, plate columns, centrifugal contactors); and liquid distributors, vapour distributors or liquid collectors designed for such equipment, where all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials: a. Alloys with more than 25 % nickel and 20 % chromium by weight; b. Fluoropolymers; c. Glass (including vitrified or enamelled coating or glass lining); d. Graphite or 'carbon graphite'; e. Nickel or alloys with more than 40 % nickel by weight; f. Tantalum or tantalum alloys; g. Titanium or titanium alloys; h. Zirconium or zirconium alloys; or i. Stainless steel. Technical note: 'Carbon graphite' is a composition consisting of amorphous carbon and graphite, in which the graphite content is 8 % or more by weight.	2B350.e.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A2.009	Industrial equipment and components, other than those specified in 2B350.d., as follows: Heat exchangers or condensers with a heat transfer surface area greater than 0,05 m^2, and less than 30 m^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 fluid(s) are made from any of the following materials: a. Alloys with more than 25 % nickel and 20 % chromium by weight; b. Fluoropolymers; c. Glass (including vitrified or enamelled coating or glass lining); d. Graphite or 'carbon graphite'; e. Nickel or alloys with more than 40 % nickel by weight; f. Tantalum or tantalum alloys; g. Titanium or titanium alloys; h. Zirconium or zirconium alloys; i. Silicon carbide; j. Titanium carbide; or k. Stainless steel. Note: This item does not cover vehicle radiators. Technical note: The materials used for gaskets and seals and other implementation of sealing functions do not determine the status of control of the heat exchanger.	2B350.d.
II.A2.010	Multiple-seal, and seal-less pumps, other than those specified in 2B350.i, suitable for corrosive fluids, or vacuum pumps 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: a. Alloys with more than 25 % nickel and 20 % chromium by weight; b. Ceramics; c. Ferrosilicon; d. Fluoropolymers; e. Glass (including vitrified or enamelled coatings or glass lining); f. Graphite or 'carbon graphite'; g. Nickel or alloys with more than 40 % nickel by weight; h. Tantalum or tantalum alloys; i. Titanium or titanium alloys; j. Zirconium or zirconium alloys; k. Niobium (columbium) or niobium alloys; l. Stainless steel; m. Aluminium alloys; or n. Rubber. Technical notes: The materials used for gaskets and seals and other implementations of sealing functions do not determine the status of control of the pump. The term 'rubber' encompasses all kinds of natural and synthetic rubbers.	2B350.i.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A2.011	'Centrifugal separators', other than those specified in 2B352.c., capable of continuous separation without the propagation of aerosols and manufactured from: a. Alloys with more than 25 % nickel and 20 % chromium by weight; b. Fluoropolymers; c. Glass (including vitrified or enamelled coating or glass lining); d. Nickel or alloys with more than 40 % nickel by weight; e. Tantalum or tantalum alloys; f. Titanium or titanium alloys; or g. Zirconium or zirconium alloys. Technical note: 'Centrifugal separators' include decanters.	2B352.c.
II.A2.012	Sintered metal filters, other than those specified in 2B352.d., made of nickel or nickel alloy with more than 40 % nickel by weight.	2B352.d.
II.A2.013	Spin-forming machines and flow-forming machines, other than those specified by 2B009, 2B109 or 2B209 and specially designed components therefor. Technical note: For the purpose of this item, machines combining the functions of spin-forming and flow-forming are regarded as flow-forming machines.	2B009 2B109 2B209
II.A2.014	Equipment and reagents, other than those specified in 2B350 or 2B352, as follows: a. Fermenters capable of cultivation of pathogenic 'micro-organisms' or viruses, or capable of toxin production, without the propagation of aerosols, and having a total capacity of 10 l or more; b. Agitators for fermenters as mentioned in a. above; TechnicalNote: Fermenters include bioreactors, chemostats and continuous-flow systems. c. Laboratory equipment as follows: 1. Polymerase chain reaction (PCR)-equipment 2. Genetic sequencing equipment; 3. Genetic synthesizers; 4. Electroporation equipment; 5. Specific reagents associated with the equipment in I.A2.014.c. numbers 1. to 4. above; d. Filters, micro-filters, nano-filters or ultra-filters usable in industrial or laboratory biology for continuous filtering, except filters specially designed or modified for medical or clear water production purposes and to be used in the framework of EU or UN officially supported projects; e. Ultracentrifuges, rotors and adaptors for ultracentrifuges; f. Freeze drying equipment.	2B350 2B352

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A2.015	Equipment, other than that specified in 2B005, 2B105 or 3B001.d., for the deposition of metallic overlays as follows, and specially designed components and accessories therefor: a. Chemical vapour deposition (CVD) production equipment; b. Physical vapour deposition (PVD) production equipment; c. Production equipment for deposition by means of inductive or resistance heating.	2B005 2B105 3B001.d.
II.A2.016	Open tanks or containers, with or without agitators, with a total internal (geometric) volume greater than 0,5 m^3 (500 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: a. Alloys with more than 25 % nickel and 20 % chromium by weight; b. Fluoropolymers; c. Glass (including vitrified or enamelled coatings or glass lining); d. Nickel or alloys with more than 40 % nickel by weight; e. Tantalum or tantalum alloys; f. Titanium or titanium alloys; g. Zirconium or zirconium alloys; h. Niobium (columbium) or niobium alloys; i. Stainless steel; j. Wood; or k. Rubber. Technicalnote: The term 'rubber' encompasses all kinds of natural and synthetic rubbers.	2B350

II.A3. ELECTRONICS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A3.001	High voltage direct current power supplies, other than those specified in 0B001.j.5. or 3A227, having both of the following characteristics: a. Capable of continuously producing, over a time period of eight hours, 10 kV or more, with output power of 5 kW or more with or without sweeping; and b. Current or voltage stability better than 0,1 % over a time period of four hours.	0B001.j.5. 3A227
II.A3.002	Mass spectrometers, other than those specified in 0B002.g. or 3A233, capable of measuring ions of 200 atomic mass units or more and having a resolution of better than 2 parts in 200, as follows, and ion sources therefor: a. Inductively coupled plasma mass spectrometers (ICP/MS); b. Glow discharge mass spectrometers (GDMS); c. Thermal ionisation mass spectrometers (TIMS); d. Electron bombardment mass spectrometers which have a source chamber constructed from, lined with or plated with 'materials resistant to corrosion by uranium hexafluoride UF_6';	0B002.g. 3A233

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	e. Molecular beam mass spectrometers having either of the following characteristics: 1. A source chamber constructed from, lined with or plated with stainless steel or molybdenum and equipped with a cold trap capable of cooling to 193 K (– 80 °C) or less; or 2. A source chamber constructed from, lined with or plated with materials resistant to UF_6; f. Mass spectrometers equipped with a micro-fluorination ion source designed for actinides or actinide fluorides.	
II.A3.003	Frequency changers or generators, other than those specified by 0B001.b.13. or 3A225, having all of the following characteristics, and specially designed components and software therefor: a. Multiphase output capable of providing a power of 40 W or greater; b. Capable of operating in the frequency range between 600 and 2 000 Hz; and c. Frequency control better (less) than 0,1 %. Technicalnotes: 1. Frequency changers are also known as converters, inverters, generators, electronic test equipment, AC power supplies, variable speed motor drives or variable frequency drives. 2. The functionality specified in this item may be met by certain equipment marketed as: electronic test equipment, AC power supplies, variable speed motor drives or variable frequency drives.	0B001.b.13. 3A225
II.A3.004	Spectrometers and diffractometers, designed for the indicative test or quantitative analysis of the elemental composition of metals or alloys without chemical decomposition of the material.	N/A

II.A6. SENSORS AND LASERS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A6.001	Yttrium aluminium garnet (YAG) rods.	N/A
II.A6.002	Optical equipment and components, other than those specified in 6A002 or 6A004.b. as follows: Infrared optics in the wavelength range 9 μm – 17 μm and components thereof, including cadmium telluride (CdTe) components.	6A002 6A004.b.
II.A6.003	Wave front corrector systems, other than mirrors specified in 6A004.a., 6A005.e. or 6A005.f., for use with a laser beam having a diameter exceeding 4 mm, and specially designed components thereof, including control systems, phase front sensors and 'deformable mirrors' including bimorph mirrors.	6A004.a. 6A005.e. 6A005.f.
II.A6.004	Argon ion 'lasers', other than those specified in 0B001.g.5., 6A005.a.6. and/or 6A205.a., having an average output power equal to or greater than 5 W.	0B001.g.5. 6A005.a.6. 6A205.a.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A6.005	Semiconductor 'lasers', other than those specified in 0B001.g.5., 0B001.h.6. or 6A005.b., and components thereof, as follows: a. Individual semiconductor 'lasers' with an output power greater than 200 mW each, in quantities larger than 100; b. Semiconductor 'laser' arrays having an output power greater than 20 W. Notes: 1. Semiconductor 'lasers' are commonly called 'laser' diodes. 2. This item does not cover 'laser' diodes with a wavelength in the range 1,2 μm – 2,0 μm.	0B001.g.5. 0B001.h.6. 6A005.b.
II.A6.006	Tunable semiconductor 'lasers' and tunable semiconductor 'laser' arrays, other than those specified in 0B001.h.6. or 6A005.b., of a wavelength between 9 μm and 17 μm, as well as array stacks of semiconductor 'lasers' containing at least one tunable semiconductor 'laser' array of such wavelength. Note: Semiconductor 'lasers' are commonly called 'laser' diodes.	0B001.h.6. 6A005.b.
II.A6.007	Solid state 'tunable' 'lasers', other than those specified in 0B001.g.5., 0B001.h.6. or 6A005.c.1., and specially designed components thereof, as follows: a. Titanium-sapphire lasers, b. Alexandrite lasers.	0B001.g.5. 0B001.h.6. 6A005.c.1.
II.A6.008	Neodymium-doped (other than glass) 'lasers', other than those specified in 6A005.c.2.b., having an output wavelength greater than 1,0 μm but not exceeding 1,1 μm and output energy exceeding 10 J per pulse.	6A005.c.2.b.
II.A6.009	Components of acousto-optics, as follows: a. Framing tubes and solid-state imaging devices having a recurrence frequency equal to or exceeding 1 kHz; b. Recurrence frequency supplies; c. Pockels cells.	6A203.b.4.
II.A6.010	Radiation-hardened cameras, or lenses thereof, other than those specified in 6A203.c., 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.	6A203.c.
II.A6.011	Tunable pulsed dye laser amplifiers and oscillators, other than those specified in 0B001.g.5., 6A005 and or 6A205.c., having all of the following characteristics: a. Operating at wavelengths between 300 nm and 800 nm; b. An average output power greater than 10 W but not exceeding 30 W; c. A repetition rate greater than 1 kHz; and d. Pulse width less than 100 ns. Note: This item does not cover single mode oscillators.	0B001.g.5. 6A005 6A205.c.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A6.012	Pulsed carbon dioxide 'lasers', other than those specified in, 0B001.h.6., 6A005.d. or 6A205.d., having all of the following characteristics: a. Operating at wavelengths between 9 μm and 11 μm; b. A repetition rate greater than 250 Hz; c. An average output power greater than 100 W but not exceeding 500 W; and d. Pulse width less than 200 ns.	0B001.h.6. 6A005.d. 6A205.d.
II.A6.013	Lasers, other than those specified in 6A005 or 6A205.	6A005 6A205

II.A7. NAVIGATION AND AVIONICS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A7.001	Inertial navigation systems and specially designed components thereof, as follows: a. Inertial navigation systems which are certified for use on 'civil aircraft' by civil authorities of a State participating in the Wassenaar Arrangement, and specially designed components thereof, as follows: 1. Inertial navigation systems (INS) (gimballed or strapdown) and inertial equipment designed for 'aircraft', land vehicle, vessels (surface or underwater) or 'spacecraft' for attitude, guidance or control, having any of the following characteristics, and specially designed components thereof: a. Navigation error (free inertial) subsequent to normal alignment of 0,8 nautical mile per hour (nm/hr) 'Circular Error Probable' (CEP) or less (better); or b. Specified to function at linear acceleration levels exceeding 10 g; 2. Hybrid Inertial Navigation Systems embedded with Global Navigation Satellite Systems(s) (GNSS) or with 'Data-Based Referenced Navigation' ('DBRN') System(s) for attitude, guidance or control, subsequent to normal alignment, having an INS navigation position accuracy, after loss of GNSS or 'DBRN' for a period of up to four minutes, of less (better) than 10 metres 'Circular Error Probable' (CEP); 3. Inertial Equipment for Azimuth, Heading, or North Pointing having any of the following characteristics, and specially designed components thereof: a. Designed to have an Azimuth, Heading, or North Pointing accuracy equal to, or less (better) than 6 arc minutes RMS at 45 degrees latitude; or b. Designed to have a non-operating shock level of at least 900 g at a duration of at least 1 msec. b. Theodolite systems incorporating inertial equipment specially designed for civil surveying purposes and designed to have an Azimuth, Heading, or North Pointing accuracy equal to, or less (better) than 6 arc minutes RMS at 45 degrees latitude, and specially designed components thereof.	7A001 7A003 7A101 7A103

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	c. Inertial or other equipment using accelerometers specified in 7A001 or 7A101, where such accelerometers are specially designed and developed as MWD (Measurement While Drilling) sensors for use in down-hole well services operations. Note: The parameters of a.1. and a.2. are applicable with any of the following environmental conditions: 1. Input random vibration with an overall magnitude of 7,7 g rms in the first half hour and a total test duration of one and a half hours per axis in each of the three perpendicular axes, when the random vibration meets the following: a. A constant power spectral density (PSD) value of 0,04 g^2/Hz over a frequency interval of 15 to 1 000 Hz; and b. The PSD attenuates with a frequency from 0,04 g^2/Hz to 0,01 g^2/Hz over a frequency interval from 1 000 to 2 000 Hz; 2. A roll and yaw rate equal to or greater than + 2,62 radian/s (150 deg/s); or 3. According to national standards equivalent to 1. or 2. above. Technicalnotes: 1. a.2. refers to systems in which an INS and other independent navigation aids are built into a single unit (embedded) in order to achieve improved performance. 2. 'Circular Error Probable' (CEP) – In a circular normal distribution, the radius of the circle containing 50 % of the individual measurements being made, or the radius of the circle within which there is a 50 % probability of being located.	

II.A9. AEROSPACE AND PROPULSION

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.A9.001	Explosive bolts.	N/A
II.A9.002	Internal combustion engines (i.e. axial piston or rotary piston type), designed or modified for propelling 'aircrafts' or 'lighter-than-air-vehicles' and specially designed components therefor.	N/A
II.A9.003	Trucks, other than those specified in 9A115, having more than one motorised axle and a payload exceeding 5 tonnes. Note: This item includes flatbed trailers, semi trailers and other trailers.	9A115

B. **SOFTWARE**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
II.B.001	Software required for the development, production or use of the items in Part A. (Goods).	N/A

C. **TECHNOLOGY**

No	Description Items, materials, equipment, goods and technology	Related item from Annex I to Regulation (EC) No 428/2009
II.C.001	Technology required for the development, production or use of the items in Part A. (Goods).	N/A

PART III

Other items, materials, equipment, goods and technology which could contribute to DPRK's ballistic-missile sector.

A. **GOODS**

III.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
III.A1.001	Unwrought aluminium	1C002
III.A1.002	Aluminium waste and scrap	1C002
III.A1.003	Aluminium powders and flakes	1C111
III.A1.004	Aluminium bars, rods and profiles	1C002
III.A1.005	Aluminium wire	1C002
III.A1.006	Aluminium plates, sheets and strip, of a thickness exceeding 0,2 mm	1C002
III.A1.007	Aluminium tubes and pipes	1C002
III.A1.008	Aluminium tube or pipe fittings (for example, couplings, elbows, sleeves)	1C002
III.A1.009	Stranded wire, cables, plaited bands and the like, of aluminium, not electrically insulated	1C002

PART IV

Weapons of mass destruction-related items, materials, equipment, goods and technology identified and designated pursuant to paragraph 25 of UN Security Council Resolution 2270 (2016).

A. **GOODS**

IV.A0. NUCLEAR MATERIALS, FACILITIES AND EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IV.A0.001	Ring Magnets Permanent magnet materials having both the following characteristics: i. Ring-shaped magnet with a relation between outer and inner diameter smaller or equal to 1.6:1; and ii. Made of any of the following magnetic materials: aluminium-nickel-cobalt, ferrites, samarium-cobalt, or neodymium-iron-boron.	3A201.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IV.A0.002	Frequency Changers (also known as converters or inverters) Frequency changers, other than those specified in entries 0B001.b.13 or 3A225 of Annex 1, having all of the following characteristics, and specially designed software therefore: i. Multiphase frequency output; ii. Capable of providing a power of 40 W or greater; and iii. Capable of operating anywhere (at any one point or more) within the frequency range of between 600 and 2 000 Hz. TechnicalNotes: (1) Frequency changers are also known as converters or inverters. (2) The functionality specified above may be met by certain equipment described or marketed as electronic test equipment, AC power supplies, variable speed motor drives, or variable frequency drives.	0B001.b.13. 3A225

IV.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IV.A1.001	Maraging steel having both the following characteristics: i. "capable of" an ultimate tensile strength of 1 500 MPa or more at 293 K (20 °C). ii. In bar or tube form, with an outer diameter of 75 mm or greater.	1C216
IV.A1.002	Magnetic alloy materials in sheet or thin strip form having both of the following characteristics: (a) Thickness of 0,05 mm or less; or height of 25 mm or less, and (b) Made of any of the following magnetic alloy materials: iron-chromium-cobalt, iron-cobalt-vanadium, iron- chromium-cobalt-vanadium, or iron-chromium.	1C005
IV.A1.003	High-strength Aluminium Alloy Aluminium alloys having both the following characteristics: i. "capable of" an ultimate tensile of strength of 415 MPa or more at 293 K (20 °C) and ii. In bar or tube form, with an outer diameter of 75 mm or greater. TechnicalNote: The phrase "capable of" encompasses aluminium alloy before or after heat treatment.	1C202
IV.A1.004	"Fibrous or filamentary materials" and prepregs, as follows: i. Carbon, aramid, or glass "fibrous or filamentary materials" having both of the following characteristics: (1) A "specific modulus" exceeding $3{,}18 \times 10^6$ m; and (2) A "specific tensile strength" exceeding $76{,}2 \times 10^3$ m; ii. Prepregs: Thermoset resin-impregnated continuous "yarns", "rovings", "tows" or "tapes" with a width of 30 mm or less, made from carbon, aramid, or glass "fibrous or filamentary materials" controlled in (a) above.	1C210

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IV.A1.005	Filament winding machines and related equipment, as follows: i. 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 of diameter of 75 mm or greater; ii. Coordinating and programming controls for filament winding machines specified in (a) above; iii. Mandrels for filament winding machines specified in (a) above.	1B201
IV.A1.006	Metal hydrides such as, zirconium	1B231
IV.A1.007	Sodium metal (7440-23-5)	1C350
IV.A1.008	Sulphur trioxide (7446-11-9)	1C350
IV.A1.009	Aluminium chloride (7446-70-0)	N/A
IV.A1.010	Potassium Bromide (7758-02-3)	1C350
IV.A1.011	Sodium bromide (7647-15-6)	1C350
IV.A1.012	Dichloromethane (75-09-2)	1C350
IV.A1.013	Isopropyl bromide (75-26-3)	1C350
IV.A1.014	Isopropyl ether (108-20-3)	1C350
IV.A1.015	Monoisopropylamine (75-31-0)	1C350
IV.A1.016	Trimethylamine (75-50-3)	1C350
IV.A1.017	Tributylamine (102-82-9)	1C350
IV.A1.018	Triethylamine (121-44-8)	1C350
IV.A1.019	N,N-Dimethylaniline (121-69-7)	1C350
IV.A1.020	Pyridine (110-86-1)	1C350

IV.A2. MATERIALS PROCESSING

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IV.A2.001	Flow-forming Machines As described in INFCIRC/254/Rev.9/Part2 and S/2014/253	2B209
IV.A2.002	Laser welding equipment	N/A

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IV.A2.003	4- and 5-axis CNC machine tools	2B201
IV.A2.004	Plasma cutting equipment	N/A
IV.A2.005	Reaction vessels, reactors, agitators, heat exchangers, condensers, pumps, valves, storage tanks, containers, receivers, and distillation or absorption columns that meet performance parameters described in S/2006/853 and S/2006/853/corr.1 Single-seal pumps with manufacturer's specified maximum flow-rate greater than 0,6 m^3/h and casings (pump bodies), preformed casing liners, impellers, rotors or jet pump nozzles designed for such pumps, in which all surfaces that come into direct contact with the chemical(s) being processed are made from 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; (c) fluoropolymers (polymeric or elastomeric materials with more than 35 % fluorine by weight); (d) glass or glass-lined (including vitrified or enamelled coating); (e) graphite or carbon-graphite; (f) tantalum or tantalum alloys; (g) titanium or titanium alloys; (h) zirconium or zirconium alloys; (i) ceramics; (j) ferrosilicon (high silicon iron alloys); or (k) niobium (columbium) or niobium alloys.	2B350
IV.A2.006	Conventional or turbulent air-flow clean-air rooms and self-contained fan-HEPA filter units that could be used for P3 or P4 (BSL 3, BSL 4, L3, L4) containment facilities.	2B352

PART V

Weapons of mass destruction-related items, materials, equipment, goods and technology identified and designated pursuant to paragraph 4 of UN Security Council Resolution 2321 (2016).

A. **GOODS**

V.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.A1.001	Isocyanates (TDI (Toluene di-isocyanate), MDI (Methylene bis (phenyl isocyanate)), IPDI (Isophorone diisosocyanate), HNMDI or HDI (Hexamethylene diisocyanate), and DDI (dimeryl diisocyanate) and production equipment.	N/A
V.A1.002	Ammonium nitrate, chemically pure or in phase stabilized version (PSAN).	1C111

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.A1.003	Polymeric Substances (Hydroxyl Terminated Poly-Ether (HTPE), Hydroxyl Terminated Caprolactone Ether (HTCE), Polypropylene glycol (PPG), Polydiethyleneglycol adipate (PGA) and Polyethylene	1C111
V.A1.004	Manganese metal Brazing Foils.	1C111

V.A2. MATERIALS PROCESSING

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.A2.001	Hydroforming machines.	2B109
V.A2.002	Thermal treatment furnaces — Temperature > 850 °C and one dimension > 1 m,	II.A2.005 2B226 2B227
V.A2.003	Electrical Discharge Machines (EDMs)	2B001.d
V.A2.004	Friction stir welding machines.	N/A
V.A2.005	Floor-mounted fume hoods (walk-in style) with a minimum nominal width of 2,5 meters,	2B352
V.A2.006	Batch centrifuges with a rotor capacity of 4 L or greater, usable with biological materials	II.A2.014.e. 2B350 2B352
V.A2.007	Fermenters with an internal volume of 10-20 L (0,01-0,02 m^3), usable with biological materials	2B352 II.A2.014.a.

V.A6. SENSORS AND LASERS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.A6.001	High-speed imaging cameras except those used in medical imaging systems	6A003.a.2

V.A9. AEROSPACE AND PROPULSION

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.A9.001	Non-destructive test chambers with a 1m or more critical internal dimension.	9B106
V.A9.002	Turbo-pumps for liquid or hybrid rocket engines	9A006

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.A9.003	Countermeasure Subsystems and Penetration Aids (e.g. jammers, chaff, decoys) designed to saturate, confuse, or evade missile defences.	N/A
V.A9.004	Truck chassis with 6 or more axles	9A115 II.A9.003

B. **SOFTWARE**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
V.B.001	Modelling and design software related to the modelling of aerodynamic and thermodynamic analysis of rocket or unmanned aerial vehicle systems.	N/A

PART VI

Weapons of mass destruction-related items, materials, equipment, goods and technology identified and designated pursuant to paragraph 4 of UNSCR 2371 (2017).

A. **GOODS**

VI.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VI.A1.001	Explosive bolts, nuts and shackles, flexible linear-shaped charges, ball locks, compression springs, circular cutting devices and acceleration rockets usable for staging mechanisms	N/A
VI.A1.002	All environmental test chambers capable of simulating flight conditions (temperature, pressure, shock and vibration) except those used for civilian aircraft safety purposes	9B106
VI.A1.003	Rapid prototyping, including additive manufacturing equipment	N/A
VI.A1.004	Polyacrylonitrile (PAN) fibre usable as a precursor for carbon fibre production and its associated production equipment	1C010 1C210 9C110
VI.A1.005	For point 12 of the list in the report of the Committee prepared in accordance with paragraph 25 of resolution 2270 (2016) (S/2016/308, annex) read “Metal hydrides, such as zirconium hydride, beryllium hydride, aluminium hydride, lithium aluminium hydride and titanium hydride”	1C111
VI.A1.006	Plasticizers usable in composite propellants, such as — dioctyl adipate (DOA) (CAS 123-79-5) — dioctyl sebacate (DOS) (CAS 122-62-3) — dioctyl azelate (DOZ) (CAS 103-24-2)	1C111

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VI.A1.007	Maraging steel capable of an ultimate tensile strength of 1 950 MPa or more at 293 K (20 °C) and in any of the following forms: (a) Sheet, plate or tubing with a wall or plate thickness equal to or less than 5,0 mm; (b) Tubular forms with a wall thickness of 50 mm or less and having an inner diameter of 270 mm or more	1C216
VI.A1.008	Filament winding machines and related equipment: Filament winding machines or fibre/tow-placement machines, of which the motions for positioning, wrapping and winding fibres can be coordinated and programmed in two or more axes and which are designed to fabricate composite structures or laminates from fibrous or filamentary materials, coordinating and programming controls and precision mandrels for such equipment	1B001 1B101 1B201
VI.A1.009	Full face-mask air-purifying and air-supplying respirators except those used in breathing apparatus for firefighters	1A004.a. 2B352
VI.A1.010	Additional chemicals suitable for decontamination of chemical warfare agents: Diethylenetriamine (CAS 111-40-0)	N/A
VI.A1.011	Nerve agent chemoprophylaxis: — Butyrylcholinesterase (BCHE) — Pyridostigmine bromide (CAS 101-26-8) — Obidoxime chloride (CAS 114-90-9)	N/A

PART VII

Conventional arms-related items, materials, equipment, goods and technology designated, pursuant to paragraph 5 of UNSCR 2371 (2017).

A. **GOODS**

VII.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A1.001	"Composite" structures or laminates consisting of an organic "matrix" and materials as follows: Note: Does not apply to "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: — An area not exceeding 1 m^2; — A length not exceeding 2,5 m; — A width exceeding 15 mm.	1A002 1A202

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	Does not apply to semi-finished items, specially designed for purely civilian applications as follows: sporting goods, automotive industry, machine tool industry, medical applications. Does not apply to finished items specially designed for a specific application. (a) Inorganic "fibrous or filamentary materials" that have a "specific modulus" exceeding $2{,}54 \times 10^6$ m and a melting, softening, decomposition or sublimation point exceeding 1 649 °C in an inert environment. Note: Does not apply to the following — 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 10×10^6 m — Molybdenum and molybdenum alloy fibres — Boron fibres — Discontinuous ceramic fibres with a melting, softening, decomposition or sublimation point lower than 1 770 °C in an inert environment. (b) "Fibrous or filamentary materials" having any of the following: 1. Materials composed of aromatic polyetherimides having a glass transition temperature (Tg) exceeding 290 °C, 2. Polyarylene ketones, 3. Polyarylene sulphides where the arlylene group is biphenylene, triphenylene or combinations thereof, 4. Polybiphenylenethersulphone having a Tg exceeding 290 °C, or 5. Any of the above materials "commingled" with any of the following: a. Organic "fibrous or filamentary materials", with a "specific modulus" exceeding $12{,}7 \times 10^6$ m and a "specific tensile strength" exceeding $23{,}5 \times 10^4$ m. b. Carbon "fibrous or filamentary materials", having a "specific modulus" exceeding $14{,}65 \times 10^6$ m; and specific tensile strength exceeding $26{,}82 \times 10^4$ m. c. Inorganic "fibrous or filamentary materials", having a "specific modulus" exceeding $2{,}54 \times 10^6$ m; and a melting, softening, decomposition or sublimation point exceeding 1 649 °C in an inert environment. Notes: 1. Does not apply to polyethylene. 2. Does not apply to — "fibrous or filamentary materials", for the repair of civil aircraft structures or laminates, having an area not exceeding 1 m^2; a length not exceeding 2,5 m; and a width exceeding 15 mm. — Mechanically chopped, milled or cut carbon "fibrous or filamentary materials" 25,0 mm or less in length. 3. Does not apply to 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 10×10^6 m; molybdenum and molybdenum alloy fibres; boron fibres; discontinuous ceramic fibres with a melting, softening, decomposition or sublimation point lower than 1 770 °C in an inert environment.	

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(c) Organic "fibrous or filamentary materials" with a "specific modulus" exceeding 12,7 × 10^6 m and with a "specific tensile strength" exceeding 23,5 × 10^4 m. (d) Carbon "fibrous or filamentary materials" having a "specific modulus" exceeding 14,65 × 10^6 m and a specific tensile exceeding 26,82 × 10^4 m. (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 any of the following "fibrous or filamentary materials" and resins: 1. Inorganic "fibrous or filamentary materials" with a "specific modulus" exceeding 2,54 × 10^6 m and a melting, softening, decomposition or sublimation point exceeding 1 649 °C in an inert environment, or 2. Organic or carbon "fibrous or filamentary materials", having all of the following: a. "Specific modulus" exceeding 10,15 × 10^6 m; and b. "Specific tensile strength" exceeding 17,7 × 10^4 m; or 3. Resin or pitch, from unprocessed fluorinated compounds such as: a. Fluorinated polyimides containing 10 % by weight or more of combined fluorine; b. Fluorinated phosphazene elastomers containing 30 % by weight or more of combined fluorine; or 4. Phenolic resins with Dynamic Mechanical Analysis glass transition temperature (DMA Tg) equal to, or exceeding, 180 °C and having a phenolic resin; or 5. Other resin or pitch with Dynamic Mechanical Analysis glass transition temperature (DMA Tg) equal to, or exceeding, 232 °C. Note: Does not apply to — Epoxy resin "matrix" impregnated carbon "fibrous or filamentary materials" (prepregs) for the repair of "civil aircraft" structures or laminates, having all of the following; — An area not exceeding 1 m^2; — A length not exceeding 2,5 m; and — A width exceeding 15 mm	
VII.A1.002	"Fibrous or filamentary materials" having any of the following: (a) Materials composed of aromatic polyetherimides having a glass transition temperature (Tg) exceeding 290 °C. (b) Polyarylene ketones. (c) Polyarylene sulphides where the arlylene group is biphenylene, triphenylene or combinations thereof (d) Polybiphenylenethersulphone having a Tg exceeding 290 °C, or (e) Any of the above materials commingled with any of the following: 1. Organic "fibrous or filamentary materials", with a "specific modulus" exceeding 12,7 × 10^6 m and "specific tensile strength" exceeding 23,5 × 10^4 m, 2. Carbon "fibrous or filamentary materials", having a "specific modulus" exceeding 14,65 × 10^6 m and "specific tensile strength" exceeding 26,82 × 10^4 m, 3. Inorganic "fibrous or filamentary materials", having a "specific modulus" exceeding 2,54 × 10^6 m and melting, softening, decomposition or sublimation point exceeding 1 649 °C in an inert environment.	1C008 1C010 1C210 9C110

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	Notes: 1. Does not apply to polyethylene. 2. Does not apply to: — "fibrous or filamentary materials", for the repair of civil aircraft structures or laminates, having an area not exceeding 1 m^2; a length not exceeding 2,5 m; and a width exceeding 15 mm. — Mechanically chopped, milled or cut carbon "fibrous or filamentary materials" 25,0 mm or less in length. 3. Does not apply to 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 10×10^6 m; molybdenum and molybdenum alloy fibres; boron fibres; discontinuous ceramic fibres with a melting, softening, decomposition or sublimation point lower than 1 770 °C in an inert environment	
VII.A1.003	Equipment for the "production" or inspection of "composite" structures Specially designed components and accessories to include: (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 laminates, from "fibrous or filamentary materials". (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. (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. (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 special equipment to strain the fibre during heating; 2. Equipment for the chemical vapor 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; 5. Equipment for producing prepregs specified in VII.A1.003, paragraph "d", under "Materials", by the hot melt method; 6. Non-destructive inspection equipment specially designed for "composite" materials, as follows: a. X-ray tomography systems for three dimensional defect inspection; b. 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.	1B001.a. 1B001.b. 1B001.c. 1B001.d. 1B001.e. 1B001 1B101 1B201

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	Notes: 1. For the purposes of this "tape-laying machines" have the ability to lay one or more "filament bands" limited to widths greater than 25 mm and less than or equal to 305 mm, and to cut and restart individual "filament band" courses during the laying process. 2. The technique of interlacing includes knitting.	
VII.A1.004	Metal alloys, metal alloy powder and alloyed materials including the following: (a) Aluminides, including: 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 made from the powder or particulate material including: 1. Nickel alloys having a stress-rupture life of 10 000 hours or longer at 650 °C at a stress of 676 MPa or a low cycle fatigue life of 10 000 cycles or more at 550 °C at a maximum stress of 1 095 MPa; 2. Niobium alloys having a stress-rupture life of 10 000 hours or longer at 800 °C at a stress of 400 MPa or a low cycle fatigue life of 10 000 cycles or more at 700 °C at a maximum stress of 700 MPa; 3. Titanium alloys having a stress-rupture life' of 10 000 hours or longer at 450 °C at a stress of 200 MPa or a low cycle fatigue life of 10 000 cycles or more at 450 °C at a maximum stress of 400 MPa; 4. Aluminium alloys having a tensile strength of 240 MPa or more at 200 °C or a tensile strength of 415 MPa or more at 25 °C; 5. Magnesium alloys having a tensile strength of 345 MPa or more and a corrosion rate of less than 1 mm/year in 3 % sodium chloride aqueous solution measured in accordance with ASTM standard G-31 or national equivalents; 6. Metal alloy powder or particulate material, having all of the following and 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 100 μm 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)	1C002 1C202

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	7. Made in a controlled environment by any of the following processes: a. "Vacuum atomization" b. "Gas atomization" c. "Rotary atomization" d. "Splat quenching" e. "Melt spinning and comminution" Note: Unless provision to the contrary is made, the words "metals" and "alloys" cover crude and semi-fabricated forms. 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: Wrought or worked materials fabricated by rolling, drawing, extruding, forging, impact extruding, pressing, graining, atomising, and grinding, i.e.: angles, channels, circles, 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. 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.	
VII.A1.005	Magnetic metals, of all types and of whatever form, having any of the following: (a) Initial relative permeability of 120 000 or more and a thickness of 0,5 mm 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 (Bs) of 1,6 T or more; and any of the following: a. A strip thickness of 0,02 mm or less; or b. An electrical resistivity of 2×10^{-4} ohm cm or more.	1C003
VII.A1.006	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; (b) An elastic limit exceeding 880 MPa; (c) An ultimate tensile strength exceeding 1 270 MPa; and (d) An elongation exceeding 8 %.	1C004
VII.A1.007	"Superconductive" composite conductors in lengths exceeding 100 m or with a mass exceeding 100 g, 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 (6 μm in diameter for circular "filaments");	1C005

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(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 – 263,31 °C; and 2. Remaining in the "superconductive" state at a temperature of – 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 12 T with critical current density exceeding 1 750 A/mm² on overall cross-section of the conductor. (c) "Superconductive" "composite" conductors consisting of one or more "superconductive" "filaments", which remain "superconductive" above – 158,16 °C	
VII.A1.008	Fluids and lubricating materials, as follows: (a) 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 5 000 mm²/s (5 000 centistokes) measured at 25 °C; (b) Damping or flotation fluids having all of the following: 1. Purity exceeding 99,8 %; 2. Containing less than 25 particles of 200 µm or larger in size per 3. 100 ml; and 4. 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 (c) 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 e. Density at 298 K (25 °C) of 1,5 g/ml or more; f. In a liquid state at 273 K (0 °C); and g. Containing 60 % or more by weight of fluorine Note: Does not apply to materials specified and packages as medical products	1C006
VII.A1.009	Ceramic powders, non-"composite" ceramic materials, ceramic-"matrix" "composite" materials and precursor materials, as follows: (a) Ceramic powders of single or complex borides of titanium, having total metallic impurities, excluding intentional additions, of less than 5 000 ppm, an average particle size equal to or less than 5 µm and no more than 10 % of the particles larger than 10 µm;	1C007

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) Non-"composite" ceramic materials in crude or semi-fabricated form, composed of borides of titanium with a density of 98 % or more of the theoretical density; (c) Ceramic-ceramic "composite" materials with a glass or oxide-"matrix" and reinforced with fibres having all of the following: 1. Made from any of the following materials: a. Si-N; b. Si-C; c. Si-A1-O-N; or d. Si-O-N; and 2. Having a "specific tensile strength" exceeding $12,7 \times 10^3$ m (d) Ceramic-ceramic "composite" materials, with or without a continuous metallic phase, incorporating particles, whiskers or fibres, where carbides or nitrides of silicon, zirconium or boron form the "matrix"; (e) Precursor materials (i.e., special purpose polymeric or metallo-organic materials) for producing any phase or phases of the materials specified above, as follows: 1. Polydiorganosilanes (for producing silicon carbide); 2. Polysilazanes (for producing silicon nitride); 3. Polycarbosilazanes (for producing ceramics with silicon, carbon and nitrogen components); (f) Ceramic-ceramic "composite" materials with an oxide or glass "matrix" reinforced with continuous fibres from any of the following systems: 1. Al_2O_3 (CAS 1344-28-1); or 2. Si-C-N. Notes: 1. Does not apply to abrasives. 2. Does not apply to "composites" containing fibres from these systems with a fibre "tensile strength" of less than 700 MPa at 1 273 K (1 000 °C) or fibre tensile creep resistance of more than 1 per cent creep strain at 100 MPa load and 1 273 K (1 000 °C) for 100 hours.	
VII.A1.010	Non-fluorinated polymeric substances as follows: (a) Imides as follows: 1. Bismaleimides; 2. Aromatic polyamide-imides (PAI) having a "glass transition temperature (Tg)" exceeding 290 °C; 3. Aromatic polyimides having a "glass transition temperature (Tg)" exceeding 232 °C; 4. Aromatic polyetherimides having a "glass transition temperature (Tg)" exceeding 290°C; (b) Polyarylene ketones; (c) Polyarylene sulphides, where the arylene group is biphenylene, triphenylene or combinations thereof; (d) Polybiphenylenethersulphone having a "glass transition temperature (Tg)" exceeding 290°C. Note: Applies to the substances in liquid or solid "fusible" form, including resin, powder, pellet, film, sheet, tape, or ribbon.	1C008

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A1.011	Unprocessed fluorinated compounds as follows: (a) Fluorinated polyimides containing 10 % by weight or more of combined fluorine; (b) Fluorinated phosphazene elastomers containing 30 % by weight or more of combined fluorine.	1C009
VII.A1.012	"Fibrous or filamentary materials" as follows: (a) Organic "fibrous or filamentary materials", having all of the following: 1. "specific modulus" exceeding $12,7 \times 10^6$ m; and 2. "specific tensile strength" exceeding $23,5 \times 10^4$ m; (b) Carbon "fibrous or filamentary materials", having all of the following: 1. "specific modulus" exceeding $14,65 \times 10^6$ m; and 2. "specific tensile strength" exceeding $26,82 \times 10^4$ m; (c) Inorganic "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding $2,54 \times 10^6$ m; and 2. Melting, softening, decomposition or sublimation point exceeding 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 VII.A1.010 b. Other materials specified in VII.A1.010 2. Composed of materials specified above and commingled with other fibres specified in VII.A1.012. (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 above b. Organic or carbon "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding $10,15 \times 10^6$ m; and 2. "Specific tensile strength" exceeding $17,7 \times 10^4$ m; and 2. Having any of the following: a. Resin or pitch, specified in previous sections; b. "Dynamic Mechanical Analysis glass transition temperature (DMA Tg)" equal to or exceeding 180 °C and having a phenolic resin; or c. "Dynamic Mechanical Analysis glass transition temperature (DMA Tg)" equal to or exceeding 232 °C and having a resin or pitch, not specified earlier and not being a phenolic resin. <u>Notes:</u> 1. Does not apply to polyethylene. 2. Does not apply to "fibrous or filamentary materials", for the repair of "civil aircraft" structures or laminates, having all of the following: (a) An area not exceeding 1 m^2;	1C010.a. 1C010.b. 1C010.c.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) A length not exceeding 2,5 m; and (c) A width exceeding 15 mm. Or to mechanically chopped, milled or cut carbon "fibrous or filamentary materials" 25,0 mm or less in length. 3. Does not apply to the following: (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 10×10^6 m; (b) Molybdenum and molybdenum alloy fibres; (c) Boron fibres; (d) Discontinuous ceramic fibres with a melting, softening, decomposition or sublimation point lower than 2 043 K (1 770 °C) in an inert environment. 4. Does not apply to: (a) Epoxy resin "matrix" impregnated carbon "fibrous or filamentary materials" (prepregs) for the repair of "civil aircraft" structures or laminates, having all of the following; 1. An area not exceeding 1 m^2; 2. A length not exceeding 2,5 m; and 3. A width exceeding 15 mm. (b) Fully or partially resin-impregnated or pitch-impregnated mechanically chopped, milled or cut carbon "fibrous or filamentary materials" 25,0 mm or less in length when using a resin or pitch other than those specified previously.	
VII.A1.013	Metals and compounds, as follows: (a) Metals in particle sizes of less than 60 μm whether spherical, atomized, spheroidal, flaked or ground, manufactured from material consisting of 99 % or more of zirconium, magnesium and alloys thereof; (b) Boron or boron alloys, with a particle size of 60 μm 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 referred to here also refer to metals or alloys encapsulated in aluminium, magnesium, zirconium or beryllium.	1C011
VII.A1.014	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. Note: this paragraph does not apply to body armour when accompanying its user for the user's own personal protection, to body armour designed to provide frontal protection only from both fragment and blast from non-military explosive devices, and to body armour designed to provide protection only from knife, spike, needle or blunt trauma.	1A005

VII.A4. COMPUTERS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A4.001	Electronic computers and related systems, equipment and components, or "electronic assemblies" having any of the following: (a) Specially designed to have any of the following: 1. Radiation hardened to exceed any of the following specifications: a. Total dose 5×10^3 Gy (Si); b. Dose rate upset 5×10^6 Gy (Si)/s; or c. Single event upset 1×10^{-8} error/bit/day.	4A001

VII.A5. TELECOMUNICATIONS AND "INFORMATION SECURITY"

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A5.001	Telecommunication systems and equipment, and specially designed components and accessories therefor, having any of the following characteristics, functions or features: (a) Specially designed to have any of the following: 1. User programmable spreading codes; or 2. A total transmitted bandwidth which is 100 or more times the bandwidth of any one information channel and in excess of 50 kHz. Note: Does not apply to 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. (b) Being digitally controlled radio receivers having all of the following: 1. More than 1 000 channels; 2. A "channel switching time" of less than 1 ms; 3. Automatic searching or scanning of a part of the electromagnetic spectrum; and 4. Identification of the received signals or the type of transmitter. Note: Does not apply to radio equipment specially designed for use with civil cellular radio-communications systems. Technicalnote: "Channel switching time": 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.	5A001.b.
VII.A5.002	Telecommunication test, inspection and production equipment and specially designed components or accessories therefor, specially designed for the "development" or "production" of telecommunication equipment, functions or features. Note: Does not apply to optical fibre characterization equipment.	5B002

VII.A6 SENSORS AND LASERS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A6.001	Hydrophones having any of the following: (a) Incorporating continuous flexible sensing elements (b) Incorporating flexible assemblies of discrete sensing elements with either a diameter or length less than 20 mm and with a separation between elements of less than 20 mm; (c) Having any of the following sensing elements: 1. Optical fibres; 2. "Piezoelectric polymer" films other than polyvinylidene-fluoride (PVDF) and its co-polymers {P(VDF-TrFE) and P(VDF-TFE)}; 3. "Flexible piezoelectric composites" 4. 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 5. 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-PMN-PT) piezoelectric single crystals grown from solid solution; (d) Designed to operate at depths exceeding 35 m with acceleration compensation; or (e) Designed for operation at depths exceeding 1 000 m. Note: The status of hydrophones specially designed for other equipment is determined by the status of the other equipment.	6A001.a.
VII.A6.002	Towed acoustic hydrophone arrays having any of the following: (a) Hydrophone group spacing of less than 12,5 m or "able to be modified" to have hydrophone group spacing of less than 12,5 m; (b) Designed or "able to be modified" to operate at depths exceeding 35 m; (c) Heading sensors specified in VII.A6.003 (d) Longitudinally reinforced array hoses; (e) An assembled array of less than 40 mm in diameter; (f) Hydrophone characteristics specified in (a) above or a hydrophone with a hydrophone sensitivity better than 180 dB at any depth with no acceleration, or (g) Accelerometer-based hydro-acoustic with the following: 1. Composed of three accelerometers arranged along three distinct axes; 2. Having an overall "acceleration sensitivity" better than 48 dB (reference 1 000 mV rms per 1g); 3. Designed to operate at depths greater than 35 metres; and 4. Operating frequency below 20 kHz.	6A001.a.
VII.A6.003	Heading sensors having all of the following: (a) An "accuracy" of better than 0,5°; and (b) Designed to operate at depths exceeding 35 m or having an adjustable or removable depth sensing device in order to operate at depths exceeding 35 m;	6A001.a.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A6.004	Bottom or bay-cable hydrophone arrays having any of the following: (a) Incorporating hydrophones specified in VII.A6.002 or a hydrophone with a hydrophone sensitivity better than 180 dB at any depth with no acceleration. (b) Incorporating multiplexed hydrophone group signal modules having all of the following characteristics: 1. Designed to operate at depths exceeding 35 m or having an adjustable or removable depth sensing device in order to operate at depths exceeding 35 m; and 2. Capable of being operationally interchanged with towed acoustic hydrophone array modules; or (c) Incorporating accelerometer based hydro-acoustic sensors. Technicalnote: 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 48 dB (reference 1 000 mV rms per 1g); 3. Designed to operate at depths greater than 35 metres; and 4. Operating frequency below 20 kHz. Notes: 1. Does not apply to particle velocity sensors or geophones. 2. Also applies to receiving equipment, whether or not related in normal application to separate active equipment, and specially designed components therefor.	6A001.a.
VII.A6.005	"Monospectral imaging sensors" and "multispectral imaging sensors", designed for remote sensing applications and having any of the following: (a) An Instantaneous-Field-Of-View (IFOV) of less than 200 μrad (microradians); or (b) Specified for operation in the wavelength range exceeding 400 nm but not exceeding 30 000 nm and having all the following; 1. Providing output imaging data in digital format; and 2. Having any of the following characteristics: a. "Space-qualified"; or b. Designed for airborne operation, using other than silicon detectors, and having an IFOV of less than 2,5 mrad (milliradians); Note: Does not apply to monospectral imaging sensors' with a peak response in the wavelength range exceeding 300 nm but not exceeding 900 nm and only incorporating any of the following non "space-qualified" detectors or non-"space-qualified" "focal plane arrays": (a) Charge Coupled Devices not designed or modified to achieve "charge multiplication"; or (b) Complementary Metal Oxide Semiconductor devices not designed or modified to achieve "charge multiplication".	6A002

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A6.006	"Space-qualified" components for optical systems, as follows: (a) Components lightweighted to less than 20 % "equivalent density" compared with a solid blank of the same aperture and thickness; (b) Raw substrates, processed substrates having surface coatings (single-layer or multi-layer, metallic or dielectric, conducting, semiconducting or insulating) or having protective films; (c) 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; (d) Components manufactured from "composite" materials having a coefficient of linear thermal expansion equal to or less than 5×10^{-6} in any coordinate direction;	6A004.a.
VII.A6.007	Optical control equipment as follows: (a) Equipment specially designed to maintain the surface figure or orientation of the "space-qualified" components specified above. (b) Steering, tracking, stabilization and resonator alignment equipment as follows: 1. Beam steering mirror stages designed to carry mirrors having diameter or major axis length greater than 50 mm and having all of the following, and specially designed electronic control equipment therefor: a. A maximum angular travel of ±26 mrad or more; b. A mechanical resonant frequency of 500 Hz or more; and c. An angular "accuracy" of 10 μrad (microradians) or less (better); 2. Resonator alignment equipment having bandwidths equal to or more than 100 Hz and an accuracy of 10 μrad or less (better); (c) Gimbals having all of the following: 1. A maximum slew exceeding 5°; 2. A bandwidth of 100 Hz or more; 3. Angular pointing errors of 200 μrad (microradians) or less; and 4. Having any of the following: a. Exceeding 0,15 m but not exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 2 rad (radians)/s^2; or b. Exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 0,5 rad (radians)/s^2.	6A004.d.
VII.A6.008	"Magnetometers" using superconductive technology (SQUID) 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 50 fT (rms) per square root Hz at a frequency of 1 Hz; or (b) SQUID systems having an in-motion-magnetometer "sensitivity" lower (better) than 2 pT (rms) per square root Hz at a frequency of 1 Hz and specially designed to reduce in-	6A006 Except: — 6A006.a.3 "Magnetometers" using fluxgate "technology" — 6A006.a.4 Induction coil "magnetometers" — 6A006.b. Underwater electric field sensors

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A6.009	"Magnetometers" using optically pumped or nuclear precession (proton/Overhauser) "technology" having a "sensitivity" lower (better) than 2 pT (rms) per square root Hz at a frequency of 1 Hz;	6A006
VII.A6.010	"Magnetic gradiometers" using multiple "magnetometers" specified in VII.A6;	6A006
VII.A6.011	"Compensation systems" for the following: (a) "Magnetometers" using optically pumped or nuclear precession (proton/ Overhauser) "technology" having a "sensitivity" lower (better) than 20 pT (rms) per square root Hz at a frequency of 1 Hz, and using optically pumped or nuclear precession (proton/Overhauser) "technology" that will permit these sensors to realize a "sensitivity" lower (better) than 2 pT rms per square root Hz. (b) Underwater electric field sensors having a "sensitivity" lower (better) than 8 nanovolt per meter per square root Hz when measured at 1 Hz. (c) "Magnetic gradiometers" specified in VII.A6.010 that will permit these sensors to realize a "sensitivity" lower (better) than 3 pT/m rms per square root H Note: Fibre optic "intrinsic magnetic gradiometers" having a magnetic gradient field "sensitivity" lower (better) than 0,3 nT/m (rms) per square root Hz; "Intrinsic magnetic gradiometers", using "technology" other than fibre-optic "technology", having a magnetic gradient field "sensitivity" lower (better) than 0,015 nT/m (rms) per square root Hz.	6A006
VII.A6.012	Underwater electromagnetic receivers incorporating "magnetometer" specified by section 1 or 2 "Magnetic and electric field sensors".	6A006

VII.A7. NAVIGATION AND AVIONICS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A7.001	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 130 ppm with respect to a fixed calibration value over a period of one year; 2. Specified to function at linear acceleration levels exceeding 15 g but less than or equal to 100 g and having all of the following: 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 1 250 ppm over a period of one year; or	7A001

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	3. Designed for use in inertial navigation or guidance systems and specified to function at linear acceleration levels exceeding 100 g; Note: paragraphs above do not apply to accelerometers limited to measurement of only vibration or shock. (b) Angular or rotational accelerometers, specified to function at linear acceleration levels exceeding 100 g.	
VII.A7.002	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 100 g 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 1 g environment over a period of 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 Note: this paragraph does not apply to "spinning mass gyros". 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 1 g 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 Note: this paragraph does not apply to "spinning mass gyros". (b) Specified to function at linear acceleration levels exceeding 100 g.	7A002
VII.A7.003	"Inertial measurement equipment or systems", having any of the following: Notes: 1. "Inertial measurement equipment or systems" incorporate accelerometers or gyroscopes to measure changes in velocity and orientation in order to 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).	7A003

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	2. This paragraph does not apply to "inertial measurement equipment or systems" which are certified for use on "civil aircraft" by civil aviation authorities of one or more Member States. (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 hr 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 metres "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 500 deg/s and a heading "accuracy" without the use of "positional aiding references" equal to or less (better) than 0,07 deg sec(Lat) (equivalent to 6 arc minutes rms at 45 degrees latitude); or 2. A maximum operating angular rate equal to or greater (higher) than 500 deg/s and a heading "accuracy" without the use of "positional aiding references" equal to or less (better) than 0,2 deg sec (Lat) (equivalent to 17 arc minutes rms at 45 degrees latitude); (d) Providing acceleration measurements or angular rate measurements, in more than one dimension, and having any of the following: 1. Performance specified for accelerometers and gyros described above 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.	

VII.A8. MARINE

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A8.001	Air independent power systems specially designed for underwater use, as follows: (a) Brayton or Rankine cycle engine air independent power systems having any of the following: 1. Chemical scrubber or absorber systems, specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust; 2. Systems specially designed to use a monoatomic gas; 3. Devices or enclosures, specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; or	8A002.j.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	4. Systems having all of the following: a. Specially designed to pressurise the products of reaction or for fuel reformation; b. Specially designed to store the products of the reaction; and c. Specially designed to discharge the products of the reaction against a pressure of 100 kPa or more;	
VII.A8.002	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 10 kHz, or special mounting devices for shock mitigation; and (d) Specially designed exhaust systems that do not exhaust continuously the products of combustion;	8A002.j.
VII.A8.003	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 10 kHz, 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 3. Specially designed to discharge the products of the reaction against a pressure of 100 kPa or more	8A002.j.
VII.A8.004	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 10 kHz, or special mounting devices for shock mitigation; and (b) Specially designed exhaust systems which discharge the products of combustion against a pressure of 100 kPa or more;	8A002.p.
VII.A8.005	Manned, tethered submersible vehicles designed to operate at depths exceeding 1 000 m.	8A001.a.

VII.A9. AEROSPACE AND PROPULSION

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.A9.001	Equipment, tooling or fixtures, specially designed for manufacturing gas turbine engine blades, vanes or "tip shrouds", 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.	9B001
VII.A9.002	Aero gas turbine engines, except aero gas turbine engines which meet all of the following: (a) Certified by civil aviation authorities of one or more Member 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 Member States for the "aircraft" with this specific engine type: 1. A civil type certificate; or 2. An equivalent document recognized by the International Civil Aviation Organization.	9A001

B. **SOFTWARE**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.B.001	"Software" for the "development" of the material listed in VII.A1.	1D002
VII.B.002	"Software" specially designed for the "development" or "production" of equipment as follows: (a) Machine tools for turning having two or more axes which can be coordinated simultaneously for "contouring control" having any of the following: 1. "Unidirectional positioning repeatability" equal to or less (better) than 0,9 µm along one or more linear axis with a travel length less than 1,0 m; or 2. "Unidirectional positioning repeatability" equal to or less (better) than 1,1 µm along one or more linear axis with a travel length equal to or greater than 1,0 m. (b) Machine tools for milling having any of the following: 1. Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control" having any of the following: a. "Unidirectional positioning repeatability" equal to or less (better) than 0,9 µm along one or more linear axis with a travel length less than 1,0 m; or	2D001 2D002

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	b. "Unidirectional positioning repeatability" equal to or less (better) than 1,1 µm along one or more linear axis with a travel length equal to or greater than 1,0 m. 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 0,9 µm along one or more linear axis with a travel length less than 1,0 m; b. "Unidirectional positioning repeatability" equal to or less (better) than 1,4 µm along one or more linear axis with a travel length equal to or greater than 1 m and less than 4 m; c. "Unidirectional positioning repeatability" equal to or less (better) than 6,0 µm along one or more linear axis with a travel length equal to or greater than 4 m; 3. A "unidirectional positioning repeatability" for jig boring machines equal to or less (better) than 1,1 µm along one or more linear axis. 4. Electrical discharge machines of the non-wire type which have two or more rotary axes which can be coordinated simultaneously for "contouring control". 5. Deep-hole-drilling machines and turning machines modified for deep-hole-drilling, having a maximum depth-of-bore capability exceeding 5 m. 6. "Numerically controlled" or manual machine tools, and specially designed components, controls and accessories therefor, specially designed for the shaving, finishing, grinding or honing of hardened (Rc = 40 or more) spur, helical and double-helical gears with a pitch diameter exceeding 1 250 mm and a face width of 15 % of pitch diameter or larger finished to a quality of AGMA 14 or better (equivalent to ISO 1 328 class 3).	
VII.B.003	"Software" for marine systems, equipment, components, test, inspection and "production" equipment and other related technology	8D001 8D002

C. **TECHNOLOGY**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.C.001	"Technology" for the "development" or "production" of equipment or materials listed in VII.A	1E001 1E002 1E102 1E103 1E104 1E201
VII.C.002	"Technology" for the repair of "composite" structures, laminates or materials specified by the "systems, equipment and components" listed in VII.A1. Note: Does not apply to technology for the repair of civil aircraft structures using carbon "fibrous or filamentary materials" and epoxy resins, contained in aircraft manufacturers' manuals.	1E001 1E002 1E201 1E103

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VII.C.003	"Technology" for marine systems, equipment, components, test, inspection and "production" equipment and other related technology.	8E001 8E002

PART VIII

Weapons of mass destruction-related items, materials, equipment, goods and technology designated, pursuant to paragraph 4 of UNSCR 2375 (2017).

A. **GOODS**

VIII.A0. NUCLEAR MATERIALS, FACILITIES, AND EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VIII.A0.001	Ring magnets (except those designed for consumer electronics or automobile applications)	0B001
VIII.A0.002	Hot cells	0B006
VIII.A0.003	Glove boxes suitable for use with radioactive materials	0B005
VIII.A0.004	Electrolytic cells for fluorine production	0B001
VIII.A0.005	Particle accelerators	N/A
VIII.A0.006	Freon and chilled-water cooling systems capable of continuous cooling capacity of 100 000 Btu/hr (29,3 kW) or greater	0B001 0B002 1B231
VIII.A0.007	Bellows-sealed valves	0B001 2A226
VIII.A0.008	Monel equipment, including valves, piping, tanks and vessels (pipes and valves greater than 8-in diameter and rated for 500 psi and tanks greater than 500 l)	0B001 2A226 2B350
VIII.A0.009	Grade 304, 316 and austenitic stainless steel plates, valves, piping, tanks and vessels (pipes and valves greater than 8-in diameter and rated for 500 psi and tanks greater than 500 l)	0B001 1C116 1C216
VIII.A0.010	Vacuum valves, piping, flanges, gaskets and related equipment specially designed for use in high-vacuum service (0,1 Pa or lower pressure)	0B001 0B002 2A226 2B350

VIII.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VIII.A1.001	Radiation detection, monitoring and measurement equipment	1A004 6A002 6A102
VIII.A1.002	Radiographic detection equipment such as X-ray converters, and storage phosphor image plates (except X-ray equipment specially designed for medical use)	1B001 9B007
VIII.A1.003	Tributyl phosphate (CAS 126-73-8)	N/A
VIII.A1.004	Nitric acid in concentrations of 20 % of weight or greater	1C111
VIII.A1.005	Fluorine (except that used for strictly civilian purposes, such as refrigerants, including freon and fluoride for toothpaste production)	1C350
VIII.A1.006	Alpha-emitting radionuclides	1C236
VIII.A1.007	Radiation-hardened television cameras	6A003

VIII.A2. MATERIALS PROCESSING

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VIII.A2.001	Hardened steel and tungsten carbide precision ball bearings (3-mm diameter or greater)	2A001 2A101
VIII.A2.002	Isostatic presses	2B004 2B104 2B204
VIII.A2.003	Electroplating equipment designed for coating parts with nickel or aluminium	2B005
VIII.A2.004	Bellows manufacturing equipment, including hydraulic forming equipment and bellows forming dies	2B009 2B109 2B209
VIII.A2.005	Metal inert gas welders (greater than 180 A DC)	N/A
VIII.A2.006	Centrifugal multiplane balancing machines	2B119 2B219
VIII.A2.007	Seismic detection equipment or seismic intrusion-detection systems that detect, classify and determine the bearing of the source of a detected signal	2B116 9B006

VIII.A3. ELECTRONICS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VIII.A3.001	Frequency changers capable of operating in the frequency range of 300-600 Hz	3A225
VIII.A3.002	Mass spectrometers	3A233
VIII.A3.003	All flash X-ray machines and "parts" or "components" of pulsed power systems designed therefrom, including Marx generators, high-power pulse-shaping networks, high-voltage capacitors and triggers	3A102
VIII.A3.004	Electronic equipment of synthesized frequencies within the range of 31,8 GHz or greater and power output of 100 mW or greater for time-delay generation or time-interval measurement, as follows: (a) digital time delay generators with a resolution of 50 nanoseconds or less over time intervals of 1 microsecond or greater; or (b) multichannel (i.e., with 3 or more channels) or modular time interval meters and chronometry equipment with resolution of 50 nanoseconds or less over time intervals of 1 microsecond or greater	3B002
VIII.A3.005	Chromatography and spectrometry analytical instruments	3A233

B. **SOFTWARE**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
VIII.B.001	Software for neutronic calculations/modelling	0D001
VIII.B.002	Software for radiation transport calculations/modelling	0D001
VIII.B.003	Software for hydrodynamic calculations/modelling (except those used strictly for civilian purposes, such as but not limited to communal heating utilities)	0D001

PART IX

Conventional arms-related items, materials, equipment, goods and technology designated, pursuant to paragraph 5 of UNSCR 2375 (2017).

A. **GOODS**

IX.A1. SPECIAL MATERIALS AND RELATED EQUIPMENT

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A1.001	Seals, gaskets, sealants or fuel bladders, specially designed for "aircraft" or aerospace use, made from more than 50 % by weight of any of the fluorinated polyimides or fluorinated phosphazene elastomers.	1A001

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A1.002	Manufactures of non-"fusible" aromatic polyimides in film, sheet, tape or ribbon: (a) A thickness exceeding 0,254 mm; or (b) Coated or laminated with carbon, graphite, metals or magnetic substances. Note: The category above does not apply to manufactures when coated or laminated with copper and designed for the production of electronic printed circuit boards.	1A003
IX.A1.003	Protective and detection equipment and components, not specially designed for military use, as follows: (a) Full face masks, filter canisters, protective suits, gloves and shoes, detection systems and decontamination equipment specially designed or modified for defence against any of the following: 1. "Biological agents"; 2. "Radioactive materials"; or 3. Chemical warfare (CW) agents.	1A004.a. Except 1A004.a: riot control agents
IX.A1.004	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 item (b); (b) Electrically driven explosive detonators, as follows: 1. Exploding bridge (EB); 2. Exploding bridge wire (EBW); 3. Slapper; or 4. Exploding foil initiators (EFI).	1A007
IX.A1.005	Charges, devices and components, as follows: (a) "Shaped charges"; 1. Net Explosive Quantity (NEQ) greater than 90 g; and 2. Outer casing diameter equal to or greater than 75 mm; (b) Linear shaped cutting charges; 1. An explosive load greater than 40 g/m; and 2. A width of 10 mm or more; (c) Detonating cord with explosive core load greater than 64 g/m; or (d) Cutters and severing tools, having a NEQ greater than 3,5 kg, and other severing tools.	1A008
IX.A1.006	Equipment for the production or inspection of "composite" structures or laminates or "fibrous or filamentary materials" as follows, and specially designed components and accessories therefor: (a) "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.	1B001.g.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A1.007	Equipment for producing metal alloys, metal alloy powder or alloyed material specially designed to avoid contamination and specially designed for use in one of the following processes: (a) Vacuum atomization; (b) Gas atomization; (c) Rotary atomization; (d) Splat quenching; (e) Melt spinning and comminution; (f) Melt extraction and comminution; (g) Mechanical alloying; or (h) Plasma atomization.	1B002
IX.A1.008	Tools, dies, moulds or fixtures, for "superplastic forming" or "diffusion bonding" titanium, aluminium or their alloys: (a) Airframe or aerospace structures; (b) "Aircraft" or aerospace engines; or (c) Specially designed components for structures specified in item (a) or for engines specified in item (b).	1B003
IX.A1.009	Materials specially designed for use as absorbers of electromagnetic waves, or intrinsically conductive polymers, as follows: (a) 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. Technical note: "Bulk electrical conductivity" and "sheet (surface) resistivity" should be determined using ASTM D-257 or national equivalents.	1C001.c.
IX.A1.010	"Superconductive" "composite" conductors consisting of one or more "superconductive" "filaments", which remain "superconductive" above 115 K (– 158,16 °C). Technical note: For the purposes of the item above, "filaments" may be in wire, cylinder, film, tape or ribbon form.	1C005.a.
IX.A1.011	"Fibrous or filamentary materials", as follows: (a) Organic "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding $12,7 \times 10^6$ m; and 2. "Specific tensile strength" exceeding $23,5 \times 10^4$ m; Note: This item does not apply to polyethylene.	1C010.a. 1C010.b. 1C010.c.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) Carbon "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding 14,65 × 10^6 m; and 2. "Specific tensile strength" exceeding 26,82 × 10^4 m; (c) Inorganic "fibrous or filamentary materials", having all of the following: 1. "Specific modulus" exceeding 2,54 × 10^6 m; and 2. Melting, softening, decomposition or sublimation point exceeding 1 922 K (1 649 °C) in an inert environment.	

IX.A2. MATERIALS PROCESSING

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A2.001	Anti-friction bearings and bearing systems, as follows, and components therefore: Note: This category does not apply to balls with tolerances specified by the manufacturer in accordance with ISO 3290 as grade 5 or worse. (a) Ball bearings and solid roller bearings, having all tolerances specified by the manufacturer in accordance with ISO 492 Tolerance Class 4 (or national equivalents) or better, and having both "rings" and "rolling elements", made from monel or beryllium; 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). (b) Active magnetic bearing systems using any of the following: 1. Materials with flux densities of 2,0 T or greater and yield strengths greater than 414 MPa; 2. All-electromagnetic three-dimensional homopolar bias designs for actuators; or 3. High-temperature (450 K (177 °C) and above) position sensors.	2A001.a. 2A001.c.
IX.A2.002	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": (a) Machine tools for grinding having any of the following: 1. Three or more axes which can be coordinated simultaneously for "contouring control" and a "unidirectional positioning repeatability" equal to or less (better) than 1,1 μm along one or more linear axis; or 2. Five or more axes which can be coordinated simultaneously for "contouring control";	2B001.c.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) 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 that can be coordinated simultaneously for "contouring control".	
IX.A2.003	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 1,0 μm; (b) Finishing to a roughness less (better) than 100 nm 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". Technicalnotes: For the purposes of the items above: 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	2B002.a. 2B002.b. 2B002.c. 2B002.d.
IX.A2.004	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 406 mm or more; and (b) Having any of the following: 1. A maximum working pressure exceeding 207 MPa; 2. A controlled thermal environment exceeding 1 773 K (1 500 °C); or 3. A facility for hydrocarbon impregnation and removal of resultant gaseous degradation products.	2B004 2B104 2B204

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A2.005	Equipment specially designed for the deposition, processing and in-process control of inorganic overlays, coatings and surface modifications, as follows: (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 0,01 Pa) rotating seals; or b. Incorporating in situ coating thickness control; (b) Ion implantation production equipment having beam currents of 5 mA or more; (c) Electron beam physical vapour deposition (EB-PVD) production equipment incorporating power systems rated for over 80 kW and having any of the following: 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 ionized 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 10 kPa measured above and within 300 mm of the gun nozzle exit) in a vacuum chamber capable of evacuation down to 0,01 Pa prior to the spraying process; or 2. Incorporating in situ coating thickness control; (e) Sputter deposition production equipment capable of current densities of 0,1 mA/mm² or higher at a deposition rate of 15 μm/h or more; (f) Cathodic arc deposition production equipment incorporating a grid of electromagnets for steering control of the arc spot on the cathode; or (g) Ion plating production equipment capable of in situ measurement of any of the following: 1. Coating thickness on the substrate and rate control; or 2. Optical characteristics.	2B005
IX.A2.006	Dimensional inspection or measuring systems, equipment 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 (E0,MPE) at any point within the operating range of the machine (i.e., within the length of 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);	2B006.b. 2B206.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) Linear and angular displacement measuring instruments, as follows: 1. "Linear displacement" measuring instruments having any of the following: a. Non-contact-type measuring systems with a "resolution" equal to or less (better) than 0,2 μm within a measuring range up to 0,2 mm; b. Linear Variable Differential Transformer (LVDT) systems: 1. Having any of the following: a. "Linearity" equal to or less (better) than 0,1 % measured from 0 to the "full operating range", for LVDTs with a "full operating range" up to and including ± 5 mm; or b. "Linearity" equal to or less (better) than 0,1 % measured from 0 to 5 mm for LVDTs with a "full operating range" greater than ± 5 mm; and 2. Drift equal to or less (better) than 0,1 % per day at a standard ambient test room temperature ± 1 K; Technical note: For the purposes of item b. above, "full operating range" is half of the total possible linear displacement of the LVDT. For example, LVDTs with a "full operating range" up to and including ± 5 mm can measure a total possible linear displacement of 10 mm. c. Measuring systems having all of the following: 1. Containing a "laser"; 2. A "resolution" over their full scale of 0,200 nm or less (better); and 3. 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 a temperature of 20 ± 0,01 °C; or d. "Electronic assemblies" specially designed to provide feedback capability in systems specified above; 2. Angular displacement measuring instruments; Note: The category above does not apply to optical instruments, such as autocollimators, using collimated light (e.g., "laser" light) to detect angular displacement of a mirror. (c) Equipment for measuring surface roughness (including surface defects), by measuring optical scatter with a sensitivity of 0,5 nm or less (better).	
IX.A2.007	"Robots" having any of the following characteristics and specially designed controllers and "end-effectors" therefor: (a) Capable in real time of full three-dimensional image processing or full three-dimensional "scene analysis" to generate or modify "programs" or to generate or modify numerical program data; Technical note: The "scene analysis" limitation does not include approximation of the third dimension by viewing at a given angle, or limited greyscale interpretation for the perception of depth or texture for the approved tasks (2 1/2 D).	2B007 2B207

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(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 greater than 5×10^3 Gy (Si) without operational degradation; or (d) Specially designed to operate at altitudes exceeding 30 000 m.	
IX.A2.008	Assemblies or units, specially designed for machine tools, or dimensional inspection or measuring systems and equipment, as follows: (a) Linear position feedback units having an overall "accuracy" less (better) than (800 + (600 × L/1 000)) nm (L equals the effective length in mm); (b) Rotary position feedback units having an "accuracy" less (better) than 0,00025 °; or (c) "Compound rotary tables" and "tilting spindles", for use with machine tools to or above the levels specified by this category.	2B008
IX.A2.009	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: (a) Three or more axes which can be coordinated simultaneously for "contouring control"; and (b) A roller force more than 60 kN. Technicalnote: Machines combining the functions of spin-forming and flow-forming are regarded as flow-forming machines.	2B009 2B109 2B209

IX.A3. ELECTRONICS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.001	Electronic items, as follows: (a) General-purpose integrated circuits, as follows: Notes: 1. The status of wafers (finished or unfinished), in which the function has been determined, is to be evaluated against the parameters of 3A001.a. 2. 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").	3A001.a

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.002	Integrated circuits designed or rated as radiation hardened to withstand any of the following: (a) A total dose of 5×10^3 Gy (Si) or higher; (b) A dose rate upset of 5×10^6 Gy (Si)/s or higher; or (c) A fluence (integrated flux) of neutrons (1 MeV equivalent) of $5 \times 1\ 013$ n/cm^2 or higher on silicon, or its equivalent for other materials; Note: The category above does not apply to Metal Insulator Semiconductors (MIS).	3A001.a.
IX.A3.003	"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 digitized data, digital-to-analogue converters, electro-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 status of the equipment in which the integrated circuit will be used is unknown, Fast Fourier Transform (FFT) processors, Electrical Erasable Programmable Read-Only Memories (EEPROMs), flash memories, Static Random-Access Memories (SRAMs) or Magnetic Random-Access Memories (MRAMs), 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); Note: This category does not apply to integrated circuits for civil automobile or railway train applications.	3A001.a.2
IX.A3.004	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 (c) Optical waveguides;	3A001.a.
IX.A3.005	4. 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: This category 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).	3A001.a.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.006	Neural network integrated circuits;	3A001.a.
IX.A3.007	Custom integrated circuits for which the function is unknown, or the 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 0,02 ns; or (c) An operating frequency exceeding 3 GHz;	3A001.a.
IX.A3.008	Direct Digital Synthesizer (DDS) integrated circuits having any of the following: (a) A Digital-to-Analogue Converter (DAC) clock frequency of 3,5 GHz or more and a DAC resolution of 10 bit or more, but less than 12 bit; or (b) A DAC clock frequency of 1,25 GHz or more and a DAC resolution of 12 bit or more; Technicalnote: The DAC clock frequency may be specified as the master clock frequency or the input clock frequency.	3A001.a.
IX.A3.009	Microwave or millimetre wave items, as follows: (a) Travelling-wave "vacuum electronic devices", pulsed or continuous wave; 1. Devices operating at frequencies exceeding 31,8 GHz; 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; 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; 5. Devices with a "fractional bandwidth" of greater than or equal to 10 %, with any of the following: a. An annular electron beam; b. A non-axisymmetric electron beam; or c. Multiple electron beams; (b) Crossed-field amplifier "vacuum electronic devices" with a gain of more than 17 dB;	3A001.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(c) Thermionic cathodes designed for "vacuum electronic devices" producing an emission current density at rated operating conditions exceeding 5 A/cm^2 or a pulsed (non-continuous) current density at rated operating conditions exceeding 10 A/cm^2; (d) "Vacuum electronic devices" with the capability to operate in a "dual mode"; Technical note: "Dual mode" means that 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.	
IX.A3.010	"Monolithic Microwave Integrated Circuit" ("MMIC") amplifiers that are any of the following: (a) Rated for operation at frequencies exceeding 2,7 GHz up to and including 6,8 GHz with a "fractional bandwidth" of greater than 15 %, and having any of the following: 1. A peak saturated power output greater than 75 W (48,75 dBm) at any frequency exceeding 2,7 GHz up to and including 2,9 GHz; 2. A peak saturated power output greater than 55 W (47,4 dBm) at any frequency exceeding 2,9 GHz up to and including 3,2 GHz; 3. A peak saturated power output greater than 40 W (46 dBm) at any frequency exceeding 3,2 GHz up to and including 3,7 GHz; or 4. A peak saturated power output greater than 20 W (43 dBm) at any frequency exceeding 3,7 GHz up to and including 6,8 GHz; (b) Rated for operation at frequencies exceeding 6,8 GHz up to and including 16 GHz with a "fractional bandwidth" of greater than 10 %, and having any of the following: 1. A peak saturated power output greater than 10W (40 dBm) at any frequency exceeding 6,8 GHz up to and including 8,5 GHz; or 2. A peak saturated power output greater than 5W (37 dBm) at any frequency exceeding 8,5 GHz up to and including 16 GHz; (c) Rated for operation with a peak saturated power output greater than 3 W (34,77 dBm) at any frequency exceeding 16 GHz up to and including 31,8 GHz, and with a "fractional bandwidth" of greater than 10 %; (d) Rated for operation with a peak saturated power output greater than 0,1n W (– 70 dBm) at any frequency exceeding 31,8 GHz up to and including 37 GHz; (e) Rated for operation with a peak saturated power output greater than 1 W (30 dBm) at any frequency exceeding 37 GHz up to and including 43,5 GHz, and with a "fractional bandwidth" of greater than 10 %; (f) Rated for operation with a peak saturated power output greater than 31,62 mW (15 dBm) at any frequency exceeding 43,5 GHz up to and including 75 GHz, and with a "fractional bandwidth" of greater than 10 %; (g) Rated for operation with a peak saturated power output greater than 10 mW (10 dBm) at any frequency exceeding 75 GHz up to and including 90 GHz, and with a "fractional bandwidth" of greater than 5 %; or (h) Rated for operation with a peak saturated power output greater than 0,1 nW (– 70 dBm) at any frequency exceeding 90 GHz;	3A001.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	Notes: 1. The status of the MMIC whose rated operating frequency includes frequencies listed in more than one frequency range is determined by the lowest peak saturated power output threshold. 2. This category does not apply to MMICs if they are specially designed for other applications, e. g., telecommunications, radar, automobiles.	
IX.A3.011	Discrete microwave transistors that are any of the following: a. Rated for operation at frequencies exceeding 2,7 GHz up to and including 6,8 GHz and having any of the following: 1. A peak saturated power output greater than 400 W (56 dBm) at any frequency exceeding 2,7 GHz up to and including 2,9 GHz; 2. A peak saturated power output greater than 205 W (53,12 dBm) at any frequency exceeding 2,9 GHz up to and including 3,2 GHz; 3. A peak saturated power output greater than 115 W (50,61 dBm) at any frequency exceeding 3,2 GHz up to and including 3,7 GHz; or 4. A peak saturated power output greater than 60 W (47,78 dBm) at any frequency exceeding 3,7 GHz up to and including 6,8 GHz; b. Rated for operation at frequencies exceeding 6,8 GHz up to and including 31,8 GHz and having any of the following: 1. A peak saturated power output greater than 50 W (47 dBm) at any frequency exceeding 6,8 GHz up to and including 8,5 GHz; 2. A peak saturated power output greater than 15 W (41,76 dBm) at any frequency exceeding 8,5 GHz up to and including 12 GHz; 3. A peak saturated power output greater than 40 W (46 dBm) at any frequency exceeding 12 GHz up to and including 16 GHz; or 4. A peak saturated power output greater than 7 W (38,45 dBm) at any frequency exceeding 16 GHz up to and including 31,8 GHz; c. Rated for operation with a peak saturated power output greater than 0,5 W (27 dBm) at any frequency exceeding 31,8 GHz up to and including 37 GHz; d. Rated for operation with a peak saturated power output greater than 1 W (30 dBm) at any frequency exceeding 37 GHz up to and including 43,5 GHz; or e. Rated for operation with a peak saturated power output greater than 0,1 nW (-70 dBm) at any frequency exceeding 43,5 GHz; Notes: 1. The status of a transistor whose rated operating frequency includes frequencies listed in more than one frequency range is determined by the lowest peak saturated power output threshold. 2. This category includes bare dice, dice mounted on carriers or dice mounted in packages. Some discrete transistors may also be referred to as power amplifiers.	3A001.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.012	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 2,7 GHz up to and including 6,8 GHz with a "fractional bandwidth" of greater than 15 % and having any of the following: 1. A peak saturated power output greater than 500 W (57 dBm) at any frequency exceeding 2,7 GHz up to and including 2,9 GHz; 2. A peak saturated power output greater than 270 W (54,3 dBm) at any frequency exceeding 2,9 GHz up to and including 3,2 GHz; 3. A peak saturated power output greater than 200 W (53 dBm) at any frequency exceeding 3,2 GHz up to and including 3,7 GHz; or 4. A peak saturated power output greater than 90 W (49,54 dBm) at any frequency exceeding 3,7 GHz up to and including 6,8 GHz; (b) Rated for operation at frequencies greater than 6,8 GHz up to and including 31,8 GHz with a "fractional bandwidth" of greater than 10 % and having any of the following: 1. A peak saturated power output greater than 70 W (48,54 dBm) at any frequency exceeding 6,8 GHz up to and including 8,5 GHz; 2. A peak saturated power output greater than 50 W (47 dBm) at any frequency exceeding 8,5 GHz up to and including 12 GHz; 3. A peak saturated power output greater than 30 W (44,77 dBm) at any frequency exceeding 12 GHz up to and including 16 GHz; or 4. A peak saturated power output greater than 20 W (43 dBm) at any frequency exceeding 16 GHz up to and including 31,8 GHz; (c) Rated for operation with a peak saturated power output greater than 0,5 W (27 dBm) at any frequency exceeding 31,8 GHz up to and including 37 GHz; (d) Rated for operation with a peak saturated power output greater than 2 W (33 dBm) at any frequency exceeding 37 GHz up to and including 43,5 GHz, and with a "fractional bandwidth" of greater than 10 %; (e) Rated for operation at frequencies exceeding 43,5 GHz and having any of the following: 1. A peak saturated power output greater than 0,2 W (23 dBm) at any frequency exceeding 43,5 GHz up to and including 75 GHz, and with a "fractional bandwidth" of greater than 10 %; 2. A peak saturated power output greater than 20 mW (13 dBm) at any frequency exceeding 75 GHz up to and including 90 GHz, and with a "fractional bandwidth" of greater than 5 %; or 3. A peak saturated power output greater than 0,1 nW (- 70 dBm) at any frequency exceeding 90 GHz; Note: The status of an item whose rated operating frequency includes frequencies listed in more than one frequency range is determined by the lowest peak saturated power output threshold.	3A001.b.
IX.A3.013	Electronically or magnetically tunable band-pass or band-stop filters, having more than 5 tunable resonators capable of tuning across a 1,5:1 frequency band (fmax/fmin) in less than 10 μs 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;	3A001.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.014	Converters and harmonic mixers that are any of the following: (a) Designed to extend the frequency range of "signal analysers" beyond 90 GHz; (b) Designed to extend the operating range of signal generators as follows: 1. Beyond 90 GHz; 2. To an output power greater than 100 mW (20 dBm) anywhere within the frequency range exceeding 43,5 GHz but not exceeding 90 GHz; (c) Designed to extend the operating range of network analysers as follows: 1. Beyond 110 GHz; 2. To an output power greater than 31,62 mW (15 dBm) anywhere within the frequency range exceeding 43,5 GHz but not exceeding 90 GHz; 3. To an output power greater than 1 mW (0 dBm) anywhere within the frequency range exceeding 90 GHz but not exceeding 110 GHz; or (d) Designed to extend the frequency range of microwave test receivers beyond 110 GHz;	3A001.b.
IX.A3.015	Microwave power amplifiers containing "vacuum electronic devices" specified above and having all of the following: (a) Operating frequencies above 3 GHz; (b) An average output power to mass ratio exceeding 80 W/kg; and (c) A volume of less than 400 cm^3; Note: This category does not apply to equipment designed or rated for operation in any frequency band which is "allocated by the International Telecommunication Union (ITU)" for radio communications services, but not for radio determination.	3A001.b.
IX.A3.016	Microwave Power Modules (MPMs) consisting of, at least, a travelling-wave "vacuum electronic device", a "Monolithic Microwave Integrated Circuit" ("MMIC") 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 10 cm^3/W; and (c) An "instantaneous bandwidth" of greater than 1 octave ($f_{max} > 2f_{min}$) and having any of the following: 1. For frequencies equal to or less than 18 GHz, an RF output power greater than 100 W; or 2. A frequency greater than 18 GHz; Technicalnotes: 1. To calculate the volume in item b. above, the following example is provided: for a maximum rated power of 20 W, the volume would be: 20 W × 10 cm^3/W = 200 cm^3. 2. The "turn-on time" in item a. above refers to the time from fully off to fully operational, i.e., it includes the warm-up time of the MPM.	3A001.b.
IX.A3.017	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 ≤ 10 kHz;	3A001.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	Technicalnote: In the category above, F is the offset from the operating frequency in Hz and f is the operating frequency in MHz.	
IX.A3.018	"Frequency synthesizer" "electronic assemblies" having a "frequency switching time" as specified by any of the following: (a) Less than 143 ps; (b) Less than 100 μs for any frequency change exceeding 2,2 GHz within the synthesized frequency range exceeding 4,8 GHz but not exceeding 31,8 GHz; (c) Less than 500 μs for any frequency change exceeding 550 MHz within the synthesized frequency range exceeding 31,8 GHz but not exceeding 37 GHz; (d) Less than 100 μs for any frequency change exceeding 2,2 GHz within the synthesized frequency range exceeding 37 GHz but not exceeding 90 GHz; or (e) Less than 1 ms within the synthesized frequency range exceeding 90 GHz;	3A001.b.
IX.A3.019	"Transmit/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), Psat, greater than 505,62 divided by the maximum operating frequency (in GHz) squared [$P_{sat} > 505{,}62$ W * GHz^2/f_{GHz}^2] for any channel; (b) A "fractional bandwidth" of 5 % or greater for any channel; (c) Any planar side with length d (in cm) equal to or less than 15 divided by the lowest operating frequency in GHz [$d \leq 15$ cm * GHz * N/f_{GHz}] where N is the number of transmit or transmit/receive channels; and d. An electronically variable phase shifter per channel; Technicalnotes: 1. A "transmit/receive module" is a multifunction "electronic assembly" that provides bidirectional 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 bidirectional amplitude and phase control for transmission and reception of signals. 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 (fGHz) in the formula in item (c) for transmit/receive or transmit modules that have a rated operation range extending downward to 2,7 GHz and below [$d \leq 15$ cm * GHz * N/2,7 GHz]. 6. Item IX.A3.019 applies to "transmit/receive modules" or "transmit modules" with or without a heat sink. The value of d in item 11.c. does not include any portion of the "transmit/receive module" or "transmit module" that functions as a heat sink. 7. "Transmit/receive modules", "transmit modules", "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.	3A001.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.020	Surface acoustic wave and surface skimming (shallow bulk) acoustic devices with any of the following: (a) A carrier frequency exceeding 6 GHz; (b) A carrier frequency exceeding 1 GHz, but not exceeding 6 GHz and having any of the following: 1. A "frequency side-lobe rejection" exceeding 65 dB; 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 of greater than 250 MHz; or 4. A dispersive delay of more than 10 μs; or (c) A carrier frequency of 1 GHz 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 100 MHz;	3A001.c.
IX.A3.021	Bulk (volume) acoustic wave which permit the direct processing of signals at frequencies exceeding 6 GHz;	3A001.c.
IX.A3.022	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;	3A001.c.
IX.A3.023	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: (a) 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 (b) Frequency selection at all frequencies using resonant circuits with Q-values exceeding 10 000;	3A001.d.
IX.A3.024	High-energy cells, as follows: (a) "Primary cells" having an "energy density" exceeding 550 Wh/kg at 20 °C; (b) "Secondary cells" having an "energy density" exceeding 350 Wh/kg at 20 °C; Technicalnotes: 1. For the purposes of high-energy devices, "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.	3A001.e.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	2. For the purposes of high-energy devices, a "cell" is defined as an electrochemical device, which has positive and negative electrodes and an electrolyte, and is a source of electrical energy. It is the basic building block of a battery. 3. For the purposes of high-energy devices, a "primary cell" is a "cell" that is not designed to be charged by any other source. 4. For the purposes of high-energy devices, a "secondary cell" is a "cell" that is designed to be charged by an external electrical source. Note: High-energy devices do not apply to batteries, including single-cell batteries.	
IX.A3.025	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 5 kV; 2. An energy density equal to or more than 250 J/kg; and 3. A total energy equal to or more than 25 kJ; (b) Capacitors with a repetition rate of 10 Hz 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 50 J/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;	3A001.e.
IX.A3.026	"Superconductive" electromagnets and solenoids, specially designed to be fully charged or discharged in less than one second and having all of the following: Note: The item above does not apply to "superconductive" electromagnets or solenoids specially designed for Magnetic Resonance Imaging (MRI) medical equipment. (a) Energy delivered during the discharge exceeding 10 kJ in the first second; (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;	3A001.e.
IX.A3.027	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); Technical note: "AM0", or "Air Mass Zero", refers to the spectral irradiance of sunlight in the Earth's outer atmosphere when the distance between the Earth and the sun is one astronomical unit (AU).	3A001.e.
IX.A3.028	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, discs or scales therefor;	3A001.f.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A3.029	Solid-state pulsed power switching thyristor devices and "thyristor modules", using either electrically, optically or electron radiation controlled switch methods and having any of the following: 1. A maximum turn-on current rate of rise (di/dt) greater than 30 000 A/μs and off-state voltage greater than 1 100 V; or 2. A maximum turn-on current rate of rise (di/dt) greater than 2 000 A/μs and having all of the following: a. An off-state peak voltage equal to or greater than 3 000 V; and b. A peak (surge) current equal to or greater than 3 000 A; Notes: 1. Item (g) above includes: — Silicon Controlled Rectifiers (SCRs); — Electrical Triggering Thyristors (ETTs); — Light Triggering Thyristors (LTTs); — Integrated Gate Commutated Thyristors (IGCTs); — Gate Turn-off Thyristors (GTOs); — MOS Controlled Thyristors (MCTs); — Solidtrons. 2. Item (g) above does not apply to thyristor devices and "thyristor modules" incorporated into equipment designed for civil railway or "civil aircraft" applications. Technical note: For the purposes of item (g) above, a "thyristor module" contains one or more thyristor devices.	3A001.g.
IX.A3.030	Solid-state power semiconductor switches, diodes or "modules", having all of the following: 1. Rated for a maximum operating junction temperature greater than 488 K (215 °C); 2. Repetitive peak off-state voltage (blocking voltage) exceeding 300 V; and 3. Continuous current greater than 1 A. Note: Repetitive peak off-state voltage in the item above includes drain to source voltage, collector to emitter voltage, repetitive peak reverse voltage and peak repetitive off-state blocking voltage.	3A001.h.
IX.A3.031	Recording equipment and oscilloscopes, as follows 1. Digital data recorders having all of the following: a. A sustained "continuous throughput" of more than 6,4 Gbit/s to disk or solid-state drive memory; and b. A processor that performs analysis of radio frequency signal data while it is being recorded; 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.	3A002.a.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	2. "Continuous throughput" is the fastest data rate the instrument can record to disk or solid-state drive memory without the loss of any information while sustaining the input digital data rate or digitizer conversion rate. 2. 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 3 dB bandwidth of 60 GHz or greater per channel;	
IX.A3.032	"Signal analysers", as follows: 1. "Signal analysers" having a 3 dB resolution bandwidth (RBW) exceeding 10 MHz anywhere within the frequency range exceeding 31,8 GHz but not exceeding 37 GHz; 2. "Signal analysers" having Displayed Average Noise Level (DANL) less (better) than -150 dBm/Hz anywhere within the frequency range exceeding 43,5 GHz but not exceeding 90 GHz; 3. "Signal analysers" having a frequency exceeding 90 GHz; 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 15 μs or less; or 2. A "frequency mask trigger" function with 100 % probability of trigger (capture) for signals having a duration of 15 μs or less; Technicalnotes: 1. Probability of discovery in item 1. above is also referred to as probability of intercept or probability of capture. 2. For the purposes of item 1. above, the duration for 100 % probability of discovery is equivalent to the minimum signal duration necessary for the specified level measurement uncertainty. Note: The category above does not apply to those "signal analysers" using only constant percentage bandwidth filters (also known as octave or fractional octave filters).	3A002.c.
IX.A3.033	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 31,8 GHz but not exceeding 37 GHz: a. "Pulse duration" of less than 25 ns; and b. On/off ratio equal to or exceeding 65 dB; 2. An output power exceeding 100 mW (20 dBm) anywhere within the frequency range exceeding 43,5 GHz but not exceeding 90 GHz; 3. A "frequency switching time" as specified by any of the following: a. Less than 100 μs for any frequency change exceeding 2,2 GHz within the frequency range exceeding 4,8 GHz but not exceeding 31,8 GHz	3A002.d.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	b. Less than 500 μs for any frequency change exceeding 550 MHz within the frequency range exceeding 31,8 GHz but not exceeding 37 GHz; or c. Less than 100 μs for any frequency change exceeding 2,2 GHz within the frequency range exceeding 37 GHz but not exceeding 90 GHz;	
IX.A3.034	Network analysers having any of the following: 1. An output power exceeding 31,62 mW (15 dBm) anywhere within the operating frequency range exceeding 43,5 GHz but not exceeding 90 GHz; 2. An output power exceeding 1 mW (0 dBm) anywhere within the operating frequency range exceeding 90 GHz but not exceeding 110 GHz; 3. "Non-linear vector measurement functionality" at frequencies exceeding 50 GHz but not exceeding 110 GHz; or 4. A maximum operating frequency exceeding 110 GHz; 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.	3A002.e.
IX.A3.035	Microwave test receivers having all of the following; 1. A maximum operating frequency exceeding 110 GHz; and 2. Being capable of measuring amplitude and phase simultaneously;	3A002.f.
IX.A3.036	Atomic frequency standards being any of the following: 1. "Space-qualified"; 2. Non-rubidium and having a long-term stability less (better) than 1×10^{-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 1×10^{-11}/month; and c. Total power consumption of less than 1 Watt.	3A002.f.
IX.A3.037	Equipment for the manufacturing of semiconductor devices or materials, as follows and specially designed components and accessories therefor: (a) Equipment designed for ion implantation and having any of the following: 1. Being designed and optimized to operate at a beam energy of 20 keV or more and a beam current of 10 mA or more for hydrogen, deuterium or helium implant; 2. Direct write capability; 3. A beam energy of 65 keV or more and a beam current of 45 mA or more for high-energy oxygen implant into a heated semiconductor material "substrate"; or 4. Being designed and optimized to operate at a beam energy of 20 keV or more and a beam current of 10 mA or more for silicon implant into a semiconductor material "substrate" heated to 600 °C or greater;	3B001.b. 3B001.f. 3B001.f.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) Lithography equipment as follows and imprint lithography equipment capable of producing features of 45 nm or less: 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 193 nm; or b. Capable of producing a pattern with a "Minimum Resolvable Feature size" (MRF) of 45 nm or less; 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 (c) Equipment specially designed for mask using deflected focused electron beam, ion beam or "laser" beam;	
IX.A3.038	Equipment designed for device processing using direct writing methods; Masks and reticles, designed for integrated circuits.	3B001.g.
IX.A3.038	Test equipment specially designed for testing finished or unfinished semiconductor and microwave devices as follows and specially designed components and accessories therefor: (a) For testing S-parameters of transistor devices at frequencies exceeding 31,8 GHz; (b) For testing microwave integrated circuits specified above.	3B002
IX.A3.039	Hetero-epitaxial materials consisting of a "substrate" having stacked epitaxially grown multiple layers with any of the following: (a) Silicon (Si); (b) Germanium (Ge); (c) Silicon Carbide (SiC); or (d) "III/V compounds" of gallium or indium. Note: This item does not apply to 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.	3C001
IX.A3.040	Resist materials as follows and "substrates" coated with the following resists: (a) Resists designed for semiconductor lithography as follows: 1. Positive resists adjusted (optimized) for use at wavelengths less than 245 nm but equal to or greater than 15 nm; 2. Resists adjusted (optimized) for use at wavelengths less than 15 nm but greater than 1 nm;	3C002

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(b) All resists designed for use with electron beams or ion beams, with a sensitivity of 0,01 μcoulomb/mm^2 or better; (c) All resists optimized for surface imaging technologies; (d) All resists designed or optimized for use with imprint lithography equipment capable of producing features of 45 nm or less that use either a thermal or photo-curable process.	
IX.A3.041	Organo-inorganic compounds: (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 %.	3C003
IX.A3.042	Hydrides of phosphorus, arsenic or antimony, having a purity better than 99,999 %, even diluted in inert gases or hydrogen. Note: The item above does not apply to hydrides containing 20 % molar or more of inert gases or hydrogen.	3C004
IX.A3.043	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.	3C005
IX.A3.044	"Substrates" specified in item 5 above with at least one epitaxial layer of silicon carbide, gallium nitride, aluminium nitride or aluminium gallium nitride.	3C006

IX.A6. SENSORS AND LASERS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A6.001	Optical sensors or equipment and components therefor, as follows: (a) Special support components for optical sensors, as follows: 1. "Space-qualified" cryocoolers;	6A002.d.
IX.A6.002	Non-"space-qualified" cryocoolers having a cooling source temperature below 218 K (– 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 8 mm;	6A002.d.
IX.A6.003	Optical sensing fibres specially fabricated either compositionally or structurally, or modified by coating, to be acoustically, thermally, inertially, electromagnetically or nuclear radiation sensitive.	6A002.d.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A6.004	Cameras, systems or equipment, and components therefor, as follows: (a) Instrumentation cameras and specially designed components therefor, as follows: Note: Instrumentation cameras, specified above, with modular structures should be evaluated by their maximum capability, using plug-ins available according to the camera manufacturer's specifications.	6A003
IX.A6.005	High-speed cinema recording cameras using any film format from 8 mm to 16 mm inclusive, in which the film is continuously advanced throughout the recording period, and that are capable of recording at framing rates exceeding 13 150 frames/s; Note: The item above does not apply to cinema recording cameras designed for civil purposes. 2. Mechanical high-speed cameras, in which the film does not move, capable of recording at rates exceeding 1 000 000 frames/s for the full framing height of 35 mm film, or at proportionately higher rates for lesser frame heights, or at proportionately lower rates for greater frame heights; 3. Mechanical or electronic streak cameras as follows: a. Mechanical streak cameras having writing speeds exceeding 10 mm/μs; b. 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 1 μs per full frame; and 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 this item; and b. Enabling these cameras to meet the characteristics specified above, according to the manufacturer's specifications;	6A003
IX.A6.006	Imaging cameras, as follows: Note: The item above does not apply to television or video cameras, specially designed for television broadcasting. 1. Video cameras incorporating solid-state sensors, having a peak response in the wavelength range exceeding 10 nm, but not exceeding 30 000 nm and having all of the following: a. Having any of the following: 1. More than 4×10^6 "active pixels" per solid-state array for monochrome (black and white) cameras;	6A003

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	2. More than 4×10^6 "active pixels" per solid-state array for colour cameras incorporating three solid-state arrays; or 3. More than 12×10^6 "active pixels" for solid-state array colour cameras incorporating one solid-state array; and b. Having any of the following: 1. Optical mirrors specified below; 2. Optical control equipment specified below; or 3. The capability for annotating internally generated "camera tracking data"; Technicalnotes: 1. For the purposes of this entry, digital video cameras should be evaluated by the maximum number of "active pixels" used for capturing moving images. 2. For the purposes of this entry, "camera tracking data" is the information necessary to define camera line of sight orientation with respect to the Earth. This includes: (a) the horizontal angle the camera line of sight makes with respect to the Earth's magnetic field direction; and (b) the vertical angle between the camera line of sight and the Earth's horizon.	
IX.A6.007	Scanning cameras and scanning camera systems; a. A peak response in the wavelength range exceeding 10 nm, but not exceeding 30 000 nm; b. Linear detector arrays with more than 8 192 elements per array; and c. Mechanical scanning in one direction; Note: The item above does not apply to scanning cameras and scanning camera systems, 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.	6A003
IX.A6.008	Imaging cameras incorporating image intensifier tubes having any of the following: a. Having all of the following: 1. A peak response in the wavelength range exceeding 400 nm but not exceeding 1 050 nm; 2. Electron image amplification using any of the following: a. A microchannel plate with a hole pitch (centre-to-centre spacing) of 12 μm or less; or b. An electron sensing device with a non-binned pixel pitch of 500 μm or less, specially designed or modified to achieve "charge multiplication" other than by a microchannel plate; and 3. Any of the following photocathodes: a. Multialkali photocathodes (e.g., S-20 and S-25) having a luminous sensitivity exceeding 350 μA/lm;	6A003

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	b. GaAs or GaInAs photocathodes; or c. Other "III/V compound" semiconductor photocathodes having a maximum "radiant sensitivity" exceeding 10 mA/W; or b. Having all of the following: 1. A peak response in the wavelength range exceeding 1 050 nm but not exceeding 1 800 nm; 2. Electron image amplification using any of the following: a. A microchannel plate with a hole pitch (centre-to-centre spacing) of 12 μm or less; or b. An electron sensing device with a non-binned pixel pitch of 500 μm 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 15 mA/W;	
IX.A6.009	Imaging cameras incorporating "focal plane arrays" having any of the following: a. Incorporating non-"space-qualified" "focal plane arrays" having any of the following: 1. Having all of the following: a. Individual elements with a peak response within the wavelength range exceeding 900 nm but not exceeding 1 050 nm; and b. Any of the following: 1. A response "time constant" of less than 0,5 ns; or 2. Specially designed or modified to achieve "charge multiplication" and having a maximum "radiant sensitivity" exceeding 10 mA/W; 2. Having all of the following: a. Individual elements with a peak response in the wavelength range exceeding 1 050 nm but not exceeding 1 200 nm; and b. Any of the following: 1. A response "time constant" of 95 ns or less; or 2. Specially designed or modified to achieve "charge multiplication" and having a maximum "radiant sensitivity" exceeding 10 mA/W; or 3. Being non-"space-qualified" non-linear (two-dimensional) "focal plane arrays" having individual elements with a peak response in the wavelength range exceeding 1 200 nm but not exceeding 30 000 nm; 4. Being non-"space-qualified" linear (one-dimensional) "focal plane arrays" having all of the following: a. Individual elements with a peak response in the wavelength range exceeding 1 200 nm but not exceeding 3 000 nm; and b. Any of the following: 1. 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 2. Signal processing in the detector elements; or	6A003

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	5. Being non-"space-qualified" linear (one-dimensional) "focal plane arrays" having individual elements with a peak response in the wavelength range exceeding 3 000 nm but not exceeding 30 000 nm; b. Incorporating non-"space-qualified" non-linear (two-dimensional) infrared "focal plane arrays" based on "microbolometer" material having individual elements with an unfiltered response in the wavelength range equal to or exceeding 8 000 nm but not exceeding 14 000 nm; or c. Incorporating non-"space-qualified" "focal plane arrays" having all of the following: 1. Individual detector elements with a peak response in the wavelength range exceeding 400 nm but not exceeding 900 nm; 2. Specially designed or modified to achieve "charge multiplication" and having a maximum "radiant sensitivity" exceeding 10 mA/W for wavelengths exceeding 760 nm; and 3. Greater than 32 elements. Notes: 1. Imaging cameras specified in item 4 above 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. 2. Item 4.a. does not apply to 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; (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. 3. Item 4.b. does not apply to 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 10 mrad (milliradians); 2. Incorporating a fixed focal-length lens that is not designed to be removed; 3. Not incorporating a "direct view" display; and Technicalnote: "Direct view" refers to an imaging camera operating in the infrared spectrum that presents a visual image to a human observer using a near-to-eye microdisplay incorporating any light-security mechanism.	

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	4. Having any of the following: a. No facility to obtain a viewable image of the detected field of view; or b. The camera is designed for a single kind of application and designed not to be user modified; or Technicalnote: "Instantaneous Field of View (IFOV)" specified in 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. (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.	
IX.A6.010	Optical mirrors (reflectors), as follows: 1. "Deformable mirrors" having an active optical aperture greater than 10 mm and having any of the following, and specially designed components therefor: a. Having all the following: 1. A mechanical resonant frequency of 750 Hz or more; and 2. More than 200 actuators; or b. A Laser Induced Damage Threshold (LIDT) being any of the following: 1. Greater than 1 kW/cm^2 using a "CW laser"; or 2. Greater than 2 J/cm^2 using 20 ns "laser" pulses at 20 Hz repetition rate; 2. Lightweight monolithic mirrors having an average "equivalent density" of less than 30 kg/m^2 and a total mass exceeding 10 kg; 3. Lightweight "composite" or foam mirror structures having an average "equivalent density" of less than 30 kg/m^2 and a total mass exceeding 2 kg; Note: Items 2 and 3 above do not apply to mirrors specially designed to direct solar radiation for terrestrial heliostat installations.	6A004.a.
IX.A6.011	Mirrors specially designed for beam steering mirror stages with a flatness of λ/10 or better (λ is equal to 633 nm) and having any of the following: a. Diameter or major axis length greater than or equal to 100 mm; or b. Having all of the following: 1. Diameter or major axis length greater than 50 mm but less than 100 mm; and 2. A Laser Induced Damage Threshold (LIDT) being any of the following: a. Greater than 10 kW/cm^2 using a "CW laser"; or b. Greater than 20 J/cm^2 using 20 ns "laser" pulses at 20 Hz repetition rate;	6A004.b.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A6.012	Optical components made from zinc selenide (ZnSe) or zinc sulphide (ZnS) with transmission in the wavelength range exceeding 3 000 nm but not exceeding 25 000 nm and having any of the following: 1. Exceeding 100 cm^3 in volume; or 2. Exceeding 80 mm in diameter or length of major axis and 20 mm 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 5×10^{-6} in any coordinate direction.	6A004.c.
IX.A6.013	Non-"tunable" continuous-wave "(CW) lasers" having any of the following: 1. Output wavelength less than 150 nm and output power exceeding 1 W; 2. Output wavelength of 150 nm or more but not exceeding 510 nm and output power exceeding 30 W; Note: Item 2 above does not apply to Argon "lasers" having an output power equal to or less than 50 W. 3. Output wavelength exceeding 510 nm but not exceeding 540 nm and any of the following: a. Single transverse mode output and output power exceeding 50 W; or b. Multiple transverse mode output and output power exceeding 150 W; 4. Output wavelength exceeding 540 nm but not exceeding 800 nm and output power exceeding 30 W; 5. Output wavelength exceeding 800 nm but not exceeding 975 nm and any of the following: a. Single transverse mode output and output power exceeding 50 W; or b. Multiple transverse mode output and output power exceeding 80 W; 6. Output wavelength exceeding 975 nm but not exceeding 1 150 nm and any of the following: a. Single transverse mode and output power exceeding 500 W; or b. Multiple transverse mode output and any of the following: 1. "Wall-plug efficiency" exceeding 18 % and output power exceeding 500 W; or 2. Output power exceeding 2 kW;	6A005.a.1. 6A005.a.2.. 6A005.a.3 6A005.a.4. 6A005.a.5. 6A005.a.6.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	Notes: 1. Item b. above does not apply to multiple transverse mode, industrial "lasers" with output power exceeding 2 kW and not exceeding 6 kW with a total mass greater than 1 200 kg. For the purposes 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 and/or delivery. 2. Item b. above does not apply to multiple transverse mode, industrial "lasers" having any of the following: (a) Output power exceeding 500 W but not exceeding 1 kW and having all of the following: 1. Beam Parameter Product (BPP) exceeding 0,7 mm · mrad; and 2. "Brightness" not exceeding 1 024 W/(mm · mrad)^2; (b) Output power exceeding 1 kW but not exceeding 1,6 kW and having a BPP exceeding 1,25 mm · mrad; (c) Output power exceeding 1,6 kW but not exceeding 2,5 kW and having a BPP exceeding 1,7 mm · mrad; (d) Output power exceeding 2,5 kW but not exceeding 3,3 kW and having a BPP exceeding 2,5 mm · mrad; (e) Output power exceeding 3,3 kW but not exceeding 4 kW and having a BPP exceeding 3,5 mm · mrad; (f) Output power exceeding 4 kW but not exceeding 5 kW and having a BPP exceeding 5 mm · mrad; (g) Output power exceeding 5 kW but not exceeding 6 kW and having a BPP exceeding 7,2 mm · mrad; (h) Output power exceeding 6 kW but not exceeding 8 kW and having a BPP exceeding 12 mm · mrad; or (i) Output power exceeding 8 kW but not exceeding 10 kW and having a BPP exceeding 24 mm · mrad; Technicalnote: For the purposes of 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.	
IX.A6.014	"Tunable" "lasers" having any of the following: 1. Output wavelength less than 600 nm and any of the following: a. Output energy exceeding 50 mJ per pulse and "peak power" exceeding 1 W; or b. Average or CW output power exceeding 1 W; Note: Item 1. above does not apply to dye "lasers" or other liquid "lasers", having a multimode output and a wavelength of 150 nm or more but not exceeding 600 nm and all of the following: 1. Output energy less than 1,5 J per pulse or a "peak power" less than 20 W; and 2. Average or CW output power less than 20 W.	6A005.c.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	2. Output wavelength of 600 nm or more but not exceeding 1 400 nm, and any of the following: a. Output energy exceeding 1 J per pulse and "peak power" exceeding 20 W; or b. Average or CW output power exceeding 20 W; or 3. Output wavelength exceeding 1 400 nm and any of the following: a. Output energy exceeding 50 mJ per pulse and "peak power" exceeding 1 W; or b. Average or CW output power exceeding 1 W;	
IX.A6.015	Other semiconductor "lasers", as follows: Notes: 1. Includes semiconductor "lasers" having optical output connectors (e.g., fibre-optic pigtails). 2. The status of semiconductor "lasers" specially designed for other equipment is determined by the status of the other equipment. a. Individual single-transverse mode semiconductor "lasers" having any of the following: 1. Wavelength equal to or less than 1 510 nm and average or CW output power, exceeding 1,5 W; or 2. Wavelength greater than 1 510 nm and average or CW output power, exceeding 500 mW; b. Individual, multiple-transverse mode semiconductor "lasers" having any of the following: 1. Wavelength of less than 1 400 nm and average or CW output power, exceeding 15 W; 2. Wavelength equal to or greater than 1 400 nm and less than 1 900 nm and average or CW output power, exceeding 2,5 W; or 3. Wavelength equal to or greater than 1 900 nm and average or CW output power, exceeding 1 W; c. Individual semiconductor "laser" "bars" having any of the following: 1. Wavelength of less than 1 400 nm and average or CW output power, exceeding 100 W; 2. Wavelength equal to or greater than 1 400 nm and less than 1 900 nm and average or CW output power, exceeding 25 W; or 3. Wavelength equal to or greater than 1 900 nm and average or CW output power, exceeding 10 W; d. Semiconductor "laser" "stacked arrays" (two-dimensional arrays) having any of the following: 1. Wavelength less than 1 400 nm and having any of the following: a. Average or CW total output power less than 3 kW and having average or CW output "power density" greater than 500 W/cm^2; b. Average or CW total output power equal to or exceeding 3 kW but less than or equal to 5 kW, and having average or CW output "power density" greater than 350W/cm^2;	6A005.d.1

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	c. Average or CW total output power exceeding 5 kW; d. Peak pulsed "power density" exceeding 2 500 W/cm^2; or Note: Item d. does not apply to epitaxially fabricated monolithic devices. e. Spatially coherent average or CW total output power, greater than 150 W; 2. Wavelength greater than or equal to 1 400 nm but less than 1 900 nm, and having any of the following: a. Average or CW total output power less than 250 W and average or CW output "power density" greater than 150 W/cm^2; b. Average or CW total output power equal to or exceeding 250 W but less than or equal to 500 W, and having average or CW output "power density" greater than 50W/cm^2; c. Average or CW total output power exceeding 500 W; d. Peak pulsed "power density" exceeding 500 W/cm^2; or Note: Item d. does not apply to epitaxially fabricated monolithic devices. e. Spatially coherent average or CW total output power, exceeding 15 W; 3. Wavelength greater than or equal to 1 900 nm and having any of the following: a. Average or CW output "power density" greater than 50 W/cm^2; b. Average or CW output power greater than 10 W; or c. Spatially coherent average or CW total output power, exceeding 1,5W; or 4. At least one "laser" "bar" specified above; Technicalnote: For the purposes of this category "power density" means the total "laser" output power divided by the emitter surface area of the "stacked array".	
IX.A6.016	"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"; 3. "Non-repetitive pulsed" Nd: glass "lasers" having any of the following: a. "Pulse duration" not exceeding 1 μs and output energy exceeding 50 J per pulse; or b. "Pulse duration" exceeding 1 μs and output energy exceeding 100 J per pulse;	6A005.d.5
IX.A6.017	Components, as follows: 1. Mirrors cooled either by "active cooling" or by heat pipe cooling; Technicalnote: "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.	6A005.e.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	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: a. Multimode to multimode fused tapered fibre combiners having all of the following: 1. An insertion loss better (less) than or equal to 0,3 dB maintained at a rated total average or CW output power (excluding output power transmitted through the single mode core if present) exceeding 1 000 W; 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: 1. An insertion loss better (less) than 0,5 dB maintained at a rated total average or CW output power exceeding 4 600 W; 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 1,5 mm mrad for a number of input fibres less than or equal to 5; or b. A BPP measured at the output not exceeding 2,5 mm 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 10 kW/cm^2.	
IX.A6.018	Gravity meters (gravimeters) and gravity gradiometers, as follows: (a) Gravity meters designed or modified for ground use and having a static "accuracy" of less (better) than 10 μGal; Note: Item (a) does not apply to ground gravity meters of the quartz element (Worden) type. (b) Gravity meters designed for mobile platforms and having all of the following: 1. A static "accuracy" of less (better) than 0,7 mGal; and 2. An in-service (operational) "accuracy" of less (better) than 0,7 mGal having a "time-to-steady-state registration" of less than 2 minutes under any combination of attendant corrective compensations and motional influences; Technical note: For the purposes of item (b), "time-to-steady-state registration" (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. (c) Gravity gradiometers.	6A007

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A6.019	1. Radar systems, equipment and assemblies, having any of the following, and specially designed components therefor: Note: This section does not apply to: — 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 International Civil Aviation Organization (ICAO) standards and employing electronically steerable linear (one-dimensional) arrays or mechanically positioned passive antennae. (a) Operating at frequencies from 40 GHz to 230 GHz and having any of the following: 1. An average output power exceeding 100 mW; or 2. Locating "accuracy" of 1 m 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"; Technicalnote: The "centre operating frequency" equals one half of the sum of the highest plus the lowest specified operating frequencies. (c) Capable of operating simultaneously on more than two carrier frequencies; (d) Capable of operating in synthetic aperture radar (SAR), inverse synthetic aperture radar (ISAR) or side-looking airborne radar (SLAR) mode; (e) Incorporating electronically steerable array antennae; (f) Capable of height-finding 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 185 km; Note: Item (i) above does not apply to: (a) Fishing ground surveillance radar; (b) Ground radar equipment specially designed for en-route air traffic control and having all of the following: 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;	6A008

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	3. Contains no provisions for remote control of the radar scan rate from the en-route 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 20 μrad (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 400 nm but not exceeding 600 nm; Notes: 1. LIDAR equipment specially designed for surveying is only specified by 3. 2. The item above does not apply to LIDAR equipment specially designed for meteorological observation. 3. Parameters in the IHO Order 1a Standard (5th Edition, February 2008) are summarized as follows: Horizontal Accuracy (95 % confidence level) = 5 m + 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" subsystems 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 200 ns; or Note: Item 2. above does not apply to two-dimensional "marine radar" or "vessel traffic service" radar, having all of the following: (a) "Pulse compression" ratio not exceeding 150; (b) Compressed pulse width of greater than 30 ns; (c) Single and rotating mechanically scanned antenna; (d) Peak output power not exceeding 250 W; and (e) Not capable of "frequency hopping".	

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(l) Having data processing subsystems 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 Note: The item above does not apply to conflict alert capability in ATC systems, or "marine radar". 2. 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 items (f) or (i). Note: The item above does not apply to systems, equipment and assemblies used for "vessel traffic services". Technicalnotes: 1. For the purposes of this section, "marine radar" is a radar that is used to navigate safely at sea, in inland waterways or in near-shore environments. 2. For the purposes of this section, "vessel traffic service" is a vessel traffic monitoring and control service similar to air traffic control for "aircraft".	
IX.A6.020	Optical equipment, as follows: (a) Equipment for measuring absolute reflectance to an "accuracy" of equal to or better than 0,1 % of the reflectance value; (b) Equipment other than optical surface scattering measurement equipment, having an unobscured aperture of more than 10 cm, specially designed for the non-contact optical measurement of a non-planar optical surface figure (profile) to an "accuracy" of 2 nm or less (better) against the required profile. Note: The item above does not apply to microscopes.	6B004
IX.A6.021	Equipment to produce, align and calibrate land-based gravity meters with a static "accuracy" of better than 0,1 mGal.	6B007
IX.A6.022	Pulse radar cross-section measurement systems having transmit pulse widths of 100 ns or less, and specially designed components therefor.	6B008
IX.A6.023	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. Technicalnote: "Mole fraction" is defined as the ratio of moles of ZnTe to the sum of the moles of CdTe and ZnTe present in the crystal.	6C002

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A6.024	Optical materials, as follows: (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 100 cm^3; or 2. A diameter greater than 80 mm and a thickness of 20 mm 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 bi-phosphide or zinc germanium diphosphide); or 5. Gallium selenide (GaSe) (CAS 12024-11-2);	6C004.a. 6C004.b.
IX.A6.025	"Substrate blanks" of silicon carbide or beryllium beryllium (Be/Be) deposited materials, exceeding 300 mm in diameter or major axis length;	6C004.d.
IX.A6.026	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 5 ppm; 2. Integrated metallic purity levels of less than 1 ppm; and 3. High homogeneity (index of refraction variance) less than 5×10^{-6}; (e) Synthetically produced diamond material with an absorption of less than 10^{-5} cm^{-1} for wavelengths exceeding 200 nm but not exceeding 14 000 nm.	6C004.e.
IX.A6.027	"Laser" materials, as follows: (a) Synthetic crystalline "laser" host material in unfinished form as follows: 1. Titanium doped sapphire; (b) Rare-earth-metal doped double-clad fibres; 1. Nominal "laser" wavelength of 975 nm to 1 150 nm and having all of the following: a. Average core diameter equal to or greater than 25 μm; and b. Core "Numerical Aperture" ("NA") less than 0,065; or Note: The item above does not apply to double-clad fibres having an inner glass cladding diameter exceeding 150 μm and not exceeding 300 μm. 2. Nominal "laser" wavelength exceeding 1 530 nm and having all of the following: a. Average core diameter equal to or greater than 20 μm; and b. Core "NA" less than 0,1. Technicalnotes: 1. For the purposes of the item above, the core "Numerical Aperture" ("NA") is measured at the emission wavelengths of the fibre. 2. Item (b) above includes fibres assembled with end caps.	6C005

IX.A7. NAVIGATION AND AVIONICS

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A7.001	"Star trackers" and components therefor, as follows: (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 item (a), as follows: 1. Optical heads or baffles; 2. Data processing units. Technicalnote: "Star trackers" are also referred to as stellar attitude sensors or gyro-astro compasses.	7A004
IX.A7.002	Global Navigation Satellite Systems (GNSS) 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". Note: Item (b) does not apply to GNSS 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. Technicalnote: For the purposes of item (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.	7A005
IX.A7.003	Airborne altimeters operating at frequencies other than 4,2 to 4,4 GHz inclusive and having any of the following: (a) "Power management"; or (b) Using phase shift key modulation.	7A006
IX.A7.004	Test, calibration or alignment equipment, specially designed for equipment specified in the section above.	7B001
IX.A7.005	Equipment specially designed to characterize mirrors for ring "laser" gyros, as follows: (a) Scatterometers having a measurement "accuracy" of 10 ppm or less (better); (b) Profilometers having a measurement "accuracy" of 0,5 nm (5 angstrom) or less (better).	7B002

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A7.006	Equipment specially designed for the "production" of equipment specified IN IX.A7. Note: Including: — 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.	7B003

IX.A8. MARINE

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A8.001	Systems, equipment and components, specially designed or modified for submersible vehicles and designed to operate at depths exceeding 1 000 m, as follows: 1. Pressure housings or pressure hulls with a maximum inside chamber diameter exceeding 1,5 m; 2. Direct current propulsion motors or thrusters; 3. Umbilical cables, and connectors therefor, using optical fibre and having synthetic strength members; 4. Components manufactured from material as follows: "Syntactic foam" designed for underwater use and having all of the following: a. Designed for marine depths exceeding 1 000 m; and b. A density less than 561 kg/m^3;	8A002.a.
IX.A8.002	Systems specially designed or modified for the automated control of the motion of submersible vehicles specified above, using navigation data, having closed loop servo-controls and having any of the following: 1. Enabling a vehicle to move within 10 m of a predetermined point in the water column; 2. Maintaining the position of the vehicle within 10 m of a predetermined point in the water column; or 3. Maintaining the position of the vehicle within 10 m while following a cable on or under the seabed;	8A002.b.
IX.A8.003	Fibre-optic pressure hull penetrators;	8A002.c.
IX.A8.004	"Robots" specially designed for underwater use, controlled by using a dedicated computer and having any of the following: (a) Systems that control the "robot" using information from sensors which measure force or torque applied to an external object, distance to an external object, or tactile sense between the "robot" and an external object; or (b) The ability to exert a force of 250 N or more or a torque of 250 Nm or more and using titanium-based alloys or "composite" "fibrous or filamentary materials" in their structural members;	8A002.h.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A8.005	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 10 kHz, or special mounting devices for shock mitigation; and (b) Specially designed exhaust systems which discharge the products of combustion against a pressure of 100 kPa or more;	8A002.j.
IX.A8.006	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 500 Hz 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. Technicalnote: "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.	8A002.j.

IX.A9. AEROSPACE AND PROPULSION

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A9.001	Aero gas turbine engines: (a) Incorporating any of the "technologies" specified in paragraph 2 of the section below entitled "Technology"; or Note1: This item does not apply to aero gas turbine engines which meet all of the following: (a) Certified by civil aviation authorities; and (b) Intended to power non-military manned "aircraft" for which any of the following has been issued by civil aviation authorities for the "aircraft" with this specific engine type: 1. A civil type certificate; or 2. An equivalent document recognized by ICAO. Note2: This item does not apply to aero gas turbine engines designed for Auxiliary Power Units (APUs) approved by the civil aviation authority of the Member State. (b) Designed to power an "aircraft" designed to cruise at Mach 1 or higher, for more than 30 minutes.	9A001

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A9.002	"Marine gas turbine engines" with an ISO standard continuous power rating of 24 245 kW or more and a specific fuel consumption not exceeding 0,219 kg/kWh in the power range from 35 to 100 %, and specially designed assemblies and components therefor. 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.	9A002
IX.A9.003	Specially designed assemblies or components, incorporating any of the "technologies" specified in paragraph 2 of the section below entitled "Technology", for any of the following aero gas turbine engines: (a) Specified in item 1 above; or (b) Whose design or production origins are unknown to the manufacturer.	9A003
IX.A9.004	Space launch vehicles, "spacecraft", "spacecraft buses", "spacecraft payloads", "spacecraft" on-board systems or equipment, and terrestrial equipment, as follows: (a) Space launch vehicles; (b) "Spacecraft"; (c) "Spacecraft buses"; (d) "Spacecraft payloads" incorporating items specified in this list; (e) On-board systems or equipment, specially designed for "spacecraft" and having any of the following functions: 1. "Command and telemetry data handling"; (f) Terrestrial equipment specially designed for "spacecraft", as follows: 1. Telemetry and telecommand equipment; 2. Simulators.	9A004
IX.A9.005	Liquid rocket propulsion systems.	9A005
IX.A9.006	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; (b) Cryogenic containers or closed-cycle refrigeration systems capable of providing temperatures of 100 K (– 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;	9A006

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	(d) High-pressure (exceeding 17,5 MPa) turbo pumps, pump components or their associated gas generator or expander cycle turbine drive systems; (e) High-pressure (exceeding 10,6 MPa) 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 0,381 mm or smaller in diameter (an area of $1{,}14 \times 10^{-3}$ 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 1,4 g/cm^3 and tensile strengths exceeding 48 MPa	
IX.A9.007	Solid rocket propulsion systems.	9A007
IX.A9.008	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; (b) Filament-wound "composite" motor cases exceeding 0,61 m in diameter or having "structural efficiency ratios (PV/W)" exceeding 25 km; 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). (c) Nozzles with thrust levels exceeding 45 kN or nozzle throat erosion rates of less than 0,075 mm/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.	9A008
IX.A9.009	Hybrid rocket propulsion systems.	9A009
IX.A9.010	Specially designed components, systems and structures, for launch vehicles, launch vehicle propulsion systems or "spacecraft", as follows: (a) Components and structures, specially designed for launch vehicle propulsion systems manufactured using any of the following: 1. "Fibrous or filamentary materials"; 2. Metal "matrix" "composite" materials; or 3. Ceramic "matrix" "composite" materials.	9A010

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A9.011	"Unmanned Aerial Vehicles" ("UAVs"), unmanned "airships", related equipment and components, as follows: (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; Technical notes: 1. For the purposes of the item above, "operator" is a person who initiates or commands the "UAV" or unmanned "airship" flight. 2. For the purposes of the item above, "endurance" is to be calculated for International Standard Atmosphere (ISA) conditions (ISO 2533:1975) at sea level in zero wind. 3. For the purposes of the item above, "natural vision" means unaided human sight, with or without corrective lenses. (b) Related equipment and components, as follows: 1. Equipment or components, specially designed to convert a manned "aircraft" or a manned "airship" to a "UAV" or unmanned "airship", specified in item (a) above; 2. 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).	9A012
IX.A9.012	On-line (real-time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment specially designed for the "development" of gas turbine engines, assemblies or components and incorporating any of the "technologies" specified in paragraph 2 (b) or 2 (c) of the section below entitled "Technology".	9B002
IX.A9.013	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.	9B003
IX.A9.014	Tools, dies or fixtures, for the solid-state joining of "superalloy", titanium or intermetallic airfoil-to-disk combinations described in paragraph 2 of the section below entitled "Technology" for gas turbines.	9B004
IX.A9.015	On-line (real-time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment, specially designed for use in wind tunnels designed for speeds of Mach 1,2 or more.	9B005
IX.A9.016	Acoustic vibration test equipment capable of producing sound pressure levels of 160 dB or more (referenced to 20 Pa) 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.	9B006

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.A9.017	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.	9B007
IX.A9.018	Direct measurement wall skin friction transducers specially designed to operate at a test flow total (stagnation) temperature exceeding 833 K (560 °C).	9B008
IX.A9.019	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: The item above does not specify tooling for the production of powder.	9B008
IX.A9.020	Equipment specially designed for the production of items specified by "Unmanned Aerial Vehicles" ("UAVs"), unmanned "airships" and components.	9B010

B. **SOFTWARE**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.B.001	"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in IX.A1.	1D001 1D002 1D003
IX.B.002	"Software" for the "development" of material specified in IX.A1.	1D001 1D002 1D003
IX.B.003	"Software" specially designed or modified to enable non-listed equipment to perform the functions of any equipment specified in IX.A1.	1D001 1D002 1D003
IX.B.004	"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in IX.A2	2D001
IX.B.005	"Software" specially designed or modified to allow non-listed equipment to function as equipment specified IX.A2	2D003 2D101 2D202
IX.B.006	"Software" specially designed for the "development", "production" or "use" of equipment specified in IX.A3.	3D001 3D002 3D003

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.B.007	"Software" specially designed or modified to allow non-listed equipment to function as equipment specified in IX.A3	3D001 3D002 3D003
IX.B.008	"Software" specially designed for the "development", "production" or "use" of equipment specified in IX.A6.	6D001 6D003 6D002 6D102 6D203 6D203
IX.B.009	"Software" specially designed or modified to allow non-listed equipment to function as equipment specified in IX.A6.	6D001 6D003 6D002 6D102 6D203 6D203
IX.B.010	"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in IX.A7.	7D001 7D002 7D003 7D004 7D005 7D102 7D103 7D104
IX.B.011	"Software" specially designed or modified to allow non-listed equipment to function as equipment specified IX.A7.	7D001 7D002 7D003 7D004 7D005 7D102 7D103 7D104
IX.B.012	"Source code" for the operation or maintenance of equipment specified IX.A7.	7D001 7D002 7D003 7D004 7D005 7D102 7D103 7D104

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.B.013	Computer-Aided Design (CAD) "software" specially designed for the "development" of "active flight control systems", helicopter multi-axis fly-by-wire or fly-by-light controllers or helicopter "circulation controlled anti-torque or circulation-controlled direction control systems".	7D001 7D002 7D003 7D004 7D005 7D102 7D103 7D104
IX.B.014	"Software" specially designed or9modified for the "development", "production" or "use" of equipment. Specified in IX.A9.	9D001 9D002 9D003 9D004 9D005 9D101 9D103 9D104 9D105
IX.B.015	"Software" specially designed or modified to allow non-listed equipment to function as equipment specified in IX.A9.	9D001 9D002 9D003 9D004 9D005 9D101 9D103 9D104 9D105

C. **TECHNOLOGY**

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.C.001	"Technology" for the "development", "production" or "use" of equipment or "software" specified in IX.A1.	2E001
IX.C.002	"Technology" for the "development", "production" or "use" of equipment or materials specified in IX.A3	3E001 3E003 3E101 3E102 3E201

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
IX.C.003	"Technology" for the "development", "production" and "use" of equipment or "software", specified in IX.A7.	7E001 7E002 7E003 7E004 7D005 7E101 7E102 7E104
IX.C.004	"Technology" for the "development", "production" or "use" of equipment or software, specified in IX.A9.	9E001 9E002
IX.C.005	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 1 883 K (1 610 °C); 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 by 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"; or 2. Ceramic "matrix" "composites"; or c. Stators, vanes, blades, tip seals (shrouds), rotating blings, rotating blisks, or "splitter ducts", that are all of the following: 1. Not specified above; 2. Designed for compressors or fans; and 3. Manufactured from material "fibrous or filamentary materials" with resins; 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", designed to operate at a "gas path temperature" of 1 693 K (1 420 °C) or more;	9E003.a.

No	Description	Related item from Annex I to Regulation (EC) No 428/2009
	6. Airfoil-to-disk blade combinations using solid-state joining; 7. Gas turbine engine components using "diffusion bonding" "technology"; 8. "Damage tolerant" gas turbine engine rotor components using powder metallurgy materials; 9. Hollow fan blades.	
IX.C.006	"Technology" for gas turbine engine "Full Authority Digital Engine Control (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 system" and used to regulate engine thrust or shaft power; Note: Item (b) above does not apply to technical data related to engine-"aircraft" integration required by civil aviation authorities of one or more Member 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).	9E003.h.
IX.C.007	"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	9E003.i'