Resolution of the Government of the Republic of Kazakhstan of February 5, 2008 No 104
On Approval of the Nomenclature (List) of Goods Subject to Export Control

With the view to implement the Law of the Republic of Kazakhstan of July 21, 2007 "On Export Control" the Government of the Republic of Kazakhstan **RULES**:

1. To approve the enclosed nomenclature (list) of goods subject to export control.
2. To declare the Resolution of Government of the Republic of Kazakhstan of August 18, 2000 No 1282 "On Approval of the List of Goods Subject to Export Control in the Republic of Kazakhstan" invalid.
3. The present resolution shall come into effect starting February 9, 2008 and shall be officially published.

Prime-Minister
Of the Republic of Kazakhstan **A. Masimov**

Approved
by the Resolution of the
Government of the Republic of Kazakhstan
of February 5, 2008 No 104

The Nomenclature (List)
of Goods Subject to Export Control

Goods and Technologies of Dual Use

General Notes on the List

1. For control of goods designed of modified for military use refer to the correspondent list/-s on control of products of military use. References in the given list with the text "Also see Control of Goods of Military Use" also refer to those lists.

2. The control item included into the given list shall not be exempted from control in case of export of uncontrolled goods (including plants), containing one or more controlled components which make up a major part of goods and which can be removed and used for other purposes.

Special note: When considering the controlled component or components with the view of considering them as a major part it is necessary to evaluate such factors as quantity, value and used technological

know-how, as well as other specific factors able to establish the fact: whether a controlled component or components are a major part of goods.

3. Goods stated in this list include both new and used goods.

4. The Trade Nomenclature of Foreign-Economy Activity Codes are the advisory and auxiliary codes for identification and correlation of goods (services) with those of dual and military use. The Trade Nomenclature of Foreign-Economy Activity Code can be not complete and not cover all controlled item, as well as they can not meet the parameters of a controlled item. Final decisions on identification and correlation of these or those goods to those of dual or military use shall be determined based on the technical parameters of controlled goods in this list.

5. The structure of the dual-use products list Структура списка продукции двойного назначения состоит из 10 категорий, которое включает следующие категории:

Terminology used in this list;

CATEGORY 0 – NUCLEAR MATERIALS, PLANTS AND EQUIPMENT

CATEGORY 1 – MATERIALS, CHEMICALS, "MICROORGANISMS", AND "TOXINS"

CATEGORY 2 – PROCESSING OF MATERIALS

CATEGORY 3 – ELECTRONICS

CATEGORY 4 – COMPUTER TECHNIQUES

CATEGORY 5 – TELECOMMUNICATIONS AND "INFORMATION SECURITY"

PART 1. TELECOMMUNICATIONS

PART 2. "INFORMATION SECURITY"

CATEGORY 6. SENSORS AND LASERS

CATEGORY 7 NAVIGATION EQUIPMENT AND AVIATION ELECTRONICS;

CATEGORY 8 – MARINE;

CATEGORY 9 - PROPULSION SYSTEMS, SPACE VEHICLES AND RELATED EQUIPMENT.

Every category includes 4 technical groups of dual use goods:

A - apparatus, junction and components;

B - Industrial and testing equipment

C - Materials

D - Computer software

E - Technology.

There is a reference to multisided and onesided regimes of export control:

00-99 - Wassenaar Arrangements (WA);

100-199 - Missile Technologies Control Regime (MTCR);

200 -299- Nuclear Suplyers Group (NSG);

300-399 – Australia group (AG);

400-499- Chemical Weapons Convention (CWC);

500-899- Reserve;
900-999-One-sided lists.

NUCLEAR TECHNOLOGY NOTE (NTN)

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

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

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

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

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

GENERAL TECHNOLOGY NOTE (GTN)

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

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

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

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

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

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

GENERAL SOFTWARE NOTE (GSN)

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

Categories 0 to 9 of this list do not control "software" which is either:

a) Generally available to the public by being:
1. Sold from stock at retail selling points, without restriction, by means of:
a. Over-the-counter transactions;
b. Mail order transactions; or
c. Telephone order transactions; and
2. Designed for installation by the user without further

substantial support by the supplier; or

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

b) "In the public domain".

DEFINITIONS OF TERMS USED IN THIS LIST

Category references are given in brackets after the defined term.

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

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

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

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

"Aircraft" (179) - means a fixed wing, swivel wing, rotary wing (helicopter), tilt rotor or tilt-wing airborne vehicle.

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

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

“Allocation of frequencies on ITU " (3 5) - means, that allocation of a range of frequencies is made according to Regulations about the rules of a radio communication of the International union of telecommunications (edition of 1998) for the basic (primary), resolved and secondary services of communication.

N.B.: Additional and alternative allocation is not considered

"Angular position deviation" (2) means the maximum difference between angular position and the actual, very accurately measured angular position after the workpiece mount of the table has been turned out of its initial position (ref. VDI/VDE 2617, Draft: 'Rotary tables on coordinate measuring machines').

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

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

"Automatic target tracking" (6) means a processing technique that automatically determines and provides as output an extrapolated value of

the most probable position of the target in real time.

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

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

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

a.The common hardware and software architecture;

b.The common design and process technology; and

c.The common basic characteristics.

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

"Bias" (accelerometer) (7) means an accelerometer output when no acceleration is applied.

“Palpation " (2) - radial displacement for one turn of the basic spindle, measured in a plane, a perpendicular axis of a spindle in a point of measurement on an external or internal surface of rotation (a source - ISO 230/1 1986, paragraph 5.63).

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

"CE" is equivalent to "computing element".

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

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

" The chemical mix " (1) - means the firm, liquid or gaseous product which has turned out from two or more components which do not cooperate with each other in conditions of storage of a mix.

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

"Civil aircraft" (1 7 9) means those "aircraft" listed by designation hi published airworthiness certification lists by the civil aviation authorities to fly commercial civil internal and external routes or for legitimate civil, private or business use.

N.B.: See also "aircraft".

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

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

"Common channel signalling" (5) is a signalling method in which a single channel between exchanges conveys, by means of labelled messages, signalling information relating to a multiplicity of circuits or calls and other information such as that used for network management.

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

"Composite" (12689) means a "matrix" and an additional phase or additional phases consisting of particles, whiskers, fibres or any combination thereof, present for a specific purpose or purposes.

"Composite theoretical performance" ("CTP") (3, 4) is a measure of computational performance given in millions of theoretical operations per second (Mtops), calculated using the aggregation of "computing elements" ("CE").

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

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

"Computing element," ("CE") (4) means the smallest computational unit that produces an arithmetic or logic result.

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

"Critical temperature" (1 3 6) (sometimes referred to as the transition temperature) of a specific "superconductive" material means the temperature at which the material loses all resistance to the flow of direct electrical current.

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

N.B.: 'Secret parameter': a constant or key kept from the knowledge of others or shared only within a group.

"CTP" is equivalent to "composite theoretical performance".

"Data signalling rate" (7) means the rate, as defined in ITU Recommendation 53-36, taking into account that, for non-binary modulation, baud and bit per second are not equal. Bits for coding, checking and synchronisation functions are to be included.

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

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

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

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

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

"Diffusion bonding" (1 2 9) means a solid state molecular joining of at least two separate metals into a single piece with a joint strength equivalent to that of the weakest material.

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

a.Accept data;

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

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

d.Provide output of data.

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

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

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

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

"Drift rate" (gyro) (7) means the time rate of output deviation from the desired output. It consists of random and systematic components and is expressed as an equivalent input angular displacement per unit time with respect to inertial space.

"Dynamic adaptive routing" (5) means automatic rerouting of traffic

based on sensing and analysis of current actual network conditions.

N.B.: This does not include cases of routing decisions taken on predefined information.

"Dynamic signal analysers" (3) means "signal analysers" which use digital sampling and transformation techniques to form a Fourier spectrum display of the given waveform including amplitude and phase information.

N.B.: See also "signal analysers".

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

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

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

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

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

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

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

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

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

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

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

"Expert systems" (7) mean systems providing results by application of rules to data which are stored independently of the "programme" and capable of any of the following:

a.Modifying automatically the "source code" introduced by the user;

b.Providing knowledge linked to a class of problems in quasi-natural language; or

c.Acquiring the knowledge required for their development (symbolic training).

"FADEC" is equivalent to "foil authority digital engine control".

"Fault tolerance" (4) is the capability of a computer system, after any malfunction of any of its hardware or "software" components, to continue to operate without human intervention, at a given level of service that provides: continuity of operation, data integrity and recovery of service within a given time.

"Fibrous or filamentary materials" (0 12 8) include:

a.Continuous "monofilaments";

b.Continuous "yarns" and "rovings";

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

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

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

f.Aromatic polyamide pulp.

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

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

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

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

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

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

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

" Relative width of a strip of frequencies " (3) - " instant width " strips of frequencies, devided on average frequency bearing, expressed in percentage

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

"Frequency switching time" (3 5) means the maximum time (i.e., delay), taken by a signal, when switched from one selected output frequency to another selected output frequency, to reach:

a.A frequency within 100 Hz of the final frequency; or

b.An output level within 1 dB of the final output level.

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

"Full Authority Digital Engine Control" ("FADEC") (7 9) means an electronic control system for gas turbine or combined cycle engines utilising a digital computer to control the variables required to regulate engine thrustor shaft power output throughout the engine operating range from the beginning of fuel metering to fuel shutoff.

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

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

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

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

"Hybrid computer" (4) means equipment, which can perform all of the following:

a.Accept data;

b.Process data, in both analogue and digital representations; <u>and</u>

c.Provide output of data.

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

a.Containing at least one unencapsulated device;

b.Connected together using typical 1C production methods;

c.Replaceable as an entity; <u>and</u>

d.Not normally capable of being disassembled.

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

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

"Image enhancement" (4) means the processing of externally derived information-bearing images by algorithms such as time compression, filtering, extraction, selection, correlation, convolution or transformations

between domains (e.g., fast Fourier transform or Walsh transform). This does not include algorithms using only linear or rotational transformation of a single image, such as translation, feature extraction, registration or false coloration.

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

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

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

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

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

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

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

"Interconnected radar sensors" (6) means two or more radar sensors are interconnected when they mutually exchange data hi real time.

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

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

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

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

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

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

N.B.: See also: "Chemical laser"; "Q-switched laser "; "Super High Power Laser"; "Transfer laser".

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

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

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

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

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

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

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

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

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

"Materials resistant to corrosion by UF6" (0) may be copper, stainless steel, aluminium, aluminium oxide, aluminium alloys, nickel or alloy containing 60 weight percent or more nickel and UF6- resistant fluorinated hydrocarbon polymers, as appropriate for the type of separation process.

"Matrix" (1289) means a substantially continuous phase that fills the space between particles, whiskers or fibres.

"Measurement uncertainty" (2) is the characteristic parameter which specifies in what range around the output value the correct value of the measurable variable lies with a confidence level of 95 %. It includes the uncorrected systematic deviations, the uncorrected backlash and the random deviations (ref. ISO 10360-2, orVDI/VDE2617).

"Mechanical Alloying" (1) means an alloying process resulting from the bonding, fracturing and rebonding of elemental and master alloy powders by mechanical impact. Non-metallic particles may be incorporated

in the alloy by addition of the appropriate powders.

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

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

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

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

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

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

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

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

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

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

"Missiles" (13679) means complete rocket systems and unmanned air vehicle systems, capable of delivering at least 500 kg payload to a range of at least 300 km.

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

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

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

b.Can be considered as indivisibly associated; <u>and</u>

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

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

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

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

"Multi-data-stream processing" (4) means the 'microprogramme' or equipment architecture technique which permits simultaneous processing of two or more data sequences under the control of one or more instruction sequences by means such as:

a.Single Instruction Multiple Data (SIMD) architectures such as vector or array processors;

b.Multiple Single Instruction Multiple Data (MSIMD) architectures;

c.Multiple Instruction Multiple Data (MIMD) architectures, including those which are tightly coupled, closely coupled or loosely coupled; or

d.Structured arrays of processing elements, including systolic arrays.

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

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

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

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

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

"Noise level" (6) means an electrical signal given in terms of power spectral density. The relation between "noise level" expressed in peak-to-peak is given by S 2 pp = 8N0(f2-fi), where Spp is the peak-to-peak value of the signal (e.g., nanoteslas), N0 is the power spectral density (e.g., (nanotesla)2/Hz) and (f2-fi) defines the bandwidth of interest.

"Nuclear reactor" (0) means the items within or attached directly to the reactor vessel, the equipment which controls the level of power in the core, and the components which normally contain, come into direct contact

with or control the primary coolant of the reactor core.

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

"Object code" (9) means an equipment executable form of a convenient expression of one or more processes ("source code" (source language)) which has been converted by programming system.

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

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

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

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

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

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

"Peak power" (6), means energy per pulse in joules divided by the pulse duration in seconds.

"Personalized smart card" (5) means a smart card containing a microcircuit which has been programmed for a specific application and cannot be reprogrammed for any other application by the user.

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

"Pressure transducers" (2) are devices that convert pressure measurements into an electrical signal.

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

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

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

"Production" - means all production phases, such as: construction, production engineering, manufacture, integration, assembly (mounting), inspection, testing, and quality assurance.

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

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

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

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

"Pulse duration" (6) is the duration of a "laser" pulse measured at Full Width Half Intensity (FWHI) levels.

"Q-switched laser" (6) means a "laser" in which the energy is stored in the population inversion or in the optical resonator and subsequently emitted in a pulse.

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

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

"Real time bandwidth" (2 3) for "dynamic signal analysers" is the widest frequency range which the analyser can output to display or mass storage without causing any discontinuity in the analysis of the input data. For analysers with more than one channel, the channel configuration yielding the widest "real-time bandwidth" shall be used to make the calculation.

"Real tune processing" (6,7) means the processing of data by a computer system providing a required level of service, as a function of available resources, within a guaranteed response time, regardless of the

load of the system, when stimulated by an external event.

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

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

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

a.Is multifunctional;

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

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

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

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

1. Manipulation mechanisms which are only manually/teleoperator controllable;
2. Fixed sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed stops, such as pins or cams. The sequence of motions and the selection of paths or angles are not variable or changeable by mechanical, electronic or electrical means;
3. Mechanically controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed, but adjustable stops, such as pins or cams. The sequence of motions and the selection of paths or angles are variable within the fixed programme pattern. Variations or modifications of the programme pattern (e.g., changes of pins or exchanges of cams) in one or more motion axes are accomplished only through

mechanical operations;

4. Non-servo-controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is variable but the sequence proceeds only by the binary signal from mechanically fixed electrical binary devices or adjustable stops;
5. Stacker cranes defined as Cartesian coordinate manipulator systems manufactured as an integral part of a vertical array of storage bins and designed to access the contents of those bins for storage or retrieval.

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

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

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

"Palpation" (2) - radial displacement for one turn of the basic spindle, measured in a plane, a perpendicular axis of a spindle in a point of measurement on an external or internal surface of rotation (a source - ISO 230/1-1986, paragraph 5.61).

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

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

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

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

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

"Software" (GSN All) means a collection of one or more

"programmes" or 'microprogrammes' fixed in any tangible medium of expression.

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

"Source code" (or source language) (4,6,7, 9) is a convenient expression of one or more processes which may be turned by a programming system into equipment executable form ("object code" (or object language)).

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

"Space qualified" (3,6) refers to products designed, manufactured and tested to meet the special electrical, mechanical or environmental requirements for use in the launch and deployment of satellites or high altitude flight systems operating at altitudes of 100 km or higher.

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

"Specific modulus" (0 19) is Young's modulus in pascals, equivalent to N/m2 divided by specific weight in N/m3, measured at a temperature of (296 ± 2) K ((23 ± 2)°C) and a relative humidity of (50 + 5)%.

"Specific tensile strength" (0,1,9) is ultimate tensile strength in pascals, equivalent to N/m2 divided by specific weight in N/mJ, measured at a temperature of (296 + 2) K ((23 + 2)°C) and a relative humidity of (50 + 5)%.

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

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

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

"Spread spectrum" radar (6) - see "Radar spread spectrum"

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

The countries (not) participants of the Convention on the chemical weapon (CWC) "(1) - states for which the Convention on prohibition of development, manufacture, accumulation and application of the chemical weapon has (not) come into force (www.opew.org)

"Stored programme controlled" (2 3 8) means controlled by using instructions stored in an electronic storage which a processor can execute in order to direct the performance of predetermined functions.

N.B.: Equipment may be "storedprogramme controlled" whether the

electronic storage is internal or external to the equipment.

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

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

connections.

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

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

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

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

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

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

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

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

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

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

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

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

"Tape" (1) is a material constructed of interlaced or unidirectional

"monofilaments", 'strands', "rovings", "tows", or "yarns", etc., usually preimpregnated with resin.

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

"Technology" (GTN NTN All) means specific information necessary for the "development", "production" or "use" of goods. This information takes the form of'technical data' or 'technical assistance1.

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

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

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

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

" Superbroadband modulation on time " (5) - technology according to which very short radio-frequency impulses with precisely certain position on time are modulated according to transferred data by change of time position of impulses (usually named by pulse item modulation, PIM), which channeliesed or reestablished according to pseudo-casual шумовыми codes ИПМ, then are transferred and accepted directly in a pulse kind without use of bearing frequencies therefore extremely small density of capacity in ultra-wide frequency ranges turns out. This technology is known also as pulse radio (radiocommunication).

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

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

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

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

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

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

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

"Uranium enriched in the isotopes 235 or 233" (0) means uranium containing the isotopes 235 or 233, or both, in an amount such that the abundance ratio of the sum of these isotopes to the isotope 238 is more than the ratio of the isotope 235 to the isotope 238 occurring in nature (isotopic ratio 0.72 per cent).

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

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

a.A physical change in wiring or interconnections; or

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

"Vaccine" (1) is a medicinal product which is intended to stimulate a protective immunological response in humans or animals in order to prevent disease.

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

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

"Yarn" (1) is a bundle of twisted 'strands'.

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

CATEGORY 0

NUCLEAR MATERIALS, FACILITIES, AND EQUIPMENT

OA Systems, Equipment and Components

OA001"Nuclear reactors" and specially designed or prepared equipment and components there for, as follows:

a."Nuclear reactors" capable of operation so as to maintain a controlled self-sustaining fission chain reaction;

b.Metal vessels, or major shop-fabricated parts therefor, specially designed or prepared to contain the core of a "nuclear reactor", including the reactor vessel head for a reactor pressure vessel;

c.Manipulative equipment specially designed or prepared for inserting or removing fuel in a "nuclear reactor";

d.Control rods specially designed or prepared for the control of the fission process in a "nuclear reactor", support or suspension structures therefor, rod drive mechanisms and rod guide tubes;

e.Pressure tubes specially designed or prepared to contain fuel

elements and the primary coolant in a "nuclear reactor" at an operating pressure in excess of 5.1 MPa;

f.Zirconium metal and alloys in the form of tubes or assemblies of tubes in which the ratio of hafnium to zirconium is less than 1:500 parts by weight, specially designed or prepared for use in a "nuclear reactor";

g. Coolant pumps specially designed or prepared for circulating the primary coolant of "nuclear reactors";

h. "Nuclear reactor internals' specially designed or prepared for use in a "nuclear reactor", including support columns for the core, fuel channels, thermal shields, baffles, core grid plates, and diffuser plates;

Note: In OAOOl.h. 'nuclear reactor internals' means any major structure -within a reactor vessel which has one or more functions such as supporting the core, maintaining fuel alignment, directing primary coolant flow, providing radiation shields for the reactor vessel, and guiding in-core instrumentation.

i. Heat exchangers (steam generators) specially designed or prepared for use in the primary coolant circuit of a "nuclear reactor";

j. Neutron detection and measuring instruments specially designed or prepared for determining neutron flux levels within the core of a "nuclear reactor".

		8401 10 000 0
1, b	0A00	8401 40 000 0
1, c	0A00	8426 19 000 0
		8426 99 900 0
1, d	0A00	8401 40 000 0
1, e	0A00	7304
		7507 12 000 0
		7608 20
		8109 90 000 0
		8401 40 000 0
1, f	0A00	8109 90 000 0
1, g	0A00	8413 81 000 9
1, h	0A00	8401 40 000 0
1, i	0A00	8419 50 000 0 (Except for, intended for civil aircraft)
		8404 20 000 0
		8402 19 900 9
	0A00	9030 10 000 0

1, j

OB Test, Inspection and Production Equipment

OBOO1 Plant for the separation of isotopes of "natural uranium", "depleted uranium" and "special fissile materials", and specially designed or prepared equipment and components therefor, as follows:

a. Plant specially designed for separating isotopes of "natural uranium", "depleted uranium", and "special fissile materials", as follows:

1. Gas centrifuge separation plant;
2. Gaseous diffusion separation plant;
3. Aerodynamic separation plant;
4. Chemical exchange separation plant;
5. Ion-exchange separation plant;
6. Atomic vapour "laser" isotope separation (AVLIS) plant;
7. Molecular "laser" isotope separation (MLIS) plant;
8. Plasma separation plant;
9. Electro magnetic separation plant;

b. Gas centrifuges and assemblies and components, specially designed or prepared for gas centrifuge separation process, as follows:

Note: In OBOOl.b. 'high strength-to-density ratio material' means any of the following:

a.Maraging steel capable of an ultimate tensile strength of 2,050 MPa or more;

b.Aluminium alloys capable of an ultimate tensile strength of 460 MPa or more; or

c."Fibrous or filamentary materials " with a "specific modulus " of more than 3.18 x 106 m and a "specific tensile strength" greater than 76.2x itf m;

1. Gas centrifuges;
2. Complete rotor assemblies;
3. Rotor tube cylinders with a wall thickness of 12 mm or less, a diameter of between 15 mm and 400 mm, made from 'high strength-to-density ratio materials';
4. Rings or bellows with a wall thickness of 3 mm or less and a diameter of between 75 mm and 400 mm and designed to give local support to a rotor tube or to join a number together, made from 'high strength-to-density ratio materials';

5. Baffles of between 75 mm and 400 mm diameter for mounting inside a rotor tube, made from 'high strength-to-density ratio materials'.
6. Top or bottom caps of between 75 mm and 400 mm diameter to fit the ends of a rotor tube, made from 'high strength-to-density ratio materials';
7. Magnetic suspension bearings consisting of an annular magnet suspended within a housing made of or protected by "materials resistant to corrosion by UF6" containing a damping medium and having the magnet coupling with a pole piece or second magnet fitted to the top cap of the rotor;
8. Specially prepared bearings comprising a pivot-cup assembly mounted on a damper;
9. Molecular pumps comprised of cylinders having internally machined or extruded helical grooves and internally machined bores;
10. Ring-shaped motor stators for multiphase AC hysteresis (or reluctance) motors for synchronous operation within a vacuum in the frequency range of 600 to 2,000 Hz and a power range of 50 to 1,000 Volt-Amps;
11. Centrifuge housing/recipients to contain the rotor tube assembly of a gas centrifuge, consisting of a rigid cylinder of wall thickness up to 30 mm with precision machined ends and made of or protected by "materials resistant to corrosion by UF6";
12. Scoops consisting of tubes of up to 12 mm internal diameter for the extraction of UFs gas from within a centrifuge rotor tube by a Pitot tube action, made of or protected by "materials resistant to corrosion by UF6";
13. Frequency changers (converters or inverters) specially designed or prepared to supply motor stators for gas centrifuge enrichment, having all of the following characteristics, and specially designed components therefor:

a.Multiphase output of 600 to 2,000 Hz;
b.Frequency control better than 0.1 %;

c.Harmonic distortion of less than 2%; and

d.An efficiency greater than 80%;

c.Equipment and components, specially designed or prepared for gaseous diffusion separation process, as follows:

1. Gaseous diffusion barriers made of porous metallic, polymer or ceramic"materials resistant to corrosion by UF6" with a pore size of 10 to 100 nm, a thickness of 5 mm or less, and, for tubular forms, a diameter of 25 mm or less;
2. Gaseous diffuser housings made of or protected by "materials resistant to corrosion by UF6";
3. Compressors (positive displacement, centrifugal and axial flow types) or gas blowers with a suction volume capacity of 1 m7min or more of UF6, and discharge pressure up to 666.7 kPa, made of or protected by "materials resistant to corrosion by UF6";
4. Rotary shaft seals for compressors or blowers specified in OBOOl.c.3. and designed for a buffer gas in-leakage rate of less than 1,000 cmVmin.;
5. Heat exchangers made of aluminium, copper, nickel, or alloys containing more than 60 per cent nickel, or combinations of these metals as clad tubes, designed to operate at sub-atmospheric pressure with a leak rate that limits the pressure rise to less than 10 Pa per hour under a pressure differential of lOOkPa;
6. Bellow valves made of or protected by "materials resistant to corrosion by UF6", with a diameter of 40 mm to 1,500 mm;

d. Equipment and components specially designed or prepared for aerodynamic separation process, as follows:

1. Separation nozzles consisting of slit-shaped, curved channels having a radius of curvature less than 1 mm, resistant to corrosion by UF6, and having a knife-edge contained within the nozzle which separates the gas flowing through the nozzle into two streams;
2. Tangential inlet flow-driven cylindrical or conical tubes, (vortex tubes), made of or protected by "materials resistant to corrosion by UFe" with a diameter of between 0.5 cm

and 4 cm and a length to diameter ratio of 20:1 or less and with one or more tangential inlets;

3. Compressors (positive displacement, centrifugal and axial flow types) or gas blowers with a suction volume capacity of 2 m7min or more, made of or protected by "materials resistant to corrosion by UF6", and rotary shaft sealstherefor;
4. Heat exchangers made of or protected by "materials resistant to corrosion by UF6";
5. Aerodynamic separation element housings, made of or protected by "materials resistant to corrosion by UF6" to contain vortex tubes or separation nozzles;
6. Bellows valves made of or protected by "materials resistant to corrosion by UF6", with a diameter of 40 to 1,500 mm;
7. Process systems for separating UF6 from carrier gas (hydrogen or helium) to 1 ppm UF6 content or less, including:

a.Cryogenic heat exchangers and cryoseparators capable of temperatures of!53K(-120°C)orless;

b.Cryogenic refrigeration units capable of temperatures of 153 K (-120°C) or less;

c.Separation nozzle or vortex tube units for the separation of UF$ from carrier gas;

d.UF6 cold traps capable of temperatures of 253 K (-20°C) or less;

e.Equipment and components, specially designed or prepared for chemical exchange separation process, as follows:

1. Fast-exchange liquid-liquid pulse columns with stage residence time of 30 seconds or less and resistant to concentrated hydrochloric acid (e.g. made of or protected by suitable plastic materials such as fluorocarbon polymers or glass);
2. Fast-exchange liquid-liquid centrifugal contactors with stage residence time of 30 seconds or less and resistant to concentrated hydrochloric acid (e.g. made of or protected by suitable plastic materials such as fluorocarbon polymers or glass);
3. Electrochemical reduction cells resistant to concentrated hydrochloric acid solutions, for reduction of uranium from one valence state to another;

4. Electrochemical reduction cells feed equipment to take U+4 from the organic stream and, for those parts in contact with the process stream, made of or protected by suitable materials (e.g. glass, fluorocarbon polymers, polyphenyl sulphate, polyether sulfone and resin-impregnated graphite);
5. Feed preparation systems for producing high purity uranium chloride solution consisting of dissolution, solvent extraction and/or ion exchange equipment for purification and electrolytic cells for reducing the uranium U*6 or U+4 to IT3;
6. Uranium oxidation systems for oxidation of U+3 to U+4;

f. Equipment and components specially designed or prepared for ion-exchange separation process, as follows:

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

g. Equipment and components specially designed or prepared for

atomic vapour "laser" isotope separation process (AVLIS), as follows:

1. High power strip or scanning electron beam guns with a delivered power of more than 2.5 kW/cm for use in uranium vaporization systems;
2. Liquid uranium metal handling systems for molten uranium or uranium alloys,consisting of crucibles, made of or protected by suitable corrosion and heat resistant materials (e.g. tantalum, yttria-coated graphite, graphite coated with other rare earth oxides or mixtures thereof), and cooling equipment for the crucibles;

N.B.: SEE ALSO 2A225.

3. Product and tails collector systems made of or lined with materials resistant to the heat and corrosion of uranium metal vapour or liquid, such as yttria-coated graphite or tantalum;
4. Separator module housings (cylindrical or rectangular vessels) for containing the uranium metal vapour source, the electron beam gun and the product and tails collectors.

OB001 g. 5. "Lasers" or "laser" systems for the separation of uranium isotopes with a spectrum frequency stabiliser for operation over extended periods;

N.B.: SEE ALSO 6A005 AND 6A205.

h. Equipment and components specially designed or prepared for molecular "laser" isotope separation process (MLIS) or chemical reaction by isotope selective laser activation (CRISLA), as follows:

1. Supersonic expansion nozzles for cooling mixtures of UF6 and carrier gas to 150 K (-123°C) or less and made from "materials resistant to corrosion by UF6";
2. Uranium pentafluoride (UF5) product collectors consisting of filter, impact, or cyclone-type collectors or combinations thereof, and made of "materials resistant to corrosion by UF5/UF6";
3. Compressors made of or protected by "materials resistant to corrosion by UF6", and rotary shaft seals therefor;

4. Equipment for fluorinating UF5 (solid) to UF6 (gas);
5. Process systems for separating UF6 from carrier gas (e.g. nitrogen or argon) including:

a.Cryogenic heat exchangers and cryoseparators capable of temperatures ofl53K (-120°C) orless;

b.Cryogenic refrigeration units capable of temperatures of 153 K (-120°C) or less;

c.UF6 cold traps capable of temperatures of 253 K (-20°C) or less;

6."Lasers" or "laser" systems for the separation of uranium isotopes with a spectrum frequency stabiliser for operation over extended periods of time;

N.B.: SEE ALSO 6A005 AND 6A205.

i. Equipment and components, specially designed or prepared for plasma separation process, as follows:

1. Microwave power sources and antennae for producing or accelerating ions, with an output frequency greater than 30 GHz and mean power output greater than 50 kW;
2. Radio frequency ion excitation coils for frequencies of more than 100 kHz and capable of handling more than 40 kW mean power;
3. Uranium plasma generation systems;
4. Liquid metal handling systems for molten uranium or uranium alloys,consisting of crucibles, made of or protected by suitable corrosion and heat resistant materials (e.g. tantalum, yttria-coated graphite, graphite coated with other rare earth oxides or mixtures thereof), and cooling equipment for the crucibles;

N.B.: SEE ALSO 2A225.

5. Product and tails collectors made of or protected by materials resistant to the heat and corrosion of uranium vapour such as yttria-coated graphite or tantalum;
6. Separator module housings (cylindrical) for containing the uranium plasma source, radio-frequency drive coil and the product and tails collectors and made of a suitable non-magnetic material (e.g. stainless steel);

j. Equipment and components specially designed or prepared for electromagnetic separation process, as follows:

1. Ion sources, single or multiple, consisting of a vapour source, ion

niser, and beam accelerator made of suitable non-magnetic materials (e.g. graphite, stainless steel, or copper) and capable of providing a total ion beam current of 50 mA or greater;

2. Ion collector plates for collection of enriched or depleted uranium ion beams,consisting of two or more slits and pockets and made of suitable non-magnetic materials (e.g. graphite or stainless steel);
3. Vacuum hou netic materials (e.g. stainless steel) and designed to operate at pressures of 0.1 Pa or lower;
4. Magnet pole pieces with a diameter greater than 2 m;
5. High voltage power supplies for ion sources, having all of the following characteristics:
   a. Capable of continuous operation;
   b. Output voltage of 20,000 V or greater;
   c. Output current of 1 A or greater; <u>and</u>
   d. Voltage regulation of better than 0.01 % over a period of 8 hours;

N.B.: SEE ALSO 3A227.

6. Magnet power supplies (high power, direct current) having all of the following characteristics:
   a. Capable of continuous operation with a current output of 500 A or greater at a voltage of 100 V or greater; <u>and</u>
   b. Current or voltage regulation better than 0.01 % over a period of 8 hours.

N.B.: SEE ALSO 3A226.

0B001 a. 8401 20 000 0

I couldn't do the table.

OB002 Specially designed or prepared auxiliary systems, equipment and components, as follows,for isotope separation plant specified in OB001, made of or protected by "materials resistant to corrosion by UF6":

a.Feed autoclaves, ovens or systems used for passing UF6 to the enrichment process;

b.Desublimers or cold traps, used to remove UF6 from the enrichment process for subsequent transfer upon heating;

c.Product and tails stations for transferring UF6 into containers;

d.Liquefaction or solidification stations used to remove UF6 from the enrichment process by compressing, cooling and converting UF6 to a liquid or solid form;

e.Piping systems and header systems specially designed for handling UF6 within gaseous diffusion, centrifuge or aerodynamic cascades;

f.1. Vacuum manifolds or vacuum headers having a suction capacity of

five m3/minute or more; or

2. Vacuum pumps specially designed for use in UF6 bearing atmospheres;

g.UF6 mass spectrometers/ion sources specially designed or prepared for taking on-line samples of feed, product or tails from UF6 gas streams and having all of the following characteristics:

1. Unit resolution for mass of more than 320 amu;
2. Ion sources constructed of or lined with nichrome or monel, or nickel plated;
3. Electron bombardment ionisation sources; and
4. Collector system suitable for isotopic analysis.

	0B00	8419 89 989 0
2 a.		8486 10 000 9
		8486 20 900 9
		8486 30 900 9
		8486 40 000 9
	0B00	8401 20 000 0
2 b.		
	0B00	8401 20 000 0
2 c.		
	0B00	8419 89 989 0
2 d.		8486 10 000 9
		8486 20 900 9
		8486 30 900 9
		8486 40 000 9
	0B00	8401 20 000 0
2 e.		
	0B00	8401 20 000 0
2 f. 1.		
	0B00	8414 10 250 0
2 f. 2.		8414 10 810 0
	0B00	9027 80 970 0
2 g.		

OB003 Plant for the conversion of uranium and equipment specially designed or prepared there for, as follows:

a.Systems for the conversion of uranium ore concentrates to UO3;
b.Systems for the conversion of UO3 to UF6;
c.Systems for the conversion of UO3 to U02;
d.Systems for the conversion of U02 to UF4;
e.Systems for the conversion of UF4 to UF6;
f.Systems for the conversion of UF4 to uranium metal;
g.Systems for the conversion of UF6 to UO2;
h.Systems for the conversion of UF6 to UF4;
i.Systems for the conversion of UO2 to UC14.

0B003	8419 89 989 0
	8486 10 000 9

8486 20 900 9
8486 30 900 9
8486 40 000 9

OB004 Plant for the production or concentration of heavy water, deuterium and deuterium compounds and specially designed or prepared equipment and components therefor, as follows:

a. Plant for the production of heavy water, deuterium or deuterium compounds, as follows:

1. Water-hydrogen sulphide exchange plants;
2. Ammonia-hydrogen exchange plants;

OB004

b. Equipment and components, as follows:

1. Water-hydrogen sulphide exchange towers fabricated from fine carbon steel (e.g. ASTM A516) with diameters of 6 m to 9 m, capable of operating at pressures greater than or equal to 2 MPa and with a corrosion allowance of 6 mm or greater;
2. Single stage, low head (i.e. 0.2 MPa) centrifugal blowers or compressors for hydrogen sulphide gas circulation (i.e. gas containing more than 70% H2S) with a throughput capacity greater than or equal to 56 mj/second when operating at pressures greater than or equal to 1.8 MPa suction and having seals designed for wet H2S service;

3. Ammonia-hydrogen exchange towers greater than or equal to 35 m in height with diameters of 1.5 m to 2.5 m capable of operating at pressures greater than 15 MPa;

4. Tower internals, including stage contactors, and stage pumps, including those which are submersible, for heavy water production utilizing the ammonia-hydrogen exchange process;
5. Ammonia crackers with operating pressures greater than or equal to 3 MPa for heavy water production utilizing the ammonia-hydrogen exchange process;
6. Infrared absorption analysers capable of on-line hydrogen/deuterium ratio analysis where deuterium concentrations are equal to or greater than 90%;
7. Catalytic burners for the conversion of enriched deuterium gas into heavy water utilizing the ammonia-hydrogen exchange process;
8. Complete heavy water upgrade systems, or columns therefor, for the upgrade of heavy water to reactor-grade deuterium concentration.

0B004 a. 8401 20 000 0

1.

0B004 a. 8401 20 000 0
2.
0B004 b. 8401 20 000 0
1.
0B004 b. 8414 80 110
2.
0B004 b. 8401 20 000 0
3.
0B004 b. 8401 20 000 0
4. 8413 70 290 0
0B004 b. 8401 20 000 0
5.
0B004 b. 9027 30 000 0
6.
0B004 b. 8401 20 000 0
7. 8514 30
8486 10 000
8486 20
0B004 b. 8401 20 000 0
8.

OB005 Plant specially designed for the fabrication of "nuclear reactor" fuel elements and specially designed or prepared equipment therefor.

Note: A plant for the fabrication of "nuclear reactor" fuel elements includes equipment which:

a.Normally comes into direct contact with or directly processes or controls the production flow of nuclear materials;

b.Seals the nuclear materials -within the cladding;

c.Checks the integrity of the cladding or the seal; or_

d.Checks the finish treatment of the sealed fuel.

0B005 a. 8401 20 000 0
0B005 b. 8401 20 000 0
0B005 c. 8401 20 000 0
0B005 d. 8401 20 000 0

OB006 Plant for the reprocessing of irradiated "nuclear reactor" fuel elements, and specially designed or prepared equipment and components therefor.

Note: OB006 includes:

1.Plant for the reprocessing of irradiated "nuclear reactor" fuel elements including equipment and components which normally come into direct contact with and directly control the irradiated fuel and the major nuclear material and fission product processing streams;

a.Fuel element chopping or shredding machines, i. e. remotely operated equipment to cut, chop, shred or shear irradiated "nuclear reactor"fuel assemblies, bundles or rods;

b.Dissolvers, critically safe tanks (e.g. small diameter, annular or slab tanks) specially designed or prepared for the dissolution of irradiated

"nuclear reactor" fuel, which are capable of withstanding hot, highly corrosive liquids, and which can be remotely loaded and maintained;

c.Counter-current solvent extractors and ion-exchange processing equipment specially designed or prepared for use in a plant for the reprocessing of irradiated "natural uranium ", "depleted uranium " or "special fissile materials";

d.Holding or storage vessels specially designed to be critically safe and resistant to the corrosive effects of nitric acid;

Note: Holding or storage vessels may have the following features:

1. Walls or internal structures with a boron equivalent (calculated for all constituent elements as defined in the note to OC004) of at least two per cent;
2. A maximum diameter ofl 75 mm for cylindrical vessels;or
3. A maximum width of 75 mm for either a slab or annular vessel.

e. Process control instrumentation specially designed or prepared for monitoring or controlling the reprocessing of irradiated "natural uranium ", "depleted uranium " or "special fissile materials ".

0B006 a.	8401 20 000 0
0B006 b.	8456
	8486 10 000 9
	8486 20 900 9
	8486 30 900 9
	8486 40 000 9
	8462 31 000 0
	8462 39 990 0
	8479 82 000 0
0B006 c.	7309 00
	8479 89 970 9
	8486 10 000
	8486 20
	8486 30
	8486 40 000
0B006 d.	8479 89 970 9
	8486 10 000
	8486 20
	8486 30
	8486 40 000
0B006 e.	7309 00 300 0
	7310 10 000 0
0B006 f.	8401 20 000 0

OB007 Plant for the conversion of plutonium and equipment

specially designed or prepared there for, as follows:

a.Systems for the conversion of plutonium nitrate to oxide;

b.Systems for plutonium metal production.

0B007 a. 8479 89 970 9

0B007 b. 8479 89 970 9OC Materials

OC001 "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;

Note: OC001 does not control the following:

a.Four grammes or less of "natural uranium «or "depleted uranium «when contained in a sensing component in instruments;

b."Depleted uranium» specially fabricated for the following civil non-nuclear applications:

1. Shielding;
2. Packaging;
3. Ballasts having a mass not greater than 100 kg;
4. Counter-weights having a mass not greater than 100 kg;

5.Alloys containing less than 5% thorium;

c.Ceramic products containing thorium, -which have been manufactured for non-nuclear use.

0C001 2844 10 100 0
2844 30 110 0
2844 30 550 0
2844 30 690 0
2844 30 510 0
2844 30 690 0

0C002 «Special fissile materials»

0C002 2844 20 990 0
2844 40 100 0
2844 20

OC002 "Special fissile materials"

Note: OC002 does not control four "effective grammes» or less when contained in a sensing component in instruments.

OC003 Deuterium, heavy water (deuterium oxide) and other compounds of deuterium, and mixtures and solutions containing deuterium, in which the isotopic ratio of deuterium to hydrogen exceeds 1:5,000.

0C003 2845 10 000 0
2845 90 100 0

OC004 Graphite, nuclear grade, is having a purity level of less than 5 parts per million 'boron equivalent' and with a density greater than 1.5 g/cm3. **N.B.:** SEE ALSO 1C107

Note 1: OC004 does not control the following:

a.Manufactures of graphite having a mass less than 1 kg, other than

thosespecially designed or prepared for use in a nuclear reactor;

b.Graphite powder.

Note 2: In OC004, 'boron equivalent' (BE) is defined as the sum of BE, for impurities (excluding BEcarbon since carbon is not considered an impurity) including boron, where:

BE: (ppm) = CFx concentration of element Z inppm;

Where CF is the conversion factor =and &B and az are the thermal neutron capture cross sections (in barns) for naturally occurring boron and element Z respectively; andAB andAz are the atomic masses of naturally occurring boron and element Z respectively.

0C004 3801

OC005 Specially prepared compounds or powders for the manufacture of gaseous diffusion barriers, resistant to corrosion by UF6 (e.g. nickel or alloy containing 60 weight per cent or more nickel, aluminium oxide and fully fluorinated hydrocarbon polymers), having a purity of 99.9 weight per cent or more and a mean particle size of less than 10 micrometres measured by American Society for Testing and Materials (ASTM) B330 standard and a high degree of particle size uniformity.

0C 005 7504 00 000 0
2818 20 000 0
2903 39 300 0

0D Software

0D001"Software" specially designed or modified for the "development", "production" or "use"of goods specified in this Category.

0D001 8524

0E Technology

0E001 "Technology" according to the Nuclear Technology Note for the "development", "production" or "use" of goods specified in this Category.

0E001

CATEGORY 1
MATERIALS, CHEMICALS, "MICROORGANISMS" & "TOXINS"
1A Systems, Equipment and Components

1A001Components made from fluorinated compounds, as follows:

a.Seals, gaskets, sealants or fuel bladders specially designed for "aircraft" or aerospace use made from more than 50 % by weight of any of the materials specified in lC009.b. or 1C009.C.;

b.Piezoelectric polymers and copolymers made from vinylidene fluoride materials specified in lC009.a.:

1. In sheet or film form; <u>and</u>
2. With a thickness exceeding 200 utn;
3. Seals, gaskets, valve seats, bladders or diaphragms made from fluoroelastomers containing at least one vinylether group as a constitutional unit, specially designed for "aircraft", aerospace or 'missile' use.

Note: In 1A001. c., 'missile' means complete rocket systems and unmanned air vehicle systems.

1A001 a. 3919 90 900 0
1A001 b. 3921 90 900 0
1A001 c. 3919 90 900 0

1A002 "Composite" structures or laminates, having any of the following:

N.B: SEE ALSO 1A202, 9A010 and 9A110

a.An organic "matrix" and made from materials specified in ICOlO.c., ICOlO.d. or lC010.e.;or

b.A metal or carbon "matrix" and made from:

1.Carbon "fibrous or filamentary materials" with:

a. With " the specific module of elasticity " from above 10,15Õ106 m; and
b. With " specific breaking strength " from above 17,7x104 m; or

2.Materials specified in ICOlO.c.

Note 1: 1A002 does not control composite structures or laminates made from epoxy resin impregnated carbon "fibrous or filamentary materials" for the repair ofaircraft structures or laminates, provided the size does not exceed 1 m .

Note 2: 1A002 does not control finished or semi-finished items specially designed for purely civilian applications as follows:

a.Sporting goods;

b.Automotive industry;

c.Machine tool industry;

d.Medical applications.

1A002 3926 90 980 2
1A002 b. 1 3801
6903 10 000 0
1A002 b. 2 3926 90 980 2

1A003Manufactures of non-fluorinated polymeric substances specified in lC008.a.3. in film,sheet, tape or ribbon form with either of the following characteristics :

a.With a thickness exceeding 0.254 mm; or

b.Coated or laminated with carbon, graphite, metals or magnetic substances.

Note: 1A003 does not control manufactures when coated or laminated with copper and designed for the production of electronic printed circuit boards.

1A003 3919 90 900 0
3920 99 900 0

1A004Protective and detection equipment and components, other than those specified in military goods controls, as follows:

N.B.: SEE ALSO 2B351 AND 2B352.

a.Gas masks, filter canisters and decontamination equipment therefor designed or modified for defence against biological agents or radioactive materials "adapted for use in war" or chemical warfare (CW) agents and specially designed components therefor;

b.Protective suits, gloves and shoes specially designed or modified for defence against biological agents or radioactive materials "adapted for use in war" or chemical warfare (CW) agents;

c.Nuclear, biological and chemical (NBC) detection systems specially designed or modified for detection or identification of biological agents or radioactive materials" adapted for use in war" or chemical warfare (CW) agents and specially designed components therefor.

Note: IA004 does not control:

a.Personal radiation monitoring dosimeters;

b.Equipment limited by design or function to protect against hazards specific to civil industries, such as mining, quarrying, agriculture, Pharmaceuticals, medical, veterinary, environmental, waste management, or to the food industry.

1A004 a. 9020 00 900 0

1A004 b. 3926 20 000 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
4015 19 900 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
4015 90 000 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
6204 29 900 0
6216 00 000 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
6405 90 (" Intended for application in the military purposes ", or fighting chemical poison gases)
6402 91 100 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
6402 99 100 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
6402 99 930 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
6404 19 900 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)

1A004 c. 9027 10 100 0
9027 10 900 0
9027 80 170 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
9027 80 970 0 (" Intended for application in the military purposes ", or fighting chemical poison gases)
9027 90 900 0
9030 10 000 0 (Except for intended for civil aircraft)
9030 89 300 0
9030 89 900 0 (Except for intended for civil aircraft)

1A005 Body armour, and specially designed components therefor, other than those manufactured to military standards or specifications or to their equivalents in performance.

N.B.: SEE ALSO MILITARY GOODS CONTROLS.

N.B.: Concerning to " Fibrous or threadlike materials ", used at

manufacturing of bullet-proof jacket, see 1C010

Note 1: IA 005 does not control individual suits of body armour and accessories therefor, when accompanying their users for his/her own personal protection.

Note 2: 1A005 does not control body armour designed to provide frontal protection only from both fragment and blast from non-military explosive devices.

1A005 6211 43 900 0
7326 90 970 0 (only bullet-proof jacket)

1A102 Resaturated pyrolized carbon-carbon components designed for space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

1A102 3801

1A202 Composite structures, other than those specified in 1A002, in the form of tubes and having both of the following characteristics:

N.B.: SEE ALSO 9A010 AND 9A110.

a.An inside diameter of between 75 mm and 400 mm; and

b.Made with any of the "fibrous or filamentary materials" specified in ICOlO.a. or b.or lC210.a. or with carbon prepreg materials specified in 1C210.C.

1A202 3801 90 000 0
3926 90 980 2
6815 10 100 0
6815 10 900 9
6815 99 900 0
7019 19

1A225 Platinized catalysts specially designed or prepared for promoting the hydrogen isotope exchange reaction between hydrogen and water for the recovery of tritium from heavy water or for the production of heavy water.

1A225 3815
7115

1A226 Specialized packings, which may be used in separating heavy water from ordinary water, having both of the following characteristics:

a. Made of phosphor bronze mesh chemically treated to improve wettability; and

b. Designed to be used in vacuum distillation towers.

1A226 8401 20 000 0

1A227 High-density (lead glass or other) radiation shielding windows, having all of the following characteristics, and specially designed frames therefor:

a. A 'cold area1 greater than 0.09 m2;

b. A density greater than 3 g/cm3; and

c. A thickness of 100 mm or greater.

Technical Note:

In 1A227 the term 'cold area' means the viewing area of the window exposed to the lowest level of radiation in the design application.

1A22 7003 19

7 7005 29 800 0
7006 00
7308 30 000 0 (only frames)
9022 90 900 0

1B Test, Inspection and Production Equipment

1B001 Equipment for the production of fibres, prepregs, preforms or "composites" specified in 1A002 or ICO 10, as follows, and specially designed components and accessories therefor:

N.B.: SEE ALSO 1B101 AND 1B201.

a. Filament winding machines of which the motions for positioning, wrapping and winding fibres are coordinated and programmed in three or more axes, specially designed for the manufacture of "composite" structures or laminates from "fibrous or filamentary materials";

b. Tape-laying or tow-placement machines of which the motions for positioning and laying tape, tows or sheets are coordinated and programmed in two or more axes, specially designed for the manufacture of "composite" airframe or 'missile' structures;

Note: In IBOOl.b., 'missile' means complete rocket systems and unmanned air vehicle systems.

c. Multidirectional, multidimensional weaving machines or interlacing machines,including adapters and modification kits, for weaving, interlacing or braiding fibres to manufacture "composite" structures;

Technical note: 1B001 The перемеживания technics includes the knitting

Note: 1 BOO I.e. does not control textile machinery not modified for the above end-uses.

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 vapour deposition of elements or compounds on heated filamentary substrates to manufacture silicon carbide fibres;
3. Equipment for the wet-spinning of refractory ceramics (such as aluminium oxide);
4. Equipment for converting aluminium containing precursor fibres into alumina fibres by heat treatment;

e. Equipment for producing prepregs specified in ICOlO.e. by the hot melt method;

f. Non-destructive inspection equipment capable of inspecting defects three dimensionally, using ultrasonic or X-ray tomography and specially designed for "composite" materials.

1B001 a. 8445 40 000

1B001 b.	8445 40 000
1B001 c.	8446
	8447
1B001 d.	8477 80 990 0
1.	8486 20 900 9
	8456 10 00
	8456 90 000 0
	8515 80 990 0
1B001 d.	8417 80 850 0
2.	8419 89
1B001 d.	8417 80 850 0
3.	
1B001 d.	8419 39 100 9
4.	8514 10 800 0
	8514 20 100 0
	8514 20 800 0
	8514 30 190 0
	8514 30 990 0
	8514 40 000 0
1B001 e.	8419 89 989 0
	8486 10 000
	8486 20
	8451 80 800
	8477 59 100 0
	8477 59 800 0
	8486 40 000 9
1B001 f.	9022 12 000 0
	9022 19 000 0
	9022 29 000 0
	9031 80 380 0

1B002 Systems and components therefor, specially designed to avoid contamination and specially designed for producing metal alloys, metal alloy powder or alloyed materials specified in lC002.a.2., lC002.b. or 1C002.C.

N.B.: SEE ALSO 1B102.

1B002 8417

1B003 Tools, dies, moulds or fixtures, for "superplastic forming" or "diffusion bonding» titanium or aluminium or their alloys, specially designed for the manufacture of:

a. Airframe or aerospace structures;

b. "Aircraft" or aerospace engines; or

c. Specially designed components for those structures or engines.

1B003 8207 30 100 0

1B101 Equipment, other than that specified in 1 BOO 1, for the "production" of structural composites as follows; and specially designed

components and accessories therefor:

N.B.: SEE ALSO 1B201.

Note: Components and accessories specified in 1B101 include moulds, mandrels, dies, fixtures and tooling for the preform pressing, curing, casting, sintering or bonding of composite structures, laminates and manufactures thereof

a. Filament winding machines of which the motions for positioning, wrapping and winding fibres can be coordinated and programmed in three or more axes, designed to fabricate composite structures or laminates from fibrous or filamentary materials, and coordinating and programming controls;

b. Tape-laying machines of which the motions for positioning and laying tape and sheets can be coordinated and programmed in two or more axes, designed for the manufacture of composite airframe and "missile" structures;

c. Equipment designed or modified for the "production" of "fibrous or filamentary materials" as follows:

1. Equipment for converting polymeric fibres (such as polyacrylonitrile, rayon or polycarbosilane) including special provision to strain the fibre during heating;
2. Equipment for the vapour deposition of elements or compounds on heated filament substrates;
3. Equipment for the wet-spinning of refractory ceramics (such as aluminiumoxide);

d. Equipment designed or modified for special fibre surface treatment or for producing prepregs and preforms specified in entry 9C110.

Note: IBWl.d.includes rollers, tension stretchers, coating equipment, cutting equipment and clicker dies.

1B101 a. 8445 40 000
8537 10 100 0
8537 10 990 0
1B101 b. 8445 40 000
1B101 c. 1. 8477 80 990 0
8486 20 900 9
1B101 c. 2. 8417 80 850 0
1B101 c. 3. 8417 80 850 0
8451 80 800 9
1B101 d. 8451 80 800 9
8477 59 100 0
8477 59 800 0
8486 40 000 9

1B102 Metal powder "production equipment", other than that specified in 1B002, usable for the "production", in a controlled environment, of spherical or atomised materials specified in ICOll.a., ICOll.b., lClll.a.1., 1C lll.a.2. or in the Military Goods Controls. N.B.: SEE ALSO IBllS.b.

Note: 1B102 includes:

a. Plasma generators (high frequency arc-jet) usable for obtaining sputtered or spherical metallic powders -with organization of the process in an argon-water environment;

b. Electroburst equipment usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment;

c. Equipment us able for the "production " of spherical aluminium powders by powdering a melt in an inert medium (e.g. nitrogen).

1B102 a. 8515
8486 40 000
8486 20
8486 90
1B102 b. 8515
8486 40
8486 20
8486 90
1B102 c. 8515
8486 40
8486 20
8486 90
8424 89 000 9

1B115 Equipment, other than that specified in 1B002 or 1B102, for the production of propellant and propellant constituents, as follows, and specially designed components therefor:

a. "Production equipment" for the "production", handling or acceptance testing of liquid propellants or propellant constituents specified in ICOll.a., ICOll.b., 1C111 or in the Military Goods Controls;

b. "Production equipment" for the "production", handling, mixing, curing, casting,pressing, machining, extruding or acceptance testing of solid propellants or propellant constituents specified in 1C01 La., 1C01 l.b., 1C111 or in the Military Goods Controls.

Note: 1B115.b. does not control batch mixers, continuous mixers or fluid energy mills. For the control of batch mixers, continuous mixers and fluid energy mills see 1B117, 1B118 and 1B119.

Note 1: For equipment specially designed for the production of military goods, see theMilitary Goods Controls.

Note 2: 1B115 does not control equipment for the "production", handling andacceptance testing of boron carbide.

1B115 a. 8479 82 000 0
1B115 b. 8479 82 000 0

1B116 Specially designed nozzles for producing pyrolitically derived materials formed on a mould, mandrel or other substrate from precursor gases which decompose in the 1,573 K (1,300°C) to 3,173 K (2,900°C) temperature range at pressures of 130 Pa to 20 kPa.

1B116 8417 90 000 0

1B 117 Batch mixers with provision for mixing under vacuum in the range of zero to 13.326 kPa and with temperature control capability of the mixing chamber and having all of the following:

a. A total volumetric capacity of 110 litres or more; and

b. At least one mixing/kneading shaft mounted off centre.

1B117 8479 82 000 0

8479 82 000 0

IB 118 Continuous mixers with provision for mixing under vacuum in the range of zero to 13.326 kPa and with temperature control capability of the mixing chamber and having all of the following:

a. Two or more mixing/kneading shafts; and

b. Capability to open the mixing chamber.

1B118 8479 82 000 0

1B119 Fluid energy mills usable for grinding or milling substances specified in 1C01 l.a., 1C011 .b., 1C111 or in the Military Goods Controls.

1B119 8479 82 000 0

1B201 Filament winding machines, other than those specified inlBOOlorlBlOl, and related equipment, as follows:

a. Filament winding machines having all of the following characteristics:

1. Having motions for positioning, wrapping, and winding fibres coordinated and programmed in two or more axes;
2. Specially designed to fabricate composite structures or laminates from "fibrous or filamentary materials"; and
3. Capable of winding cylindrical rotors of diameter between 75 and 400 mm and lengths of 600 mm or greater;

b. Coordinating and programming controls for the filament winding machines specified in lB201.a.;

c. Precision mandrels for the filament winding machines specified in 1B201 .a.

1B201 a. 8445 40 000

8445 90 000

1B201 b. 8537 10

1B201 c. 8448 39 000 0

1B225 Electrolytic cells for fluorine production with an output capacity greater than 250 g of fluorine per hour.

1B225 8543 30 000 0

1B226 Electromagnetic isotope separators designed for, or equipped with, single or multiple ion sources capable of providing a total ion beam current of 50 mA or greater.

Note: 1B226 includes separators:

a. Capable of enriching stable isotopes;

b. With the ion sources and collectors both in the magnetic field and those configurations in which they are external to the field.

1B226 840120000

1B227 Ammonia synthesis converters or ammonia synthesis units, in which the synthesis gas (nitrogen and hydrogen) is withdrawn from an ammonia/hydrogen high-pressure exchange column and the synthesized ammonia is returned to said column.

1B227 8401 20 000 0

8419 89 989 0

1B228 Hydrogen-cryogenic distillation columns having all of the following characteristics:

a. Designed for operation with internal temperatures of 35 K (-238°C) or less;

b. Designed for operation at an internal pressure of 0.5 to 5 MPa;

c. Constructed of either:

1. Stainless steel of the 300 series with low sulphur content and with an austenitic ASTM (or equivalent standard) grain size number of 5 or greater; or
2. Equivalent materials which are both cryogenic and H2-compatible; <u>and</u>

d. With internal diameters of 1 m or greater and effective lengths of 5 m or greater.

1B228 8419 40 000 9

1B229 Water-hydrogen sulphide exchange tray columns and 'internal contactors', as follows:

N. B.: For columns which are specially designed or prepared for the production of heavy water see OB004.

a. Water-hydrogen sulphide exchange tray columns, having all of the following characteristics:

1. Can operate at pressures of 2 MPa or greater;
2. Constructed of carbon steel having an austenitic ASTM (or equivalent standard) grain size number of 5 or greater; <u>and</u>
3. With a diameter of 1.8 m or greater;

b. 'Internal contactors' for the water-hydrogen sulphide exchange tray columns specified in lB229.a.

Technical Note:

'Internal contactors' of the columns are segmented trays which have an effective assembled diameter of 1.8 m or greater, are designed to facilitate counter cur rent contacting and are constructed of stainless steels with a carbon content of 0.03% or less. These may be sieve trays, valve trays, bubble cap trays, or turbogrid trays.

1B229 a. 8419 40 000 9

1B229 b. 8419 40 000 9

1B230 Pumps capable of circulating solutions of concentrated or dilute potassium amide catalyst in liquid ammonia (KNH2/NH3), having all of the following characteristics:

a. Airtight (i.e., hermetically sealed);

b. A capacity greater than 8.5 m3/h; <u>and</u>

c. Either of the following characteristics:

1. For concentrated potassium amide solutions (1% or greater), an operating pressure of 1.5 to 60 MPa; or
2. For dilute potassium amide solutions (less than 1%), an operating pressure of 20 to 60 MPa.

1B230 8413

1B231 Tritium facilities or plants, and equipment therefor, as follows:

a. Facilities or plants for the production, recovery, extraction, concentration, or handling of tritium;

b. Equipment for tritium facilities or plants, as follows:

1. Hydrogen or helium refrigeration units capable of cooling to 23 K (-250°C) or less, with heat removal capacity greater than 150 W;
2. Hydrogen isotope storage or purification systems using metal hydrides as the storage or purification medium.

1B231 a. 8401

18231 b. 1. 8418

8401 20 000 0

1B231 b. 2. 8401 20 000 0

8421 39 900 0

1B232 Turboexpanders or turboexpander-compressor sets having both of the following characteristics:

a. Designed for operation with an outlet temperature of 35 K (-238°C) or less; <u>and</u>

b. Designed for a throughput of hydrogen gas of 1000 kg/h or greater.

1B232 8411 81 000 9

8411 82

8414 30 890 9

8414 80 220

8414 80 280

1B233 Lithium isotope separation facilities or plants, and equipment therefor, as follows:

a. Facilities or plants for the separation of lithium isotopes;

b. Equipment for the separation of lithium isotopes, as follows:

2.Packed liquid-liquid exchange columns specially designed for lithium amalgams;

3.Mercury or lithium amalgam pumps;

4.Lithium amalgam electrolysis cells;

5.Evaporators for concentrated lithium hydroxide solution.

1B233 a. 8401 20 000 0

1B233 b. 1. 8401 20 000 0

8479 89 970 9

8486 10 000

8486 20

8486 30

8486 40 000

1B233 b. 2. 8413 50 800 0

8413 60 800 0

8413 70 810 0

8413 70 890 0

8413 81 000 9

1B233 b. 3. 8401 20 000 0

8543 30 000 0

1B233 b. 4. 8401 20 000 0

8419 39 900 9

8419 89 989 0

1C Materials

Technical Note:

Metals and alloys:

Unless provision to the contrary is made, the words 'metals' and 'alloys' in ICOOl to 1C012 cover crude and semi-fabricated forms, as follows:

Crude forms:

Anodes, balls, bars (including notched bars and wire bars), billets, blocks, blooms, brickets, cakes, cathodes, crystals, cubes, dice, grains, granules, ingots, lumps, pellets, pigs, powder, rondelles, shot, slabs, slugs, sponge, sticks;

Semi-fabricated forms (whether or not coated, plated, drilled or punched):

a. Wrought or worked materials fabricated by rolling, drawing, extruding, forging,impact extruding, pressing, graining, atomising, and grinding, i.e.: angles,channels, circles, discs, dust, flakes, foils and leaf, forging, plate, powder, pressings and stampings, ribbons, rings, rods (including bare welding rods, wire rods, and rolled wire), sections, shapes, sheets, strip, pipe and tubes (including tube rounds, squares, and hollows), drawn or extruded wire;

b. Cast material produced by casting in sand, die, metal,

plaster or other types of moulds, including high-pressure castings, sintered forms, and forms made by powder metallurgy.

The object of the control should not be defeated by the export of non-listed forms alleged to be finished products but representing in reality crude forms or semi-fabricated forms.

ICOOl Materials specially designed for use as absorbers of electromagnetic waves, or intrinsically conductive polymers, as follows:

N.B.: SEE ALSO 1C101.

a. Materials for absorbing frequencies exceeding 2 x 10 Hz but less than 3 x 10 Hz; ; 3815 19; 3910 00 000 0

Note 1: ICOO1 a. does not control:

a. Hair type absorbers, constructed of natural or synthetic fibres, with non-magnetic loading to provide absorption;

b. Absorbers having no magnetic loss and whose incident surface is non-planar in shape, including pyramids, cones, wedges and convoluted surfaces;

c. Planar absorbers, having all of the following characteristics:

1. Made from any of the following:

a. Plastic foam materials (flexible or non-flexible) with carbon-loading, or organic materials, including binders, providing more than 5% echo compared with metal over a bandwidth exceeding ±15% of the centre frequency of the incident energy, and not capable of withstanding temperatures exceeding 450 K (177°C); or

b. Ceramic materials providing more than 20% echo compared with metal over a bandwidth exceeding ±15% of the centre frequency of the incident energy, and not capable of withstanding temperatures exceeding 800 K (527°C);

Technical Note:

Test' examples for the point 1C001.a.,

Note 1: 1C001 should be a square at least 5 wavelengths of the centre frequency on a side and positioned in the far field of the radiating element.

2.Tensile strength less than 7x106 N/m ; <u>and</u>

3.Compressive strength less than 14 x 106 N/m;

d. Planar absorbers made of sinteredferrite, having:

1. A specific gravity exceeding 4.4; and
2. A maximum operating temperature of 548 K (275°C).

Note 2: Nothing in Note 1 to ICOOl.a. releases magnetic materials to provide absorption when contained in paint.

b.Materials for absorbing frequencies exceeding 1.5 x 1014 Hz but less than 3.7x1014 Hz and not transparent to visible light;

c.Intrinsically conductive polymeric materials with a 'bulk electrical conductivity' exceeding 10,000 S/m (Siemens per metre) or a 'sheet (surface) resistivity' of less than 100 ohms/square, based on any of the following polymers:

1. Polyaniline;
2. Polypyrrole;
3. Polythiophene;
4. Poly phenylene-vinylene; or
5. Poly thienylene-vinylene.

Technical Note:

'Bulk electrical conductivity' and 'sheet (surface) resistivity'should be determined using ASTMD-257 or national equivalents.

1C001 a. 3815 19 900 0
3910 00 000
1C001 b. 3815 19 900 0
3910 00 000
1C001 c. 1. 3909 30 000 0
1C001 c. 2. 3911 90 990 0
1C001 c. 3. 3911 90 990 0
3911 90 990 0
1C001 c. 4. 3911 90 990 0
1C001 c. 5. 3919 90 900 0

1C002 Metal alloys, metal alloy powder and alloyed materials, as follows:

N.B.: SEE ALSO 1C202.

Note: 1C002 does not control metal alloys, metal alloy powder and alloyed materials for coating substrates.

Technical Note:

1. What contain greater percent on weight of the specified metal concern to the metal alloys specified in item 1C002, than other elements.

2. Term of operation before break should be defined in conformity with standard technique ASTM E-139 or its national equivalent.

3. The parameter of cyclic weariness should be defined in conformity with standard technique ASTM E-606 " Recommendations on testing for weariness at a small amount of cycles and constant amplitude " or its national equivalent. Testing should be made in an axial direction at average value of a parameter of the loading, equal to unit, and factor of concentration of loading (K), equal to unit. Average loading is defined as private from division of a difference maximal and minimal

a. Metal alloys, as follows:

1. Nickel aluminides containing a minimum of 15 weight percent aluminium, a maximum of 38 weight percent aluminium and at least one additional alloying element;

2. Titanium aluminides containing 10 weight percent or more aluminium and at least one additional alloying element;

1C002

b. Metal alloys, as follows, made from metal alloy powder or particulate material specified in lC002.b.:

1. Nickel alloys with:

A. A stress-rupture life of 10,000 hours or longer at 923 K (650°C) at a stress of 676 MPa; or

B. A low cycle fatigue life of 10,000 cycles or more at 823 K (550° C) at a maximum stress of 1,095 MPa; .

2. Niobium alloys with:

a. A stress-rupture life of 10,000 hours or longer at 1,073 K (800°C) at a stress of 400 MPa; or

b. A low cycle fatigue life of 10,000 cycles or more at 973 K (700°C) at a maximum stress of 700 MPa;

3. Titanium alloys with:

a. A stress-rupture life of 10,000 hours or longer at 723 K (450°C) at a stress of 200 MPa; or

b. A low cycle fatigue life of 10,000 cycles or more at 723 K (450°C) at a maximum stress of 400 MPa;

4. Aluminium alloys with a tensile strength of:

A 240 MPa or more at 473 K (200°C); or

B 415 MPaormore at 298K(25°C);

5. a.Magnesium alloys with a tensile strength of 345 MPa or more and;

b. 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;

c. Metal alloy powder or paniculate material for materials specified in lC002.a., as follows:

1. Made from any of the following composition systems:

Technical Note:

X in the following equals one or more alloying elements.

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 urn 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-XorAl-X-Fe);or

e. Magnesium alloys (Mg-Al-X or Mg-X-Al); <u>and</u>

2. Made in a controlled environment by any of the following processes:

a. "Vacuum atomisation";

b. "Gas atomisation";

c. "Rotary atomisation";

d. "Splat quenching";

e. "Melt spinning" and "comminution";

f. "Melt extraction" and "comminution"; or

g. "Mechanical alloying";

3. Capable to create the materials listed in 1C002.á. Or 1C002.b.
d. The alloyed materials having following characteristics:
1. Made of any composite systems established in 1C002.c.1.; in the form of not crushed flakes, shavings or thin cores; and
2. Made in the controllable environment, using one of following methods:
a. " Coolings разбрызгиванием ";
b. " Спиннингования расплава "; or
c. " экстракцией расплава ".

1C002 a. 1. 7502 20 000 0
1C002 a. 2. 8108 20 000 9
8108 90 300 0
8108 90 500 0
8108 90 600 0
8108 90 900 0
1C002 b. 1. 7502 20 000 0
1C002 b. 2. 8112 92 310 0
8112 99 300 0
1C002 b. 3. 8108 20 000 9
8108 90 300 0
8108 90 500 0
8108 90 600 0
8108 90 900 0
1C002 b. 4. 7601 20
7604 29 100 0
7608 20 890 0
7603
1C002 b. 5. 8104
8104 30 000 0
1C002 c. 1. a. 7502 20 000 0
7504 00 000 0
1C002 c. 1. b. 8112 92 310 0
8112 99 300 0
1C002 c. 1. e. 8108 20 000 9
1C002 c. 1. d. 7603
1C002 c. 1. e. 8104 30 000 0
1C002 c. 2. 8112 92 310 0
8112 99 300 0
1C002 c. 3.
1C002 d. 7503 00 900 0
7504 00 000 0
7505 12 000 0
7602 00 110 0
7506
7603 20 000 0
7604 29 100 0

7606 12 910 0
7606 92 000 0
7607 19
8104 30 000 0
8104 90 000 0
8108 20 000 1
8408 20 000 5
8108 0 300 0
8108 90 500 0
8112 92 310 0
8112 99 300

1C003 Magnetic metals, of all types and of whatever form, having any of the following characteristics:

a. Initial relative permeability of 120,000 or more and a thickness of 0.05 mm or less;

Technical Note:

Measurement of initial permeability must be performed on fully annealed materials.

b.Magnetostrictive alloys, having any of the following characteristics:

1. A saturation magnetostriction of more than 5x10(-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 characteristics:

1. A composition having a minimum of 75 weight percent of iron, cobalt or nickel;
2. A saturation magnetic induction (Bs) of 1.6 T or more; and
3. Any of the following:
   a. A strip thickness of 0.02 mm or less; or
   b. An electrical resistivity of 2 x 10(-4) ohm cm or more.

Technical Note 'Nanocrystalline' materials in 1C003.C. are those materials having a crystal grain size of 50 nm or less, as determined by X-ray diffraction.

Table in their

1C004 Uranium titanium alloys or tungsten alloys with a "matrix" based on iron, nickel or copper, having all of the following:

a. A density exceeding 17.5 g/cm ;
b. An elastic limit exceeding 880 MPa;
c. An ultimate tensile strength exceeding 1,270 MPa; and
d. An elongation exceeding 8%.

1C004 2844
8108 20 000
8101 99 900 0

1C005 "Superconductive" "composite" conductors in lengths exceeding 100

m or with a mass exceeding 100 g, as follows:

a. Multifilamentary "superconductive" "composite" conductors containing one or more niobium-titanium filaments:

1. Embedded in a "matrix" other than a copper or copper-based mixed "matrix";or

2.Having a cross-section area less than 0.28 x 10-4 mm (6 um in diameter for circular filaments);

b."Superconductive" "composite" conductors consisting of one or more "superconductive" filaments other than niobium-titanium, having all of the following:

1.A "critical temperature" at zero magnetic induction exceeding 9.85 K (-263.3 PC) but less than 24 K (-249.16°C);

2. A cross-section area less than 0.28 x 10-4 mm ; and
3. Remaining in the "superconductive" state at a temperature of 4.2 K (-268.96°C) when exposed to a magnetic field corresponding to a magnetic induction of 12 T.

1C005 a. 8544 19 900 0

1C005 b. 8544 19 900 0

1C006 Fluids and lubricating materials, as follows:

a.Hydraulic fluids containing, as their principal ingredients, any of the following
compounds or materials:

1.Synthetic silahydrocarbon oils, having all of the following:

Technical Note:

For the purpose oflC006.a.L, silahydrocarbon oils contain exclusively silicon, hydrogen and carbon.

a.A flash point exceeding 477 K (204°C);

b.A pour point at 239 K (-34°C) or less;

c.A viscosity index of 75 or more; and

d.A thermal stability at 616 K(343°C); or

2.Chlorofluorocarbons, having all of the following:

Technical Note:

For the purpose oflC006.a.2., chlorofluorocarbons contain exclusively carbon, fluorine and chlorine.

a.No flash point;

b.An autogenous ignition temperature exceeding 977 K (704°C);

c.A pour point at 219 K (-54°C) or less;

d.A viscosity index of 80 or more; and

e.A boiling point at 473 K (200°C) or higher;

b.Lubricating materials containing, as their principal ingredients, any of the following compounds or materials:

1.Phenylene or alkylphenylene ethers or thio-ethers, or their mixtures, containing more than two ether or thio-ether functions or mixtures thereof; or

Fluorinated silicone fluids with a kinematic viscosity of less than 5,000

mm'/s (5,000 centistokes) measured at 298 K (25°C);

c.Damping or flotation fluids with a purity exceeding 99.8%, containing less than 25 particles of 200 urn or larger in size per 100 ml and made from at least 85% of any of the following compounds or materials:

1. Dibromotetrafluoroethane;
2. Polychlorotrifluoroethylene (oily and waxy modifications only); or
3. Polybromotrifluoroethylene;

d.Fluorocarbon electronic cooling fluids, having all of the following characteristics:

1.Containing 85% by weight or more of any of the following, or mixtures there of:

a.Monomeric forms of perfluoropolyalkylether-triazines or perfluoroaliphatic-ethers;

b.Perfluoroalkylamines;

c.Perfluorocycloalkanes; or

d.Perfluoroalkanes;

2. Density at 298 K (25°C) of 1.5 g/ml or more;
3. In a liquid state at 273 K (0°C); <u>and</u>
4. Containing 60% or more by weight of fluorine.

Technical Note:

For the purpose of lC006:

a.Flash point is determined using the Cleveland Open Cup Method described in ASTM D-92 or national equivalents;

b.Pour point is determined using the method described in ASTMD-97 or national equivalents;

c.Viscosity index is determined using the method described in ASTM D-22 70 or national equivalents;

d.Thermal stability is determined by the following test procedure or national equivalents:

Twenty ml of the fluid under test is placed in a 46 ml type 317 stainless steel chamber containing one each of 12.5 mm (nominal) diameter balls ofM-10 tool steel, 52 WO steel and naval bronze (60% Cu, 39% Zn, 0. 75% Sn);

The chamber is purged with nitrogen, sealed at atmospheric pressure and the temperature raised to and maintained at 644 ±6 K (371 ± 6°C)for six hours; The specimen will be considered thermally stable if, on completion of the above procedure, all of the following conditions are met:

1. The loss in weight of each ball is less than 10 mg/mm of ball surface;
2. The change in original viscosity as determined at 311 K (38°C) is less than 25%; <u>and</u>
3. The total acid or base number is less than 0.40;

e.Autogenous ignition temperature is determined using the method described in ASTME-659 or national equivalents.

1C006 a. 1. 3819 00 000 0

2909 19 000 0
3910 00 000
1C006 a. 2. 2812
2826
3819 00 000 0
2903 41 000 0
2903 42 000 0
2903 43 000 0
2903 44
2903 45
3824 71 000 0
1C006 b. 1. 2909 30 900 0
2930 90 850 0
1C006 b. 2. 3910 00 000 9
1C006 c. 1. 2903 46 900 0
1C006 c. 2. 3904 69 900 0
1C006 c. 3. 3904 69 000 0
3904 69 900 0
1C006 d. 2903
2903 41 000 0
2903 42 000 0
2903 45 100 0
3824 90 980 0

1C007Ceramic base materials, non-"composite" ceramic materials, ceramic-"matrix" "composite" materials and precursor materials, as follows:

N.B.: SEE ALSO 1C107.

a.Base materials 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 urn and no more than 10% of the particles larger than 10 um;

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;

Note: lC007.b. does not control abrasives.

c.Ceramic-ceramic "composite" materials with a glass or oxide-"matrix" and reinforced with fibres made from any of the following systems:

1. Si-N;
2. Si-C;
3. Si-Al-O-N;or
4. Si-O-N;

having a specific tensile strength exceeding 12.7 x 103 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 in 1C007.C., 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. Al2O3;or
2. Si-C-N.

Note: lC007.f. does not control "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% creep strain at 100 MPa load and 1,273 K (l,000°C)for 100 hours.

1C007 a. 2850 00 900 0
1C007 b. 2850 00 900 0
1C007 c. 2849
2850 00
8803 90 900 0
8803 90 200 0
9306 90
1C007 d. 8803 90 900 0
9306 90
2849 20 000 0
2849 90 100 0
2850 00 200 0
8113 00 200 0
8113 00 900 0
1C007 e. 3910 00 000 9
1C007 f. 6903
6914 90 900 0

1C008 Non-fluorinated polymeric substances, as follows:

a.

1. Bismaleimides;
2. Aromatic polyamide-imides;
3. Aromatic polyimides;
4. Aromatic polyetherimides having a glass transition temperature (T) exceeding 513 K (240°C) determined using the dry method described hi ASTM D 3418;

Note: ICOO8.a. does not control non-fusible compression moulding powders or moulded forms.

b.Thermoplastic liquid crystal copolymers having a heat distortion temperature exceeding 523 K (250°C) measured according to ASTM D-648, method A, or national equivalents, with a load of 1.82 N/mm and composed of:

1.Any of the following:

a.Phenylene, biphenylene or naphthalene; or

b.Methyl, tertiary-butyl or phenyl substituted phenylene, biphenylene or naphthalene; and

2.Any of the following acids:

a.Terephthalic acid;

b.6-hydroxy-2 naphthoic acid; or

c.4-hydroxybenzoic acid;

c.Polyarylene ether ketones, as follows:

1. Polyether ether ketone (PEEK);
2. Polyether ketone ketone (PEKK);
3. Polyether ketone (PEK);
4. Polyether ketone ether ketone ketone (PEKEKK);

d.Polyarylene ketones;

e.Polyarylene sulphides, where the arylene group is biphenylene, triphenylene or combinations thereof;

f.Polybiphenylenethersulphone.

Technical Note:

The glass transition temperature (TG for 1C008 materials is determined using the method described in ASTMD 3418 using the dry method.

1C008 a. 1. 2925 19 950 0

1C008 a. 2. 3908 90 000 0

1C008 a. 3. 3909 30 000 0

3911 90 990 0

1C008 a. 4. 3907 20 990 0

3907 91 900 0

1C008 b. 3907 91 900 0

1C008 c. 1. 3907 91 900 0

1C008 c. 2. 3907 91 900 0

1C008 c. 3. 3907 91 900 0

1C008 c. 4. 397 91 900 0

1C008 d. 3907 99

3907 70 000 0

1C008 e. 3911 90 190 0

3911 90 990 0

1C008 f. 3911 90 190 0

3911 90 990 0

1C009Unprocessed fluorinated compounds, as follows:

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.

1C009 a. 3904 69 900 0

1C009 b. 3904 69 900 0

1C009 c. 3904 69 900 0

1C010"Fibrous or filamentary materials" which may be used in organic "matrix", metallic "matrix" or carbon "matrix" "composite" structures or laminates, as follows:

N.B.: SEE ALSO 1C210.

a.Organic "fibrous or filamentary materials", having all of the following:

1.A "specific modulus" exceeding 12.7 x 10(6) m: and

2.A "specific tensile strength" exceeding 23.5 x 10(4) m;

Note: ICOlO.a. does not control polyethylene. Carbon "fibrous or filamentary materials", having all of the following:

1.A "specific modulus" exceeding 12.7 x 10(6) m: and

2.A "specific tensile strength" exceeding 23.5 x 10(4) m;

Note: ICO10.b. does not control fabric made from "fibrous or filamentary materials" for the repair of aircraft structures or laminates, in -which the size of individual sheets does not exceed 50 cm x 90 cm.

Technical Note:

Properties for materials described in ICO10.b. should be determined using SACMA recommended methods SRM12 to 17, or national equivalent tow tests, such as Japanese Industrial Standard JIS-R-7601, Paragraph 6.6.2., and based on lot average.

b.Inorganic "fibrous or filamentary materials", having all of the following:

1. A "specific modulus" exceeding 2.54 x 10 m: and
2. A melting, softening, decomposition or sublimation point exceeding 1,922 K (1,649°C) in an inert environment;

Note: ICOlO.c. does not control:

a. Discontinuous, multiphase, polycrystalline alumina fibres in Chopped fibre or random mat form, containing 3 weight percent or more silica, with a specific modulus of less than 10 x 10 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.

c."Fibrous or filamentary materials":

1.Composed of any of the following:

a.Polyetherimides specified in ICOO8.a.; or

b.Materials specified in ICOO8.b. to ICOO8.f.; or

2.Composed of materials specified in ICOlO.d.l.a. or ICOlO.d.l.b. and "commingled" with other fibres specified in ICOlO.a., ICOlO.b. or ICOlO.c.;

d.Resin-impregnated or pitch-impregnated fibres (prepregs), metal or carbon-coated fibres (preforms) or "carbon fibre preforms", as follows:

1. Made from "fibrous or filamentary materials" specified in ICOlO.a., ICOlO.b. or ICOlO.c.;
2. Made from organic or carbon "fibrous or filamentary materials":

a.With a "specific tensile strength" exceeding 17.7 x 10(4) m;

b.With a "specific modulus" exceeding 10.15 x 106 m;

c.Not controlled by ICOlO.a. or ICOlO.b.; and

d.When impregnated with materials specified in 1C008 or lC009.b., having a glass transition temperature (T) exceeding 383 K (110°C) or with phenolic or epoxy resins, having a glass transition temperature (T) equal to or exceeding 418 K (145°C).

Note: ICOIO.e. does not control:

a.Epoxy resin "matrix" impregnated carbon "fibrous or filamentary materials" (prepregs) for the repair of aircraft structures or laminates, in which the size of individual sheets ofprepreg does not exceed 50 cm x 90 cm;

b.Prepregs when impregnated with phenolic or epoxy resins having a glass transition temperature (Tg) less than 433 K (16Q°C) and a cure temperature lower than the glass transition temperature.

Technical Note:

The glass transition temperature (Tg)for ICOIO.e. materials is determined using the method described in ASTMD 3418 using the dry method. The glass transition temperature for phenolic and epoxy resins is determined using the method described in ASTMD 4065 at a frequency oflHz and a heating rate of 2 K (°C) per minute using the dry method.

1C010 a. 3926 90 980 2
5402 11 000 0
5404 11 000 0
5501 10 000 1
5503 11 000 0
1C010 b. 3801
3926 90 980 2
5402 11 000 0
5404 90 900 0
6815 10 100 0
6903 10 000 0
1C010 c. 3926 90 980 2
8101 99 100 0
8101 96 000 0
8101 99 900 0
8108 90 300 0
8108 90 600 0
8108 90 900 0
1C010 d. 1. a. 5402 49 000 0
5501 90 000 0
5503 90 900 0
5402 11 000 0
5402 20 000 0

5402 49 000 0
5404 11 000 0
5501 10 000 1
5501 20 000 0
5501 90 000 0
5503 11 000 0
5503 20 000 0
1C010 d. 1. b. 5402 49 000 0
5501 90 000 0
5503 90 900 0
5402 20 000 0
5402 49 000 0
5404 11 000 0
5501 20 000 0
5501 90 000 0
5503 20 000 0
1C010 d. 2. 3801
3926 90 980 2
1C010 e. 1. 3801
3926 90 980 2
6815 10 100 0
6815 99 900 0
6903 10 000 0
7019 11 000 0
7019 12 000 0
3006 91 000 0
6815 10 900
ICO 11 Metals and compounds, as follows:

N.B.: SEE ALSO MILITARY GOODS CONTROLS and 1C111.

a.Metals in particle sizes of less than 60 urn whether spherical, atomised, spheroidal, flaked or ground, manufactured from material consisting of 99% or more of zirconium, magnesium and alloys of these;

Technical Note:

The natural content of hafnium in the zirconium (typically 2% to 7%) is counted with the zirconium.

Note: The metals or alloys listed in IC11.a. are controlled whether or not themetals or alloys are encapsulated in aluminium, magnesium, zirconium or beryllium.

b.Boron or boron carbide of 85% purity or higher and a particle size of 60 um or less;

Note: The metals or alloys listed in 1C01 l.b. are controlled whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium or beryllium.

c.Guanidine nitrate;

d.Nitroguanidine (NQ) (CAS 556-88-7).

1C011 a. 8104 30 000 0
8109 20 000 0
1C011 b. 2804 50 100 0
2849 90 100 0
1C011 c. 2825 10 000 0
2834 29 800 0
2904
1C011 d. 2925 21 000 0
2925 29 000 0
1C012 Materials as follows:
Technical Note: These materials ar typically used for nuclear heat sources.
a.Plutonium in any form with a plutonium isotopic assay of plutonium-238 of more than 50% by weight;
Note: ICO 12.a. does not control:
a.Shipments with a plutonium content of 1 g or less;
b.Shipments of 3 "effective grammes " or less when contained in a sensing component in instruments.
b."Previously separated" neptunium-237 in any form.
Note: lC012.b. does not control shipments with a neptunium-237 content of 1 g or less.
1C012 a. 2844 20 590 0
2844 20 510 0
2844 20 990 0
1C012 b. 2844 40 800 0
2844 40 200 0
2844 40 300 0
1C 101Materials and devices for reduced observables such as radar reflectivity,ultraviolet/infrared signatures and acoustic signatures, other than those specified in 1C001, usable in "missiles" and their subsystems.
Note 1: 1C101 includes:
a.Structural materials and coatings specially designed for reduced radar reflectivity;
b.Coatings, including paints, specially designed for reduced or tailored reflectivity or emissivity in the microwave, infra red or ultra violet regions of the electromagnetic spectrum.
Note 2: 1C101 does not include coatings when specially used for the thermal control of satellites.
1C101 8512 30
3206
9306
9032 20 000 0
3910 00 000
7205 29 000 0
1C102 Resaturated pyrolized carbon-carbon materials designed for space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

1C102 3801
6815 10

1C107 Graphite and ceramic materials, other than those specified in 1C007, as follows:

a.Fine grain recrystallised bulk graphites having a bulk density of 1.72 g/cnr3 or greater, measured at 288 K (15°C), and having a particle size of 100 micrometres or less, usable for "missile" nozzles and reentry vehicle nose tips:

1. Cylinders in diameter of 120 mm and from above, length 50 mm and from above;

2. Tubes with internal diameter 65 mm and more, with thickness of a wall in 25 mm and from above at length of 50 mm and from above;

3. Blocks in the size of 120 mm x 120 mm x 50 mm or from above

N.B.: See also OC004

b.Pyrolytic or fibrous reinforced graphites, usable for "missile" nozzles and reentry vehicle nose tips;

N.B.: See also OC004

c.Ceramic composite materials (dielectric constant less than 6 at frequencies from 100 Hz to 10,000 MHz) usable for "missile" radomes;

d.Bulk machinable silicon-carbide reinforced unfired ceramic, usable for "missile" nose tips.

1C107 a. 3801
1C107 b-d. 2804 50 100 0
2849 20 000 0
2850 00 200 0
6815 99 100 0
6815 10 100 0
6815 99 900 0
8803 90 900 0
9306 90

1C111Propellants and constituent chemicals for propellants, other than those specified in ICO 11, as follows:

a. Propulsive substances:

1.Spherical aluminium powder, other than that specified in the Military Goods Controls, with particles of uniform diameter of less than 200 um and an aluminium content of 97% by weight or more, if at least 10% of the total weight is made up of particles of less than 63 um, according to ISO 2591:1988 or national equivalents;

Technical Note:

A particle size of 63 fim (ISO R-565) corresponds to 250 mesh (Tyler) or 230 mesh (ASTM standard E-ll).

2. Metal fuels, other than that specified in the Military Goods Controls, in particle sizes of less than 60 um, whether spherical, atomized, spheroidal, flaked or ground, consisting 97% by weight or more of any of the following:

a.Zirconium;

b.Beryllium

c.Magnesium; or

d.Alloys of the metals specified by a. to c. above;

Technical Note:

The natural content of hafnium in the zirconium (typically 2% to 7%) is counted with the zirconium.

3. Liquid oxidisers, the following:

a.Dinitrogen trioxide;

b.Nitrogen dioxide/dinitrogen tetroxide;

c.Dinitrogen pentoxide;

d. Mixed oksid nitrogen (MON);

Technical Note: Mixed oksid nitrogen (MON) - solutions окиси nitrogen (NÄ) in denetrogine tetrookside/dioksid nitrogen (N2O4/NO2 which are used in rocket systems. A lot of compositions can be defined as MONi or as MONij, where: i and j are an integer representing percent окиси of nitrogen in structures (for example, M Î N3 contains 3 % of nitrogen oxide, MON25 accordingly 25 % of nitrogen oxide. The top limit makes MON40, 40 % on weight)).

e. Look the military list on ингибированной red smoking nitric acid (IRFNA);

f. Look the military list on 1æ238 on connections from fluorine and one or more other halogens, oxygen and nitrogen.

b. Polymeric substances:

1. Carboxy-terminated polybutadiene (CTPB);
2. Hydroxy-terminated polybutadiene (HTPB), other than that specified in the Military Goods Controls;
3. Polybutadiene-acrylic acid (PBAA);
4. Polybutadiene-acrylic acid-acrylonitrile (PBAN);

c. Other propellant additives and agents:

1. SEE MILITARY GOODS CONTROLS FOR Butacene;
2. Triethylene glycol dinitrate (TEGDN);
3. 2-Nitrodiphenylamine;
4. Trimethylolethane trinitrate (TMETN);
5. Diethylene glycol dinitrate (DEGDN);
6. Ferrocene derivatives other than those specified in the Military Goods Controls.

a. Look the Military List by катоцену:

b. Этилферроцен;

c. пропилферроцен;

d. Look the military list on Н-бутилферроцену:

e. Пентилферроцен;

f. Дициклопентилферроцен;

g. Дициклогексилферроцен;

h. Диэтилферроцен;

i. Дипропилферроцен;

j. Дибутилферроцен;
k. Дигексилферроцен;
l. Ацетилферроцен
m. Look the Military List by Ферроценкарбоновым acids;
n. Look the Military List by бутацину;
o. Other derivatives of ферроцена, adjusting speed of burning of the rocket fuel, not included in the Military list.

Note: For propellents and constituent chemicals for propellants not specified in 1C111, see the Military Goods Controls.

1C111 a. 1. 7603 10 000 0
1C111 a. 2. a 8109 20 000 0
1C111 a. 2. b 8112 12 000 0
1C111 a. 2. c 8104 30 000 0
1C111 a. 2. d 2804 50 100 0
8112 12 000 0
8104 30 000 0
8109 20 000 0
1C111 a. 3. 2811 29 300 0
1C111 b. 1. 4002 20 000 0
1C111 b. 2. 4002 20 000 0
1C111 b. 3. 4002 20 000 0
1C111 b. 4. 4002 59 000 0
1C111 c. 1. 2905 59 990 0
1C111 c. 2. 2905 59 990 0
1C111 c. 3. 2921 44 000 0
1C111 c. 4. 2905 59 990 0
1C111 c. 5. 2905 59 990 0
1C111 c. 6. 2931 00 950 0

1C116 Maraging steels (steels generally characterised by high nickel, very low carbon content and the use of substitutional elements or precipitates to produce age-hardening) having an ultimate tensile strength of 1,500 MPa or greater, measured at 293 K (20°C), in the form of sheet, plate or tubing with a wall or plate thickness equal to or less than 5 mm.

1C116 7218
7219
7220
7221 00
7222
7223 00
7224
7225
7226
7227
7228
7229

7304 41 000 0
7304 49 100 0

N.B.: SEE ALSO 1C216.

1C117 Tungsten, molybdenum and alloys of these metals in the form of uniform spherical or atomized particles of 500 micrometre diameter or less with a purity of 97% or greater for fabrication of "missile" motor components, i.e., heat shields, nozzle substrates, nozzle throats and thrust vector control surfaces.

1C117 8101 10 000 0
8102 10 000 0

1C118 Titanium-stabilised duplex stainless steel (Ti-DSS) having all of the following:

a.Having all of the following characteristics:

1. Containing 17.0 - 23.0 weight percent chromium and 4.5 - 7.0 weight percent nickel;
2. Having a titanium content of greater than 0.10 weight percent; and
3. A ferritic-austenitic microstructure (also referred to as a two-phase microstructure) of which at least 10 percent is austenite by volume (according to ASTM E-l 181-87 or national equivalents); and

b.Having any of the following forms:

1. Ingots or bars having a size of 100 mm or more in each dimension;
2. Sheets having a width of 600 mm or more and a thickness of 3 mm or less; or
3. Tubes having an outer diameter of 600 mm or more and a wall thickness of 3 mm or less.

1C118 7304
7218
7219
7304 41 000 0
7304 49 990 0

1C202 Alloys, other than those specified in lC002.a.2.c. or d., as follows:

a.Aluminium alloys having both of the following characteristics:

1. 'Capable of an ultimate tensile strength of 460 MPa or more at 293 K (20°C);and
2. In the form of tubes or cylindrical solid forms (including forgings) with an outside diameter of more than 15 mm;

b.Titanium alloys having both of the following characteristics:

1. 'Capable of an ultimate tensile strength of 900 MPa or more at 293 K (20°C); and
2. In the form of tubes or cylindrical solid forms

(including forgings) with an outside diameter of more than 75 mm.

Technical Note:

The phrase alloys 'capable of encompasses alloys before or after heat treatment.

1C202 a. 7604 29 100 0

7608 20 810 0

7608 20 890 0

1C202 b. 8108 90 300 0

8108 90 600 0

1C210 'Fibrous or filamentary materials' or prepregs, other than those specified in ICOlO.a., b.or e., as follows:

a.Carbon or aramid 'fibrous or filamentary materials' having either of the following characteristics:

1. A "specific modulus" of 12.7 x 106 m or greater; or
2. A "specific tensile strength" of 235 x 103 m or greater;

Note: 1C21Q.O. does not control aramid'fibrous or filamentary materials' having 0.25 percent or more by weight of an ester based fibre surface modifier;

b.Glass 'fibrous or filamentary materials' having both of the following characteristics:

1. A "specific modulus" of 3.18 x 106 m or greater; <u>and</u>
2. A "specific tensile strength" of 76.2 x 103 m or greater;

c.Thermoset resin impregnated continuous "yams", "rovings", "tows" or "tapes" with a width of 15 mm or less (prepregs), made from carbon or glass 'fibrous or filamentary materials' specified in 1C210.3. or b.

Technical Note:

The resin forms the matrix of the composite.

Note: InlC210, 'fibrous or filamentary materials'is restricted to continuous "monofilaments", "yarns", "rovings", "tows"or "tapes".

1C210 a. 3801 90 000 0

5402 11 000 0

5404 90 900 0

5501 10 000 1

5503 11 000 0

5509 11 000 0

5509 12 000 0

6815 10 100 0

1C210 b. 7019

1C210 c. 3801 90 000 0

3926 90 980 2

6815 99 900 0

7019

3916

3920

3921
5604 90 000 0
5607 50 110 0
6815 10 100 0

1C216 Maraging steel, other than that specified in 1C116, 'capable of an ultimate tensile strength of 2,050 MPa or more, at 293 K (20°C).

Note: 1C216 does not control forms in which all linear dimensions are 75 mm or less.

Technical Note:

The phrase maraging steel 'capable of encompasses maraging steel before or after heat treatment.

1C216 7218
7219
7220
7221 00
7222
7223 00
7224
7225
7226
7227
7228
7229
7304 41 000 0
7304 49 100 0

1C225 Boron enriched in the boron-10 (10B) isotope to greater than its natural isotopic abundance, as follows: elemental boron, compounds, mixtures containing boron, manufactures thereof, waste or scrap of any of the foregoing.

Note: In 1C225 mixtures containing boron include boron loaded materials.

Technical Note:

The natural isotopic abundance ofboron-10 is approximately 18.5 weight per cent (20 atom per cent).

1C225 2845 90 900 0

1C226 Tungsten, tungsten carbide, and alloys containing more than 90% tungsten by weight, having both of the following characteristics:

a.In forms with a hollow cylindrical symmetry (including cylinder segments) with a inside diameter between 100 mm and 300 mm; <u>and</u>

b.A mass greater than 20 kg.

Note: 1C226 does not control manufactures specially designed as weights or gamma-ray collimators.

1C226 2849 90 300 0
8101 99 900 0

1C227 Calcium having both of the following characteristics:

a.Containing less than 1,000 parts per million by weight of metallic impurities other than magnesium; <u>and</u>

b.Containing less than 10 parts per million by weight of boron.

1C227 2805 12 000 0

1C228Magnesium having both of the following characteristics:

a.Containing less than 200 parts per million by weight of metallic impurities other than calcium; and

b.Containing less than 10 parts per million by weight of boron.

1C228 8104 20 000 0

8104 30 000 0

8104 90 000 0

1C229Bismuth having both of the following characteristics:

a.A purity of 99.99% or greater by weight; and

b.Containing less than 10 parts per million by weight of silver.

1C229 8106 00

1C230Beryllium metal, alloys containing more than 50% beryllium by weight, beryllium compounds, manufactures thereof, and waste or scrap of any of the foregoing.

Note: 1C230 does not control the following:

a.Metal windows for X-ray machines, or for bore-hole logging devices;

b.Oxide shapes in fabricated or semi-fabricated forms specially designed for electronic component parts or as substrates for electronic circuits;

c.Beryl (silicate of beryllium and aluminium) in the form of emeralds or aquamarines.

1C230 2825 90 200 0

2826 19 900 0

2827 39 850 0

2833 29 900 0

2834 29 200 0

2836 99 170 0

2850 00 900 0

8112 12 000 0

8112 13 000 0

8112 19 000 0

1C231 Hafnium metal, alloys containing more than 60% hafnium by weight, hafnium compounds containing more than 60% hafnium by weight, manufactures thereof, and waste or scrap of any of the foregoing.

1C231 2825 90 800 0

2826 19 900 0

2826 90 800 0

2827 39 850 0

2827 49 900 0

2827 60 000 0

2833 29 900 0

2834 29 800 0

2841 90 850 0

2850 00 200 0

8112 92 100 0

1C232 Helium-3 (3He), mixtures containing helium-3, and products or devices containing any of the foregoing.

Note: IC232 does not control a product or device containing less than 1 g of helium-3.

1C232 2845 90 900 0

1C233Lithium enriched in the lithium-6 (6Li) isotope to greater than its natural isotopic abundance, and products or devices containing enriched lithium, as follows: elemental lithium, alloys, compounds, mixtures containing lithium, manufactures thereof, waste or scrap of any of the foregoing.

Note: 1C233 does not control thermoluminescent dosimeters

Technical Note:

The natural isotopic abundance of lithium-6 is approximately 6.5 weight per cent (7.5 atom per cent).

1C233 2845 90 900 0

1C234Zirconium with a hafnium content of less than 1 part hamium to 500 parts zirconium by weight, as follows: metal, alloys containing more than 50% zirconium by weight, compounds, manufactures thereof, waste or scrap of any of the foregoing.

Note: 1C234 does not control zirconium in the form of foil having a thickness of 0.10 mm or less.

1C234 2825 60 000 0

2825 90 800 0

2826 19 900 0

2826 90 100 0

2827 39 850 0

2827 49 900 0

2827 60 000 0

2829 90 100 0

2833 29 900 0

2834 29 800 0

2835 29 800 0

2836 99 170 0

2839 90 000 0

2841 90 850 0

2849 90 900 0

2850 00 200 0

2850 00 900 0

2915 29 000 0

3823 19 900 0

7202 99 800 0

8109

1C235 Tritium, tritium compounds, mixtures containing tritium in which the ratio of tritium to hydrogen atoms exceeds 1 part in 1000, and products or devices containing any of the foregoing.

Note: 1C235 does not control a product or device containing less than 1.48X103 GBq (40 Ci) of tritium.

1C235 2844 40 800 0

1C236 Alpha-emitting radionuclides having an alpha half-life of 10 days or greater but less than 200 years, in the following forms:

a.Elemental;

b.Compounds having a total alpha activity of 37 GBq/kg (1 Ci/kg) or greater;

c.Mixtures having a total alpha activity of 37 GBq/kg (1 Ci/kg) or greater;

d.Products or devices containing any of the foregoing.

Note: 1C236 does not control a product or device containing less than 3.7 GBq (100 millicuries) of alpha activity.

1C236 2844

9022 29 000 0

1C237Radium-226 (226Ra), radium-226 alloys, radium-226 compounds, mixtures containing radium-226, manufactures therof, and products or devices containing any of the foregoing.

Note: 1C23 7 does not control the following:

a.Medical applicators;

b.A product or device containing less than 0.37 GBq (10 millicuries) of radium-226.

1C237 2844 40 800 0

1C238 Chlorine trifluoride (CLF3)

1C238 2812 90 000 0

1C239 High explosives, other than those specified in the Military Goods Controls, or substances or mixtures containing more than 2% by weight thereof, with a crystal density greater than 1.8 g/cnr1 and having a detonation velocity greater than 8,000 m/s.

1C239 3602 00 000 0

1C240 Nickel powder and porous nickel metal, other than those specified in OC005, as follows:

a.Nickel powder having both of the following characteristics:

1. A nickel purity content of 99.0% or greater by weight; <u>and</u>
2. A mean particle size of less than 10 micrometres measured by American Society for Testing and Materials (ASTM) B330 standard;

b.Porous nickel metal produced from materials specified in lC240.a.

Note: 1C240 does not control the following:

a.Filamentary nickel powders;

b.Single porous nickel sheets with an area of 1,000 cm2 per sheet or less.

Technical Note:

1C240. b. refers to porous metal formed by compacting and sintering the materials in 1C240. a. to form a metal material with fine pores interconnected throughout the structure.

1C240 a. 7504 00 000 0

1C240 b. 7506 10 000 0

7508 90 000 0

1C350 Chemicals, which may be used as precursors for toxic chemical agents, as follows:

N.B.: SEE ALSO MILITARY GOODS CONTROLS AND 1C450.

1. Thiodiglycol (111-48-8);
2. Phosphorus oxychloride (10025-87-3);
3. Dimethyl methylphosphonate (756-79-6);
4. SEE MILITARY GOODS CONTROLS FOR Methyl phosphonyl difluoride (676-99-3);
5. Methyl phosphonyl dichloride (676-97-1);
6. Dimethyl phosphite (868-85-9);
7. Phosphorus trichloride (7719-12-2);
8. Trimethyl phosphite (121-45-9);
9. Thionyl chloride (7719-09-7);
10. 3-Hydroxy-l-methylpiperidine (3554-74-3);
11. N,N-Diisopropyl-(beta)-aminoethyl chloride (96-79-7);
12. N,N-DiisopropyI-(beta)-aminoethane thiol (5842-07-9);
13. 3-Quinuclidinol (1619-34-7);
14. Potassium fluoride (7789-23-3);
15. 2-Chloroethanol (107-07-3);
16. Dimethylamine (124-40-3);
17. Diethyl ethylphosphonate (78-3 8-6);
18. Diethyl-N,N-dimethylphosphoramidate (2404-03-7);
19. Diethyl phosphite (762-04-9);
20. Dimethylamine hydrochloride (506-59-2);
21. Ethyl phosphinyl dichloride (1498-40-4);
22. Ethyl phosphonyl dichloride (1066-50-8);
23. SEE MILITARY GOODS CONTROLS FOR Ethyl phosphonyl difluoride (753-98-0);
24. Hydrogen fluoride (7664-39-3);
25. Methyl benzilate (76-89-1);
26. Methyl phosphinyl dichloride (676-83-5);
27. N,N-Diisopropyl-(beta)-amino ethanol (96-80-0);
28. Pinacolyl alcohol (464-07-3);
29. SEE MILITARY GOODS CONTROLS FOR o-Ethyl-2-diisopropylaminoethyI methyl phosphonite (57856-11-8);
30. Triethyl phosphite (122-52-1);
31. Arsenic trichloride (7784-34-1);
32. Benzilic acid (76-93-7);
33. Diethyl methylphosphonite (15715-41-0);
34. Dimethyl ethylphosphonate (6163-75-3);
35. Ethyl phosphinyl difluoride (430-78-4);
36. Methyl phosphinyl difluoride (753-59-3);
37. 3-Quinuclidone (3731-38-2);
38. Phosphorus pentachloride (10026-13-8);

39. Pinacolone (75-97-8);
40. Potassium cyanide (151-50-8);
41. Potassium bifluoride (7789-29-9);
42. Ammonium hydrogen fluoride (1341-49-7);
43. Sodium fluoride (7681-49-4);
44. Sodium bifluoride (1333-83-1);
45. Sodium cyanide (143-33-9);
46. Triethanolamine (102-71-6);
47. Phosphorus pentasulphide (1314-80-3);
48. Di-isopropylamine (108-18-9);
49. Diethylaminoethanol (100-37-8);
50. Sodium sulphide (1313-82-2);
51. Sulphur monochloride (10025-67-9);
52. Sulphur dichloride (10545-99-0);
53. Triethanolamine hydrochloride (637-39-8);
54. N,N-Diisopropyl-(Beta)-aminoethyl chloride hydrochloride (4261-68-1).

NOTE 1: 1C350 does not supervise export in " the state, Conventions not being by participants on prohibition of development, manufacture, accumulation and application of the chemical weapon and about its destruction (further - КЗХО) " chemical mixes ", the containing one or more chemical substances listed in 1C350.1, .3, .5, .11, .12, .13, .17, .18, .21, .22, .26, .27, .28, .31, .32, .33, .34, .35, .36 and .54 in which any of specified химикалий does not exceed 30 % of weight of all structure.

NOTE 2: 1C350 does not supervise "chemical compounds" for export in " the state, Conventions being by participants on prohibition of development, manufacture, accumulation and application of the chemical weapon and about its destruction (further - КЗХО), containing one or more chemical substances listed in 1C350.1, .3, .5, .11, .12, .13, .17, .18, .21, .22, .26, .27, .28, .31, .32, .33, .34, .35, .36 and .54 in which any of specified химикалий does not exceed 30 % of weight of all structure.

NOTE 3: 1C350 does not supervise the "chemical compounds" containing one or more chemicaliyes, listed in 1C350.2, .6, .7, .8, .9, .10, .14, .15, .16, .19, .20, .24, .25, .30, .37, .38, .39, .40, .41, .42, .43, .44, .45, .46, .47, .48, .49, .50, .51, .52 and .53 in which any of specified химикалий does not exceed 30 % of weight of all structure.

NOTE 4: 1C350 does not supervise production carried to the category of consumer goods, packed for retail trade, for personal or individual using.

1C350 1. 2920 90 850 0
1C350 2. 2812 10 110 0
1C350 3. 2931 00 100 0
1C350 4. 2931 00 200 0
1C350 5. 2931 00 300 0
1C350 6. 2920 90 200 0
1C350 7. 2812 10 150 0

1C350 8. 2920 90 300 0
1C350 9. 2812 10 950 0
1C350 10. 2933 39 990 0
1C350 11. 2921 19 800 0
1C350 12. 2922 19 800 0
1C350 13. 2933 39 990 0
1C350 14. 2826 19 900 0
1C350 15. 2905 59 100 0
1C350 16. 2921 11 100 0
2921 11 900 0
1C350 17. 2920 90 850 0
2931 00 950 0
1C350 18. 2921 19 800 0
1C350 19. 2920 90 500 0
1C350 20. 2921 11 900 0
1C350 21. 2931 00 950 0
1C350 22. 2931 00 950 0
1C350 23. 2931 00 950 0
1C350 24. 2811 11 000 0
1C350 25. 2918 19 850 0
1C350 26. 2931 00 300 0
1C350 27. 2922 19 800 0
1C350 28. 2905 19 000 0
1C350 29. 2931 00 950 0
1C350 30. 2920 90 400 0
1C350 31. 2812 10 990 0
1C350 32. 2916 34 000 0
1C350 33. 2931 00 950 0
1C350 34. 2920 90 850 0
1C350 35. 2931 00 950 0
1C350 36. 2931 00 950 0
1C350 37. 2933 39 990 0
1C350 38. 2812 10 160 0
1C350 39. 2914 19 900 0
1C350 40. 2837 19 000 0
1C350 41. 2826 19 900 0
1C350 42. 2826 19 100 0
2826 19 900 0
1C350 43. 2826 19 100 0
1C350 44. 2826 19 100 0
1C350 45. 2837 11 000 0
1C350 46. 2922 13 100 0
2922 13 900 0
1C350 47. 2813 90 100 0
1C350 48. 2921 19 800 0

1C350 49. 2922 19 800 0
1C350 50. 2830 10 000 0
1C350 51. 2812 10 990 0
1C350 52. 2812 10 930 0
1C350 53. 2922 13 900 0
1C350 54. 2921 19 800 0

1C351Human pathogens, zoonoses and "toxins", as follows:

a.Viruses, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:

1. Chikungunya virus;
2. Congo-Crimean haemorrhagic fever virus;
3. Dengue fever virus;
4. Eastern equine encephalitis virus;
5. Ebola virus;
6. Hantaan virus;
7. Junin virus;
8. Lassa fever virus;
9. Lymphocytic choriomeningitis virus;
10. Machupo virus;
11. Marburg virus;
12. Monkey pox virus;
13. Rift Valley fever virus;
14. Tick-borne encephalitis virus (Russian Spring-Summer encephalitis virus);
15. Variola virus;
16. Venezuelan equine encephalitis virus;
17. Western equine encephalitis virus;
18. White pox;
19. Yellow fever virus;
20. Japanese encephalitis virus;
21. Kyasanur Forest disease virus
22. Louping virus
23. Murray Valley encephalitis virus
24. Omsk haemorrhagic fever virus
25. Oropouche virus
26. Powassan virus
27. Rocio virus
28. St Louis encephalitis virus
29. Hendra virus
30. Sabia virus, Flexal virus, Guanarito virus
31 Seou virus, Dobrava virus, Puumala virus, Sin Nombre virus;
32 Nipah virus
33 Human immunodeficiency virus

b.Rickettsiae, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:

1. Coxiella burnetii;
2. Bartonella quintana (Rochalimaea quintana, Rickettsia quintana);
3. Rickettsia prowasecki;
4. Rickettsia rickettsii;

c.Bacteria, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:

1. Bacillus anthracis;
2. Brucella abortus;
3. Brucella melitensis;
4. Brucella suis;
5. Chlamydia psittaci;
6. Clostridium botulinum;
7. Francisella tularensis;
8. Burkholderia mallei (Pseudomonas mallei);
9. Burkholderia pseudomallei (Pseudomonas pseudomallei);
10. Salmonella typhi;
11. Shigella dysenteriae;
12. Vibrio cholerae;
13. Yersinia pestis;
14. Clostridium perfringens
15. Escherichia coli

Note: on item 1C351. the vaccines satisfying following criteria are not supervised:
1. If such production - is packaged in advance and intended for distribution as a medical product;
2.If such production is authorized by corresponding state body to sale as medical production.

Here it is necessary to carry vaccines against the following patogenics.

1. Bacillus anthracis;
2. Brucella abortus;
3. Brucella melitensis;
4. Brucella suis;
7. Francisella tularensis;
12. Vibrio cholerae;
13. Yersinia pestis.

d. "Toxins", as follows, and "sub-unit of toxins" thereof:

1.Botulinum toxins;
2. Clostridium perfringens toxins;
3. Conotoxin;
4. Ricin;

5. Saxitoxin;
6. Shiga toxin;
7. Staphylococcus aureus toxins;
8. Tetrodotoxin;
9. Verotoxin;
10. Microcystin (Cyanginosin);
11. Aflatoxins
12. Arbin
13. Cholera toxin
14. Diacetoxyscirpenol toxin;
15. Toxin T-2;
16. ToxinHT-2;
17. Modeccin;
18. Volkensin;
19. Viskumin.

Note: 1C351. d. 1. does not control botulinum toxins in product form meeting all of the following criteria:

1. Are pharmaceutical formulations designed for human administration in the treatment of medical conditions;
2. Are pre-packaged for distribution as medical products;
3. Are authorised by a state authority to be marketed as medical products.

Note: 1C35J does not control "vaccines" or "immunotoxins".

1C351 a. 3002 90 500 0
1C351 b. 3002 90 500 0
1C351 c. 3002 90 500 0
1C351 d. 3002 90 900 0
3002 90 500 0

1C352Pathogens, which are dangerous for animals, as follows:

a. Viruses, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:

1. African swine fever virus;
2. Avian influenza virus, which are:

a.Uncharacterised; or

b.Defined in EC Directive 92/40/EC (O.J. L.I6 23.1.92 p. 19) as having high pathogenicity, as follows:

1. Type A viruses with an VVPI (intravenous pathogenicity index) in 6 week old chickens of greater than 1.2; or
2. Type A viruses H5 or H7 subtype for which nucletide sequencing has demonstrated multiple basic amino acids at the cleavage site

of haemagglutinin;

3. Bluetongue virus;
4. Foot and mouth disease virus;
5. Goat pox virus;

6. Suid herpes virus 1
7. Classical swine fever virus
8. Lyssavirus
9. Newcastle disease virus
10. Peste-des-petits-ruminants virus
11. Swine vesicular disease virus
12. Rinderpest virus
13. Sheep poxvirus
14. Porcine teschovirus 1
15. Vesicular stomatitis virus
16. Lumpy skin disease virus
17. African horse sickness virus

b. Mycoplasma mycoides, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such Mycoplasma mycoides.

Note: 1C352 does not control "vaccines".

1C352 3002 90 500 0

1C353Genetically-modified "microorganisms", as follows:

a.Genetically modified "microorganisms" or genetic elements that contain nucleic acid sequences associated with pathogenicity of organisms specified in 1C35 l.a. to c. or 1C352 or 1C354;

b.Genetically modified "microorganisms" or genetic elements that contain nucleic acid sequences coding for any of the "toxins" specified in lC351.d. or "sub-units of toxins" thereof.

Technical note: Genetic elements include among other chromosomes, genoms, plazmides, transpozones and vectors, irrespective of genetic updating or its absence.

Note: 1C353 we shall not apply to the sequences (sites) of a nucleinic acid connected with pathogenicity enterrogemmoragetically barky , Serotip O157, or to another shtamms, forming verotoksin, differing from coded as verotoksin or as it under-types;

1C353 3002 90 500 0

1C354 Plant pathogens, as follows:

a. The viruses, a natural origin or changed, in the form of " the isolated alive culture " or as a material, including a nutrient medium purposely infected or imparted by such cultures as:

1. Latent timovirus of an ands potato;
2. Veroed of a potato tuber;

b. Bacteria, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material which has been deliberately

inoculated or contaminated with such cultures, as follows:

1. Xanthomonas albilineans;
2. Xanthomonas campestris pv. citri including strains referred to as Xanthomonas campestris pv. citri types A,B,C,D,E or otherwise classified as Xanthomonas citri, Xanthomonas campestris pv. aurantifolia or Xanthomonas campestris pv. citrumelo;

3. Ксантомонас орузае патовар Орузае (Псюдомонас кампестрис патовар Орузае);

4. Клавибактер михиганенсис подвид Сепедоникуса (коринебактериум михиганенсис подвид Сепедоникуса или коринебактериум Сепедоникум);

5. Ралстония соланасеарум биологическая раса 2 и 3 (псюдомонас соланасеарум биологическая раса 2 и 3);

3.

c.Fungi, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material which has been deliberately inoculated or contaminated with such cultures, as follows:

1. Colletotrichum coffeanum var. virulans (Colletotrichum kahawae);
2. Cochliobolus miyabeanus (Helminthosporium oryzae);
3. Microcyclus ulei (syn. Dothidella ulei);
4. Puccinia graminis (syn. Puccinia graminis f. sp. tritici);
5. Puccinia striiformis (syn. Puccinia glumarum);
6. Magnaporthe grisea (pyricularia grisea/pyricularia oryzae).

1C354 a. 3002 90 500 0

1C354 b. 3002 90 500 0

1C354 c. 3002 90 500 0

1C450 Toxic chemicals and toxic chemical precursors, as follows:

N.B.: SEE ALSO ENTRY 1C350, lC351.d. AND MILITARY GOODS CONTROLS.

a.Toxic chemicals, as follows:

1. Amiton: O,0-Diethyl S-[2-(diethylamino)ethyl] phosphorothiolate (78-53-5) and corresponding alkylated or protonated salts;
2. PFIB: l,l,3,3,3-Pentafluoro-2-(trifluoromethyl)-l-propene (382-21-8);
3. SEE MILITARY GOODS CONTROLS FOR BZ: 3-QuinucIidinyl benzilate (6581-06-2);
4. Phosgene: Carbonyl dichloride (75-44-5);2812 10 940 0
5. Cyanogen chloride (506-77-4);2851 00 500 0

6. Hydrogen cyanide (74-90-8);2811 19 200 0
7. Chloropicrin: Trichloronitromethane (76-06-2);2904 90 400 0

Note 1: For export in " the states, Conventions not being by participants on prohibition of development, manufacture, accumulation and application of the chemical weapon and about its destruction (further - КЗХО), 1С450 does not supervise the "chemical compounds" containing one or more chemicals, listed in 1С450.a.1 and a.2 in which any of specified chemicals does not exceed 1 % of weight of all structure.

Note 2: For export in " the states, Conventions being by participants on prohibition of development, manufacture, accumulation and application of the chemical weapon and about its destruction (further - КЗХО), 1С450 does not supervise the "chemical compounds" containing one or more chemicals, listed in 1С450.a.1. And .a.2. in which any of specified chemicals does not exceed 30 % of weight of structure.

Note 3: 1С450 does not supervise the "chemical compounds" containing one or more chemicals, listed in 1С450.a.4, .a.5., .a.6. And .a.7. In which any of specified chemicals does not exceed 30 % of weight of structure.

b.Toxic chemical precursors, as follows:

1.Chemicals, other than those specified in the Military Goods Controls or in 1С350, containing a phosphorus atom to which is bonded one methyl, ethyl or propyl (normal or iso) group but not further carbon atoms;

Note: 1С450. b. 1 does not control Fonofos: O-Ethyl S-phenyl ethylphosphonothiolothionate (944-22-9);

2. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] phosphoramidic dihalides;
3. Dialkyl [methyl, ethyl or propyl (normal or iso)] N,N-dialkyl [methyl, ethyl or propyl (normal or iso)]-phosphoramidates, other than Diethyl-N,N-dimethylphosphoramidate which is specified in 1С350;
4. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethyl-2-chlorides and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethyl chloride or N,N-Diisopropyl-(beta)-aminoethyl chloride hydrochloride which are specified in 1С350;
5. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethane-2-ols and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethanol (96-80-0) and N,N-Diethylaminoethanol (100-37-8) which are specified in 1С350;

Note: 1С450. b. 5. does not control the following:

a.N,N-Dimethylaminoethanol (108-01-0) and corresponding protonated

salts;

b.Protonated salts ofN,N-Diethylaminoethanol (100-3 7-8);

6. N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethane-2-thiols and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethane thiol which is specified in 1C350;
7. Ethyldiethanolamine (139-87-7);2922 19 100 0
8. Methyldiethanolamine (105-59-9).2922 19 200 0

Note 1: For export in " the states, Conventions not being by participants on prohibition of development, manufacture, accumulation and application of the chemical weapon and about its destruction (further - КЗХО), 1æ450 does not supervise the "chemical compounds" containing one or more chemicaliyes, listed in 1C450.b.1., .b.2, .b.3., .b4., .b.5. And .b.6. in which not listed in lists chemicaliy makes over 10 % from weight of all structure.

Note 2: For export in " the states, Conventions being by participants on prohibition of development, manufacture, accumulation and application of the chemical weapon and about its destruction (further - КЗХО), 1C450 does not supervise the "chemical compounds" containing one or more chemicaliy, listed in 1C450.b.1., .b.2, .b.3., .b4., .b.5. And .b.6. in which not listed in lists chemicaliy makes over 30 % from weight of all structure.

Note 3: 1C450 does not supervise the "chemical compounds" containing one or more chemicaliy, listed in 1C450.b.7. And .b.8. in which chemicaliy, not listed separately, makes over 30 % from weight of all structures.

Note: 1C450 does not supervise the products carried to the category of consumer goods, intended in retail trade for a private use or packaged for individual consumption.

1C450 a. 1. 2930 90 850 0
1C450 a. 2. 2930 39 900 0
1C450 a. 3. 2916 39 000 0
1C450 a. 4. 2812 10 940 0
1C450 a. 5. 2853 00 500 0
1C450 a. 6. 2811 19 200 0
1C450 a. 7. 2904 90 400 0
1C450 b. 1. 2931 00 950 0
1C450 b. 2. 2931 00 950 0
1C450 b. 3. 2931 00 950 0
2929 90 000 0
1C450 b. 4. 2921 19 800 0
1C450 b. 5. 2921 19 800 0
1C450 b. 6. 2930 90 850 0
1C450 b. 7. 2922 19 100 0
1C450 b. 8. 2922 19 200 0

ID Software

1D001"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in 1B001 to 1B003.

1D001

1D002"Software" for the "development" of organic "matrix", metal "matrix" or carbon "matrix" laminates or "composites".

1D002

1D101"Software" specially designed or modified for the "use" of goods specified in IB 101, 1B102, 1B115, 1B117, 1B118 or 1B119.

1D101

1D103"Software" specially designed for analysis of reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures

1D103

1D201"Software" specially designed for the "use" of goods specified in 1B201.

1D 8524

IE Technology

1E001"Technology" according to the General Technology Note for the "development" or "production" of equipment or materials specified in lAOOl.b.., lAOOl.c., 1A002 to 1A005, IB or 1C.

1E001

1E002Other "technology", as follows:

a."Technology" for the "development" or "production" of polybenzothiazoles or polybenzoxazoles;

b."Technology" for the "development" or "production" of fiuoroelastomer compounds containing at least one vinylether monomer;

c."Technology" for the design or "production" of the following base materials or non-"composite" ceramic materials:

1.Base materials having all of the following characteristics:

a.Any of the following compositions:

1. Single or complex oxides of zirconium and complex oxides of silicon or aluminium;
2. Single nitrides of boron (cubic crystalline forms);
3. Single or complex carbides of silicon or boron; or
4. Single or complex nitrides of silicon;

b.Total metallic impurities, excluding intentional additions, of less than:

1. 1,000 ppm for single oxides or carbides; or
2. 5,000 ppm for complex compounds or single nitrides; <u>and</u>

c. Being any of the following:

1. Zirconia with an average particle size equal to or less than 1 urn and no more than 10% of the particles larger than 5 urn;
2. Other base materials with an average particle size equal to or less than 5 um and no more

than 10% of the particles larger than 10 um; or

3.Having all of the following:

a.Platelets with a length to thickness ratio exceeding 5;

b.Whiskers with a length to diameter ratio exceeding 10 for diameters less than 2 um; and

c.Continuous or chopped fibres less than 10 um in diameter;

2.Non-"composite" ceramic materials composed of the materials described in 1E002.C.1;

Note: 1E002.C.2. does not control "technology"for the design or production of abrasives.

d."Technology" for the "production" of aromatic polyamide fibres;

e."Technology" for the installation, maintenance or repair of materials specified in 1C001;

f."Technology" for the repair of "composite" structures, laminates or materials
specified in 1A002, 1C007.C. or ICOOT.d.

Note: IE002.f. does not control "technology"for the repair of "civil aircraft" structures using carbon "fibrous or filamentary materials" and epoxy resins, contained in aircraft manufacturers' manuals.

1E002

1E101"Technology" according to the General Technology Note for the "use" of goods specified in 1A102, 1B001, 1B101, 1B115,1B116, 1C001, 1C101, 1C107, 1C111 to 1C117, 1D101 or 1D103.

1E101

1E102"Technology" according to the General Technology Note for the"development" of "software" specified in 1D001, 1D101 or 1D103.

1E102

1E103"Technology" for the regulation of temperature, pressure or atmosphere in autoclaves or hydroclaves, when used for the "production" of "composites" or partially processed "composites".

1E103

1E104"Technology" relating to the "production" of pyrolytically derived materials formed on a mould, mandrel or other substrate from precursor gases which decompose in the 1,573 K (1,300°C) to 3,173 K (2,900°C) temperature range at pressures of 130 Pa to 20kPa.

Note: 1E104 includes "technology" for the composition of precursor gases, flow-rates and process control schedules and parameters.

1E104

1E201"Technology" according to the General Technology Note for the "use" of goods specified in 1A002, 1A202, 1A225 to 1A227, 1B201, 1B225 to 1B233, lC002.a.2.c. or d., ICOlO.b., 1C202, 1C210, 1C216,1C225 to 1C240 or 1D201.

1E201

1E202"Technology" according to the General Technology Note for

the"development" or "production" of goods specified in 1A202 or 1A225 to 1A227.

1E203"Technology" according to the General Technology Note for the"development" of "software" specified in 1D201.

1E203

CATEGORY 2
MATERIALS PROCESSING
2A Systems, Equipment and Components

N.B.: For quiet running bearings, see the Military Goods Controls.

2A001 Anti-friction bearings and bearing systems, as follows, and components therefor:

Note: 2A001 does not control 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 tolerances specified by the manufacturer in accordance with ABEC 7, ABEC 7P, ABEC 7T or ISO Standard Class 4 or better (or national equivalents), and having rings, balls or rollers made from monel or beryllium;

Note: 2AOOl.a. does not control tapered roller bearings.

b.Other ball bearings and solid roller bearings having tolerances specified by the manufacturer in accordance with ABEC 9, ABEC 9P or ISO Standard Class 2 or better (or national equivalents);

Note: 2AOOI.b. does not control tapered roller bearings.

c.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 3D homopolar bias designs for actuators; or
3. High temperature (450 K (177°C) and above) position sensors.

2A001 a. 8482 10 900 1
8482 10 900 9
8482 50 000 0
8482 40 000 0
2A001 b. 8482 80 000 0
2A001 c. 8483 30 380 0
8483 30 800

2A225 Crucibles made of materials resistant to liquid actinide metals, as follows:

a.Crucibles having both of the following characteristics:

1. A volume of between 150 cm3 and 8,000 cm3; <u>and</u>
2. Made of or coated with any of the following materials, having a purity of 98% or greater by weight:

a.Calcium fluoride (CaF2);
b.Calcium zirconate (metazirconate) (CaZrO3);
c.Cerium sulphide (Ce2S3);
d.Erbium oxide (erbia) (Er2O3);

e.Hafnium oxide (hafhia) (HfO2);

f.Magnesium oxide (MgO);

g.Nitrided niobium-titanium-tungsten alloy (approximately 50% Nb, 30% Ti, 20% W);

h. Yttrium oxide (yttria) (Y203); or

i. Zirconium oxide (zirconia) (Zr02);

b.Crucibles having both of the following characteristics:

1. A volume of between 50 cm" and 2,000 cm3; and
2. Made of or lined with tantalum, having a purity of 99.9% or greater by weight;

c. Crucibles having all of the following characteristics:

1. A volume of between 50 cm3 and 2,000 cm3;
2. Made of or lined with tantalum, having a purity of 98% or greater by weight; and
3. Coated with tantalum carbide, nitride, boride, or any combination thereof.

2A225 a. 6903 90 900 0

6909 19 000

2A225 b. 6903

8103 90 900 0

2A225 c. 6903

8103 90 900 0

2A226Valves having all of the following characteristics:

a.A 'nominal size' of 5 mm or greater;

b.Having a bellows seal; and

c.Wholly made of or lined with aluminium, aluminium alloy, nickel, or nickel alloy containing more than 60% nickel by weight.

Technical Note:

For valves with different inlet and outlet diameters, the 'nominal size' in 2A226 refers to the smallest diameter.

2A226 8481 10 990 0

8481 30 990 0

8481 40 900 0

8481 80 639 0

8481 80 690 0

8481 80 739 0

8481 80 790 0

8481 80 819 0

8481 80 990 0

2B Test, Inspection and Production Equipment

Technical Notes:

1. Secondary parallel contouring axes, (e.g., the w-axis on horizontal boring mills or a secondary rotary axis the centre line of which is parallel to the primary rotary axis) are not counted in the total number of contouring axes. Rotary axes need not rotate over 360°. A rotary axis can be driven by a linear device (e.g. a screw or a

rack-and-pinion).

2. For 2B, the number of axes which are simultaneously coordinated for " planimetric management " is a number of the axes influencing relative movement between the machine tool and a detail, an added cutting torch or grinding circle which cuts off or deletes a material from a surface, a processable detail. Additional axes are not used, which could affect relative movement inside of the machine tool. Such axes include:

a. Systems of editing of a grinding circle of the grinding machine tool;

b. Parallel axes of rotation for installation separately several details;

c. Kolleanar axes of rotation for a manipulation a detail, having clamped it in the holder from the different ends

3. Axis nomenclature shall be in accordance with International Standard ISO 841, 'Numerical Control Machines - Axis and Motion Nomenclature'.

4. For the purposes of2B001 to 2B009 a "tilting spindle" is counted as a rotary axis.

5. Stated positioning accuracy levels derived from measurements made according to ISO 230/2 (1988)' or national equivalents may be used for each machine tool model instead of individual machine tests. Stated positioning accuracy means the accuracy value provided to the competent authorities of the Member State in which the exporter is established as representative of the accuracy of a machine model.

Determination of Stated Values

a.Select five machines of a model to be evaluated;

b.Measure the linear axis accuracies according to ISO 230/2 (1988)';

c.Determine the A-valuesfor each axis of each machine. The method of calculating the A-value is described in the ISO standard;

d.Determine the mean value of the A-value of each axis. This mean value A becomes the stated value of each axis for the model (Ax Ay...);

e.Since the Category 2 list refers to each linear axis there will be as manystated values as there are linear axes;

f.If any axis of a machine model not controlled by 2B001.a. to 2B001.C. or 2B201 has a stated accuracy A of 6 microns for grinding machines and 8 microns for milling and turning machines or better, the manufacturer should be required to reaffirm the accuracy level once every eighteen months.

2B001 Machine tools, as follows, 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":

N.B.: SEE ALSO 2B201.

Note 1: the Item 2B001 does not supervise the metal-cutting machine tools specially developed for manufacture sixs. See 2B003 on such machine tools.

Note 2: the Item 2B001 does not supervise the metal-cutting machine tools specially developed for manufacture of following details and their parts:

a. A shaft of a crank and a shaft of the clown;

b. Machine tools and mills;

c. Pressing shnek;
d. The engraved or faceted details of jeweller ornaments.

Note 3: the Metal-cutting machine tool possessing, at least, two or three following opportunities: to sharpen, to mill or grind (for example, the lathe with frezrovs opportunities is estimated under the list 2B001.a., .b. Or .c.

a.Machine tools for turning, having all of the following characteristics:

1. Positioning accuracy with "all compensations available" equal to or less (better) than 6 urn according to ISO 230/2 (1988)2 or national equivalents along any linear axis; and
2. Two or more axes which can be coordinated simultaneously for "contouring control";

Note: 2B001. a. does not control turning machines specially designed for the production of contact lenses.

b.Machine tools for milling, having any of the following characteristics:

1As follows:

a. Positioning accuracy with "all compensations available" equal to or less (better) than 6 nm according to ISO 230/2 (1988)2 or national equivalents along any linear axis: and

b.Three linear axes plus one rotary axis which can be coordinated simultaneously for "contouring control";

2. Five or more axes which can be coordinated simultaneously for "contouring control"; or
3. A positioning accuracy for jig boring machines, with "all compensations available", equal to or less (better) than 4 urn according to ISO 230/2 (1988)2 or national equivalents along any linear axis;

4. The flying cutters possessing any following characteristics:

a. Movement by inertia of a spindle or system of cams less better) 0,0004 mm of full internal reflection (TTR); and

b. An angular deviation of sliding movement (turn in a horizontal plane; turn around of a vertical axis, change of a step and rotation.

c.Machine tools for grinding, having any of the following characteristics:

1.As follows;

a. Positioning accuracy with "all compensations available" equal to or less (better) than 4 urn according to ISO 230/2 (1988)3 or national equivalents along any linear axis; and

b.Three or more axes which can be coordinated simultaneously for "contouring control"; or

2.Five or more axes which can be coordinated simultaneously for "contouring control";

Note: 2B001.C. does not control grinding machines, as follows:

1.Cylindrical external, internal, and external-internal grinding machines having all the following characteristics:

a.Limited to cylindrical grinding; and

b.Limited to a maximum workpiece capacity of 150 mm outside diameter or length.

2.Machines designed specifically as jig grinders having any of the following characteristics:

a.The c-axis is used to maintain the grinding wheel normal to the work surface; or

b.The a-axis is configured to grind barrel cams.

3. Surface grinders.

d.Electrical discharge machines (EDM) of the non-wire type which have two or more rotary axes which can be coordinated simultaneously for "contouring control";

e.Machine tools for removing metals, ceramics or "composites":

1.By means of:

a.Water or other liquid jets, including those employing abrasive additives;

b.Electron beam; or

c."Laser" beam; and

2.Having two or more rotary axes which:

a.Can be coordinated simultaneously for "contouring control"; and

b.Have a positioning accuracy of less (better) than 0.003°;

f.Deep-hole-drilling machines and turning machines modified for deep-hole-drilling, having a maximum depth-of-bore capability exceeding 5,000 mm and specially designed components therefor.

2B001 a. 8458 11 200 0
8458 11 410
8458 11 490 0
8458 11 800 0
8458 19 200 0
8458 19 400 0
8465 99 000 0
8458 19 800 0
8458 91 200
8464 91 800 0
8464 90 800 0
8465 99 100 0
2B001 b. 8459 31 000 0
8459 39 000 0
8459 51 000 0
8459 61 100 0
8459 61 900
8459 61
8459 69 900 0
8464 90 800 0
8465 92 000 0
2B001 c. 8460 11 000 0
8460 19 000 0
8460 21 110 0

8460 21 150 0
8460 21 190 0
8460 21 900 0
8460 21
8460 29 110 0
8460 29 190 0
8460 29 900 0
8460 29
8464 20 950 0
8465 93 000 0
8464 20 110 0
8464 20 190 0
8464 20 200 0
8464 20 950 0
8465 93 000 0
2B001 d. 8456 30 190 0
8424 30 900 0
8456 30
2B001 e. 8424 30 900 0
8456 10 001 0
8456 10 009 0
8456 90 000 0
8456 10
2B001 f. 8458 11 200 0
8458 11 410
8458 11 490 0
8458 11 800 0
8458 19 200 0
8458 19 400 0
8458 19 800 0
8458 91 200
8458 91 800
8458 99 000
8458
8459 21 000 0
8459 29 000 0

2B002 Machine tools with numerical program management with use a magnetiorological process of fair processing (MRF) [W].

The technical note: For item 2é002, MRF is a process on removal of a material by means of abrasive магнитожидкости which viscosity copes a magnetic field.

2B002 8464 20 110 0;
8464 20 190 0;
8464 20 950 0;
8465 93 000 0

2B003"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 (Re = 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 1328 class 3).

2B003 8461 40 710 0

8461 40 790 0

2B004 Hot "isostatic presses", having all of the following, and specially designed components and accessories therefor:

N.B.: SEE ALSO 2B104 and 2B204.

a.A controlled thermal environment within the closed cavity and a chamber cavity with an inside diameter of 406 mm or more; and

b.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.

Technical Note:

The inside chamber dimension is that of the chamber in which both the working temperature and the working pressure are achieved and does not include fixtures. That dimension will be the smaller of either the inside diameter of the pressure chamber or the inside diameter of the insulated furnace chamber, depending on which of the two chambers is located inside the other.

N.B. For specially designed dies, moulds and tooling see 1B003, 9B009 and the Military Goods Controls.

2B004 8462 99 100 0

8462 99 500 0

8462 99 900 1

8462 99 900 9

8462 99

2B005Equipment specially designed for the deposition, processing and in-process control of inorganic overlays, coatings and surface modifications, as follows, for non-electronic substrates, by processes shown in the Table and associated Notes following 2E003.f., and specially designed automated handling, positioning, manipulation and control components therefor:

a."Stored programme controlled" chemical vapour deposition (CVD) production equipment having all of the following:

N.B.: SEE ALSO 2B105.

1.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.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."Stored programme controlled" ion implantation production equipment

having beam currents of 5 mA or more;

c."Stored programme controlled" electron beam physical vapour deposition (EB-PVD) production equipment incorporating power systems rated for over 80 kW, 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 ionised atoms in the evaporant stream to control the deposition rate of a coating containing two or more elements;

d."Stored programme controlled" plasma spraying production equipment having any of the following characteristics:

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."Stored programme controlled" sputter deposition production equipment capable of current densities of 0.1 mA/mm or higher at a deposition rate of 15 um/h or more;

f."Stored programme controlled" cathodic arc deposition production equipment incorporating a grid of electromagnets for steering control of the arc spot on the cathode;

g."Stored programme controlled" ion plating production equipment allowing for thein situ measurement of any of the following:

1. Coating thickness on the substrate and rate control; or
2. Optical characteristics.

Note: 2B005 does not control chemical vapour deposition, cathodic arc, sputter deposition, ion plating or ion implantation equipment specially designed for cutting or machining tools.

2B005 a. 8456 90 000 0
8486 10
8486 30
8486 40
8419 89 989 0
2B005 b. 8456 10 001 0
8456 10 009 0
8543 10 000 0
2B005 c. 8456 10 001 0
8456 10 009 0
8486 10
8486 30

8486 40
2B005 d. 8456 90 000 0
8486 10
8486 30
8486 40
8419 89 98
2B005 e. 8456 90 000 0
8486 10
8486 30
8486 40
8419 89 300 0
8419 89 98
2B005 f. 8515 80 990 0
8486 10
8486 30
8486 40
2B005 g. 8456 10 001 0
8456 10 009 0

2B006Dimensional inspection or measuring systems and equipment, as follows:

a.Computer controlled, "numerically controlled" or "stored programme controlled"dimensional inspection machines, having a three dimensional length (volumetric) "measurement uncertainty" equal to or less (better) than (1.7 + L/1,000) um (L is the measured length in mm) tested according to ISO 10360-2;

N.B.: SEE ALSO 2B206.

b.Linear and angular displacement measuring instruments, as follows:

1. Linear measuring instruments having any of the following:

Technical note: For 2B006.b.1., " linear moving " means change of distance between a contact measuring head and measured object.

a.Non-contact type measuring systems with a "resolution" equal to or less (better) than 0.2 um within a measuring range up to 0.2 mm;

b.Linear voltage differential transformer systems having all of the following characteristics:

1. "Linearity" equal to or less (better) than 0.1% within a measuring range up to 5 mm; <u>and</u>
2. Drift equal to or less (better) than 0.1% per day at a standard ambient test room temperature ±1 K; or

c.Measuring systems having all of the following:

1. Containing a "laser": and

2. Maintaining, for at least 12 hours, over a temperature range of ±1 K around a standard temperature and at a standard pressure, all of the following:

a.A "resolution" over their full scale of 0.1 um or less (better);<u>and</u>

b.A "measurement uncertainty" equal to or less (better) than (0.2 + L/2,000) um (L is the measured length in mm);

Note: 2B006. b. 1. does not control measuring interferometer systems, without closed or open loop feedback, containing a "laser" to measure slide movement errors of machine-tools, dimensional inspection machines or similar equipment.

2.Angular measuring instruments having an "angular position deviation" equal to or less (better) than 0.00025°

Note: 2B006.b.2. does not control optical instruments, such as

autocollimators, using collimated light to detect angular displacement of a mirror.

: ~ c. Equipment for measuring surface irregularities, by measuring optical scatter as a function of angle, with a sensitivity of 0.5 nm or less (better).

Note: Machine tools which can be used as measuring machines are controlled if they meet or exceed the criteria specified for the machine tool function or the measuring machine function

2B006 a. 9031 80 340 0

9031 80 320 0

2B006 b. 9031 49 900 0

9031 49 000 0

9031 80 320 0

9031 80 340 0

9031 80 910 0

2B006 c. 9031 49 900 0

2B007 "Robots" having any of the following characteristics and specially designed controllers and "end-effectors" therefor:

N.B.: SEE ALSO 2B207.

a.Capable in real time of full three-dimensional image processing or full three-dimensional 'scene analysis' to generate or modify "programmes" or to generate or modify numerical programme data;

Technical Note:

The 'scene analysis' limitation does not include approximation of the third dimension by viewing at a given angle, or limited grey scale interpretation for the perception of depth or texture for the approved tasks (2 1/2 D).

b.Specially designed to comply with national safety standards applicable to explosive munitions environments;

c.Specially designed or rated as radiation-hardened to withstand a total radiation dose greater than 5x10 Gy (silicon) without operational degradation; or

Techncial Note:

The term Gy (silicon) refers to the energy in Joules per kilogram absorbed by an unshielded silicon sample when exposed to ionising radiation.

d. Specially designed to operate at altitudes exceeding 30,000 m.

2B007 8479 50 000 0

8537 10 100 0

8537 10 910

8537 10 990 0

2B008Assemblies, units or inserts specially designed for machine tools or for equipment specified in 2B006 or 2B007, as follows:

a.Linear position feedback units (e.g., inductive type devices, graduated scales, infrared systems or "laser" systems) having an overall "accuracy" less (better) than

(800 + (600 x L x 10')) nm (L equals the effective length in mm);

N.B.: For "laser" systems see also Note to 2B006.b. 1.

b.Rotary position feedback units (e.g., inductive type devices, graduated scales, infrared systems or "laser" systems) having an "accuracy" less (better) than 0.00025°;

N.B.: For "laser" systems see also Note to 2B006.b. 1.

c."Compound rotary tables" and "tilting spindles", capable of upgrading, according to the manufacturer's specifications, machine tools to or above the levels specified in 2B.

2B008 a 8466 10 150 0
8486 90
2B008 c. 8466 10 310 0
8466 10 380 0
8466 10 950 0
8466 20 150 0
8486 90
8466 20 910 0
8466 20 950 0
8466 30 000 0
8466 91 150 0
8466 91 200 0
8466 91 950 0
8466 92 200 0
8466 92 800 0
8466 93 000 0
8466 94 000 0
2B009
2B104

Spin-forming machines and flow-forming machines, which, according to the manufacturer's technical specification, can be equipped with "numerical control" units or a computer control and having all of the following:

N.B.: SEE ALSO 2B109 AND 2B209.

a. Two or more controlled axes of which at least two can be coordinated simultaneously for "contouring control"; <u>and</u>

b. A roller force more than 60 kN.

Technical Note:

Machines combining the function of spin-forming and flow-forming are for the purpose of 2B009 regarded as flow-forming machines.

"2B009 8462 29 100 0

8462 21 100
8462 21 800
8463 90 000 0

Isostatic presses", other than those specified in 2B004, having all of the following:

N.B.: a. Maximum working pressure of 69 MPa or greater;

b. Designed to achieve and maintain a controlled thermal environment of 873 K (600°C) or greater; and

c. Possessing a chamber cavity with an inside diameter of 254 mm or greater.

2B104 8462 99 100 0
8462 99 500 0

2B105CVD furnaces, other than those specified in 2B005.a., designed or modified for the densification of carbon-carbon composites.

2B105 8462 99 100 0
8462 99 500 0

2B109Flow-forming machines, other than those specified in 2B009, and specially designed components as follows:

N.B.: SEE ALSO 2B209.

a.Flow-forming machines having all of the following:

1. According to the manufacturer's technical specification, can be equipped with "numerical control" units or a computer control, even when not equipped with such units; and
2. With more than two axes which can be coordinated simultaneously for "contouring control".

b.Specially designed components for flow-forming machines specified in 2B009 or 2B 109.a.

Note: 2B109 does not control machines that are not usable in the production of propulsion components and equipment (e.g. motor cases) for systems specified in 9A005, 9A007.a. or9A105.a.

Technical Note:

Machines combining the function of spin-forming and flow-forming are for the purpose

of2B109 regarded as flow-forming machines.

2B109 8462 29 100 0
8463 90 000 0
8462 21
8462 29
8462 99 500 0
8462 99 900 9

2B116Vibration test systems, equipment and components therefor, as follows:

a.Vibration test systems employing feedback or closed loop techniques and

incorporating a digital controller, capable of vibrating a system at 10 g rms or more over the entire range 20 Hz to 2,000 Hz and imparting forces of 50 kN, measured 'bare table', or greater;

b.Digital controllers, combined with specially designed vibration test software, with a "real-tune bandwidth" greater than 5 kHz designed for use with vibration test systems specified in 2B116.a.;

c.Vibration thrusters (shaker units), with or without associated amplifiers, capable of imparting a force of 50 kN, measured 'bare table', or greater and usable in vibration test systems specified in 2B116.a.;

d.Test piece support structures and electronic units designed to combine multiple shaker units in a system capable of providing an effective combined force of 50 kN, measured 'bare table', or greater, and usable in vibration systems specified in2B116.a.

Technical Note:

In 2B1J6, 'bare table' means aflat table, or surface, with no fixture or fittings.

2B116 a. 9031 20 000 0
2B116 b. 8537 10 100 0
8537 10 910
8537 10 990 0
8537 20
2B116 c. 9031 90 850 0
2B116 d. 9031 20 000 0
9031 90 850 0

2B117Equipment and process controls, other than those specified in 2B004, 2B005.a., 2B104 or 2B105, designed or modified for densification and pyrolysis of structural composite rocket nozzles and reentry vehicle nose tips.

2B117 8803 90 200 0
8803 90 300 0

2B119Balancing machines and related equipment, as follows:

N.B.: SEE ALSO 2B219.

a.Balancing machines 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; <u>and</u>
4. Capable of balancing to a residual specific unbalance of 0.2 g mm per kg of rotor mass;

Note: 2B119.a. does not control balancing machines designed or modified for dental or other medical equipment.

b.Indicator heads designed or modified for use with machines specified in 2B119.a.

Technical Note: Indicator heads are sometimes known as balancing

instrumentation.

2B119 a. 9031 10 000 0

2B119 b. 9031 10 000 0

9031 90 850 0

2B120Motion simulators or rate tables having all of the following characteristics:

a.Two axes or more;

b.Slip rings capable of transmitting electrical power and/or signal information; and

c.Having any of the following characteristics:

1.For any single axis having all of the following:

a.Capable of rates of 400 degrees/s or more, or 30 degrees/s or less; and

b.A rate resolution equal to or less than 6 degrees/s and an accuracy equal to or less than 0.6 degrees/s;

2. Having a worst-case rate stability equal to or better (less) than plus or minus 0.05 % averaged over 10 degrees or more; or
3. A positioning accuracy equal to or better than 5 arc second.

Note: 2BJ20 does not control rotary tables designed or modified for machine tools or for medical equipment. For controls on machine tool rotary tables see 2B008.

2B120 8805 21 000 0

9031 20 000 0

2B121Positioning tables (equipment capable of precise rotary positioning in any axes), other than those specified in 2B120, having all the following characteristics:

a.Two axes or more; and

b.A positioning accuracy equal to or better than 5 arc second.

Note: 2B121 does not control rotary tables designed or modified for machine tools or for medical equipment. For controls on machine tool rotary tables see 2B008.

2B121 8805

9031 20 000 0

2B122Centrifuges capable of imparting accelerations above 100 g and having slip rings capable of transmitting electrical power and signal information.

2B122 8421 19 700 9

8401

8421 19 990 9

9031 20 000 0

2B201Machine tools, other than those specified in 2B001, as follows, for removing or cutting metals, ceramics or "composites", which, according to the manufacturer's technical specification, can be equipped with electronic devices for simultaneous "contouring control" in two or more axes:

a.Machine tools for milling, having any of the following characteristics:

1. Positioning accuracies with "all compensations available" equal to or less (better) than 6 urn according to ISO 230/2 (1988)4 or national

equivalents
along any linear axis; or

2. Two or more contouring rotary axes;

Note: 2B201.a. does not control milling machines having the following characteristics:

a.X-axis travel greater than 2 m; and

b.Overall positioning accuracy on the x-axis more (worse) than 30fvn.

b.Machine tools for grinding, having any of the following characteristics:

1. Positioning accuracies with "all compensations available" equal to or less (better) than 4 um according to ISO 230/2 (1988)4 or national equivalents along any linear axis; or
2. Two or more contouring rotary axes.

Note: 2B201.b. does not control the following grinding machines:

a.Cylindrical external, internal, and external-internal grinding machines having all of the following characteristics:

1. Limited to cylindrical grinding;
2. A maximum workpiece outside diameter or length of 150 mm;
3. Not more than two axes that can be coordinated simultaneously for "contouring control"; and
4. No contouring c axis;

b.Jig grinders with axes limited to x, y, c and a where c axis is used to maintain the grinding wheel normal to the work surface, and the a axis is configured to grind barrel cams;

c.Tool or cutter grinding machines with "software" specially designed for the production of tools or cutters; or

d.Crankshaft or camshaft grinding machines.

2B201 a. 8459 31 000 0
8459 39 000 0
8459 51 000 0
8459 61 100 0
8459 61 900
8459 69 100 0
8459 69 900 0
8464 90 200 0
8464 90 800 0
8465 92 000 0
8457 20 000 0
8457 30
8459 69
2B201 b. 8460 11 000
8460 19 000 0
8460 21 110 0
8460 21 150 0
8460 21 190 0

8460 21 900 0
8460 29 110 0
8460 29 190 0
8460 29 900 0
8460 20 950 0
8465 93 000 0
8457 30
8460 29
8464 20

2B204"Isostatic presses", other than those specified in 2B004 or 2B104, and related equipment, as follows:

a."Isostatic presses" having both of the following characteristics:

1. Capable of achieving a maximum working pressure of 69 MPa or greater; and
2. A chamber cavity with an inside diameter in excess of 152 mm;

b.Dies, moulds and controls, specially designed for "isostatic presses" specified in 2B204.a.

Technical Note:

In 2B204 the inside chamber dimension is that of the chamber in which both the working temperature and the working pressure are achieved and does not include fixtures. That dimension will be the smaller of either the inside diameter of the pressure chamber or the inside diameter of the insulated furnace chamber, depending on which of the two chambers is located inside the other.

2B204 a. 8462 99 100 0
8462 99 500 0
8463 90 000 0;
8477 40 000 0;
8477 59 100 0;
8477 80 990 0
8466 94 900 0;
8477 90 100 0;
8477 90 800 0

2B206Dimensional inspection machines, instruments or systems, other than those specified in 2B006, as follows:

a.Computer controlled or numericaly controlled dimensional inspection machines having both of the following characteristics:

1. Two or more axes; and
2. A one-dimensional length "measurement uncertainty" equal to or less (better) than (1.25 + L/1000) um tested with a probe of an "accuracy" of less (better) than 0.2 um (L is the measured length in millimeters) (Ref.:VDI/VDE 2617 Parts 1 and 2);

b.Systems for simultaneously linear-angular inspection of hemishells, having both of the following characteristics:

1. "Measurement uncertainty" along any linear axis equal to or less (better) than 3.5 um per 5 mm; and

2. "Angular position deviation" equal to or less than 0.02°.

Note 1: Machine tools that can be used as measuring machines are controlled if they meet or exceed the criteria specified for the machine tool function or the measuring machine function.

Note 2: A machine specified in 2B206 is controlled if it exceeds the control threshold anywhere within its operating range.

Technical Notes:

1.The probe used in determining the measurement uncertainty of a dimensional inspection system shall be described in VDI/VDE 2617parts 2, 3 and 4.

2. All parameters of measurement values in 2B206 represent plus/minus i. e., not total band.

2B206 9031 80 340 0
9031 49 900 0
9031 80 320 0

2B207"Robots", "end-effectors" and control units, other than those specified in 2B007, as follows:

a. "Robots" or "end-effectors" specially designed to comply with national safety standards applicable to handling high explosives (for example, meeting electrical code ratings for high explosives);

c. Control units specially designed for any of the "robots" or "end-effectors" specified in 2B207.3.

2B207 a. 8479 50 000 0
8486 30 900
8428 90 950 0
2B207 b. 8537 10 100 0
8537 10 910
8537 10 990 0

2B209Flow forming machines, spin forming machines capable of flow forming functions, other than those specified in 2B009 or 2B109, and mandrels, as follows:

a.Machines having both of the following characteristics:

1. Three or more rollers (active or guiding); <u>and</u>
2. Which, according to the manufacturer's technical specification, can be equipped with "numerical control" units or a computer control;

b.Rotor-forming mandrels designed to form cylindrical rotors of inside diameter between 75 mm and 400 mm.

Note: 2B209.a. includes machines which have only a single roller designed to deform metal plus two auxiliary rollers which support the mandrel, but do not participate directly in the deformation process.

2B209 a. 8462 29 100 0
8463 90 000 0
8462 21 100 0

8462 21 800 0
2B209 b. 8466 10 150 0
8486 90
8466 20 150 0
8466 20 950 0

2B219Centrifugal multiplane balancing machines, fixed or portable, horizontal or vertical, as follows:

a. Centrifugal balancing machines designed for balancing flexible rotors having a length of 600 mm or more and having all of the following characteristics:
    1. Swing or journal diameter greater than 75 mm;
    2. Mass capability of from 0.9 to 23 kg ; and
    3. Capable of balancing speed of revolution greater than 5,000 r.p.rn.;
b. Centrifugal balancing machines designed for balancing hollow cylindrical rotor components and having all of the following characteristics:
    1. Journal diameter greater than 75 mm;
    2. Mass capability of from 0.9 to 23 kg;
    3. Capable of balancing to a residual imbalance equal to or less than 0.01 kg x mm/kg per plane; <u>and</u>
    4. Belt drive type.

2B219 a. 9031 10 000 0
2B219 b. 9031 10 000 0

2B225Remote manipulators that can be used to provide remote actions in radiochemical separation operations or hot cells, having either of the following characteristics:

a.A capability of penetrating 0.6 m or more of hot cell wall (through-the-wall operation); or

b.A capability of bridging over the top of a hot cell wall with a thickness of 0.6 m or more (over-the-wall operation).

Techncial 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 orkeypad.

2B225 8428 90 950 0

2B226Controlled atmosphere (vacuum or inert gas) induction furnaces, and power supplies therefor, as follows: N.B: SEE ALSO 3B.

a.Furnaces having all of the following characteristics:
    1. Capable of operation above 1,123 K (850°C);
    2. Induction coils 600 mm or less in diameter; <u>and</u>

Power supplies, with a specified power output of 5 kW or more, specially designed for furnaces specified in 2B226.a.

Note: 2B226. a. does not control furnaces designed for the processing of semiconductor -wafers.

2B226 a 8504

2B226 b. 8514 20 100 0

2B227Vacuum or other controlled atmosphere metallurgical melting and casting furnaces and related equipment, as follows:

a.Arc remelt and casting furnaces having both of the following characteristics:

1. Consumable electrode capacities between 1,000 cm3 and 20,000 cm3, and
2. Capable of operating with melting temperatures above 1,973 K (1,700°C);

b.Electron beam melting furnaces and plasma atomization and melting furnaces, having both of the following characteristics:

1. A power of 50 kW or greater; and
2. Capable of operating with melting temperatures above 1,473 K (1,200°C).

d. Computer control and monitoring systems specially configured for any of the furnaces specified in 2B227.a. or b.

2B227 a. 8514 30 990 0

2B227 b. 8514 30 990 0

2B227 c. 8471

2B228Rotor fabrication or assembly equipment, rotor straightening equipment, bellows-forming mandrels and dies, as follows:

a.Rotor assembly equipment for assembly of gas centrifuge rotor tube sections, baffles, and end caps;

Note: 2B228.a. includes precision mandrels, clamps, and shrink fit machines.

b.Rotor straightening equipment for alignment of gas centrifuge rotor tube sections to a common axis;

Technical Note:

In 2B228.b. such equipment normally consists of precision measuring probes linked to a computer that subsequently controls the action of for example, pneumatic rams used for aligning the rotor tube sections.

c.Bellows-forming mandrels and dies for producing single-convolution bellows.

Technical Note:

In 2B228.C. the bellows have all of the following characteristics:

1. Inside diameter between 75 mm and 400 mm;
2. Length equal to or greater than 12.7 mm;
3. Single convolution depth greater than 2 mm; and
4. Made of high-strength aluminium alloys, maraging steel or high strength "fibrous or filamentary materials".

2B228 a. 8479 89 970 9

8486 10 000 0

8486 20
8486 30
8486 40 000 0
8207 30;
8462 21;
8462 29;
8462 99 500 0;
8462 99 900 9;
8466 20;
2B228 b. 9031 80 340 0
2B228 c. 8466 94 000 0

2B230"Pressure transducers" capable of measuring absolute pressures at any point in the range 0 to 13 kPa and having both of the following characteristics:

a.Pressure sensing elements made of or protected by aluminium, aluminium alloy, nickel or nickel alloy with more than 60% nickel by weight; and

b.Having either of the following characteristics:

1. A full scale of less than 13 kPa and an 'accuracy' of better than + 1% of full-scale; or
2. A full scale of 13 kPa or greater and an 'accuracy' of better than + 130 Pa.

Technical Note:

For the purposes of2B230, 'accuracy' includes non-linearity, hysteresis and repeatability at ambient temperature.

2B230, a 9026 20 200 9
2B230, в 9026 20 200 9
8543 89 950 0
9026 90 000 0

2B231Vacuum pumps having all of the following characteristics:

a.Input throat size equal to or greater than 380 mm;

b.Pumping speed equal to or greater than 15 m3/s; and

c.Capable of producing an ultimate vacuum better than 13 mPa.

Technical Notes:

1. The pumping speed is determined at the measurement point with nitrogen gas or air.
2. The ultimate vacuum is determined at the input of the pump with the input of the pump blocked off.

2B231 8414 10 250 0
8414 10 810 0
8414 10 890 0

2B232Multistage light gas guns or other high-velocity gun systems (coil, electromagnetic, and electrothermal types, and other advanced systems) capable of accelerating projectiles to 2 km/s or greater.

2B232 8501
9024 10 990 0

2B350Chemical manufacturing facilities and equipment, as follows:

a.Reaction vessels or reactors, with or without agitators, with total internal (geometric) volume greater than 0.1 m3 (100 litres) and less than 20 mj (20,000 litres), where all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Fluoropolymers;
3. Glass (including vitrified or enamelled coating or glass lining);
4. Nickel or alloys with more than 40% nickel by weight;
5. Tantalum or tantalum alloys;
6. Titanium or titanium alloys; or
7. Zirconium or zirconium alloys;

b.Agitators for use in reaction vessels or reactors where all surfaces of the agitator that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Fluoropolymers;
3. Glass (including vitrified or enamelled coatings or glass lining);
4. Nickel or alloys with more than 40% nickel by weight;
5. Tantalum or tantalum alloys;
6. Titanium or titanium alloys; or
7. Zirconium or zirconium alloys;

c.Storage tanks, containers or receivers with a total internal (geometric) volume greater than 0.1 m"5 (100 litres) where all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Fluoropolymers;
3. Glass (including vitrified or enamelled coatings or glass lining);
4. Nickel or alloys with more than 40% nickel by weight;
5. Tantalum or tantalum alloys;
6. Titanium or titanium alloys; or
7. Zirconium or zirconium alloys;

d.Heat exchangers or condensers with a heat transfer surface area of less than 20 m2, where all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;

2. Fluoropolymers;
3. Glass (including vitrified or enamelled coatings or glass lining);
4. Graphite;
5. Nickel or alloys with more than 40% nickel by weight;
6. Tantalum or tantalum alloys;
7. Titanium or titanium alloys;
8. Zirconium or zirconium alloys;
9. Silicon carbide; or
10. Titanium carbide;

e.Distillation or absorption columns of internal diameter greater than O.lm, where all surfaces that come hi direct contact with the chemical(s) being processed are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Fluoropolymers;
3. Glass (including vitrified or enamelled coatings or glass lining);
4. Graphite;
5. Nickel or alloys with more than 40% nickel by weight;
6. Tantalum or tantalum alloys;
7. Titanium or titanium alloys; or
8. Zirconium or zirconium alloys;

f.Remotely operated filling equipment in which all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight; or
2. Nickel or alloys with more than 40% nickel by weight;

g. Multiple seal valves incorporating a leak detection port, bellows-seal valves, non-return (check) valves or diaphragm valves, in which all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Fluoropolymers;
3. Glass (including vitrified or enamelled coatings or glass lining);
4. Nickel or alloys with more than 40% nickeLby weight;
5. Tantalum or tantalum alloys;
6. Titanium or titanium alloys; or

7. Zirconium or zirconium alloys;

h. Multi-walled piping incorporating a leak detection port, in which all surfaces that come in direct contact with the chemical(s) being processed or contained are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Fluoropolymers;
3. Glass (including vitrified or enamelled coatings or glass lining);
4. Graphite;
5. Nickel or alloys with more than 40% nickel by weight;
6. Tantalum or tantalum alloys;
7. Titanium or titanium alloys; or
8. Zirconium or zirconium alloys;

i. Multiple-seal, canned drive, magnetic drive, bellows or diaphragm pumps, with manufacturer's specified maximum flow-rate greater than 0.6 nr'/hour, or vacuum pumps with manufacturer's specified maximum flow-rate greater than 5 m3/hour (under standard temperature (273 K (0°C)) and pressure (101.3 kPa) conditions), in which all surfaces that come in direct contact with the chemical(s) being processed are made from any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Ceramics;
3. Ferrosilicon;
4. Fluoropolymers;
5. Glass (including vitrified or enamelled coatings or glass lining);
6. Graphite;
7. Nickel or alloys with more than 40% nickel by weight;
8. Tantalum or tantalum alloys;
9. Titanium or titanium alloys; or
10. Zirconium or zirconium alloys;

j. Incinerators designed to destroy chemicals specified in entry 1C350, having specially designed waste supply systems, special handling facilities and an average combustion chamber temperature greater than 1,273 K (1,000°C), in which all surfaces in the waste supply system that come into direct contact with the waste products are made from or lined with any of the following materials:

1. Alloys with more than 25% nickel and 20% chromium by weight;
2. Ceramics; or
3. Nickel or alloys with more than 40% nickel by weight.

Note: " Coal graphite "- is the composite material consisting from amorf of

carbon and graphite in which the maintenance of graphite makes 8 % or more on weight.

2B350 a. 7310 10 000 0
8419 40 000 9
8479 82 000 0
3926 90 990 9
7020 00
7115 90
7309 00 300 0
7309 00 590 0
7508 90 000 0
8103 90 900 0
8108 90 900 0
8419 89 989 0
2B350 b. 8479 82 000 0
8479 90 930 0
8479 90 960 0
7020 00
2B350 c. 7309 00 300 0
7310 10 000 0
7311 00 910 0
8609 00 900 9
3923 10 000 0
3923 29 900 0
3923 30 909 0
7010 90 910 0
7010 90 990 0
7020 00
7115 90
7309 00 300 0
7309 00 590 0
7311 00
7508 90 000 0
8103 90 900 0
8108 90 900 0
8109 90 000 0
2B350 d. 8419 50 000 0
7020 00;
8419 50 000 0
2B350 e. 8419 40 000 9
7020 00
2B350 f. 8422 30 000 8
2B350 g. 8481 80 790 0
8481 80 870 0
8481 80 990 0

7020 00
8481
2B350 h. 8419 90 850 9
3917
6815 10 900 9
7020 00
7115 90
7303 00
7304
7305
7306
7508 90 000 0
8103 90 900 0
8108 90 900 0
8109 90 000 0
8419 90 800
2B350 i. 8413 81 000 9
8414 10 250 0
8414 10 810 0
8414 20 800 0
7020 00;
8413 81 900 0
8414 10 300 0
8414 10 500 0
8414 10 800 0
2B350 j. 8417 80 850 0
8514 20 800 0
8514 30 990 0
8417 80 100 0

2B351Toxic gas monitoring systems, as follows; and dedicated detectors therefor:

a.Designed for continuous operation and usable for the detection of chemical warfare agents or chemicals specified in 1C350, at concentrations of less than 0.3 mg/m3; or

b.Designed for the detection of cholinesterase-inhibiting activity.

2B351, a 9027 10 100 0
2B351, b 9027 10 900 0
9027 90 800 0

2B352Equipment capable of use in handling biological materials, as follows:

a.Complete biological containment facilities at P3, P4 containment level;

Technical Note:

P3 or P4 (BL3, BL4, L3, L4) containment levels are as specified in the WHO Laboratory Biosafety manual (Geneva, 1983).

b.Fermenters capable of cultivation of pathogenic "microorganisms",

viruses or capable of toxin production, without the propagation of aerosols, and having a total capacity of 100 litres or more;

Technical Note:

Fermenters include bioreactors, chemostats and continuous-flow systems.

c.Centrifugal separators, capable of continuous separation without the propagation of aerosols, having all the following characteristics:

1. Flow rate exceeding 100 litres per hour;
2. Components of polished stainless steel or titanium;
3. Double or multiple sealing joints within the steam containment area; and
4. Capable of in-situ steam sterilisation in a closed state;

Technical Note:

Centrifugal separators include decanters.

d.Cross (tangential) flow filtration equipment, capable of continuous separation without the propagation of aerosols, having both of the following characteristics:

1. Systems of a filtration in the cross-section (tangential) stream, intended for continuous separation of pathogenic microorganisms, viruses or toxins or culture of cells without risk of formation of aerosols, and having both following characteristics:

a. The area of a filtration equal or from above 1 кв. M; and

b. An opportunity of sterilization or disinfection on a place;

Technical note:

With reference to Item 2B352.d.1.b. The term "sterilized" means removal of all viable microbes from the equipment and devices by use or physical (for example, pairs) or chemical means. The term "disinfected" means destruction potential microbic invasion abilities in the equipment and devices by use of the chemical means having bactericidal action. Disinfection and sterilization differ from sanitary processing. Sanitary processing concerns to procedures of cleaning with the purpose of reduction of the maintenance of microbes on the equipment and devices thus the purpose to destroy microbic invasion ability completely or viability of microbes is not necessarily put.

2.Components of system of a filtration in a cross-section (tangential) stream (for example, modules, elements, cartridges, cartridges, units and plates) with the area of the filtration equal or above 0,2 ¼2 of each component, intended for use in the equipment of system of a filtration in the cross-section (tangential) stream listed in 2B352.d.;

Note: By the 2B352.d. item the equipment of the return osmos, as for example, controllable by the manufacturer is not supervised.

e.Steam sterilisable freeze drying equipment with a condenser capacity exceeding 50 kg of ice in 24 hours and less than 1,000 kg of ice in 24 hours;

f.Equipment that incorporates or is contained in P3 or P4 containment housing, as follows:

1. Independently ventilated protective full or half suits;
2. Class III biological safety cabinets or isolators with

similar performance standards;

Note: In 2B352J.2., isolators include flexible isolators, dry boxes, anaerobic chambers, glove boxes and laminar flow hoods.

g.Chambers designed for aerosol challenge testing with "microorganisms" or "toxins" and having a capacity of 1 m" or greater.

2B352 a. 6113 00
9020 00 000 0
2B352 b. 8419 89 989 0
8486 10 000
8486 20
8479 82 000 0
2B352 c. 8421 19 200 9
8421 19 910 9
8421 19 990 9
2B352 d. 8421 29 000 9
8421 29 900 9
2B352 e. 8419 39 900 8
8419 39 900 9
2B352 f. 1. 8479 89 970 9
8486 10 000 0
8486 20
8486 30
8486 40 000 0
4015 90 000 0;
6113 00 100 0;
6210 20 000 0;
6210 40 000 0;
9020 00 900 0
2B352 f. 2. 8414 80 800 9
8414 60 000 0;
8414 80 900 0
2B352 g. 8424 89 000 9
8424 89 950 9

2C Materials

None

2D Software

2DOO1"Software", other than that specified in 2D002, specially designed or modified for the "development", "production" or "use" of equipment specified in 2 AGO lor 2B001 to2B009.

2D001 8523 80 950 0
8523 80 990 0

2D002"Software" for electronic devicesa even when residing in an electronic device or system, enabling such devices or systems to function as a "numerical control" unit, capable of any of the following:

a.Coordinating simultaneously more than four axes for "contouring

control"; or

b."Real time processing" of data to modify tool path, feed rate and spindle data,during the machining operation, by any of the following:

1. Automatic calculation and modification of part program data for machining in two or more axes by means of measuring cycles and access to source data; or
2. "Adaptive control" with more than one physical variable measured and processed by means of a computing model (strategy) to change one or more machining instructions to optimize the process.

Note: 2D002 does not control "software" specially designed or modified for the operation of machine tools not controlled by Category 2.

2D002 8523 80 950 0

8523 80 990 0

2D101"Software" specially designed or modified for the "use" of equipment specified in 2B104,2B105,2B109,2B116,2B117 or 2B119 to 2B122. N.B.: SEE ALSO 9D004.

2D101 8523 80 950 0

8523 80 990 0

2D201"Software" specially designed for the "use" of equipment specified in 2B204, 2B206, 2B207, 2B209,2B219 or 2B227.

2D201 8523 80 950 0

8523 80 990 0

2D202"Software" specially designed or modified for the "development", "production" or "use" of equipment specified in 2B201.

2D202 8523 80 950 0

8523 80 990 0

2ETechnology

2EOO1"Technology" according to the General Technology Note for the "development" of equipment or "software" specified in 2A, 2B or 2D.

2E001

2E002"Technology" according to the General Technology Note for the "production" of equipment specified in 2A or 2B.

2E002

2E003Other "technology", as follows:

a."Technology" for the "development" of interactive graphics as an integrated part in "numerical control" units for preparation or modification of part programmes;

b."Technology" for metal-working manufacturing processes, as follows:

1."Technology" for the design of tools, dies or fixtures specially designed for any of the following processes:

a."Superplastic forming";

b."Diffusion bonding"; or

c."Direct-acting hydraulic pressing";

2.Technical data consisting of process methods or parameters as listed below used to control:

a."Superplastic forming" of aluminium alloys, titanium alloys or "superalloys":

1. Surface preparation;
2. Strain rate;
3. Temperature;
4. Pressure;

b."Diffusion bonding" of "superalloys" or titanium alloys:

1. Surface preparation;
2. Temperature;
3. Pressure;

c."Direct-acting hydraulic pressing" of aluminium alloys or titanium alloys:

1. Pressure;
2. Cycle time;

d."Hot isostatic densification" of titanium alloys, aluminium alloys or "superalloys":

1. Temperature;
2. Pressure;
3. Cycle time;

c."Technology" for the "development" or "production" of hydraulic stretch-forming machines and dies therefor, for the manufacture of airframe structures;

d."Technology" for the "development" of generators of machine tool instructions (e.g., part programmes) from design data residing inside "numerical control" units;

e."Technology" for the "development" of integration "software" for incorporation of expert systems for advanced decision support of shop floor operations into "numerical control" units;

f."Technology" for the application of inorganic overlay coatings or inorganic surface modification coatings (specified in column 3 of the following table) to nonelectronic substrates (specified in column 2 of the following table), by processes specified in column 1 of the following table and defined in the TechnicalNote.

Note: The table and Technical Note appear after entry 2E30J.

2E003

2E101"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 2B004, 2B009, 2B104,2B109, 2B116 or 2D101.

2E201"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 2A225,2A226, 2B001,2B006, 2B007.b., 2B007.C., 2B008, 2B009, 2B201,2B204,2B206,2B207,2B209, 2B225 to 2B232,2D201 or 2D202.

2E201

2E301"Technology" according to the General Technology Note for the "use" of goods specified in 2B350 to 2B352.

2E301

TABLE - DEPOSITION TECHNIQUES

1. Coating Process (1)	2. Substrate	3. Resultant Coating
A. Chemical Vapour Deposition (CVD)	"Superalloys" Ceramics (19) and Low-expansion glasses (14) Carbon-carbon, Ceramic and Metal "matrix" "composites" Cemented tungsten carbide (16), Silicon carbide (18) Molybdenum and Molybdenum alloys Beryllium and Beryllium alloys Sensor window materials (9)	Aluminides for internal passages Silicides Carbides Dielectric layers (15) Diamond Diamond-like carbon (17) Silicides Carbides Refractory metals Mixtures thereof (4) Dielectric layers (15) Aluminides Alloyed aluminides (2) Boron nitride Carbides Tungsten Mixtures thereof (4) Dielectric layers (15) Dielectric layers (15) Dielectric layers (15) Diamond Diamond-like carbon (17) Dielectric layers (15) Diamond Diamond-like carbon (17)

TABLE - DEPOSITION TECHNIQUES

•1. Coating Process (1) 2. Substrate

B. Thermal-Evaporation Physical Vapour Deposition (TE- PVD)

3. Resultant Coating

B.I. Physical Vapour Deposition (PVD): Electron-Beam (EB-PVD)

"Superalloys"

Ceramics (19) and Low-expansion glasses (14)

Corrosion resistant steel (7)

Carbon-carbon, Ceramic and Metal "matrix" "composites"

Cemented tungsten carbide (16), Silicon carbide (18)

Molybdenum and Molybdenum alloys

Beryllium and Beryllium alloys

Sensor window materials (9)

Titanium alloys (13)

Alloyed silicides Alloyed aluminides (2) MCrAlX (5) Modified zirconia (12) Silicides Aluminides Mixtures thereof (4)

Dielectric layers (15)

MCrAlX (5) Modified zirconia (12) Mixtures thereof (4)

Silicides Carbides Refractory metals Mixtures thereof (4) Dielectric layers (15) Boron nitride

Carbides Tungsten

Mixtures thereof (4) Dielectric layers (15)

Dielectric layers (15)

Dielectric layers (15)

Borides

Beryllium

Dielectric layers (15)

Borides Nitrides

TABLE - DEPOSITION TECHNIQUES

1. Coating Process (1) 2. Substrate

B.2. Ion assisted resistive heating Physical

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

TABLE - DEPOSITION TECHNIOUES

•1. Coating Discharge Process (1)		2. Substrate "Superalloys" Polymers (11) and Organic "matrix" "composites"
B.4. Physical Vapour Deposition (PVD): Cathodic Arc		

	3. Resultant Coating	MCrAlX (5) Alloyed silicides Alloyed aluminides (2)	Diamond-like carbon (17)
		Borides Carbides Nitrides	
C. Pack cementation (see A above for out-of-pack cementation) (10)		Carbon-carbon, Ceramic and Metal "matrix" "composites" Titanium alloys (13)	Silicides Carbides Mixtures thereof (4) Silicides Aluminides Alloyed aluminides (2)
	Refractory metals and alloys (8) Silicides Oxides		
D. Plasma spraying		"Superalloys" Aluminium alloys (6) Refractory metals and alloys (8)	MCrAlX (5) Modified zirconia (12) Mixtures thereof (4) Abradable Nickel-Graphite Abradable materials containing Ni-Cr-Al Abradable Al-Si-Polyester Alloyed aluminides (2) MCrAlX (5) Modified zirconia (12) Silicides Mixtures thereof (4) Aluminides Silicides Carbides

TABLE - DEPOSITION TECHNIQUES

1. D. Coating Process (1)	2. Substrate
)	Corrosion resistant steel (7) Titanium alloys (13)

3. Resultant Coating

MCrAlX (5) Modified zirconia (12) Mixtures thereof (4)
Carbides
Aluminides
Silicides
Alloyed aluminides (2)

Abradable Nickel-Graphite
Abradable materials
containing Ni-Cr-Al
Abradable Al-Si-Polyester

E. Slurry Deposition

Refractory metals and alloys (8)
Carbon-carbon, Ceramic and Metal "matrix" "composites"
Fused silicides Fused aluminides except for resistance heating elements
Silicides Carbides Mixtures thereof (4)

F. Sputter Deposition

"Superalloys"
Ceramics and Low-expansion glasses (14)

Alloyed silicides Alloyed aluminides (2) Noble metal modified aluminides (3) MCrAlX (5) Modified zirconia (12) Platinum Mixtures thereof (4)
Silicides Platinum
Mixtures thereof (4) Dielectic layers (15) Diamond-like carbon (17)

TABLE - DEPOSITION TECHNIQUES

•1. Coating Process (1)	2. Substrate	3. Resultant Coating
F. (continued)	Titanium alloys (13) Carbon-carbon, Ceramic and Metal "matrix" "composites" Cemented tungsten carbide (16), Silicon carbide (18)	Borides Nitrides Oxides Silicides Aluminides Alloyed aluminides (2) Carbides Silicides Carbides Refractory metals Mixtures thereof (4) Dielectric layers (15) Boron nitride

Carbides Tungsten

Molybdenum and Molybdenum alloys

Berylliu m and Beryllium alloys

Sensor window materials (9)

Refractory metals and alloys (8)

Mixtures thereof (4)

Dielectric layers (15)

Borides

Dielectric layers (15)

Beryllium

Dielectric layers (15)

Diamond-like carbon (17)

Aluminides Silicides Oxides Carbides

Dielectric layers (15) Boron nitride

TABLE - DEPOSITION TECHNIOUES

•1. Coating Process CD 2. Substrate 3. Resultant Coating

G. Ion Implantation
High temperature bearing steels
Titanium alloys (13)
Beryllium and Beryllium alloys
Cemented tungsten carbide (16)
Additions of Chromium Tantalum or Niobium (Columbium)
Borides Nitrides
Borides
Carbides Nitrides

TABLE - DEPOSITION TECHNIQUES -NOTES

1. The term 'coating process' includes coating repair and refurbishing as well as original coating.
2. The term 'alloyed aluminide coating' includes single or multiple-step coatings in which an element or elements are deposited prior to or during application of the aluminide coating, even if these elements are deposited by another coating process. It does not, however, include the multiple use of single-step pack cementation processes to achieve alloyed aluminides.
3. The term 'noble metal modified aluminide' coating includes multiple-step coatings in which the noble metal or noble metals are laid down by some other coating process prior to application of the aluminide coating.
4. The term 'mixtures thereof includes infiltrated material, graded compositions, co-deposits and multilayer deposits and are obtained by one or more of the coating processes specified in the Table.
5. 'MCrAlX' refers to a coating alloy where M equals cobalt, iron, nickel or combinations thereof and X equals hafnium, yttrium, silicon, tantalum in any amount or other intentional additions over 0.01 weight percent in various proportions and combinations, except:

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

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

c.NiCrAlY coatings which contain 21 to 23 weight percent of chromium, 10 to 12 weight percent of aluminium and 0.9 tol.l weight percent of yttrium.

6. The term 'aluminium alloys' refers to alloys having an ultimate tensile strength of 190 MPa or more measured at 293 K (20°C).
7. The term 'corrosion resistant steel' refers to AISI (American Iron

and Steel Institute) 300 series or equivalent national standard steels.

8. 'Refractory metals and alloys' include the following metals and their alloys: niobium (columbium), molybdenum, tungsten and tantalum.
9. 'Sensor window materials', as follows: alumina, silicon, germanium, zinc sulphide, zinc selenide, gallium arsenide, diamond, gallium phosphide, sapphire and the following metal halides: sensor window materials of more than 40 mm diameter for zirconium fluoride and hafnium fluoride.
10. "Technology" for single-step pack cementation of solid airfoils is not controlled by Category 2.
11. 'Polymers', as follows: polyimide, polyester, polysulphide, polycarbonates and polyurethanes.
12. 'Modified zirconia' refers to additions of other metal oxides (e.g., calcia, magnesia, yttria, hafnia, rare earth oxides) to zirconia in order to stabilize certain crystallographic phases and phase compositions. Thermal barrier coatings made of zirconia, modified with calcia or magnesia by mixing or fusion, are not controlled.
13. Titanium alloys' refers only to aerospace alloys having an ultimate tensile strength of 900 MPa or more measured at 293 K (20°C).
14. 'Low-expansion glasses' refers to glasses which have a coefficient of thermal expansion of 1 x 10'7 K'1 or less measured at 293 K (20°C).
15. 'Dielectric layers' are coatings constructed of multi-layers of insulator materials in which the interference properties of a design composed of materials of various refractive indices are used to reflect, transmit or absorb various wavelength bands. Dielectric layers refers to more than four dielectric layers or dielectric/metal "composite" layers.
16. 'Cemented tungsten carbide' does not include cutting and forming tool materials consisting of tungsten carbide/(cobalt, nickel), titanium carbide/(cobalt, nickel), chromium carbide/nickel-chromium and chromium carbide/nickel.
17. "Technology" specially designed to deposit diamond-like carbon on any of the following is not controlled: magnetic disk drives and heads, polycarbonate eyeglasses, equipment for the manufacture of disposables, bakery equipment, valves for faucets, acoustic diaphragms for speakers, engine parts for automobiles, cutting tools, punching-pressing dies, high quality lenses designed for cameras or telescopes, office automation equipment, microphones or medical devices.

18. 'Silicon carbide' does not include cutting and forming tool materials.
19. Ceramic substrates, as used in this entry, does not include ceramic materials containing 5% by weight, or greater, clay or cement content, either as separate constituents or in combination.

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

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

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

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

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

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

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

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

Specific TE-PVD processes are as follows:

1. Electron Beam PVD uses an electron beam to heat and evaporate the material which forms the coating;
2. Ion Assisted Resistive Heating PVD employs electrically resistive heating sources in combination with impinging ion beam(s) to produce a controlled and uniform flux of evaporated coating species;
3. "Laser" Vaporization uses either pulsed or continuous wave "laser" beams to vaporize the material which forms the coating;
4. Cathodic Arc Deposition employs a consumable cathode of

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

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

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

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

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

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

3. An inert powder, most frequently alumina.

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

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

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

N.B.2 High velocity refers to nozzle-exit gas velocity exceeding 750 m/s calculated at 293 K (20°C) at 0.1 MPa.

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

f.Sputter Deposition is an overlay coating process based on a momentum transfer phenomenon, wherein positive ions are accelerated by an electric field towards the surface of a target (coating material). The kinetic energy of the impactingions is sufficient to cause target surface atoms to be released and deposited on an appropriately positioned substrate.

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

vaporisation of non-metallic coating materials.

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

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

CATEGORY 3
ELECTRONICS

3A Systems, Equipment and Components

Note 1: The control status of equipment and components described in 3A001 or 3A002, other than those described in 3AOOI.a.3. to SAOOl.a.10. or 3AOOJ.a. 12., which are specially designed for or which have the same functional characteristics as other equipment is determined by the control status of the other equipment.

Note 2: The control status of integrated circuits described in 3A001.a.3. to 3A001.a.9.or 3A001.a. 12. which are unalterably programmed or designed for a specific function for another equipment is determined by the control status of the other equipment.

N.B.: When the manufacturer or applicant cannot determine the control status of the other equipment, the control status of the integrated circuits is determined in 3A001.a.3. to 3A001.a.9. and 3A001.a.l2. If the integrated circuit is a silicon-based "microcomputer microcircuit" or microcontroller microcircuit described in 3A001.O.3. having an operand (data) word length of 8 bit or less, the control status of the integrated circuit is determined in 3A001.a.3.

3A001 Electronic components, as follows:

a. General purpose integrated circuits, as follows:

Note 1: The control status of wafers (finished or unfinished), in -which thefunction has been determined, is to be evaluated against the parameters qf3AOOl.a.

Note 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".

1.Integrated circuits, designed or rated as radiation hardened to withstand any of the following:

a.A total dose of 5 x 103 Gy (silicon) or higher; or

b.A dose rate upset of 5 x 10 Gy (silicon)/s or higher;

c. A fluence (integrated flux) of neutrons (1 MeV equivalent) of 5 x 10_{13} n/cm² or higher on silicon, or its equivalent for other materials

2."Microprocessor microcircuits", "microcomputer microcircuits", microcontroller microcircuits, storage integrated circuits manufactured from a compound semiconductor, analogue-to-digital converters, digital-to-analogue

converters, electro-optical or "optical integrated circuits" designed for "signal processing", field programmable logic devices, neural network integrated circuits, custom integrated circuits for which either the function is unknown or the control status of the equipment in which the integrated circuit will be used is unknown, Fast Fourier Transform (FFT) processors, electrical erasable programmable read-only memories (EEPROMs), flash memories or static random-access memories (SRAMs), 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: 3 AGO La. 2. does not apply to integrated circuits for civil automobiles or railway train applications.

3."Microprocessor microcircuits", "micro-computer microcircuits" and microcontroller microcircuits, having any of the following characteristics: Note: 3AOO!.a.3. includes digital signal processors, digital array processors and digital coprocessors.

a.no use

b.Manufactured from a compound semiconductor and operating at a clock frequency exceeding 40 MHz; or

c.More than one data or instruction bus or serial communication port for external interconnection in a parallel processor with a transfer rate exceeding 150 Mbyte/s;

4. Storage integrated circuits manufactured from a compound semiconductor;
5. Analogue-to-digital and digital-to-analogue converter integrated circuits, as follows:

a.Analogue-to-digital converters having any of the following: N.B. SEE ALSO 3A101

1. A resolution of 8 bit or more, but less than 12 bit, with a 'total conversion time' of less than 10 ns;
2. A resolution of 12 bit with a 'total conversion time' of less than 200 ns; or
3. A resolution of more than 12 bit with a 'total conversion time1 of less than 2 us;
4. Resolution more than 14 bats with " full time of transformation " less than 1 us;

b.Digital-to-analogue converters with a resolution of 12 bit or more, and a "settling time" of less than 10 ns;

Technical Notes:

L A resolution ofn bits corresponds to a quantisation of 2" levels.

2. 'Total conversion time' is the inverse of sample rate.

6.Electro-optical and "optical integrated circuits" designed for "signal processing" 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;

7.Field programmable logic devices having any of the following:

a.An equivalent usable gate count of more than 30,000 (2 input gates);

b.A typical "basic gate propagation delay time" of less than 0.4 ns; or

c.A toggle frequency exceeding 133 MHz;

Note: 3A001.a.7. includes:

- Simple Programmable Logic Devices (SPLDs)
- Complex Programmable Logic Devices (CPLDs)
- Field Programmable Gate Arrays (FPGAs)
- Field Programmable Logic Arrays (FPLAs)
- Field Programmable Interconnects (FPlCs)

N.B.: Field programmable logic devices are also known as field programmable gate or field programmable logic arrays.

8. Not used;
9. Neural network integrated circuits;
10. Custom integrated circuits for which the function is unknown, or the control status of the equipment in which the integrated circuits will be used is unknown to the manufacturer, having any of the following:

a.More than 1000 terminals;

b.A typical "basic gate propagation delay time" of less than 0.1 ns; or

c.An operating frequency exceeding 3 GHz;

11.Digital integrated circuits, other than those described in 3 AGO 1 .a.3 to 3A001.a.lO. and 3A001.a.l2., based upon any compound semiconductor and having any of the following:

a.An equivalent gate count of more than 3000 (2 input gates); or

b.A toggle frequency exceeding 1.2 GHz;

12. The processors of fast transformation Furye possessing an estimated time of performance of complex N-dot fast transformation Furye less than N log2N/20 480 мс, where N - number of points;

Technical note:

At N to equal 1 024 points, the formula specified in Item 3A001.a.12., gives an estimated time of performance of complex 1024-dot fast transformation Furye in 500 us;

b. Components of a microwave or millimetric range, such as:

1. Abovementioned electronic vacuum lamps and cathodes: t

Note 1: The item 3A001.b.1 does not supervise the lamps developed or designed for work on any strip of frequencies, possessing following characteristics:

a. Do not exceed 31,8 GHz; and

b. They are distributed by the International Union of Telecommunications for sphere of radiocommunication services, but not for radiodetection.

Note 2: the Item 3A001.b.1 does not supervise lamps " not intended for application in space ", possessing by all following characteristics:

a. Average target capacity equal or less than 50 Вт; and

b. Developed or calculated for work on any strip of frequencies which answers all following characteristics:

1. Exceeds 31,8 GHz, but does not exceed 43,5 GHz; and

2. It is distributed by the International Union of Telecommunications for sphere of radiocommunication services, but not for radiodetection

a. Lamps of a running wave of pulse or continuous action, such, as:

1. Working on the frequencies exceeding 31,8 GHz;

2. Having an element of heating of the cathode in due course from inclusion up to an output of a lamp on limiting radio-frequency capacity less than 3 sec;

3. Lamps with the interfaced resonators or their updatings with " instant width of a strip " frequencies more than 7 % or the peak of capacity exceeding 2,5 kw,

4. Spiral lamps or their updatings possessing any following characteristics:

a. " Instant width of a strip of frequencies " more than one octave and product of average capacity (expressed in kw) on working frequency (expressed in GHz) more than 0,5;

b. " instant width of a strip of frequencies " in one octave or less and product of average capacity (expressed in kw) on working frequency (expressed in GHz) more than 1; or

c. " Suitable for application in space ";

b. Lamps-amplifiers of a magnetron type with factor of strengthening more than 17 дб;

c. Импрегнированные the cathodes developed for electronic lamps, providing density of a current at continuous issue and regular conditions of the functioning, exceeding 5 A/kw Sm

2. Monolithic microwave integrated schemes (MMIS), possessing both from following characteristics:

a. Calculated for work on frequencies over 3,2 GHz up to and including 6 GHz and with average target capacity from above 4 Вт (36 dBm) at " relative width of frequency " strips over 15 %;

b. Calculated for work on frequencies over 6 GHz up to and including 16 GHz with average target capacity from above 1 Вт (30 dBm) at " relative width of frequency " strips over 10 %;

c. Calculated for work on frequencies over 16 GHz up to and including 31,8 GHz and with average target capacity from above 0,8 Вт (29 dBm) at relative width of frequency of strips over 10 %;

d. Calculated for work on frequencies over 31,8 GHz up to and including 37,5 GHz;

e. Calculated for work on frequencies over 37,5 GHz up to and including 43,5 GHz and with average target capacity from above 0,25 Вт (24 dBm) at " relative width of frequency " strips over 10 %; or

f. Calculated for work on frequencies over 43,5 GHz;

Note 1: Item 3A001.b.2. Does not supervise вещательное the satellite equipment developed and calculated for work in a range of frequencies about 40,5 GHz up to 42,5 GHz.

Note 2: The controllable condition of microwave integrated schemes or modules (MISM) is defined by a controllable threshold - the lowest target capacity. Working frequency MISM flucluates in a range over one frequency.

Note 3: Notes 1 and 2 in heading to the Category 3 mean, that Item 3A001.b.2. Does not supervise MISM if they are specially designed for other appendices, for example, telecommunication systems, radars and cars.

3. The microwave transistors possessing following characteristics:

a. Working on frequencies over 3,2 GHz and up to 6 GHz with average target capacity from above 60 Вт (47,8 dBm);

b. Working on frequencies over 6 GHz and up to 31,8 GHz with average target capacity from above 20Вт (43 dBm).

c. Working on frequencies over 31,8 GHz and up to 37,5 GHz with average target capacity from above 0,5 Вт (27 dBm).

d. Working on frequencies over 37,5 GHz and up to 43,5 GHz with average target capacity from above 1 Вт (30 dBm); or

e. Working on frequencies over 43,5 GHz.

4. Microwave solid-state amplifiers and the microwave assembly/modules containing microwave amplifiers, possessing any of following characteristics:

a. Working on frequencies over 3,2 GHz and up to 6 GHZ with average target capacity from above 60 Wt (47,8 dBm) with " relative width of a strip " frequencies over 15 %;

b. Working on frequencies over 6 GHz and up to 31,8 GHz with average target capacity from above 15Wt (42 dBm) with " relative width of a strip of frequencies " over 10 %.

c. Working on frequencies over 31,8 GHz and up to 37,5 GHz.

d. Working on frequencies over 37,5 GHz and up to 43,5 GHz with average target capacity from above 1 Wt (30 dBm) with " relative width of a strip of frequencies " over 10 %.

e. Working on frequencies over 43,5 GHz; or

f. Working on frequencies over 3 GHz and possessing following characteristics:

1. Average target capacity (in Вт.) P from above 150 devided on the maximal working frequency (in GHz.) squared [150 WxGHz2/fGHz2];

2. In the relative width of a strip of frequencies 5 % or from above; and

3. With perpendicularly located under the attitude to each other the parties at length d (in sm), equal or it is less 15, divided on the lowermost working frequency in GHz [d = 15 cìxGHz/fGHz];

N.B.: Amplifiers of capacity for MISM are estimated according to the criteria established in Item 3C001.b.2.

Note 1: By the 3A001.b.4. item the equipment designed and calculated for work on frequencies in a range from 40,5 up to 42,5 GHZ is not supervised the broadcasting satellite.

Note 2: The controllable condition of the equipment, whose working frequency flucluates in a range over one frequency according to Item 3A001.b.4., is defined by a controllable threshold - the lowest average target capacity.

5.Filters with the electronic or magnetic adjustment, containing more than five adjusted resonators providing adjustment in a strip of frequencies with a parity of the maximal and minimal frequencies 1,5 : 1 (f max/f min) less than for 10 mks, having any of following components:

a. The strip filters having a passband of frequency more of 0,5 % from resonant frequency; or

b. The protecting filters having a strip of suppression of frequency less of 0,5 % from resonant frequency;

6. Are not used;

7. Amalgamators and the converters developed for expansion of a frequency range of the equipment, specified in items 3A002.c, 3A002.Ñ. Or 3A003.f for the limits specified in these items;

8. Microwave amplifiers of capacity of the Microwevw-SWCh, the containing lamps controllable on item 3A001.b., and possessing all following characteristics:

a. Working frequencies over 3 GHz;

b. The average density of target capacity exceeding 80 Wt/kg; and

c. Volume less than 400 cube. Sm;

Note: Item 3A001.b.8. does not supervise the equipment developed or suitable for work on frequencies, " Telecommunications distributed by the International Union " for sphere of radiocommunication services, but not for radiodetection.

c. Devices on acoustic waves and components specially designed for them, such, as:

1. Devices on superficial (fine volumetric) acoustic waves and on acoustic waves in a thin substrate (i.e. devices for " processing of signals ", using elastic waves in a material), possessing any of following characteristics:

a. Bearing frequency more than 2,5 GHz;

b. Bearing frequency more than 1 GHz, but not exceeding 2,5 GHz, and in addition possessing any of following characteristics:

1. Frequency suppression of lateral petals of the diagram of an orientation more than 55 dB;

2. Product of maximal time of a delay (in mks) for width of a strip of frequencies (in MHz) more than 100;

3. Width of a strip of frequencies more than 250 MHz; or

4. The delay of dispersion exceeding 10 мкс; or

c. Bearing frequency from 1 GHz and less and in addition possessing any of following characteristics:

1. Product of maximal time of a delay (in mks) for width of a strip of frequencies (in MHz) more than 100;

2. The delay of dispersion exceeding 10 mks; or

3. Frequency suppression of lateral petals of the diagram of an orientation more than 55 db and width of a strip of the frequencies, exceeding 50 MHz;

2. Devices on volumetric acoustic waves (i.e. devices for " processing of signals ", using elastic waves in a material), providing direct processing of signals on frequencies over 1 GHz;

3.Akustooptical devices of " processing of signals ", using interaction between acoustic waves (volumetric or superficial) and light waves that allows to process directly signals or images, including the analysis of a spectrum, correlation or convolution;

d. Electronic devices and the schemes containing components, made from " the superconducting materials, specially designed for work at temperatures below " critical temperature " even one of the "superconducting" components, having any of following attributes:

1. Current switches for the digital schemes, using "superconducting" gates, at which product of time of a delay on the gate (in seconds) on dispersion of capacity on the gate (in watts) below 10-14 Dj): or

2. Selection of frequency on all frequencies with use of resonant contours with the good quality exceeding 10 000;

e. Undermentioned stores of energy:

1. Batteries and photo-electric batteries (elements), such as:

Note: Item 3A001.Ñ.1. does not supervise the battery in volume 27 kub.sm and less (for example, standard coal elements or batteries of type R-14);

a. Primary elements and batteries " with density of energy " over 480 Wt-h/kg and suitable on specifications for work in a range of temperatures from 243 To (-300C) and below up to 343 To (70 0C) and above;

b. Recharged elements and batteries with " density of energy " over 150 Wt-h/kg after 75 cycles of a charge-category at the current of the category equal C/5 ч (With - nominal capacity in ampere-hours), at work in a range of temperatures from 253 To (-20 0C) and below up to 333 To (60 0C) and above; 8506; 8507; 8541 40 900 0

Technical note:

" The Density of energy " is defined by multiplication of average capacity in watts (product of an average pressure in вольтах on an average current in amperes) on duration of a cycle of the category in hours at which the pressure on the opened plugs falls up to 75 % from face value, and divisions of the received product into a lump of an element (or batteries) in kg;

c. Batteries, on specifications " suitable for application in space ", and radiation-proof batteries on photo-electric elements with specific capacity from above 160 Wt/Kw.m. at working temperature 301 To (28 0C) and a tungstic source, heated up to 2 800 To (2 527 0C) and 1 kWt/¼m. creating power light exposure

2. Condensers for accumulation of the big energy, such as:

N.B.: See also 3C201.A.

a. Condensers with frequency of recurrence less than 10 Hz (one-digit condensers), possessing all following characteristics:

1. Rated voltage 5 кв or more:
2. Density of energy of 250 dzh/kg or more: and
3. The general energy 25 Dzh/kgor more;

b. Condensers with frequency of recurrence of 10 Hz and more (multidigit condensers), possessing all following characteristics:

1. Rated voltage not less than 5 кW;
2. Density of energy not less than 50 dzh/kg,
3. The general energy not less than 100 Dzh; and
4. Quantity of cycles of a charge-category not less than 10 000;

3. "Superconducting" electromagnets and the solenoids specially designed on a full charge or the category less than for one second, possessing all from undermentioned characteristics:

N.V.: See also 3C201.b.

Note: Item 3A001.e.3. does not supervise "superconducting" electromagnets or the solenoids specially designed for the medical equipment –a mafnetirezonans tomography.

a. The energy allocated at the category, exceeding 10 kdzh for the first second;

b. Internal diameter of current-carrying windings more than 250 mm; and

c. A nominal magnetic induction from above 8 T or " total density of a current " in a winding it is more 300 A/kw.mm.

f. Rotating converters of absolute angular position of a shaft in a code, possessing any of following characteristics:

1. The sanction is better 1/265 000 from a full range (18 bats); or
2. Accuracy is better +/-2,5 cor. seconds.

3A001 a. 1. 8542
3A001 a. 2. 8542
3A001 a. 3. 8542
8542 21 500 0
8542 21 83
8542 21 850 0
8542 60 000
3A001 a. 4. 8542
8542 21 45
8542 21 500 0
8542 21 83

8542 21 850 0
8542 60 000
3A001 a. 5. 8542
8542 29 600 0;
8542 29 900 9;
8542 60 000 9
3A001 a. 6. 8542
3A001 a. 7. 8542
8542 21 690 0;
8542 21 990 0
3A001 a. 8. 8542
3A001 a. 9. 8542
3A001 a. 10. 8542
8542 21 690 0;
8542 21 990 0;
8542 29;
8542 60 000
3A001 a. 11. 8542
3A001 a. 12. 8542
8542 21 45
8542 21 500 0
8542 21 83
8542 21 850 0
8542 60 000
3A001 b. 1. 8540
8540 99 000 0
8540 71 000 0
8540 79 000 0
3A001 b. 2 8540
8542 29
8542 60 000
8542 70 000 0
3A001 b. 3. 8540
8541 21 000 0;
8541 29 000 0
3A001 b. 4. 8540
8543 89 950 0
3A001 b. 5. 8540
8543 89 950 0
3A001 b. 6. 8540
3A001 b. 7. 8540
8543 89 950 0
3A001 b. 8. 8540
8543 89 950 0
3A001 c. 1. 8541

8541 60 000 0
3A001 c. 2. 8541
8541 60 000 0
3A001 c. 3. 5418
8541 60 000 0
3A001 d. 8542
8540
8541
8543
3A001 e. 1. 8506
8507
8541 40 900 0
3A001 e. 2. 8506
8507
8532
3A001 e. 3. 8505 19 900 0
8504 50
8505 90 100 0
3A001 f. 9031 80
9031 80 320 0
9031 80 340 0

3A002General purpose electronic equipment, as follows:

a. Recording equipment, as follows, and specially designed test tape therefor:

1. Analogue instrumentation magnetic tape recorders, including those permitting the recording of digital signals (e.g. using a high density digital recording (HDDR) module), having any of the following:

a.A bandwidth exceeding 4 MHz per electronic channel or track;

b.A bandwidth exceeding 2 MHz per electronic channel or track and having more than 42 tracks; or

c.A time displacement (base) error, measured in accordance with applicable IRIG or EIA documents, of less than ± 0.1 us;

Note: Analogue magnetic tape recorders specially designed for civilian video purposes are not considered to be instrumentation tape recorders.

2.Digital video magnetic tape recorders having a maximum digital interface transfer rate exceeding 360 Mbit/s;

Note: 3A002.a.2. does not control digital video magnetic tape recorders specially designed for television recording using a signal format, which may include a compressed signal format, standardised or recommended by the ITU, the IEC, the SMPTE, the EBU or the IEEE for civil television applications.

3.Digital instrumentation magnetic tape data recorders employing helical scan techniques or fixed head techniques, having any of the following:

a.A maximum digital interface transfer rate exceeding 175 Mbit/s; or

b.Being "space qualified";

Note: 3A002.a.3. does not control analogue magnetic tape recorders

equipped with HDDR conversion electronics and configured to record only digital data.

4.Equipment, having a maximum digital interface transfer rate exceeding 175 Mbit/s, designed to convert digital video magnetic tape recorders for use as digital instrumentation data recorders;

5.Waveform digitisers and transient recorders having all of the following:

a.Digitising rates equal to or more than 200 million samples per second and a resolution of 10 bits or more; and

b.A continuous throughput of 2 Gbit/s or more;

Technical Note:

For those instruments -with a parallel bus architecture, the continuous throughput rate is the highest word rate multiplied by the number of bits in a word.

Continuous throughput is the fastest data rate the instrument can output to mass storage without the loss of any information whilst sustaining the sampling rate and analogue-to-digital conversion.

b."Frequency synthesiser" "electronic assemblies" having a "frequency switching time" from one selected frequency to another of less than 1 ms;

c."Signal analysers", as follows:

1. "Signal analysers" capable of analysing frequencies exceeding 31 GHz;
2. "Dynamic signal analysers" having a "real-time bandwidth" exceeding 25.6 kHz;

Note: 3A002.C.2. does not control those "dynamic signal analysers" using only constant percentage bandwidth filters (also known as octave or fractional octave filters).

e. Frequency synthesised signal generators producing output frequencies, the accuracy and short term and long term stability of which are controlled, derived from or disciplined by the internal master frequency, and having any of the following:

1. The maximal synthesized frequency more than 31,8 GHz, but not over 43,5 GHz designed for creation of an impulse by duration not less than 100 nc;

2. The maximal synthesized frequency over 43,5 GHz;

3. " Time of switching " from one set frequency on another less than 1 ms; or

4. Phase noise of one lateral strip is better - (126 + 20log10F - 20log10f) in terms of dB x s/Hz , where f - displacement of working frequency in Hz, a F - working frequency in MHz

Technical note:

For the purposes of Item 3A002.d.1., " duration of an impulse " is defined as an interval of time between the forward front of an impulse reaching peak in 90 % and back front of an impulse, reaching peak in 10 %.

Note: 3A002.d. does not control equipment in which the output frequency is either produced by the addition or subtraction of two or more crystal oscillator

frequencies, or by an addition or subtraction followed by a multiplication of the result.

e.Network analysers with a maximum operating frequency exceeding 43.5 GHz;

f.Microwave test receivers having all of the following:

1. A maximum operating frequency exceeding 43.5 GHz; and
2. Being capable of measuring amplitude and phase simultaneously;

g.Atomic frequency standards having any of the following:

1. Long-term stability (aging) less (better) than 1 x 10 /month; or
2. Being "space qualified".

Note: 3A002.g. 1. does not control non-"space qualified" rubidium standards.

3A002 a. 1. 8519 81 560
8520 32 500 0
8520 32 990 0
8520 39 900 0
8520 90 900 0
8521 10 300 0
8521 10 800 0
3A002 a. 2. 8521
8521 10;
8521 90 000 0
3A002 a. 3. 8521 10
8471 70 600 0
3A002 a. 4. 8521 90 000 9
8521 90 000 0
3A002 a. 5. 8543
8471 90 000 0
8543 89 950 0
8486 10
8486 20
8486 30
8486 40
8523 59
8523 52
3A002 a. 6. 8471 50;
8471 60 100 0;
8471 60 900 0;
8471 70 100 0;
8471 70 510 0;
8471 70 530 0;
8520 90 100 0;

8520 90 900 0;
8521 90 000 0;
8522 90 590 0;
8522 90 930 0;
8522 90 980 0
3A002 b. 8543
8486 10
8486 20
8486 30
8486 40
8523 59
8523 52
8543 20 000 0
3A002 c. 1. 8543
8486 10
8486 20
8486 30
8486 40
8523 59
8523 52
9030 83 900 0
9030 89 920 0
3A002 c. 2. 8543
8586 10
8486 20
8486 30
8486 40
8523 59
8523 52
9030 83 900 0;
9030 89 920 0
3A002 d. 8543 20 000 0
3A002 e. 8543
8486 10
8486 20
8486 30
8486 40
8523 59
8523 52
9030 40 900 0
3A002 f. 8527 99 000 0
8527 90 980 0
3A002 g. 8543 20 000 0

3A003 Monitoring systems of thermal cooling and splashing in which the closed cycle of automatically adjusted equipment for transportation and

restoration of properties of a fluid in tight space is used. Here the dielectric fluid is sprayed on electronic components by means of specially designed atomizers which should keep electronic components within the limits of their working temperature, and specially designed components.

3A003 8419 89 989 0

8424 89 950 9

8479 89 980 0

3A101Electronic equipment, devices and components, other than those specified in 3A001, as follows:

a.Analog-to-digital converters, usable in "missiles", designed to meet military specifications for ruggedized equipment;

b.Accelerators capable of delivering electromagnetic radiation produced by bremsstrahlung from accelerated electrons of 2 MeV or greater, and systems containing those accelerators.

Note: 3A101.b. above does not specify equipment specially designed for medical purposes.

3A101 a. 8471 30

8471 41

8471 49

8471 50

8542

3A101 b. 8543 10 000 0

8543 19 000 0

3A201Electronic components, other than those specified in 3A001, as follows;

a. Capacitors having either of the following sets of characteristics:

1.a. Voltage rating greater than 1.4 kV;

b.Energy storage greater than 10 J;

c.Capacitance greater than 0.5 uF; <u>and</u>

d.Series inductance less than 50 nH; or

2.a. Voltage rating greater than 750 V;

b.Capacitance greater than 0.25 uF; <u>and</u>

c.Series inductance less than 10 nH;

b.Superconducting solenoidal electromagnets having all of the following characteristics:

1 . Capable of creating magnetic fields greater than 2 T;

2. A ratio of length to inner diameter greater than 2;

3 . Inner diameter greater than 300 mm; <u>and</u>

4. Magnetic field uniform to better than 1% over the central 50% of the inner volume;

Note: 3A201.b. does not control magnets specially designed for and exported 'as parts of medical nuclear magnetic resonance (NMR) imaging systems. The phrase 'as part of does not necessarily mean physical part in the same shipment; separate shipments from different sources are allowed, provided the related export documents clearly specify that the shipments are dispatched 'as

part of the imaging systems.

c.Flash X-ray generators or pulsed electron accelerators having either of the following sets of characteristics:

1 . a. An accelerator peak electron energy of 500 keV or greater but less than 25 MeV; and

b. With a 'figure of merit' (K) of 0.25 or greater;

2. a. An accelerator peak electron energy of 25 MeV or greater; and

b. A 'peak power' greater than 50 MW Note: NOTE: 3A201.C. does not control accelerators that are component parts of devices designed for purposes other than electron beam or X-ray radiation (electron microscopy, for example) nor those designed for medical purposes:

Technical notes:

1. The 'figure of merit' K is defined as:

K=1,7x10^(3)V^(2,65)Q

V-is the peak electron energy in million electron volts.

If the accelerator beam pulse duration is less than or equal to 1 [is, then Q is the total accelerated charge in Coulombs. If the accelerator beam pulse duration is greater than 1 us, then Q is the maximum accelerated charge in Jus.

Q equals the integral ofi with respect to t, over the lesser of I jus or the time duration of the beam pulse (Q = fidt), •where i is beam current in amperes and t is time in seconds.

2. 'Peak power' = (peak potential in volts) x (peak beam current in amperes).
3. In machines based on microwave accelerating cavities, the time duration of the beam pulse is the lesser of 1 us or the duration of the bunched beam packet resulting from one microwave modulator pulse.
4. In machines based on micro-wave accelerating cavities, the peak beam current is the average current in the time duration of a bunched beam packet.

3A201 a. 8532 10 000 0
8532 29 000 0
8532 23 000 0
8532 24 000 0
8532 25 000 0
3A201 b. 8505 90 100 0
3A201 c. 8543
8486 10
8486 20
8486 30
8486 40
8523 59
8523 52
8543 19 000 0

9022 19 000 0

3 A225 Frequency changers or generators, other than those specified in OBOO1 .b. 13., having all of the following characteristics:

a.Multiphase output capable of providing a power of 40 W or greater;

b.Capable of operating in the frequency range between 600 and 2000 Hz;

c.Total harmonic distortion better (less) than 10%; and

d.Frequency control better (less) than 0.1 %.

Technical note:

Frequency changers in 3A225 are also known as converters or inverters.

3A225 8502 39 800 0

8504 40 000 0

8502 39 990 0

8502 40 900 0

3 A226High-power direct current power supplies, other than those specified in OBOO 1 .j .6., having both of the following characteristics:

a.Capable of continuously producing, over a time period of 8 hours, 100 V or greater with current output of 500 A or greater; and

b.Current or voltage stability better than 0.1% over a time period of 8 hours.

3A226 8504 40 900 9

8504 40 940 9»

8504 40 990 0

3A227High-voltage direct current power supplies, other than those specified in OBOOl.j.5.,having both of the following characteristics:

a.Capable of continuously producing, over a time period of 8 hours, 20 kV or greater with current output of 1 A or greater; and

b.Current or voltage stability better than 0.1% over a time period of 8 hours.

3A227 8501 61

8501 62

8501 63 000 0

8501 64 000 0

8501 32 990 9

8501 33 900 9

8501 34 910 0

8501 34 990 0

8504 40 940 9

3A228Switching devices, as follows:

a.Cold-cathode tubes, whether gas filled or not, operating similarly to a spark gap,having all of the following characteristics:

1. Containing three or more electrodes;
2. Anode peak voltage rating of 2.5 kV or more;
3. Anode peak current rating of 100 A or more; and
4. Anode delay time of 10 [is or less;

Note: 3A228 includes gas krytron tubes and vacuum sprytron tubes.

b.Triggered spark-gaps having both of the following characteristics:

1. An anode delay time of 15 us or less; and

2. Rated for a peak current of 500 A or more;

c.Modules or assemblies with a fast switching function having all of the following characteristics:

1. Anode peak voltage rating greater than 2 kV;
2. Anode peak current rating of 500 A or more; and
3. Turn-on time of 1 us or less.

3A228 a. 8540 89 000 0
8535 90 000 0
3A228 b. 8536 90 850 0
8536 30 900 0
8535 90 000 0
8540 89 000 0
3A228 c. 8535
8535 90 000 0

3A229 Firing sets and equivalent high-current pulse generators as follows:

N.B.: SEE ALSO MILITARY GOODS CONTROLS.

a.Explosive detonator firing sets designed to drive multiple controlled detonators specified in 3A232;

b.Modular electrical pulse generators (pulsers) having all of the following characteristics:

1. Designed for portable, mobile, or ruggedized-use;
2. Enclosed in a dust-tight enclosure;
3. Capable of delivering their energy in less than 15 us;
4. Having an output greater than 100 A;
5. Having a 'rise time' of less than 10 us into loads of less than 40 ohms;
6. No dimension greater than 254 mm;
7. Weight less than 25 kg; and
8. Specified for use over an extended temperature range 223 K (-50°C) to 373 K (100°C) or specified as suitable for aerospace applications.

Note: 3A229.b. includes xenon flash-lamp drivers.

Technical note:

In 3A229.b.5. 'rise time' is defined as the time interval from 10% to 90% currentamplitude "when driving a resistive load.

3A229 a. 8543 70 900 9
8486 10
8486 20
8486 30
8486 40
8523 52
8543 70
3603 00 900 0
8543 89 950 0

3A229 b. 8543 20 000 0
8543 89 950 0
8548 90 900 0

3A230 High-speed pulse generators having both of the following characteristics:

a.Output voltage greater than 6 V into a resistive load of less than 55 ohms, and

b.'Pulse transition time' less than 500 ps.

Technical Note:

In 3A230, 'pulse transition time' is defined as the time interval between 10% and 90% voltage amplitude.

3A230 8543 20 00 0

3A231 Neutron generator systems, including tubes, having both of the following characteristics:

a.Designed for operation without an external vacuum system; and

b.Utilizing electrostatic acceleration to induce a tritium-deuterium nuclear reaction.

3A231 8543 10 000 0
8479 89 980 0
8543 19 000 0
9015 80 110 0

3A232 Detonators and multipoint initiation systems, as follows:

N.B.: SEE ALSO MILITARY GOODS CONTROLS.

a.Electrically driven explosive detonators, as follows:

1. Exploding bridge (EB);
2. Exploding bridge wire (EBW);
3. Slapper;
4. Exploding foil initiators (EFI);

b.Arrangements using single or multiple detonators designed to nearly simultaneously initiate an explosive surface over greater than 5,000 mm2 from a single firing signal with an initiation timing spread over the surface of less than 2.5 us.

Note: 3A232 does not control detonators using only primary explosives, such as lead azide.

Technical Note:

In 3A232 the detonators of concern all utilise a small electrical conductor (bridge, bridge wire or foil) that explosively vapourises when a fast, high-current electrical pulse is passed through it. In nonslapper types, the exploding conductor starts a chemical detonation in a contacting high-explosive material such as PETN (Pentaerythritoltetranitrate). In slapper detonators, the explosive vapourisation of the electrical conductor drives a flyer or slapper across a gap and the impact of the slapper on an explosive starts a chemical detonation. The slapper in some designs is driven by a magnetic force. The term exploding foil detonator may refer to either an EB or a slapper-type detonator. Also, the word initiator is sometimes used in place of the word detonator.

3A232 a. 3603 00 900 0
3A232 b. 8543 70 900 9
8486 10
8486 20
8486 30
8486 40
8523 52
8543 70
8543 89 950 0

3A233 Mass spectrometers, other than those specified in OB002.g., capable of measuring ions of 230 atomic mass units or greater and having a resolution of better than 2 parts in 230, as follows, and ion sources therefor:

a.Inductively coupled plasma mass spectrometers (ICP/MS);

b.Glow discharge mass spectrometers (GDMS);

c.Thermal ionization mass spectrometers (TIMS);

d.Electron bombardment mass spectrometers which have a source chamber constructed from, lined with or plated with materials resistant to UF6;

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 UF6;

f. Mass spectrometers equipped with a microfluorination ion source designed for actinides or actinide fluorides.

3A233 a. 9027 80 970 0
3A233 b. 9027 80 970 0
3A233 c 9027 80 970 0
3A233 d. 9027 80 970 0
3A233 e. 9027 80 970 0
3A233 f. 9027 80 970 0

3B Test, Inspection and Production equipment

3BOO1 Equipment for the manufacturing of semiconductor devices or materials, as follows, and specially designed components and accessories therefor:

a. "Stored programme controlled" equipment designed for epitaxial growth, as follows:

1. Equipment capable of producing a layer thickness uniform to less than ± 2.5% across a distance of 75 mm or more;
2. Metal organic chemical vapour deposition (MOCVD) reactors specially designed for compound semiconductor crystal growth by the chemical reaction between materials specified in 3C003 or

3C004;

3. Molecular beam epitaxial growth equipment using gas or solid sources;

b."Stored programme controlled" equipment designed for ion implantation, having any of the following:

1. A beam energy (accelerating voltage) exceeding IMeV;
2. Being specially designed and optimised to operate at a beam energy (accelerating voltage) of less than 2 keV;
3. Direct write capability; or
4. Being capable of high energy oxygen implant into a heated semiconductor material "substrate";

c."Stored programme controlled" anisotropic plasma dry etching equipment, as follows:

1.Equipment with cassette-to-cassette operation and load-locks, and having any of the following:

a.Magnetic confinement; or

b.Electron cyclotron resonance (ECR);

2.Equipment specially designed for equipment specified in 3BOOI.e. and having any of the following:

a.Magnetic confinement; or

b.ECR;

d."Stored programme controlled" plasma enhanced CVD equipment, as follows:

1.Equipment with cassette-to-cassette operation and load-locks, and having any of the following:

a.Magnetic confinement; or

b.ECR;

2.Equipment specially designed for equipment specified in 3B001 .e. and having any of the following:

a.Magnetic confinement; or

b.ECR;

e."Stored programme controlled" automatic loading multi-chamber central wafer handling systems, having all of the following:

1. Interfaces for wafer input and output, to which more than two pieces of semiconductor processing equipment are to be connected; <u>and</u>
2. Designed to form an integrated system in a vacuum environment for sequential multiple wafer processing;

Note: 3B001. e. does not control automatic robotic wafer handling systems not designed to operate in a vacuum environment.

f."Stored programme controlled" lithography equipment, as follows:

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, having any of the following:

a. A light source wavelength shorter than 350 nm; or

b. Capable of producing a pattern with a 'minimum resolvable feature' size of 0.35 urn or less; Technical Note:

The 'minimum resolvable feature' size is calculated by the following formula:

MRF = (an exposure light source wavelength in urn) x (K factor) numerical aperture where the K factor = 0.7MRF = minimum resolvable feature size

2. Equipment specially designed for mask making or semiconductor device processing using deflected focussed electron beam, ion beam or "laser" beam, having any of the following:

a.A spot size smaller than 0.2 urn;

b.Being capable of producing a pattern with a feature size of less than 1 urn; or

c.An overlay accuracy of better than ± 0.20 urn (3 sigma);

g. Masks and reticles designed for integrated circuits specified in 3A001;

h. Multi-layer masks with a phase shift layer.

3B001 a. 1. 8419 89
8486 10 000
8486 20
8479 89 650 0
3B001 a. 2. 8419 89
8486 10 000
8486 20
8419 89 200 0
3B001 a. 3. 8417 80
8479 89 700 0
8543 89 650 0
3B001 b. 8456 10
8486 10 000 0
8486 20
8486 30
8543 11 000 0
3B001 c. 1. 8456 90 000 0
8456 91 000 0
8456 99 800 0
3B001 c. 2. 8456 90 000 0
8456 91 000 0
8456 99 800 0
3B001 d. 8456 90 000 0
8419 89 200 0
8419 89 300 0
3B001 e. 8456 10
8456 90 000 0
8486 10 000 0
8486 30

8486 40
8456 91 000 0
8456 99 800 0
8456 99 300 0
8479 50 000 0
3B001 f. 1. 8443 39 290 0
9009 22 000 0
3B001 f. 2. 8456 10
8486 10 000 0
8486 20
8486 30
8456 99
3B001 g. 8471
8443 31
8443 32
8528 41
8528 51
8528 61
8517 62
9010 90
3B001 h. 9010 90 000 0
9010 90

3B002 "Stored programme controlled" test equipment, specially designed for testing finished or unfinished semiconductor devices, as follows, and specially designed components and accessories therefor:

a. For testing S-parameters of transistor devices at frequencies exceeding 31.8 GHz;

b. For testing integrated circuits capable of performing functional (truth table) testing ,at a 'pattern rate1 of more than 333 MHz;

Note: 3B002.b. does not control test equipment specially designed for testing:

1. "Electronic assemblies" or a class of "electronic assemblies" for home or entertainment applications;
2. Uncontrolled electronic components, "electronic assemblies " or integrated circuits.

Technical Note:

For the purpose of this entry, 'pattern rate' is defined as the maximum frequency of digital operation of a tester. It is therefore equivalent to the highest data rate that a tester can provide in a non-multiplexed mode. It is also referred to as test speed, maximum digital frequency or maximum digital speed.

c. For testing microwave integrated circuits specified in 3AOO1 .b.2.

3B002 a. 9031 80 380 0
9031 80 390 0

3B002 b. 9031 80 380 0
9030;
9031 20 000 0
9031 80 390 0
3B002 c.
9031 80 380
9030
9031 20 000 0
9031 80 390 0

3C Materials

3C001 Hetero-epitaxial materials consisting of a "substrate" having stacked epitaxially grown multiple layers of any of the following:

a.Silicon;

b.Germanium;

c. silicon carbide,

d.IIW compounds of gallium or indium.

Technical Note:

IIUV compounds are polycrystalline or binary or complex monocrystalline products consisting of elements of groups IIIA and VA of Mendeleyev's periodic classification table (e.g., gallium arsenide, gallium-aluminium arsenide, indium phosphide).

3C001 a. 3818 00
3818 00 100 0
3818 00 900 0
3C001 b. 3818 00
3818 00 900 0
3C001 c. 3818 00
3818 00 900 0
3C001 d. 3818 00
3818 00 900 0

3C002 Resist materials, as follows, and "substrates" coated with controlled resists:

a.Positive resists designed for semiconductor lithography specially adjusted (optimised) for use at wavelengths below 350 nm;

b.All resists designed for use with electron beams or ion beams, with a sensitivity of 0.01 ucoulomb/mm or better;

2

c.All resists designed for use with X-rays, with a sensitivity of 2.5 ml/mm" or better;

d.All resists optimised for surface imaging technologies, including 'silylated' resists.

Technical Note:

'Silylation' techniques are defined as processes incorporating oxidation of the resist surface to enhance performance for both wet and dry developing.

3C002 a 8541 40 100 0

8443 31
8443 32
8443 39
8443 99
3C002 d. 8541 40 900 0
3C003 Organo-inorganic compounds, as follows:
a.Organo-metallic compounds of aluminium, gallium or indium having a purity (metal basis) better than 99.999%;
b.Organo-arsenic, organo-antimony and organo-phosphorus compounds having a purity (inorganic element basis) better than 99.999%.
Note: 3C003 only controls compounds whose metallic, partly metallic or non-metallic element is directly linked to carbon in the organic part of the molecule.
3C003 a 2931 00 950 0
3C003 b. 2931 00 950 0
3C004 Hydrides of phosphorus, arsenic or antimony, having a purity better than 99.999%, even diluted in inert gases or hydrogen.
Note: 3C004 does not control hydrides containing 20% molar or more of inert gases or hydrogen.
3C004 2848 00 000 0;
2850 00 200 0
3D Software
3D001 "Software" specially designed for the "development" or "production" of equipment specified in SAOOl.b. to 3A002.g. or 3B.
3D001
3D002 "Software" specially designed for the "use" of "stored programme controlled" equipment specified in 3B.
a. The equipment controllable by Item 3B001.a. up to f; or
b. The equipment controllable by Item 3B002.
3D002
3D003 "Software" in which basis lies simulation of the physical properties, specially intended for "working out" of sequence of operations of lithograph, etching and sedimentation with a view of an embodiment of masking templates in concrete topological drawings of conductors, diolectik or a semi-conductor material
Technical Note:
A 'lithographicprocessing simulator' is a "software"package used in the design phase to define the sequence of lithographic, etching and deposition steps for translating masking patterns into specific topographical patterns in conductors, dielectrics or semiconductor material.
Note 1: 3.D.3 does not control "software" specially designed for schematic entry, logic simulation, placing and routing, layout verification or pattern generation tape.
Note 2: Libraries, design attributes or associated data for the design of semiconductor devices or integrated circuits are considered as "technology".

3D003

3D004 - "Software" specially designed or modified for the "use" of equipment specified in 3A003.

3D004

3D101 - "Software" specially designed or modified for the "use" of equipment specified in 3A101.b.

3D101

3D 8523

3E Technology

3EOO1 "Technology" according to the General Technology Note for the "development" or"production" of equipment or materials specified in 3 A, 3B or 3C;

Note: 3E001 does not control "technology"for the "development" or "production" of:

a.Micro-wave transistors operating at frequencies below 31 GHz;

b.Integrated circuits specified in 3A001.a.3. to 3A001.a.l2., having all of the following:

1. Using "technology" ofO. 5 urn or more, and

2.Not incorporating 'multi-layer structures'.

Technical Note: The term " multilayered structures " does not include the devices containing a maximum three metal layers and three layers of polysilicon.

3E001

3E002 "technologies", according to the General technological note, except for specified in item 3E001, for "development" or "manufacture" of " microprocessor microcircuits ", " microcircuits of the microcomputer ", microcircuits of the microcontrollers having " cumulative theoretical productivity " ("CTP") 530 million theoretical operations a second (MTOS) or more and arithmetic-logic
device with length of sample 32 bat or more.

Note: The Note 2 about clearing of the control over Item 3E001 concerns as well to 3A002.

3E002

3E003Other "technology" for the "development" or "production" of:

a.Vacuum microelectronic devices;

b.Hetero-structure semiconductor devices such as high electron mobility transistors (HEMT), hetero-bipolar transistors (HBT), quantum well and super lattice devices;

Note: 3E003.b. does not supervise technology on release of transistors with high mobility electrons, working on frequencies below 31,8 GHz and bipolar transistors on getrostructure, working on frequencies below 31,8 GHz.

c."Superconductive" electronic devices;

d.Substrates of films of diamond for electronic components.

e.Substrates of silicon-on-insulator (SOI) for integrated circuits in which the insulator is silicon dioxide;

f.Substrates of silicon carbide for electronic components;

g. The electrovacuum lamps working on frequencies in 31,8 GHz or above.

3E003

3E101"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 3A001.a.l. or 2., 3A101 or 3D101.

3E101

3E102"Technology" according to the General Technology Note for the "development" of "software" specified in 3D 101

3E102

3E201"Technology" according to the General Technology Note for the "use" of equipment specified in 3A001.e.2., 3A001.e.3., 3A201, 3A225 to 3A233.

2E201

CATEGORY 4
COMPUTERS

Note 1: Computers, related equipment and "software"performing telecommunications or "local area network" functions must also be evaluated against the performance characteristics of Category 5, Part 1 (Telecommunications).

Note 2: Control units which directly interconnect the buses or channels of central processing units, "main storage" or disk controllers are not regarded as telecommunications equipment described in Category 5, Part 1 (Telecommunications).

N.B.: For the control status of "software " specially designed for packet switching, see 5D001.

Note3:_ Computers, related equipment and "software"performing cryptographic, cryptanalytic, certifiable multi-level security or certifiable user isolation functions, or which limit electromagnetic compatibility (EMC), must also be evaluated against the performance characteristics in Category 5, Part 2 ("Information Security").

4A

and related equipment, as follows, and electronic assemblies" and specially designed co N.B.:1.A

N.B.: See also 4a101 SpeciSpessally designed to have any of the following characteristics:

1. Rated for operation at an ambient temperature below 228 K (-45°C) or above 358 K (85°C);

Note: 4A 001. a. 1. does not apply to computers specially designed for civil automobile or railway train applications.

2. Radiation hardened to exceed any of the following specifications:

a. Total Dose 5x10 Gy (silicon);

b. Dose Rate 5x10 Gy (silicon)/s: or 1 x Upset

c. Single Event Upset

4A Systems, Equiepment and components

4A001 Electronic computers and related equipment, as follows, and “Electronic assemblies” and specially designed thereof components:

N.B.: See also4A101.a. Spiciallt desighned with follows components:

1. Rated for operation at an ambient temperature below 228 K (-45°C) or above 358 K (85°C);

Note: the item 4A001 does not apply to computers, specially designed for civil automobile or railway train applications.

2. Radiation hardened to exceed any of the following specifications:

a. Total dose = 5x10 (3) rad(cremniy);

b. Dase rate upset =5x10(6) rad(cremniy)/s; or

c. Failure from a high-energy particle=1x10(7)mistakes/bit/day;

b. Having characteristics or performing functions exceeding the limits in Category 5, Part 2 ("Information Security").

Note: 4A001. b. does not control electronic computers and related equipment when accompanying their user for the user's personal use.

4a001 a. 8471 30 000 0

8471 41 000 0

8471 49 000 0

8471 50 000 0

4A001 b. 8471 30 000 0

8471 41 000 0

8471 49 000 0

8471 50 000 0

4A002 8471 30

4A003 "Digital computers", "electronic assemblies", and related equipment therefor, as follows, and specially designed components therefor:

Note 1: 4A003 includes the following:

a.Vector processors;

b.Array processors;

c.Digital signal processors;

d.Logic processors;

e.Equipment designed for "image enhancement";

f.Equipment designed for "signal processing".

Note 2: The control status of the "digital computers " and related equipment described in 4A003 is determined by the control status of other equipment or systems provided:

a.The "digital computers" or related equipment are essential for the operation of the other equipment or systems;

b.The "digital computers" or related equipment are not a "principal element" of the other equipment or systems; <u>and</u>

N.B. 1: The control status of "signal processing" or "image enhancement" equipment specially designed for other equipment with functions limited to those required for the other equipment is determined by the control status of the other equipment even if it exceeds the "principal element" criterion.

N.B. 2: For the control status of "digital computers " or related equipment for telecommunications equipment, see Category 5, Part J (Telecommunications).

c.The "technology" for the "digital computers " and related equipment is determined by 4E.

a.Designed or modified for "fault tolerance";

Note: For the purposes of 4A003.a., "digital computers" and related equipment are not considered to be designed or modified for "fault tolerance" if they utilise any of the following:

1. Error detection or correction algorithms in "main storage";
2. The interconnection of two "digital computers" so that, if the active central processing unit fails, an idling but mirroring central processing unit can continue the system's functioning;
3. The interconnection of two central processing units by data channels or by use of shared storage to permit one central processing unit to perform other work until the second central processing unit fails, at which time the first central processing unit takes over in order to continue the system's functioning; or
4. The synchronisation of two central processing units by "software" so that one central processing unit recognises when the other central processing unit fails and recovers tasks from the failing unit.

b."Digital computers" having a "composite theoretical performance" ("CTP") exceeding 6,500 million theoretical operations per second (Mtops);

c."Electronic assemblies" specially designed or modified for enhancing performance by aggregation of "computing elements" ("CEs") so that the "CTP" of the aggregation exceeds the limit in 4A003.b.;

Note 1: 4A003.C. applies only to "electronic assemblies" and programmable interconnections not exceeding the limit in 4A003.b. when shipped as unintegrated "electronic assemblies". It does not apply to "electronic assemblies" inherently limited by nature of their design for use as related equipment specified in 4A003.d. or 4A003.e.

Note 2: 4A003.C. does not control "electronic assemblies" specially designed for a product or family of products whose maximum configuration does not exceed the limit of4A003.b.

d.not used

e.Equipment performing analogue-to-digital conversions exceeding the limits in 3A001.a.5.;

f.Not used;

g.Equipment specially designed to provide external interconnection of "digital computers" or associated equipment which allows communications at data rates exceeding 80 Mbyte/s.

Note: 4A003.g. does not control internal interconnection equipment

(e.g. backplanes, buses), passive interconnection equipment, "network access controllers" or "communications channel controllers".

8443 31

8443 32

8528 41 000 0

8528 51 000 0

8528 61 000 0

8517 62 000

A003 b. 8471 (Except cars computing analogue or hybrid)

8443 31

8443 32

8528 41 000 0

8528 51 000 0

8528 61 000 0

8517 62 000

4A003 c. 8471 (Except cars computing analogue or hybrid)

4A003 d.

4A003 e. 8471 90 000 0;

8525 60 000 0

8517 12 000 0

8517 61 000

8543 90 000 1

4A003 f.

4A003 g. 8471 90 000 0;

8517 61 000

4A004 Computers, as follows, and specially designed related equipment, "electronic assemblies" and components therefor:

a."Systolic array computers";

b."Neural computers";

c."Optical computers"

4A004 a. 8471

4A004 b. 8471

4A004 c. 8471

4A101 Analogue computers, "digital computers" or digital differential analysers, other than those specified in 4AOO1 .a. 1., which are ruggedized and designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

4A101 9A104.

8471

4A102 "Hybrid computers" specially designed for modelling, simulation or design integration of space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

Note: This control only applies when the equipment is supplied with "software" specified in 7D103 or 9D103.

4A102 8471

4B Test, inspection and production equipmen

None.

4C Materials

None.

4D Software

4D

4D001

4D002 4D003

Note: The control status of "software" for the "development", "production", or "use" of equipment described in other Categories is dealt with in the appropriate Category. The control status of "software" for equipment described in this Category is dealt with herein.

a. "Software" specially designed or modified for the "development", "production" or "use" of equipment or "software" specified in 4A001 to 4A004, or 4D.

b. the "software" which is distinct from "software" controllable Item 4D001.a., specially developed or modified for "development" or "manufacture" нижеперечисленного:

1. " Digital EBM " having " compound theoretical productivity " (СРП) exceeding 28 000 million theoretical operations a second (Mtops); or
2. " electronic assembly ", specially developed or modified for improvement of function of concentration (configuration) of " computing elements " for excess of a limit "SRP" the concentration, established in 4D001.b.1.

4D001

4D002"Software" specially designed or modified to support "technology" specified in 4E.

4D002

4D003Specific "software", as follows:

a.Operating system "software", "software" development tools and compilers specially designed for "multi-data-stream processing" equipment, in "source code";

b. "Expert systems" or "software" for "expert system" inference engines providing
both:

1. Time dependent rules; and
2. Primitives to handle the time characteristics of the rules and the facts;

c. "Software" having characteristics or performing functions exceeding the limits in Category 5, Part 2 ("Information Security");

Note: 4D003.C. does not control "software" when accompanying its user for the user's personal use.

d. Operating systems specially designed for "real time processing" equipment which
guarantees a "global interrupt latency time" of less than 20

e. 4ETechnology

4EOO1 "Technology" according to the General Technology Note,

for the "development", "production" or "use" of equipment or "software" specified in 4A or 4D.

b. "technologies", besides controllable by Item 4E001.a., specially developed or modified for "development", "manufacture" undermentioned:

1. " Digital computers " having " compound theoretical productivity " (CTP), exceeding 28 000 million theoretical operations a second (Mtops); or

2. " Electronic assembly ", specially developed or modified for improvement of function of concentration (configuration) of computing elements for excess of a limit "CTP" concentration, desighned on 4E001.b.1

4E001

TECHNICAL NOTE ON "COMPOSITE THEORETICAL PERFORMANCE" ("CTP")

Abbreviations used in this Technical Note

"CE"	"computing element" (typically an arithmetic logical unit)
FP	floatingpoint
XP	fixed point
t	execution time
XOR	exclusive OR
CPU	central processing unit
TP	theoretical performance (of a single "CE")
"CTP"	"composite theoretical performance" (multiple "CEs")
R	effective calculating rate
WL	word length
L	word length adjustment
*	multiply

Execution time 't' is expressed in microseconds, TP and "CTP" are expressed in millions of

theoretical operations per second (Mtops) and WL is expressed in bits.

Outline of "CTP" calculation method

"CTP" is a measure of computational performance given in Mtops. In calculating the "CTP" of an aggregation of "CEs" the following three steps are required:

1.Calculate the effective calculating rate R for each "CE";

2.Apply the word length adjustment (L) to the effective calculating rate (R), resulting in a "Theoretical Performance (TP) for each "CE";

3.If there is more than one "CE", combine the TPs, resulting in a "CTP" for the aggregation.

Details for these steps are given in the following sections.

Note 1: For aggregations of multiple "CEs" which have both shared and unshared memory subsystems, the calculation of "CTP" is completed hierarchically, in two steps: first, aggregate the groups of "CEs" sharing memory; second, calculate the "CTP" of the groups using the calculation method for multiple "CEs" not sharing memory.

Note 2: "CEs" that are limited to input/output and peripheral functions (e.g., disk drive, communication and video display controllers) are not aggregated into

the "CTP" calculation.

TECHNICAL NOTE ON "CTP"

The following table shows the method of calculating the Effective Calculating Rate R for each "CE": Step 1: The effective calculating rate R

For "CEs" Implementing:	Effective calculating Rate, R
Note Every "CE" must be evaluated independently.	
XP only	
(	3 (txpadd)
R,	if no add is implemented use: 1
(Ixpmult/	
If neither add nor multiply is implemented use the fastest available arithmetic operation as follows:	
See Notes X & Z	
F	ı 1
P	ax tfp add
only	tfp mult
SeeNotesX&Y	
Both	Cal
FP and XP	culate
(R)	both R x>
	R f

For simple logic processors not implementing any of the specified arithmetic operations.

3*

Where t tog is the execute time of the XOR, or for logic hardware not implementing the XOR, the fastest simple logic operation. See Notes X & Z

For special logic processors not using any of the specified arithmetic or logic operations.

R = R' * WL/64

Where R' is the number of results per second, WL is the number of bits upon which the logic operation occurs, and 64 is a factor to normalize to a 64 bit operation.

TECHNICAL NOTE ON "CTP"

Note W: For a pipelined "CE" capable of executing up to one arithmetic or logic operation every

clock cycle after the pipeline is full, a pipelined rate can be established. The effective calculating rate (R) for such a "CE" is the faster of the pipelined rate or non-pipelined execution rate.

Note X: For a "CE" which performs multiple operations of a specific type in a single cycle (e.g., two additions per cycle or two identical logic operations per cycle), the execution time t is given by:

$$t = \frac{\text{Time of the cycle}}{\text{number of identical operations per machine cycle}}$$

"CEs" which perform different types of arithmetic or logic operations in a single machine cycle are to be treated as multiple separate "CEs" performing simultaneously (e.g., a "CE" performing an addition and a multiplication in one cycle is to be treated as two "CEs", the first performing an addition in one cycle and the second performing a multiplication in one cycle). If a single "CE" has both scalar function and vector function, use the shorter execution time value.

For the "CE" that does not implement FP add or FP multiply, but that performs FP divide:

Note Y: If "CE" does not carry out neither operations of addition, nor operations of multiplication with FP, but carries out operations of division with FP, then:

$$Rfp = \frac{1}{t \text{ devideing FP}}$$

If the "CE" implements FP reciprocal but not FP add, FP multiply or FP divide, then:

$$Rfp = \frac{1}{t \text{ reception of return size}}$$

If none of the specified instructions is implemented, the effective FP rate is 0.

Note Z: In simple logic operations, a single instruction performs a single logic manipulation of no more than two operands of given lengths.

In complex logic operations, a single instruction performs multiple logic manipulations to produce one or more results from two or more operands.

Rates should be calculated for all supported operand lengths considering both pipelined operations (if supported), and non-pipelined operations using the fastest executing instruction for each operand length based on:

1. Pipelined or register-to-register operations. Exclude extraordinarily short execution times generated for operations on a predetermined operand or operands (for example, multiplication by 0 or 1). If no register-to-register operations are

implemented, continue with (2).

2. The faster of register-to-memory or memory-to-register operations; if these also do not exist, then continue with (3).
3. Memory-to-memory.

In each case above, use the shortest execution time certified by the manufacturer.

Step 2: TP for each supported operand length WL

Adjust the effective rate R (or R') by the word length adjustment L as follows:

TP = R * L, where L = (1/3 + WL/96)

Note: The word length WL used in these calculations is the operand length in bits. (If an operation uses operands of different lengths, select the largest word length.)

The combination of a mantissa ALU and an exponent ALU of a floating point processor or unit is considered to be one "CE" with a Word Length (WL) equal to the number of bits in " the data representation (typically 32 or 64) for purposes of the "CTP" calculation.

This adjustment is not applied to specialized logic processors which do not use XOR instructions. In this case TP = R.

Select the maximum resulting value of TP for:

Each XP-only "CE" (Rxp);

Each FP-only "CE" (R^);

Each combined FP and XP "CE" (R);

Each simple logic processor not implementing any of the specified arithmetic operations; and

Each special logic processor not using any of the specified arithmetic or logic operations.

Step 3: "CTP" for aggregations of "CEs". including CPUs

For a CPU with a single "CE",

"CTP" = TP (for "CEs" performing both fixed and floating point operations

TP = max(TPfp,TP!tp))

"CTP" for aggregations of multiple "CEs" operating simultaneously is calculated as follows:

Note 1: For aggregations that do not allow all of the "CEs" to run simultaneously, the possible combination of "CEs" that provides the largest "CTP" should be used. The TP of each contributing "CE" is to be calculated at its maximum value theoretically possible before the "CTP" of the combination is derived.

N.B. : To determine the possible combinations of simultaneously operating "CEs", generate an instruction sequence that initiates operations in multiple "CEs", beginning with the slowest "CE" (the one needing the largest number of cycles to complete its operation) and ending with the fastest "CE". At each cycle of the sequence, the combination of "CEs" that are in operation during that cycle is a possible combination. The instruction sequence must take into account all

hardware and/or architectural constraints on overlapping operations.

Note 2 : A single integrated circuit chip or board assembly may contain multiple "CEs".

Note 3: Simultaneous operations are assumed to exist when the computer manufacturer claims concurrent, parallel or simultaneous operation or execution in a manual or brochure for the " computer.

Note 4: "CTP" values are not to be aggregated for "CE" combinations (inter)connected by "Local Area Networks", Wide Area Networks, I/O shared connections/devices, I/O controllers and any communication interconnection implemented by "software".

Note 5 : "CTP" values must be aggregated for multiple "CEs" specially designed to enhance performance by aggregation, operating simultaneously and sharing memory,- or multiple memory/"CE"- combinations operating simultaneously utilising specially designed hardware.

This aggregation does not apply to "electronic assemblies" described by 4A003.C.

"CTP" = TPt + C2 * TP2 + ... + Cn * TP n,

where the TPs are ordered by value, with TPj being the highest, TP2 being the second highest,..., and TPn being the lowest. Q is a coefficient determined by the strength of the interconnection between "CEs", as follows:

For multiple "CEs" operating simultaneously and sharing memory: C2 = C3 = C4 = ... = Cn = 0.75

Note 1: When the "CTP" calculated by the above method does not exceed 194Mtops, the following formula may be used to calculate Q:

0=075 (i = 2,...,n)

where m = the number of "CEs" or groups of "CEs" sharing access.

provided:

1. The TPi of each "CE" or group of "CEs" does not exceed SOMtops;
2. The "CEs" or groups of "CEs" share access to main memory (excluding cache memory) over a single channel; and

3.Only one "CE" or group of "CEs" can have use of the channel at any given time.

N.B.: This does not apply to items controlled under Category 3.

Note 2: "CEs" share memory if they access a common segment of solid state memory. This memory may include cache memory, main memory or other internal memory. Peripheral memory devices such as disk drives, tape drives or RAM disks are not included.

For Multiple "CEs" or groups of "CEs" not sharing memory, interconnected by one or more data channels:

Q = ' 0.75 * k; (i = 2,..., 32) (see Note below)

0.60 * kj (i = 33,..., 64) 0.45 * kj (i = 65,..., 256) = 0.30 * kj (i > 256)

The value of Q is based on the number of "CE"s, not the number of nodes.

where ks = min (S/Kr, 1), and

Kr = normalizing factor of 20 MByte/s.

S; = sum of the maximum data rates (in units of MByte/s) for all data channels connected to the i* "CE" or group of "CEs" sharing memory.

When calculating a Q for a group of "CEs", the number of the first "CE" in a group determines the proper limit for Q. For example, in an aggregation of groups consisting of 3 "CEs" each, the 22nd group will contain "CE"^ "CE"65 and "CE"66. The proper limit for Q for this group is 0.60.

Aggregation (of "CEs" or groups of "CEs") should be from the fastest-to-slowest; i.e.:

TPi > TP2 > .... > TPn, and in the case of TP; = TPj + b from the largest to smallest; i.e.:

Cj>Ci + 1 **Note** The kj factor is not to be applied to "CEs" 2 to 12 if the TPj of the "CE" or group of "CEs" is more

than 50 Mtops; i.e., Q for "CEs" 2 to 12 is 0.75.

CATEGORY 5
TELECOMMUNICATIONS AND "INFORMATION SECURITY"
Part 1
TELECOMMUNICATIONS

Note I: The control status of components, "lasers", test and "production" equipment and "software" therefor which are specially designed for telecommunications equipment or systems is determined in Category 5, Part 1.

Note 2: "Digital computers", related equipment or "software", when essential for the operation and support of telecommunications equipment described in this Category, are regarded as specially designed components, provided they are the standard models customarily supplied by the manufacturer. This includes operation, administration, maintenance, engineering or billing computer systems.

5A1 Systems, Equipment and Components

5 AGO 1 a. Any type of telecommunications equipment having any of the following characteristics,

functions or features:

1. Specially designed to withstand transitory electronic effects or electromagnetic pulse effects, both arising from a nuclear explosion;
2. Specially hardened to withstand gamma, neutron or ion radiation; or
3. Specially designed to operate outside the temperature range from 218 K (-55°C)to397K(124°C).

Note: 5A001.a.3. applies only to electronic equipment.

Note: 5A001.a.2. and5A001.a.3. do not control equipment designed or modified for use on board satellites.

b. Telecommunication transmission equipment and systems, and specially designed components and accessories therefor, having any of the following characteristics, functions or features:

1.Being underwater communications systems having any of the following characteristics:

a.An acoustic carrier frequency outside the range from 20 kHz to 60 kHz;

b.Using an electromagnetic carrier frequency below 30 kHz; or

c.Using electronic beam steering techniques;

2.Being radio equipment operating in the 1.5 MHz to 87.5 MHz band and having any of the following characteristics:

a.Incorporating adaptive techniques providing more than 15 dB suppression of an interfering signal; or

b. Having all of the following:

1. Automatically predicting and selecting frequencies and "total digital transfer rates" per channel to optimise the transmission; and
2. Incorporating a linear power amplifier configuration having a capability to support multiple signals simultaneously at an output power of 1 kW or more in the 1.5 MHz to 30 MHz frequency range or 250 W or more in the 30 MHz to 87.5 MHz frequency range, over an "instantaneous bandwidth" of one octave or more and with an output harmonic and distortion content of better than -80 dB;

3. Being radio equipment employing "spread spectrum" techniques, including "frequency hopping" techniques, having any of the following characteristics:

a.User programmable spreading codes; or

b.A total transmitted bandwidth which is 100 or more times the bandwidth of any one information channel and in excess of 50 kHz;

Note: 5A001.b.3.b. does not control radio equipment specially designed for use with civil cellular radio-communications systems.

Note: 5A001.b.3 does not control equipment designed to operate at an output power ofl. 0 Watt or less.

4.Being digitally controlled radio receivers having all of the following:

a.More than 1,000 channels;

b.A "frequency switching time" of less than 1 ms;

c.Automatic searching or scanning of a part of the electromagnetic spectrum; and

d.Identification of the received signals or the type of transmitter; or

Note: 5A001.b.5. does not control radio equipment specially designed for use with civil cellular radio-communications systems.

5.Employing functions of digital "signal processing" to provide voice coding at rates of less than 2,400 bit/s.

c. Optical fibre communication cables, optical fibres and accessories, as follows:

1. Optical fibres of more than 500 m in length, and specified by the manufacturer as being capable of withstanding a proof test tensile stress of 2 x 10 N/m or more;

Technical Note:

Proof Test: on-line or off-line production screen testing that dynamically applies a prescribed tensile stress over a 0.5 to 3 m length of fibre at a running rate of 2 to 5 m/s while passing between capstans approximately 150 mm in diameter. The ambient temperature is a nominal 293 K (20°C) and relative humidity 40%. Equivalent national standards may be used for executing the proof test.

2. Optical fibre cables and accessories designed for underwater use.

Note: 5A001.C.2. does not control standard civil telecommunication cables

and accessories.

N.B. 1: For underwater umbilical cables, and connectors therefor, see 8A002.a.3.

N.B. 2: For fibre-optic hull penetrators or connectors, see 8A002.C.

d. "Electronically steerable phased array antennae" operating above 31 GHz.

Note: 5AOOl.d. does not control "electronically steerable phased array antennae" for landing systems with instruments meeting ICAO standards covering microwave landing systems (MLS).

5A001 a. 1. 8517
8525 20 910 0
8525 20 990
8527 90 980 0
8543 89 950 0
5A001 a. 2. 8517
8525 20 910 0
8525 20 990
8527 90 980 0
8543 89 950 0
5A001 a. 3. 8517
8525 20 910 0
8525 20 990
8527 90 980 0
8543 89 950 0
5A001 b. 1. 9014 80 000 0
9015 80 910 0
5A001 b. 2. 8525 20 910 0
8525 20 990
5A001 b. 3. 8525 20 910 0
8525 20 990
5A001 b. 4. 8525 20 910 0

8525 20 990
5A001 b. 5. 8527
5A001 b. 6. 8525 20 910 0
8525 20 990
5A001 c. 1. 8544 70 000 0
9001 10 900
5A001 c. 2. 8544 70 000 0
9001 10 900
5A001 d. 8529 10 900 0
5A101 Telemetering and telecontrol equipment usable for "missiles".

Note: 5A101 does not control equipment specially designed to be used for remote control of model planes, boats or vehicles and having an electric field strength of not more than 200 microvolts per metre at a distance of 300kms.

Note: On item 5C101 the equipment is not supervised:

a. The equipment developed or modified for pilot planes and communication satellites;

b. The ground equipment developed or modified for use in overland and sea applications;

c. The equipment developed for rendering of services with use of global navigating satellite systems in the commercial, civil purposes or " protection of a human life " (for example, integrity of data, safetyflyings).

5A101 8525 10 800 9
8543 89 990 0
9030 40 900 0

5B1 Test, Inspection and Production equipment

5B001 a. Equipment and specially designed components or accessories therefor, specially designed for the "development", "production" or "use" of equipment, functions or features specified in 5A001, 5B001, 5D001 or 5E001.

Note: SBOOLa. does not control optical fibre characterization equipment not using semiconductor "lasers".

b. Equipment and specially designed components or accessories therefor, specially designed for the "development" of any of the following telecommunication transmission or "stored programme controlled" switching equipment:

1. Equipment employing digital techniques, including "Asynchronous Transfer Mode" ("ATM"), designed to operate at a "total digital transfer rate" exceeding 1.5Gbit/s;
2. Equipment employing a "laser" and having any of the following:

a.A transmission wavelength exceeding 1750 nm;

b.Performing "optical amplification";

c.Employing coherent optical transmission or coherent optical detection

techniques (also called optical heterodyne or homodyne techniques);^!

d.Employing analogue techniques and having a bandwidth exceeding 2.5 GHz;

Note: 5BOOl.b.2. d. does not control equipment specially designed for the "development" of commercial TV systems.

3.Equipment employing "optical switching";

4. Radio equipment employing quadrature-amplitude-modulation (QAM) techniques above level 256; or
5. Equipment employing "common channel signalling" operating in either non-associated or quasi- associated mode of operation.

5B001

5C1 Materials

None

5D1 Software

5DOO1 a. "Software" specially designed or modified for the "development", "production" or "use" of equipment, functions or features specified by 5A001 or 5B001.

b."Software" specially designed or modified to support "technology" specified in 5E001.

c.Specific "software" as follows:

1. "Software" specially designed or modified to provide characteristics, functions or features of equipment specified in 5A001 or 5B001;
2. no
3. "Software", other than in machine-executable form, specially designed for "dynamic adaptive routing".

d."Software" specially designed or modified for the "development" of any of the following telecommunication transmission or "stored programme controlled" switching equipment:

1. Equipment employing digital techniques, including "Asynchronous Transfer Mode" ("ATM"), designed to operate at a "total digital transfer rate" exceeding l.5Gbit/s;
2. Equipment employing a "laser" and having any of the following:

a.A transmission wavelength exceeding 1750 nm; or

b.Employing analogue techniques and having a bandwidth exceeding 2.5 GHz;

Note: 5D001. d. 2. b. does not control "software " specially designed or modified for the "development" of commercial TV systems.

3. Equipment employing "optical switching"; or

4. Radio equipment employing quadrature-amplitude-modulation (QAM) techniques above level 256.

5D001

5D101 "Software" specially designed or modified for the "use" of equipment specified in 5A101.

5D101

5E1 Technology

5E001 a. "Technology" according to the General Technology Note for the "development", "production" or "use" (excluding operation) of equipment, functions or features or "software" specified in 5A001, 5B001 or 5D001

b.Specific "technologies", as follows:

1. "Required" "technology" for the "development" or "production" of telecommunications equipment specially designed to be used on board satellites;
2. "Technology" for the "development" or "use" of "laser" communication techniques with the capability of automatically acquiring and tracking signals and maintaining communications through exoatmosphere or sub-surface (water) media;
3. "Technology" for the "development" of digital cellular radio systems;
4. "Technology" for the "development" of "spread spectrum" techniques, including "frequency hopping" techniques.

c."Technology" according to the General Technology Note for the "development" or "production" of any of the following telecommunication transmission or "stored programme controlled" switching equipment, functions or features:

1. Equipment employing digital techniques, including "Asynchronous Transfer Mode" ("ATM"), designed to operate at a "total digital transfer rate" exceeding 1.5Gbit/s;

Technical note:

For the switching equipment " total speed of transfer of figures " is measured by the maximal speed of port or a line of data transmission

2. Equipment employing a "laser" and having any of the following:

a.A transmission wavelength exceeding 1750 nm;

b.Performing "optical amplification" using praseodymium-doped fluoride fibre amplifiers (PDFFA);

c.Employing coherent optical transmission or coherent optical detection

techniques (also called optical heterodyne or homodyne techniques);

d.Employing wavelength division multiplexing techniques exceeding 8 optical carriers in a single optical window; or

e.Employing analogue techniques and having a bandwidth exceeding 2.5 GHz;

Note: 5E001.c.2.e. does not control" technology" for the "development" or "production" of commercial TV systems.

3. Equipment employing "optical switching";
4. Radio equipment having any of the following:

a.Quadrature-amplitude-modulation (QAM) techniques above level 128; or

b.Operating at input or output frequencies exceeding 31 GHz; or

Note: 5E001.c.4.b. does not control "technology"for the "development" or "production" of equipment designed or modified for operation in any ITU allocated band.

5. Equipment employing "common channel signalling" operating in either non-associated or quasi- associated mode of operation.

5E001

5E101 "Technology" according to the General Technology Note for the "development", "production" or "use" of equipment specified in 5A101.

5E10

Part 2

"INFORMATION SECURITY"

Note 1: The control status of "information security" equipment, "software", systems, application specific "electronic assemblies", modules, integrated circuits, components or functions is determined in Category 5, Part 2 even if they are components or "electronic assemblies" of other equipment.

Note 2: Category 5 — Part 2 does not control products when accompanying their user for the user's personal use.

Note 3: Cryptography Note

5A002 and 5D002 do not control goods that meet all of the following:

a.Generally available to the public by being sold, without restriction, from stock at retail selling points by means of any of the following:

I.Over-the-counter transactions;

2.Mail order transactions;

3. Electronic transactions; or
4. Telephone call transactions;

b.The cryptographic functionality cannot easily be changed by the user;

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

d. Does not contain a "symmetric algorithm " employing a key length exceeding 64 bits; and

e. When necessary, details of the goods are accessible and will be provided, upon request, to the competent authorities of the Member State in which the exporter is established in order to ascertain compliance with conditions described

in paragraphs a. to d. above.

Technical Note:

In Category 5 - Part 2, parity bits are not included in the key length.

5A2 Systems, Equipment and Components

5A002 a. Systems, equipment, application specific "electronic assemblies", modules and

integrated circuits for "information security", as follows, and other specially designed components therefor:

N.B: For the control of global navigation satellite systems receiving equipment containing or employing decryption (i.e. GPS or GLONASS), see 7A005.

1.Designed or modified to use "cryptography" employing digital techniques performing any cryptographic function other than authentication or digital signature having any of the following:

Technical Notes:

1. Authentication and digital signature functions include their associated key management function.
2. Authentication includes all aspects of access control where there is no encryption of files or text except as directly related to the protection of passwords, Personal Identification Numbers (PINs) or similar data to prevent unauthorised access.
3. "Cryptography" does not include "fixed" data compression or coding techniques.

Note: 5A002. a. 1. includes equipment designed or modified to use

"cryptography" employing analogue principles when implemented with digital techniques.

a.A "symmetric algorithm" employing a key length in excess of 56 bits; or

b.An "asymmetric algorithm" where the security of the algorithm is based on any of the following:

1. Factorisation of integers in excess of 512 bits (e.g., RSA);
2. Computation of discrete logarithms in a multiplicative group of a finite field of size greater than 512 bits (e.g., Diffle-Helknan over Z/pZ); or
3. Discrete logarithms in a group other than mentioned in 5A002.a. 1 .b.2. in excess of 112 bits (e.g., DifFie-Hellman over an elliptic curve);

2. Designed or modified to perform cryptanalytic

functions;

3. Not used;
4. Specially designed or modified to reduce the compromising emanations of information-bearing signals beyond what is necessary for health, safety or electromagnetic interference standards;
5. Designed or modified to use cryptographic techniques to generate the spreading code for "spread spectrum" systems, including the hopping code for "frequency hopping" systems;
6. Designed or modified to provide certified or certifiable "multilevel security" or user isolation at a level exceeding Class B2 of the Trusted Computer System Evaluation Criteria (TCSEC) or equivalent;
7. not used
8. Communications cable systems designed or modified using mechanical, electrical or electronic means to detect surreptitious intrusion.

Note: 5A002 does not control:

a."Personalised smart cards " where the cryptographic capability is restricted
for use in equipment or systems excluded from control under entries b. tof. of this Note. If a "personalised smart card" has multiple functions, the control status of each function is assessed individually;

b.Receiving equipment for radio broadcast, pay television or similar restricted audience broadcast of the consumer type, -without digital encryption except that exclusively used for sending the billing or programme-related information back to the broadcast providers;

c.Equipment where the cryptographic capability is not user-accessible and which is specially designed and limited to allow any of the following:

L Execution of copy-protected software;

2.Access to any of the following:

a. Copy-protected read-only media; or

b. Information stored in encrypted form on media (e.g. in connection with the protection of intellectual property rights) when the media is offered for sale in identical sets to the public; or

3.One-time copying of copyright protected audio/video data.

d.Cryptographic equipment specially designed and limited for banking use or 'money transactions';

Technical Note:

'Money transactions' in 5A002. Note d. includes the collection and settlement of fares or credit functions.

e.Portable or mobile radiotelephones for civil use (e.g. for use with commercial civil cellular radiocommunications systems) that are not capable of end-to-end encryption;

f.Cordless telephone equipment not capable of end-to-end encryption where the maximum effective range ofunboosted cordless operation (i.e. a single, unrelayed hop between terminal and home basestation) is less than 400 metres according to the manufacturer's specifications.

5A002 a. 1. 8471
8543 89 950 0
5A002 a. 2. 8471
8543 89 950 0
5A002 a. 3
5A002 a. 4. 8471
8543 89 950 0
5A002 a. 5. 8471
8543 89 950 0
5A002 a. 6. 8471
8543 89 950 0
5A002 a. 7.
5A002 a. 8. 8471
8517 50
8543 89 950 0

5B2 Test, Inspection and Production Equipment

5B002 a. Equipment specially designed for:

1. The "development" of equipment or functions specified in 5 A002,5B002, 5D002 or 5E002 including measuring or test equipment;
2. The "production" of equipment or functions specified in 5A002, 5B002, 5D002 or 5E002, including measuring, test, repair or production equipment;

c. Measuring equipment specially designed to evaluate and validate the "information security" functions specified in 5A002 or 5D002.

5B002 a. 8543 89 950 0
5B002 b. 8543 89 950 0

5C2 Materials

None

5D2 Software

5D002 a."Software" specially designed or modified for the "development", "production" or "use"

of equipment or "software" specified in 5A002, 5B002 or 5D002;

b."Software" specially designed or modified to support "technology" specified in 5E002;

c.Specific "software", as follows:

1. "Software" having the characteristics, or performing or

simulating the functions of the equipment specified in 5A002 or 5B002;

2. "Software" to certify "software" specified in 5D002.C.1.

Note: 5D002 does not control:

a."Software" required for the "use" of equipment excluded from control under the Notes to 5A002;

b."Software" providing any of the functions of equipment excluded from control under the Notes to 5A002.

5D002

5E2 Technology

5E002"Technology" according to the General Technology Note for the "development", "production" or "use" of equipment or "software" specified in 5A002, 5B002 or 5D002."

5E002

CATEGORY 6
SENSORS AND LASERS
6A Systems, Equipment and Components

6A001 Acoustics:

a. Marine acoustic systems, equipment and specially designed components therefor, as follows:

1. Active (transmitting or transmitting-and-receiving) systems, equipment and specially designed components therefor, as follows:

Note: 6A 001. a. 1. does not control:

a.Depth sounders operating vertically below the apparatus, not including a scanning function exceeding ± 20°, and limited to measuring the depth of water, the distance of submerged or buried objects or fish finding;

b.Acoustic beacons, as follows:

1. Acoustic emergency beacons;
2. Fingers specially designed for relocating or returning to an underwater position.

a.Wide-swath bathymetric survey systems designed for sea bed topographic mapping, having all of the following:

1. Being designed to take measurements at an angle exceeding 20° from the vertical;
2. Being designed to measure depths exceeding 600 m below the water surface; and
3. Being designed to provide any of the following:

a.Incorporation of multiple beams any of which is less than 1.9°; or

b.Data accuracies of better than 0.3% of water depth across the swath averaged over the individual measurements within the

swath;

b.Object detection or location systems having any of the following:

1. A transmitting frequency below 10 kHz;
2. Sound pressure level exceeding 224 dB (reference 1 uPa at 1 m) for equipment with an operating frequency in the band from 10 kHz to 24 kHz inclusive;
3. Sound pressure level exceeding 235 dB (reference 1 uPa at 1 m) for equipment with an operating frequency in the band between 24 kHz and 30kHz;
4. Forming beams of less than 1 ° on any axis and having an operating frequency of less than 100 kHz;
5. Designed to operate with an unambiguous display range exceeding 5,120m; or
6. Designed to withstand pressure during normal operation at depths exceeding 1,000 m and having transducers with any of the following:

a.Dynamic compensation for pressure; or

b.Incorporating other than lead zirconate titanate as the transduction element;

c.Acoustic projectors, including transducers, incorporating piezoelectric, magnetostrictive, electrostrictive, electrodynamic or hydraulic elements operating individually or in a designed combination, having any of the following:

Note 1: The control status of acoustic projectors, including transducers, specially designed for other equipment is determined by the control status of the other equipment.

Note 2: 6A001.a. 1.c. does not control electronic sources which direct the sound vertically only, or mechanical (e.g., air gun or vapour-shock gun) or chemical (e.g., explosive) sources.

1.An instantaneous radiated 'acoustic power density' exceeding

0.01 mW/mm /Hz for devices operating at frequencies below 10 kHz;

2.A continuously radiated 'acoustic power density' exceeding

0.001 mW/mm /Hz for devices operating at frequencies below 10 kHz;

or

Technical Note:

'Acoustic power density' is obtained by dividing the output acoustic power by the product of the area of the radiating surface and the frequency of operation.

3.Side-lobe suppression exceeding 22 dB;

d.Acoustic systems, equipment and specially designed components for determining the position of surface vessels or underwater vehicles designed to operate at a range exceeding 1,000 m with a positioning accuracy of less than 10 m rms (root mean square) when measured at a range of 1,000 m;

Note: 6A001.a.l.d. includes:

a.Equipment using coherent "signal processing" between two or more beacons and the hydrophone unit carried by the surface vessel or underwater vehicle;

b.Equipment capable of automatically correcting speed-of-sound propagation errors for calculation of a point.

2. Passive (receiving, whether or not related in normal application to separate active equipment) systems, equipment and specially designed components therefor, as follows:

a. Hydrophones having any of the following characteristics:

Note: The control status of hydrophones specially designed for other equipment is determined by the control status of the other equipment.

1. Incorporating continuous flexible sensors or assemblies of discrete sensor elements with either a diameter or length less than 20 mm and with a separation between elements of less than 20 mm;

2.Having any of the following sensing elements:

a.Optical fibres;

b.Piezoelectric polymers; or

c.Flexible piezoelectric ceramic materials;

3. A 'hydrophone sensitivity' better than -180 dB at any depth with no acceleration compensation;
4. When designed to operate at depths exceeding 35 m with acceleration compensation; or
5. Designed for operation at depths exceeding 1,000 m;

Technical Note:

'Hydrophone sensitivity' is defined as twenty times the logarithm to the base 10 of the ratio ofrms output voltage to a 1 V rms reference, when the hydrophone sensor, without a pre-amplifier, is placed in a plane wave acoustic field with an rms pressure of I uPa. For example, a hydrophone of -160 dB (reference 1 V per uPa) would yield an output voltage of 10 (-9) V in such afield, while one of-180 dB sensitivity would yield only 10 V output. Thus, -160 dB is better than -180 dB.

b.Towed acoustic hydrophone arrays having any of the following:

1. Hydrophone group spacing of less than 12.5 m;
2. Designed or 'able to be modified' to operate at depths exceeding 35 m;

Technical Note:

'Able to be modified' in 6A001.a.2.b.2. means having provisions to allow a

change of the wiring or interconnections to alter hydrophone group spacing or operating depth limits. These provisions are: spare wiring exceeding 10% of the number of wires, hydrophone group spacing adjustment blocks or internal depth limiting devices that are adjustable or that control more than one hydrophone group.

3. Heading sensors specified hi 6A001 .a.2.d.;
4. Longitudinally reinforced array hoses;
5. An assembled array of less than 40 mm in diameter;
6. Multiplexed hydrophone group signals 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; or
7. Hydrophone characteristics specified in 6A001 .a.2.a.;

c.Processing equipment, specially designed for towed acoustic hydrophone arrays, having "user accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes;

d.Heading sensors having all of the following:

1. An accuracy of better than ± 0.5°; <u>and</u>
2. Designed to operate at depths exceeding 35 m or having an adjustable or removable depth sensing device in order to operate at depths exceeding 3 5 m;

e.Bottom or bay cable systems having any of the following:

1. Incorporating hydrophones specified in 6AOO1 .a.2.a.; or
2. Incorporating multiplexed hydrophone group signal modules having all of the following characteristics:

a.Designed to operate at depths exceeding 35 m or having an adjustable or removable depth sensing device in order to operate at depths exceeding 35m; <u>and</u>

b.Capable of being operationally interchanged with towed acoustic hydrophone array modules;

f.Processing equipment, specially designed for bottom or bay cable systems, having "user accessible programmability" and time or frequency domain processing and correlation, including spectral analysis, digital filtering and beamforming using Fast Fourier or other transforms or processes;

b. Correlation-velocity sonar log equipment designed to measure the

horizontal speed of the equipment carrier relative to the sea bed at distances between the carrier and the sea bed exceeding 500 m.

6A001 a. 1. a. 9015 80 910 0
6A001 a. 1. b. 9014 80 000 0;
9015 80 910 0
6A001 a. 1. c. 9014 80 000 0;
9015 80 910 0
6A001 a. 1. d. 9014 80 000 0
9015 80 110 0
6A001 a. 2. a. 1. 9014 80 000 0
9015 80 110 0
9015 80 930 0
6A001 a. 2. a. 2. 9014 80 000 0
9015 80 930 0
6A001 a. 2. a. 3. 9014 80 000 0
9015 80 930 0
6A001 a. 2. a. 4. 9014 80 000 0
9015 80 930 0
6A001 a. 2. a. 5. 9014 80 000 0
9015 80 930 0
6A001 a. 2. b. 9014 80 000 0
9015 80 930 0
9015 80 990 0
6A001 a. 2. c. 9014 80 000 0
9015 80 930 0
9015 80 990 0
6A001 a. 2. d. 9014 80 000 0
9014 90 900 0
9015 80 110 0
9015 80 930 0
6A001 a. 2. e. 8907 90 000 0
9014 80 000 0
9014 90 000 0
9015 80 930 0
9015 80 990 0
6A001 a. 2. f. 8907 90 000 0
9014 80 000 0
9014 90 000 0
9015 80 930 0
9015 80 990 0
6A001 b. 9014 80 000 0
9015 80 930 0
9015 80 990 0

6A002 Optical sensors

N.B.: SEE ALSO 6A102.

a. Optical detectors, as follows:

Note: 6A002.a. does not control germanium or silicon photodevices.

1. "Space-qualified" solid-state detectors, as follows:

a."Space-qualified" solid-state detectors, having all of the following:

1. A peak response in the wavelength range exceeding 10 nm but not exceeding 300 nm; and
2. A response of less than 0.1% relative to the peak response at a wavelength exceeding 400 nm;

b."Space-qualified" solid-state detectors, having all of the following:

1. A peak response in the wavelength range exceeding 900 nm but not exceeding 1,200 nm; and
2. A response "time constant" of 95 ns or less;

c."Space-qualified" solid-state detectors having a peak response in the wavelength range exceeding 1,200 nm but not exceeding 30,000 nm;

2.Image intensifier tubes and specially designed components therefor, as follows:

a. Image intensifier tubes having all of the following:

1. A peak response in the wavelength range exceeding 400 nm but notexceeding 1,050 nm;
2. A microchannel plate for electron image amplification with a hole pitch (centre-to-centre spacing) of 15 um or less; and
3. Photocathodes, as follows:

a.S-20, S-25 or multialkali photocathodes with a luminous sensitivity exceeding 240 uA/lm;

b.GaAs or GalnAs photocathodes; or

c.Other III-V compound semiconductor photocathodes;

Note: 6A002.a.2.a.3.c. does not control compound semiconductor photocathodes -with a maximum radiant sensitivity of 10 mA/Wor less.

b. Specially designed components, as follows:

1. MicroChannel plates having a hole pitch (centre-to-centre spacing) of 12 um or less;
2. GaAs or GalnAs photocathodes;
3. Other III-V compound semiconductor photocathodes;

Note: 6A002.a.2.b.3. does not control compound semiconductor photocathodes with a maximum radiant sensitivity of 10 mA/Wor less.

3.Non-"space-qualified" "focal plane arrays", as follows:

Technical Note:

Linear or two-dimensional multi-element detector arrays are referred to as "focal plane arrays".

Note 1: 6A002.a.3. includes photoconductive arrays and photovoltaic arrays.

Note 2: 6A 002. a. 3. does not control:

a.Silicon "focalplane arrays";

b.Multi-element (not to exceed 16 elements) encapsulated photoconductive cells using either lead sulphide or lead selenide;

c.Pyroelectric detectors using any of the following:

1. Triglycine sulphate and variants;
2. Lead-lanthanum-zirconium titanate and variants;
3. Lithium tantalate;
4. Polyvinylidene fluoride and variants; or
5. Strontium barium niobate and variants.

a. Non-"space-qualified" "focal plane arrays", having all of the following:

1. Individual elements with a peak response within the wavelength range exceeding 900 nm but not exceeding 1,050 nm; and
2. A response "time constant" of less than 0.5 ns;

b.Non-"space-qualified" "focal plane arrays", having all of the following:

1. Individual elements with a peak response in the wavelength range exceeding 1,050 nm but not exceeding 1,200 nm; and
2. A response "time constant" of 95 ns or less;

c.Non-"space-qualified" "focal plane arrays", having individual elements with
a peak response in the wavelength range exceeding 1,200 nm but not exceeding 30,000 nm.

b."Monospectral imaging sensors" and "multispectral imaging sensors" designed for remote sensing applications, having any of the following:

1. An Instantaneous-Field-Of-View (IFOV) of less than 200 urad (microradians); or
2. Being specified for operation in the wavelength range exceeding 400 nm but not exceeding 30,000 nm and having all the following;

a.Providing output imaging data in digital format; and

b.Being any of the following:

1. "Space-qualified"; or
2. Designed for airborne operation, using other than silicon detectors, and having an IFOV of less than 2.5 mrad (milliradians).

c.'Direct view' imaging equipment operating in the visible or infrared spectrum, incorporating any of the following:

1. Image intensifier tubes specified in 6A002.a.2.a.; or
2. "Focal plane arrays" specified in 6A002.a.3.

Technical Note:

'Direct view' refers to imaging equipment, operating in the visible or infrared spectrum, that presents a visual image to a human observer without converting the image into an electronic signal for television display, and that cannot record or store the image photographically, electronically or by any other means.

Note: 6A 002. c. does not control the following equipment incorporating other than GaAs or GalnAs photocathodes:

a.Industrial or civilian intrusion alarm, traffic or industrial movement control or counting systems;

b.Medical equipment;

c.Industrial equipment used for inspection, sorting or analysis of the properties of materials;

d.Flame detectors for industrial furnaces;

e.Equipment specially designed for laboratory use.

d.Special support components for optical sensors, as follows:

1. "Space-qualified" cryocoolers;
2. 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;

3.Optical sensing fibres specially fabricated either compositionally or structurally, or modified by coating, to be acoustically, thermally, inertially, electromagnetically or nuclear radiation sensitive.

e."Space qualified" "focal plane arrays" having more than 2,048 elements per array and having a peak response in the wavelength range exceeding 300 nm but not exceeding 900 nm.

6A002 a. 1. a. 8541 40 900 0
6A002 a. 1. b. 8541 40 900 0
6A002 a. 1. c. 8541 40 900 0
6A002 a. 2. a. 8514 40 000 0
9013 80 900 0
8540 20 800 0
6A002 a. 2. b. 1. 8541 40 900 0
6A002 a. 2. b. 2 8541 40 900 0
6A002 a. 2. b. 3 8541 40 900 0
6A002 a. 3. a. 8541 40 900 0
6A002 a. 3. b. 8541 40 900 0
6A002 a. 3. c. 8541 40 900 0
6A002 a. 3. d. 8541 40 900 0
6A002 a. 3. e. 8541 40 900 0

6A002 b. 8540 89 000 0
6A002 c. 1. 8540 20 800 0
8540 99 000 0
9005
6A002 c. 2. 8540 99 000 0
9005
6A002 d. 1 9013 80 900 0
9013 90 900 0
8418 69 000 9
6A002 d. 2 9013 80 900 0
9013 90 900 0
8418 69 000 9
6A002 d. 3. 9001 90 000 0
9001 10 900
6A002 e. 9013 80 900 0

6A003 Cameras

N.B.: SEE ALSO 6A203.

N.B.: For cameras specially designed or modified for underwater use, see 8A002.d. and 8A002.e.

Note: Instrumentation cameras, specified in 6A003.a.3. to 6A003.a.5., with modular structures should be evaluated by their maximum capability, using "electronic assemblies" available according to the camera manufacturer's specifications.

a. Instrumentation cameras, as follows:

1.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: 6A003. a. I. does not control 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 having writing speeds exceeding lOmm/us;
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 us per full frame; and

b.A read out time allowing a framing rate of more than 125 full frames per second.

b.Imaging cameras, as follows:

Note: 6A003. b. does not control television or video cameras specially designed for television broadcasting.

1. Video cameras incorporating solid state sensors, having any of the following:

a.More than 4x10 "active pixels" per solid state array for monochrome (black and white) cameras;

b.More than 4x10 "active pixels" per solid state array for colour cameras incorporating three solid state arrays; or

c.More than 12 x 10 "active pixels" for solid state array colour cameras incorporating one solid state array;

2.Scanning cameras and scanning camera systems, having all of the following:

a.Linear detector arrays with more than 8,192 elements per array; and

b.Mechanical scanning in one direction;

3. Imaging cameras incorporating image intensifier tubes specified in 6A002.a.2.a.;
4. Imaging cameras incorporating "focal plane arrays" specified in 6A002.a.3. Note 6AOQ3.b.4. does not control imaging cameras incorporating linear "focal plane arrays" with twelve elements or fewer, not employing time-delay-and-integration within the element, 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.

6A003 a. 1. 9007 11 000 0
9007 19 000 0
6A003 a. 2. 9007 19 000 0
6A003 a. 3. 9007 19 000 0
6A003 a. 4 9007 19 000 0
6A003 a. 5. 9007 19 000 0
6A003 a. 6. 9007 19 000 0
9007 91 000 0
6A003 b. 1. 8525 80
8521 90 000 9
6A003 b. 2. 8525 80

8521 90 000 9
6A003 b. 3. 8525 80
8521 90 000 9
6A003 b. 4. 8525 80
8521 90 000 9

6A004 Optics

a.Optical mirrors (reflectors), as follows:

1. "Deformable mirrors" having either continuous or multi-element surfaces, and specially designed components therefor, capable of dynamically repositioning portions of the surface of the mirror at rates exceeding 100 Hz;
2. Lightweight monolithic mirrors having an average "equivalent density" of less than 30 kg/m 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 and a total mass exceeding 2 kg;
4. Beam steering mirrors more than 100 mm in diameter or length of major axis, which maintain a flatness of lambda/2 or better (lambda is equal to 633 nm) having a control bandwidth exceeding 100 Hz.

b.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 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. 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. Manufactured from "composite" materials having a coefficient of linear thermal expansion equal to or less than 5x10 in any coordinate direction.

d.Optical control equipment, as follows:

1. Specially designed to maintain the surface figure or orientation of the "space-qualified" components specified in 6A004.C.1. or 6A004.C.3.;
2. Having steering, tracking, stabilisation or resonator alignment bandwidths equal to or more than 100 Hz and an accuracy of 10 urad (microradians) or less;
3. Gimbals having all of the following:

a.A maximum slew exceeding 5°;

b.A bandwidth of 100 Hz or more;

c.Angular pointing errors of 200 urad (microradians) or less; and

d.Having any of the following:

1.Exceeding 0.15m but not exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 2 rad (radians)/s ; or

2.Exceeding 1 m in diameter or major axis length and capable of angular accelerations exceeding 0.5 rad (radians)/s ;

4.Specially designed to maintain the alignment of phased array or phased segment mirror systems consisting of mirrors with a segment diameter or major axis length of 1 m or more.

e.'Aspheric optical elements' having all of the following characteristics:

1. The largest dimension of the optical-aperture is greater than 400 mm;
2. The surface roughness is less than 1 nm (rms) for sampling lengths equal to or greater than 1 mm; <u>and</u>
3. The coefficient of linear thermal expansion's absolute magnitude is less than 3xlO"6/Kat25°C.

<u>Technical Notes:</u>

1. An 'aspheric optical element' is any element used in an optical system whose imaging surface or surfaces are designed to depart from the shape of an ideal sphere.

2. Manufacturers are not required to measure the surface roughness listed in 6A004. e.2. unless the optical element was designed or manufactured with the intent to meet, or exceed, the control parameter.

<u>Note</u> 600A4.e. does not control aspheric optical elements having any of the following:

a.A largest optical-aperture dimension less than 1 m and a focal length to aperture ratio equal to or greater than 4.5:1;

b.A largest optical-aperture dimension equal to or greater than 1 m and a focal length to aperture ratio equal to or greater than 7:1;

c.Being designed as Fresnel, flyeye, stripe, prism or diffractive optical elements;

d.Being fabricated from borosilicate glass having a coefficient of linear thermal expansion greater than 2.5x70"* /K at 25 °C; or

e.Being an x-ray optical element having inner mirror capabilities (e.g. tube-type mirrors).

N.B. : For aspheric optical elements specially designed for lithography equipment, see 3B001.

6A004 a. 1. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 a. 2. 9001 90 900 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 a. 3. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 a. 4. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 b. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 c. 1. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 c. 2. 7014 00 000 0
9001 90 000 0 (Except for civil aircraft)
6A004 c. 3. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)
6A004 c. 4. 9003 90 000 0
6A004 d. 1. 9031 49
9032 89 000 0
6A004 d. 2. 9031 49
9032 89 000 0
6A004 d. 3. 8412 21 800 9
8412 31 000 0 (Except for civil aircraft)
8479 89 970 9
9032 81 900 0
9032 89 000 0
6A004 d. 4. 9032 89 000 0
6A004 e. 9001 90 000 0 (Except for civil aircraft)
9002 90 000 0 (Except for civil aircraft)

6A005 "Lasers", other than those specified in OB001 .g.5. or OB001 .h.6., components and optical equipment, as follows:

N.B.: SEE ALSO 6A205.

Note 1: Pulsed "lasers " include those that run in a continuous wave (CW) mode with pulses superimposed.

Note 2: Pulse-excited "lasers" include those that run in a continuously excited mode with pulse excitation superimposed.

Note 3: The control status of Raman "lasers" is determined by the

parameters of the

pumping source "lasers". The pumping source "lasers" can be any of the "lasers" described below.

a. Gas "lasers", as follows:

1.Excimer "lasers", having any of the following:

a.An output wavelength not exceeding 150 nm and having any of the following:

1. An output energy exceeding 50 ml per pulse; or
2. An average or CW output power exceeding 1 W;

b.An output wavelength exceeding 150 nm but not exceeding 190 nm and having any of the following:

1. An output energy exceeding 1.5 J per pulse; or
2. An average or CW output power exceeding 120 W;

c.An output wavelength exceeding 190 nm but not exceeding 360 nm and having any of the following:

1. An output energy exceeding 10 J per pulse; or
2. An average or CW output power exceeding 500 W; or

d.An output wavelength exceeding 360 nm and having any of the following:

1. An output energy exceeding 1.5 J per pulse; or
2. An average or CW output power exceeding 30 W;

N.B.: For eximer "lasers" specially designed for lithography equipment, see 3B001

2.Metal vapour "lasers", as follows:

a.Copper (Cu) "lasers" having an average or CW output power exceeding 20 W;

b.Gold (Au) "lasers" having an average or CW output power exceeding 5 W;

c.Sodium (Na) "lasers" having an output power exceeding 5 W;

d.Barium (Ba) "lasers" having an average or CW output power exceeding 2 W;

3.Carbon monoxide (CO) "lasers" having any of the following:

a.An output energy exceeding 2 J per pulse and a pulsed "peak power" exceeding 5 kW; or

b.An average or CW output power exceeding 5 kW;

4.Carbon dioxide (CO2) "lasers" having any of the following:

a.A CW output power exceeding 15 kW;

b.A pulsed output having a "pulse duration" exceeding 10 us and having any of the following:

1. An average output power exceeding 10 kW; or
2. A pulsed "peak power" exceeding 100 kW; or

c.A pulsed output having a "pulse duration" equal to or less than 10 us; and

having any of the following:

1. A pulse energy exceeding 5 J per pulse; or
2. An average output power exceeding 2.5 kW;

5."Chemical lasers", as follows:

a.Hydrogen Fluoride (HF) "lasers";

b.Deuterium Fluoride (DF) "lasers";

c."Transfer lasers", as follows:

1. Oxygen Iodine (0,-I) "lasers";
2. Deuterium Fluoride-Carbon dioxide (DF-CO2) "lasers";

6.Krypton ion or argon ion "lasers" having any of the following:

a.An output energy exceeding 1.5 J per pulse and a pulsed "peak power" exceeding 50 W; or

b.An average or C W output power exceeding SOW;

7.Other gas "lasers", having any of the following:

Note: 6A005.a. 7. does not control nitrogen "lasers".

a.An output wavelength not exceeding 150 nm and having any of the following:

1. An output energy exceeding 50 ml per pulse and a pulsed "peak power" exceeding 1 W; or
2. An average or CW output power exceeding 1 W;

b.An output wavelength exceeding 150 nm but not exceeding 800 nm and having any of the following:

1. An output energy exceeding 1.5 J per pulse and a pulsed "peak power" exceeding 30 W; or
2. An average or CW output power exceeding 30 W;

c.An output wavelength exceeding 800 nm but not exceeding 1,400 nm and having any of the following:

1. An output energy exceeding 0.25 J per pulse and a pulsed "peak power" exceeding 10 W; or
2. An average or CW output power exceeding 10 W; or

d.An output wavelength exceeding 1,400 nm and an average or CW output power exceeding 1 W.

b.Semiconductor "lasers", having a wavelength of less than 950 nm or more than 2,000 nm, as follows:

1. Individual single-transverse mode semiconductor "lasers" having an average or CW output power exceeding 100 mW.
2. Individual, multiple-transverse mode semiconductor "lasers" and arrays of

individual semiconductor "lasers", having any of the following:

a.An output energy exceeding 500 uJ per pulse and a pulsed "peak power" exceeding 10 W; or

b.An average or CW output power exceeding 10 W.

Technical Note:

Semiconductor "lasers" are commonly called "laser" diodes.

Note 1: 6A005.b. includes semiconductor "lasers" having optical output connectors (e.g. fibre optic pigtails). Note 2: The control status of semiconductor "lasers" specially designed for other equipment is determined by the control status of the other equipment.

c.Solid state "lasers", as follows:

1. "Tunable" "lasers" having any of the following:

Note: 6A005.C.1. includes titanium - sapphire(Ti: Al£)3), thulium - YAG (Tm: YAG), thulium - YSGG (Tm: YSGG), alexandrite (Cr: BeAl2O4) and colour centre "lasers".

a.An output wavelength less than 600 nm and having any of the following:

1. An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; or
2. An average or CW output power exceeding 1 W;

b.An output wavelength of 600 nm or more but not exceeding 1,400 nm and having any of the following:

1. An output energy exceeding 1 J per pulse and a pulsed "peak power" exceeding 20 W; or
2. An average or CW output power exceeding 20 W; or

c.An output wavelength exceeding 1,400 nm and having any of the following:

1. An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; or
2. An average or CW output power exceeding 1 W;

2. Non-"tunable" "lasers", as follows:

Note: 6A005.C.2. includes atomic transition solid state "lasers".

a.Neodymium glass "lasers", as follows:

1."Q-switched lasers" having any of the following:

a.An output energy exceeding 20 J but not exceeding 50 J per pulse and an average output power exceeding 10 W; or

b.An output energy exceeding 50 J per pulse;

2.Non-"Q-switched lasers" having any of the following:

a.An output energy exceeding 50 J but not exceeding 100 J per

pulse and an average output power exceeding 20 W; or

b.An output energy exceeding 100 J per pulse;

b.Neodymium-doped (other than glass) "lasers", having an output wavelength exceeding 1,000 nm but not exceeding 1,100 nm, as follows:

N.B.: For neodymium-doped (other than glass) "lasers " having an output - wavelength not exceeding 1,000 nm or exceeding 1,100 nm, see 6A005.c.2.c.

1.Pulse-excited, mode-locked, "Q-switched lasers" having a "pulse duration" of less than 1 ns and having any of the following:

a.A "peak power" exceeding 5 GW;

b.An average output power exceeding 10 W; or

c.A pulsed energy exceeding 0.1 J;

2.Pulse-excited, "Q-switched lasers" having a pulse duration equal to or more than 1 ns, and having any of the following:

a.A single-transverse mode output having:

1. A "peak power" exceeding 100 MW;
2. An average output power exceeding 20 W; or
3. A pulsed energy exceeding 2 J; or

b.A multiple-transverse mode output having:

1. A "peak power" exceeding 400 MW;
2. An average output power exceeding 2 kW; or
3. A pulsed energy exceeding 2 J;

3.Pulse-excited, non-"Q-switched lasers", having:

a.A single-transverse mode output having:

1. A "peak power" exceeding 500 kW; or
2. An average output power exceeding 150 W; or

b.A multiple-transverse mode output having:

1. A "peak power" exceeding 1 MW; or
2. An average power exceeding 2 kW;

4. Continuously excited "lasers" having:

a.A single-transverse mode output having:

1. A "peak power" exceeding 500 kW; or
2. An average or CW output power exceeding 150 W; or

b.A multiple-transverse mode output having:

1. A "peak power" exceeding 1 MW; or
2. An average or CW output power exceeding 2 kW;

c. Other non-"tunable" "lasers", having any of the following:

1.A wavelength less than 150 nm and having any of the following:

a.An output energy exceeding 50 ml per pulse and a pulsed "peak power" exceeding 1 W; or

b.An average or CW output power exceeding 1 W;

2.A wavelength of 150 nm or more but not exceeding 800 nm and having any of the following:

a.An output energy exceeding 1.5 J per pulse and a pulsed "peak power" exceeding 30 W; or

b.An average or CW output power exceeding 30 W;

3.A wavelength exceeding 800 nm but not exceeding 1,400 nm, as follows:

a."Q-switched lasers" having:

1. An output energy exceeding 0.5 J per pulse and a pulsed "peak power" exceeding 50 W; or
2. An average output power exceeding:

a.10 W for single-transverse mode "lasers";

b.30 W for multiple-transverse mode "lasers";

b.Non-"Q-switched lasers" having:

1. An output energy exceeding 2 J per pulse and a pulsed "peak power" exceeding 50 W; or
2. An average or CW output power exceeding 50 W; or

4.A wavelength exceeding 1,400 nm and having any of the following:

a.An output energy exceeding 100 mJ per pulse and a pulsed "peak power" exceeding 1 W; or

b.An average or CW output power exceeding 1 W;

d. Dye and other liquid "lasers", having any of the following:

1. A wavelength less than 150 nm and:

a.An output energy exceeding 50 mJ per pulse and a pulsed "peak power" exceeding 1 W; or

b.An average or CW output power exceeding 1 W;

2.A wavelength of 150 nm or more but not exceeding 800 run and having any of the following:

a.An output energy exceeding 1.5 J per pulse and a pulsed "peak power" exceeding 20 W;

b.An average or CW output power exceeding 20 W; or

c.A pulsed single longitudinal mode oscillator having an average output power exceeding 1 W and a repetition rate exceeding 1 kHz if the "pulse duration" is less than 100 ns;

3.A wavelength exceeding 800 nm but not exceeding 1,400 nm and having any of the following:

a.An output energy exceeding 0.5 J per pulse and a pulsed "peak power" exceeding 10 W; or

b.An average or CW output power exceeding 10 W; or

4.A wavelength exceeding 1,400 nm and having any of the following:

a.An output energy exceeding 100 ml per pulse and a pulsed "peak power" exceeding 1 W; or

b.An average or CW output power exceeding 1 W;

e.Components, as follows:

1.Mirrors cooled either by active cooling or by heat pipe cooling;

Technical Note:

Active cooling is a cooling technique for optical components us ing flowing fluids within the subsurface (nominally less than 1 mm below the optical surface) of the optical component to remove heat from the optic.

2.Optical mirrors or transmissive or partially transmissive optical or electro-optical components specially designed for use with controlled "lasers";

f.Optical equipment, as follows:

N.B.: For shared aperture optical elements, capable of operating in "Super-High Power Laser" ("SHPL") applications, see the Military Goods Lists.

1.Dynamic wavefront (phase) measuring equipment capable of mapping at least 50 positions on a beam wavefront having any of the following:

a.Frame rates equal to or more than 100 Hz and phase discrimination of at least 5% of the beam's wavelength; or

b.Frame rates equal to or more than 1,000 Hz and phase discrimination of at least 20% of the beam's wavelength;

2. "Laser" diagnostic equipment capable of measuring "SHPL" system angular beam steering errors of equal to or less than 10 urad;
3. Optical equipment and components specially designed for a phased-array "SHPL" system for coherent beam combination to an accuracy of lambda/10 at the designed wavelength, or 0.1 urn, whichever is the smaller;
4. Projection telescopes specially designed for use with "SHPL" systems.

6A005 a. 1. 9013 20 000 0
6A005 a. 2. 9013 20 000 0
6A005 a. 3. 9013 20 000 0
6A005 a. 4. 9013 20 000 0
6A005 a. 5. 9013 20 000 0
6A005 a. 6. 9013 20 000 0
6A005 a. 7. 9013 20 000 0
6A005 b. 1. 8541 40 100 0
6A005 b. 2. 8541 40 100 0
6A005 b. 3. 8541 40 100 0
6A005 b. 4. 8541 40 100 0
6A005 c. 1. 9013 20 000 0
6A005 c. 2. 9013 20 000 0
6A005 d. 9013 20 000 0
6A005 e. 1 9002 90 000 0 (Except for civil aircraft)
9013 90 900 0

9001 90 000 0 (Except for civil aircraft)
6A005 e. 2. 9002 90 000 0 (Except for civil aircraft)
9001 90 000 0 (Except for civil aircraft)
6A005 f. 1. 9031 49
6A005 f. 2. 9031 49
6A005 f. 3. 9013 90 900 0
6A005 f. 4. 9002 19 000 0

6A006 "Magnetometers", "magnetic gradiometers", "intrinsic magnetic gradiometers" and compensation systems, and specially designed components therefor, as follows:

Note: 6A006 does not control instruments specially designed for biomagnetic measurements for medical diagnostics.

a."Magnetometers" using "superconductive", optically pumped or nuclear precession (proton/Overhauser) "technology" having a "noise level" (sensitivity) lower (better) than 0.05 nT rms per square root Hz;

b.Induction coil "magnetometers" having a "noise level" (sensitivity) lower (better) than any of the following:

1. 0.05 nT rms/square root Hz at frequencies of less than 1 Hz;
2. 1 x 10"3 nT rms/square root Hz at frequencies of 1 Hz or more but not exceeding 10 Hz; or
3. 1 x 10"4 nT rms/square root Hz at frequencies exceeding 10 Hz;

c.Fibre optic "magnetometers" having a "noise level" (sensitivity) lower (better) than 1 nT rms per square root Hz;

d."Magnetic gradiometers" using multiple "magnetometers" specified in 6A006.a.,
6A006.b. or 6A006.C.;

e.Fibre optic "intrinsic magnetic gradiometers" having a magnetic gradient field "noise level" (sensitivity) lower (better) than 0.3 nT/m rms per square root Hz;

f."Intrinsic magnetic gradiometers", using "technology" other than fibre-optic "technology", having a magnetic gradient field "noise level" (sensitivity) lower (better) than 0.015 nT/m rms per square root Hz;

g.Magnetic compensation systems for magnetic sensors designed for operation on mobile platforms;

h "Superconductive" electromagnetic sensors, containing components manufactured from "superconductive" materials and having all of the following:

1. Being designed for operation at temperatures below the "critical temperature" of at least one of their "superconductive" constituents (including Josephson effect devices or "superconductive" quantum interference devices (SQUIDS));
2. Being designed for sensing electromagnetic field

variations at frequencies of 1 kHz or less; and:

3. Having any of the following characteristics:

a.Incorporating thin-film SQUIDS with a minimum feature size of less than 2 urn and with associated input and output coupling circuits;

b.Designed to operate with a magnetic field slew rate exceeding 1x10^ magnetic flux quanta per second;

c.Designed to function without magnetic shielding in the earth's ambient magnetic field; or

d.Having a temperature coefficient less (smaller) than 0.1 magnetic flux quantum/K.

6A006 a. 9015 80 930 0
6A006 b. 9015 80 930 0
6A006 c. 9015 80 930 0
6A006 d. 9015 80 930 0
6A006 e. 9015 80 930 0
6A006 f. 9015 80 930 0
6A006 g. 9015 80 930 0
6A006 h. 9015 80 930 0

6A007Gravity meters (gravimeters) and gravity gradiometers, as follows:

N.B.: SEE ALSO 6A107.

a.Gravity meters designed or modified for ground use having a static accuracy of less (better) than 10 ugal;

Note: 6A007.a. does not control ground gravity meters of the quartz element (Warden) type.

9015 80 930 0

b.Gravity meters designed for mobile platforms, 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;

c.Gravity gradiometers.

6A007 a. 9015 80 930 0
6A007 b. 9015 80 930 0
6A007 c. 9015 80 930 0

6A008 Radar systems, equipment and assemblies having any of the following characteristics, and

specially designed components therefor: N.B.: SEE ALSO 6A108.

Note: 6A008 does not control:

a.Secondary surveillance radar (SSR);

b.Car radar designed for collision prevention;

c.Displays or monitors used for air traffic control (ATC) having no more

than 12 resolvable elements per mm;

d.Meteorological (weather) radar.

a.Operating at frequencies from 40 GHz to 230 GHz and having an average output power exceeding 100 mW;

b.Having a tunable bandwidth exceeding ± 6.25% of the 'centre operating frequency';

Technical Note:

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 (SAR), inverse synthetic aperture (ISAR) radar mode, or sidelooking airborne (SLAR) radar mode;

e.Incorporating "electronically steerable phased array antennae";

f.Capable of heightfinding non-cooperative targets;

Note: 6A008.f. does not control precision approach radar (PAR) equipment conforming to ICAO standards.

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 using any of the following:

1. "Radar spread spectrum" techniques; or
2. "Radar frequency agility" techniques;

i. Providing ground-based operation with a maximum "instrumented range" exceeding 185km;

Note: 6A008.1. does not control:

a.Fishing ground surveillance radar;

b.Ground radar equipment specially designed for enroute air traffic control, provided that all the following conditions are met:

1. It has a maximum "instrumented range" of 500 km or less;
2. It is configured so that radar target data can be transmitted only one -way from the radar site to one or more civil ATC centres;
3. It contains no provisions for remote control of the radar scan rate from the enroute ATC centre; and
4. It is to be permanently installed;

c.Weather balloon tracking radars.

j. Being "laser" radar or Light Detection and Ranging (LIDAR) equipment, having any of the following:

1. "Space-qualified"; or
2. Employing coherent heterodyne or homodyne detection techniques and having an angular resolution of less (better) than 20 urad

(microradians);

Note: 6A008J. does not control LIDAR equipment specially designed for surveying or for meteorological observation.

k. Having "signal processing" sub-systems using "pulse compression", with any of the following:

1. A "pulse compression" ratio exceeding 150; or
2. A pulse width of less than 200 ns; or

1. Having data processing sub-systems with 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;

Note: 6A008.L 1. does not control conflict alert capability in ATC systems, or marine or harbour radar.

2. Calculation of target velocity from primary radar having non-periodic (variable) scanning rates;
3. Processing for automatic pattern recognition (feature extraction) and comparison with target characteristic data bases (waveforms or imagery) to identify or classify targets; or
4. Superposition and correlation, or fusion, of target data from two or more "geographically dispersed" and "interconnected radar sensors" to enhance and discriminate targets.

Note: 6A008.1.4. does not control systems, equipment and assemblies used for marine traffic control.

6A008 9015 80 930 0
6A008 a. 8526 10 000 0 (Except for civil aircraft)
6A008 b. 8526 10 000 0 (Except for civil aircraft)
6A008 c. 8526 10 000 0 (Except for civil aircraft)
6A008 d. 8526 10 000 0 (Except for civil aircraft)
6A008 e. 8526 10 000 0 (Except for civil aircraft)
6A008 f. 8526 10 000 0 (Except for civil aircraft)
6A008 g. 8526 10 000 0 (Except for civil aircraft)
6A008 h. 8526 10 000 0 (Except for civil aircraft)
6A008 i. 8526 10 000 0 (Except for civil aircraft)
6A008 j. 9013 80
9015 10 900 0
9031 80 910 0
6A008 k. 8521 10 (Except for civil aircraft)
8526 10 000 9
6A008 l. 8521 10 (Except for civil aircraft)
8526 10 000 9

6A102 Radiation hardened detectors, other than those specified in

6A002, specially designed or modified for protecting against nuclear effects (e.g. electromagnetic pulse (EMP), X-rays, combined blast and thermal effects) and usable for "missiles", designed or rated to withstand radiation levels which meet or exceed a total irradiation dose of 5 x 105 rads (silicon).

Technical Note:

In 6A102, a detector is defined as a mechanical, electrical, optical or chemical device that automatically identifies and records, or registers a stimulus such as an environmental change in pressure or temperature, an electrical or electromagnetic signal or radiation from a radioactive material.

6A102 9030 10 000 0 (кроме гражданской авиации)

6A107 Gravity meters (gravimeters) and components for gravity meters and gravity gradiometers, as follows:

a.Gravity meters, other than those specified in 6A007.b, designed or modified for airborne or marine use, and having a static or operational accuracy of 7 x 10"6 m/s2 (0.7 milligal) or less (better), and having a time-to-steady-state registration of two minutes or less;

b.Specially designed components for gravity meters specified hi 6A007.b or 6A107.a. and gravity gradiometers specified in 6A007.C.

6A107, a 9032 89 000 0 (Except for civil aircraft)

9031 80 (Except for civil aircraft)

6A107, b 9015 80 930 0

9031 80 (Except for civil aircraft)

6A108 Radar systems and tracking systems, other than those specified in entry 6A008, as follows:

a.Radar and laser radar systems designed or modified for use hi space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;

Note: 6C108.a. Includes the following:

a. The equipment for reception of shooting izogipse;

b. The equipment of theimage gauge;

c. The equipment for reception of topographical shooting and correlation of the film-making plan (digital and analog);

d. The navigating equipment for Доплеровской РЛС.

b. Precision location systems which can be applied to "rockets", such as:

1. Location the systems having subsystems of data processing, used together with ground or air data or with the data received from satellite navigating systems, for a possibility of definition in a mode of real time of position and speed during flight;

2.Range instrumentation radars including associated optical/infrared trackers with all of the following capabilities:

a.Angular resolution better than 3 milliradians (0.5 mils);

b.Range of 30 km or greater with a range resolution better than 10 m rms;

c.Velocity resolution better than 3 m/s.

Technical note:

In item 6C108.b. The term of "rocket" is the integrated rocket system and the operated automatically (pilotless) air flying systems, capable to fly in a range

over 300 km.

6A202 Photomultiplier tubes having both of the following characteristics:

a.Photocathode area of greater than 20 cm2; and

b.Anode pulse rise time of less than 1 ns.

6A108 a.	8526 10 900 0
6A108 b.	8526 10 900 0

6A202 The photomultiplying tubes possessing both from following characteristics:

a. Photocathodic area more than 20 sm2, and

b. Anode time increase of an impulse less than 1 nanosecond

6A202	8540 20 800 0

6A203 Cameras and components, other than those specified in 6A003, as follows:

a. Mechanical rotating mirror cameras, as follows, and specially designed components therefor:

1. Framing cameras with recording rates greater than 225,000 frames per second;
2. Streak cameras with writing speeds greater than 0.5 mm per microsecond;

Note: In 6A203.a. components of such cameras include their synchronizing electronics units and rotor assemblies consisting of turbines, mirrors and bearings.

b.Electronic streak cameras, electronic framing cameras, tubes and devices, as follows:

1. Electronic streak cameras capable of 50 ns or less time resolution;
2. Streak tubes for cameras specified in 6A203.b. 1.;
3. Electronic (or electronically shuttered) framing cameras capable of 50 ns or less frame exposure time;
4. Framing tubes and solid-state imaging devices for use with cameras specified in 6A203.b.3., as follows:

a.Proximity focused image intensifier tubes having the photocathode deposited on a transparent conductive coating to decrease photocathode sheet resistance;

b.Gate silicon intensifier target (SIT) videcon tubes, where a fast system allows gating the photoelectrons from the photocathode before they impinge on the SIT plate;

c.Kerr or Pockels cell electro-optical shuttering;

d.Other framing tubes and solid-state imaging devices having a fast-image gating time of less than 50 ns specially designed for cameras specified in 6A203.b.3.;

c.Radiation-hardened TV cameras, or lenses therefor, specially designed or

rated as radiation hardened to withstand a total radiation dose greater than 50 x 10J Gy(silicon) (5 x 106 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 a.	9007 11 000 0 9007 19 000 0 9007 91 000 0 9001 90 000 0 9002 90 000 0 9006 59 000 9006 99 000 0
6A203 b. 1.	8528 72 620 8540 20 9006 59 000
6A203 b. 2.	8528 72 620 8540 20 8540 89 000 0
6A203 b. 3.	8528 49 210 0 8528 49 250 0 8528 49 900 0 8540 20 9006 59 000
6A203 b. 4. a.	8528 49 210 0 8528 49 250 0 8528 49 900 0 8528 69 8528 49 8528 59 8540 20 800 0 8540 40 000 0 8540 50 000 0 8540 60 000 0
6A203 b. 4.	8525 80 9002 19 000 0 8540 20 800 0 8540 40 000 0 8540 50 000 0 8540 60 000 0
6A203 c.	8525 80 9002 19 000 0 8540 20 100 0

6A205 "Lasers", "laser" amplifiers and oscillators, other than those specified in OB001 .g.5., "OBOOl.h.6. and 6A005; as follows:

a.Argon ion "lasers" having both of the following characteristics:

1. Operating at wavelengths between 400 nm and 515 nm; and
2. An average output power greater than 40 W;

b.Tunable pulsed single-mode dye laser oscillators having all of the following characteristics:

1. Operating at wavelengths between 300 nm and 800 nm;
2. An average output power greater than 1 W;
3. A repetition rate greater than 1 kHz; and
4. Pulse width less than 100 ns;

c.Tunable pulsed dye laser amplifiers and oscillators, having all of the following characteristics:

1. Operating at wavelengths between 300 nm and 800 nm;
2. An average output power greater than 30 W;
3. A repetition rate greater than 1 kHz; and
4. Pulse width less than 100 ns;

Note: 6A205.C. does not control single mode oscillators;

d.Pulsed carbon dioxide "lasers" having all of the following characteristics:

1. Operating at wavelengths between 9,000 nm and 11,000 nm;
2. A repetition rate greater than 250 Hz;
3. An average output power greater than 500 W; and
4. Pulse width of less than 200 ns;

e.Para-hydrogen Raman shifters designed to operate at 16 micrometre output wavelength and at a repetition rate greater than 250 Hz;

f.Pulse-excited, Q-switched neodymium-doped (other than glass) "lasers", having all of the following characteristics:

1. An output wavelength exceeding 1,000 nm but not exceeding 1,100 nm;
2. A pulse duration equal to or more than 1 ns; and
3. A multiple-transverse mode output having an average power exceeding 50 W.

6A205 a.	9013 20 000 0
6A205 b.	9013 20 000 0
6A205 c.	9013 20 000 0
6A205 d.	9013 20 000 0
6A205 e.	9013 20 000 0
	9013 80 900 0
6A205 f.	9013 20 000 0

6A225_ Velocity interferometers for measuring velocities exceeding 1 km/s during time intervals of less than 10 microseconds.

Note: 6A225 includes velocity interferometers such as VISARs (Velocity interferometer systems for any reflector) andDLIs (Doppler laser

interferometers)

6A225	9026 20 200 (кроме гражданской авиации) 8543 70 900 9 9013 20 000 0 9026 80 200 0 9031 80 980 0

6A226 Pressure sensors, as follows:

a. Manganin gauges for pressures greater than 10 GPa;

b. Quartz pressure transducers for pressures greater than 10 GPa.

6A226 a.	9026 20 200 (кроме гражданской авиации) 8543 90 000 9 9026 90 000 0

6B Test, inspection and production equipment

6B004 Optical equipment, as follows:

a.Equipment for measuring absolute reflectance to an accuracy of ± 0.1% of the reflectance value;

b.Equipment other than optical surface scattering measurement equipment, having an unobscured aperture of more than 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: 6B004 does not control microscopes.

6B004 a. 9031 49

6B004 b. 9031 49

6B007 Equipment to produce, align and calibrate land-based gravity meters with a static accuracy of better than 0.1 mgal.

6B007 9031 80 380 0

6B008 Pulse radar cross-section measurement systems having transmit pulse widths of 100 ns or less and specially designed components therefor.

N.B.: SEE ALSO 6B108.

6B008 8526 10 000 (except for civil aircraft)

6B108 Systems, other than those specified in 6B008, specially designed for radar cross section measurement usable for "missiles" and their subsystems.

6B108 8526 10 000 (except for civil aircraft)

6C Materials

6C002Optical sensor materials, as follows:

a.Elemental tellurium (Te) of purity levels of 99.9995% or more;

b.Single crystals of cadmium zinc telluride (CdZnTe), with zinc content of less than 6%by weight, or cadmium telluride (CdTe), or mercury cadmium telluride (HgCdTe) of any purity level, including epitaxial wafers thereof.

1. Zinc tellurude cadmium (CdZnTe) with the maintenance of zinc less than 6 % " moth shares ",

2. Telluride of cadmium (CdTe) any level of cleanliness; or

3. Mercury telluride of cadmium (HgCdTe) any level of cleanliness.

Technical note:

" Moth the share " is defined as a parity of the telluride moths of zinc (ZnTe) to the sum молей telluride of cadmium (CdTe) and telluride of zinc (ZnTe), present in a crystal.

6C002 a. 2804 50 900 0

6C002 b. 3818 00 900 0

8107 90 000 0

6C004 Optical materials, as follows:

a.Zinc selenide (ZnSe) and zinc sulphide (ZnS) "substrate blanks" produced by the chemical vapour deposition process, having any of the following:

1. A volume greater than 100 cm ; or
2. A diameter greater than 80 mm having a thickness of 20 mm or more;

b.Boules of the following electro-optic materials:

1. Potassium titanyl arsenate (KTA);
2. Silver gallium selenide (AgGaSe2);
3. Thallium arsenic selenide (TLAsSe,, also known as TAS);

c.Non-linear optical materials, having all of the following:

1. Third order susceptibility (chi 3) of 10 m /V or more; and
2. A response time of less than 1 ms;

d."Substrate blanks" of silicon carbide or beryllium beryllium (Be/Be) deposited materials exceeding 300 mm in diameter or major axis length;

e.Glass, including fused silica, phosphate glass, fluorophosphate glass, zirconium fluoride (ZrF4) and hafnium fluoride (HfF4), 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; <u>and</u>
3. High homogeneity (index of refraction variance) less than 5x10;

f.Synthetically produced diamond material with an absorption of less than 10 cm for wavelengths exceeding 200 nm but not exceeding 14,000 nm.

6C004 a. 2830 90 850 0

2842 90 100 0

6C004 b. 1 2842 90 800 0

6C004 b. 2 2842 90 100 0

6C004 b. 3 2842 90 100 0

6C004 c. 7020 00 800 0

6C004 d. 2849 20 000 0

8112 19 000 0

6C004 e. 7001 00 990 0

7001 00 910 0
7020 00 800 0
6C004 f. 7104 20 000 0
7105 10 000 0
6C005 Synthetic crystalline "laser" host material in unfinished form, as follows:
a.Titanium doped sapphire;
b.Alexandrite.
6C005 7103 10 000 0
7104 20 000 0
6D Software
6D001 "Software" specially designed for the "development" or "production" of equipment specified in 6A004, 6A005, 6A008 or 6B008.
6D001
6D002 "Software" specially designed for the "use" of equipment specified in 6A002.b., 6A008 or
6B002
6D003
6D003 other "Software" as follows
a. 1. "Software" specially designed for acoustic beam forming for the "real time processing" of acoustic data for passive reception using towed hydrophone arrays;
2. "Source code" for the "real time processing" of acoustic data for passive reception using towed hydrophone arrays;
3. "Software" specially designed for acoustic beam forming for "real time processing" of acoustic data for passive reception using bottom or bay cable systems;
4. "Source code" for "real time processing" of acoustic data for passive reception using bottom or bay cable systems;
b.1. "Software" specially designed for magnetic compensation systems for magnetic sensors designed to operate on mobile platforms;
2. "Software" specially designed for magnetic anomaly detection on mobile platforms;
c."Software" specially designed to correct motional influences of gravity meters or gravity gradiometers;
d.1. Air Traffic Control "software" application "programmes" hosted on general purpose computers located at Air Traffic Control centres and capable of any of the following:
a.Processing and displaying more than 150 simultaneous "system tracks"; or
b.Accepting radar target data from more than four primary radars;
2."Software" for the design or "production" of radomes which:

_ a. Are specially designed to protect the "electronically steerable phased array antennae" specified in 6A008.e.; and

b. Result hi an antenna pattern having an 'average side lobe level' more than 40 dB below the peak of the main beam level.

Technical Note:

'Average side lobe level' in 6D003.d.2.b. is measured over the entire array excluding the angular extent of the main beam and the first two side lobes on either side of the main beam.

6D003

6D102 “Software” specially designed or modified for the “use” of goods, specified in 6A108

6D102

6D103"Software" which processes post-flight, recorded data, enabling determination of vehicle position throughout its flight path, specially designed or modified for "missiles".

6D103

6D8523

6E Technology

6EOO1 "Technology" according to the General Technology Note for the "development" of equipment, materials or "software" specified in 6A, 6B, 6C or 6D.

6E001

6E002"Technology" according to the General Technology Note for the "production" of equipment or materials specified in 6A, 6B or 6C.

6E002

6E003Other "technology", as follows:

a.1. Optical surface coating and treatment "technology" "required" to achieve uniformity of 99.5% or better for optical coatings 500 mm or more hi diameter or major axis length and with a total loss (absorption and scatter) of less than 5x10"

N.B.: See also 2E003.f.

1. Optical fabrication "technology" using single point diamond turning techniques to produce surface finish accuracies of better than 10 nm rms on non-planar surfaces exceeding 0.5 m2;

b."Technology" "required" for the "development", "production" or "use" of specially designed diagnostic instruments or targets in test facilities for "SHPL" testing or testing or evaluation of materials irradiated by "SHPL" beams;

c."Technology" "required" for the "development" or "production" of fluxgate "magnetometers" or fluxgate "magnetometer" systems, having any of the following:

1. A "noise level" of less than 0.05 nT rms per square root Hz at frequencies of less than 1 Hz; or
2. A "noise level" of less than 1 x 10"3 nT rms per square root Hz at frequencies of 1 Hz or more.

6E003

6E101"Technology" according to the General Technology Note for the "use" of equipment or "software" specified in 6A002, 6A007.b. and c., 6A008, 6A102, 6A107, 6A108, 6B108, 6D102or6D103.

Note: 6E101 only specifies "technology"for equipment specified in 6A008 when it is designed for airborne applications and is usable in "missiles".

6E101

6E201"Technology" according to the General Technology Note for the "use" of equipment specified in 6A003, 6A005.a.l.c., 6A005.a.2.a., 6A005.c.l.b., 6A005.C.2.C.2, 6A005.c.2.d.2.b., 6A202, 6A203, 6A205, 6A225 or 6A226.

6E201

CATEGORY 7
NOVIGATION TECHNOLOGIS AND AVIATION ELECTRONICS
7A Systems, equipment and components

N.B.: For automatic pilots for underwater vehicles, see Category 8.

For radar, see Category 6.

Akselerometres, intended for use in inertial systems of navigation or prompting and possessing any of the following characteristics, components specially developed for them.

N.B.: See also 7A101. On measuring instruments of angular accelerations and rotary akselerometres look Item 7C002.

a. “bias” “stability” of less (better) 130 mikro g with respect to a fixed a calibration value overa period of one year;

b. A "scale factor" "stability" of less (better) than 130 ppm g with respect to a fixed calibration value over a period of one year; or

c. Specified to function at linear acceleration levels exceeding 100 g.

7A001 9014 20 800 0

9032 89 000 0

7A002 Gyros having any of the following characteristics, and specially designed components therefor:

N.B.: SEE ALSO 7A102

a. A "drift rate" "stability", when measured in a 1 g environment over a period of three months and with respect to a fixed calibration value, of:

1.Less (better) than 0.1° per hour when specified to function at linear acceleration levels below 10 g; or

2.Less (better) than 0.5° per hour when specified to function at linear acceleration levels from 10 g to 100 g inclusive; or

b.Specified to function at linear acceleration levels exceeding 100 g.

7A002 9014 20 800 0 (except for civil aircraft)

9032 89 000 0 (except for civil aircraft)

7A003 Inertial navigation systems and specially designed components thereof, as follows:

N.B.: See also 7A103

7A003 Inertial navigation systems (gimballed or strapdown) and inertial equipment designed for "aircraft", land vehicle or "spacecraft" for attitude, guidance or control having any of the following characteristics? And specially

designed components thereof:

1.Navigation error (free inertial) subsequent to normal alignment of 0.8 nautical mile per hour (50% Circular Error Probable (CEP)) or less (better); or

2.Specified to function at linear acceleration levels exceeding 10 g.

b. The hybrid inertial navigating systems interfaced to Global navigating satellite system (systems) (GNSS) or with navigating system (systems) on the basis of reference databases (DBRN) for definition of position in space, promptings or managements after the normal exhibition, definitions of site INS having navigating accuracy after loss of communication with GNSS or DBRN for a while till 4 minutes, less better) 10 m of " the Probable Circular Error " (PCE).

c. The inertial equipment for the instruction of an azimuth, a rate or the north, having any of following characteristics, and also specially developed components for it:

1. Developed for the instruction of an azimuth, a rate or the north with a margin error, to equal 6 angular minutes of middlekwarter values or less better) from operating value on 45 degrees of breadth; or

2. Developed with a level of shock loading up to a non-working condition in 900 g and more at duration in 1 мс or more.

Note 1: the Parameters specified in the subitem 7C003.á. And 7C003.b. suits for any of following conditions of environment:

1. Entrance casual vibration on a marginal level in size 7,7g СКО in the first half an hour and the general tests within one and a half hours along each of axes in three perpendicular directions when casual vibration has following characteristics:

a. Constant spectral density of capacity (SDC) 0,04g2/Gh in a frequency interval from 15 up to 1 000; and

b. SDC weakens depending on frequency from 0,04g2/ Gh and up to 0,01 g2/ Gh in a frequency interval from 1 000 up to 2 000 Hz;

2. Speed of rotation and roving is equal or exceeds + 2,62 is glad/with (150 hailstones/with); or

3. Under the conditions specified in national standards which positions are equivalent to items 1. Or 2. Of the present note.

Note 2: On item 7C003 inertial navigating systems (INS), certificated for application on " civil flying devices " services of civil aircraft of "countries-participants" are not supervised.

Note 3: On item 7C003.c.1. Are not supervised the teodolite systems including the inertial equipment, specially developed for the civil research purposes.

Technical note:

1. The item 7A003.b. supervises systems in which INS and other independent navigating means in uniform assembly (are enclosed) with the purpose of improvement of working parameters of system.

2. " The Probable Circular Error "(PCE)" is a radius of a circle in the circular normal distribution, including 50 % of the lead separate measurements, or radius of a circle in which 50 % of probability of a finding in it are distributed.

7A003 a- 9014 10 000 0 (except for civil craft)

7A003 b. 9014 20 800 0 (except for civil craft)
7A003 c. 9014 10 000 0 (except for civil craft)
9014 20 800 0 (except for civil craft)
9014 80 000 0
9014 90 000 0 (except for civil craft)

7A004 Gyro-astro compasses, and other devices which derive position or orientation by means of automatically tracking celestial bodies or satellites, with an azimuth accuracy of equal to or less (better) than 5 seconds of arc.

N.B.: SEE ALSO 7A104.

7A004 9014 20 800 0 (except for civil craft)
9014 80 000 0

7A005 Global navigation satellite systems (i.e. GPS or GLONASS) receiving equipment having any of the following characteristics, and specially designed components therefor:

N.B.: SEE ALSO 7A105.

a.Employing decryption; or
b.A null-steerable antenna.

7A005 9014 20 800 0 (except for civil craft)
9014 80 000 0

7A006 Airborne altimeters operating at frequencies other than 4.2 to 4.4 GHz inclusive, having any of the following characteristics:

N.B.: SEE ALSO 7A106.

a."Power management"; or
b.Using phase shift key modulation.

7A006 8526 10 000 9
8526 91 800 (except for civil craft)

7A007 Direction finding equipment operating at frequencies above 30 MHz and having all of the following characteristics, and specially designed components therefor:

a."Instantaneous bandwidth" of 1 MHz or more;
b.Parallel processing of more than 100 frequency channels; and
c.Processing rate of more than 1,000 direction finding results per second and per frequency channel.

7A007 8526 91 800 0 (except for civil craft)

7A101a. Accelerometers, other than those specified in 7A001and specially designed components thereof:

a.Accelerometers with a threshold of 0.05 g or less, or a linearity error within 0.25% of full scale output, or both, which are designed for use in inertial navigation systems or in guidance systems of all types.

Note: 7A101 does not specify accelerometers which are specially designed and developed as MWD (Measurement While Drilling) Sensors for use in downhole well service operations.

b. Accelerometers with the long (target) capacity, intended for work at levels of acceleration exceeding 100 g.

7A101 a. 9014 80 000 0
7A101 b. 8803 90 900 0
9032 89 000 0
(except for civil craft)
9306 90

7A102 All types of gyros, other than those specified in 7A002, usable in "missiles", with a rated "drift rate" "stability" of less than 0.5 (1 sigma or rms) per hour in a 1 g environment and specially designed components therefor.

7A102 9032 89 000 0 (except for civil craft)
8803 90 900 0
9306 90

7A103 Instrumentation, navigation equipment and systems, other than those specified in 7A003, as follows; and specially designed components therefor:

a.Inertial or other equipment using accelerometers or gyros specified in 7A001, 7A002, 7A101 or 7A102 and systems incorporating such equipment;

Note: 7A103. a. does not specify equipment containing accelerometers specified 7AOOJ where such accelerometers are specially designed and developed as MWD (Measurement While Drilling) sensors for use in down-hole well services operations.

b.Integrated flight instrument systems, which include gyrostabilisers or automatic pilots, designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

c. "The integrated navigating systems ", intended or modified for the space flying devices controllable by Item 9A004, the pilotless flying devices controllable by Item 9A012, or the rockets-probes controllable by Item 9A104, capable to provide accuracy of navigation in 200 m on " the Probable Circular Error " (PCE) or less.

Technical note: " The integrated navigating system " usually unites following elements:

1. The inertial measuring device (for example, system of definition of orientation and a direction of flight, the inertial block of readout or inertial navigating system);

2. The external gauge (one or more) for reception of the information from the external reference points, used for updating data about a site and (or) speeds, periodically or constantly during all flight (for example, the satellite navigating receiver, radar-tracking высотомер and (or) an dopler radar); and

3. Integrating equipment sand software.

7A103 a. 9014 20 800 0 (except for civil craft)
8803 90 900 0
9014 80 000 0
9032 89 000 0 (except for civil craft)
9306 90
7A103 b. 9014 20 800 0 (except for civil craft)
7A103 c. 8526 91 800 0 (except for civil craft)
9014 20 800 0 (except for civil craft)

9032 89 000 0 (except for civil craft)

9306 90

7A104 Gyro-astro compasses and other devices, other than those specified in 7A004, which derive position or orientation by means of automatically tracking celestial bodies or satellites and specially designed components therefor.

7A104 9014 80 000 0

7A105 Global Positioning Systems (GPS) or similar satellite receivers, other than those specified in 7A005, capable of providing navigation information under the following operational conditions and designed or modified for use in space launch vehicles "' specified in 9A004 or sounding rockets specified in 9A104.

a. Developed or modified for use in the space vehicles controllable on item 9Ç004, in automatically operated flying devices controllable on item 9A012, or the rockets-probes controllable on item 9A104; or

b. Developed or modified for the applied purposes in aircraft, and possessing following characteristics:

1. Providing reception of the navigating information for the speed over 600 km/s (1 165 sea miles per hour).

2. Uses the decoding developed or modified for military or governmental application, for reception of access to guaranteed to a signal or data of global navigating satellite system (GNSS); or

3. It is specially developed for functioning in conditions of active or passive handicapes and it is capable to resist to influencing handicapes (the aerial with operated position of zero of the diagram of an orientation and the aerial with electronic management DN).

Note: Items 7A105.b.2. And 7A105.b.3. the equipment developed for commercial, civil applications or for GNSS of services on maintenance of " safety of ability to live " (for example, integrity of data, safety of flight) is not supervised.

7A105 8526 91 800 0 (except for civil craft)

9014 20 800 0 (except for civil craft)

7A106 Altimeters, other than those specified in 7A006, of radar or laser radar type, designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

7A106 8526 10 000 9

9013 20 000 0

7A115 Passive sensors for determining bearing to specific electromagnetic source (direction finding equipment) or terrain characteristics, designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

Note: 7All 5 includes sensors for the following equipment:

a.Terrain contour mapping equipment;

b.Imaging sensor equipment (both active and passive);

c.Passive interferometer equipment.

7A106 8526 10 000 9

9013 20 000 0

7A116Flight control systems, as follows; designed or modified for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

a.Hydraulic, mechanical, electro-optical, or electro-mechanical fligftt control systems (including fly-by-wire types);

b.Attitude control equipment.

c. Servoclapansfor the control the flight, developed or modified for the systems controllable on item 7A116.á. or 7A116.b., developed and modified for functioning in the conditions of vibration exceeding 10 g rms (middlekwarter value) in a range between 20 Hz and 2 kghz.

7A116 a 9032 81 000 9

8803 90 900 0

9032 89 000 0 (except for civil craft)

7A116 b. 9032 89 000 0 (except for civil craft)

7A116 c. 8481 80 990 0

7A117 "Guidance sets", usable in "missiles" capable of achieving system accuracy of 3.33% or less of the range (e.g., a "CEP" of 10 km or less at a range of 300 km).

7A117 8586 92 000 9

9014 20 800 0

9306 90

7B Test, inspection production equipment

7B001 Test, calibration or alignment equipment specially designed for equipment specified in7A.

Note: 7B001 does not control test, calibration or alignment equipment for Maintenance Level I or Maintenance Level II.

Technical Notes:

1. **Maintenance Level I**

The failure of an inertial navigation unit is detected on the aircraft by indications from the control and display unit (CDU) or by the status message from the corresponding sub-system. By folio-wing the manufacturer's manual, the cause of the failure may be localised at the level of the malfunctioning line replaceable unit (LRU). The operator then removes the LRU and replaces it -with a spare.

2. **Maintenance Level II**

The defective LRU is sent to the maintenance workshop (the manufacturer's or that of the operator responsible for level II maintenance). At the maintenance workshop, the malfunctioning LRU is tested by various appropriate means to verify and localise the defective shop replaceable assembly (SRA) module responsible for the failure. This SRA is removed and replaced by an operative spare. The defective SRA (or possibly the complete LRU) is then shipped to the manufacturer.

N.B.: Maintenance Level II does not include the removal of controlled accelerometers or gyro sensors from the SRA.

7B001 9031 10 000 0

9031 49

9031 20 000 0

9031 80 (except for civil craft)

7B002 Equipment, as follows, specially designed to characterize mirrors for ring "laser" gyros:

N.B.: SEE ALSO 7B102.

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 a. 9031 80 (except for civil craft)

7B002 b. 9031 80 (except for civil craft)

7B003 Equipment specially designed for the "production" of equipment specified in 7A.

Note: 7B003 includes:

a.Gyro tuning test stations;

b.Gyro dynamic balance stations;

c.Gyro run-in/motor test stations;

d.Gyro evacuation and fill stations;

e.Centrifuge fixtures for gyro bearings;

f.Accelerometer axis align stations.

7B003 8413

8421 19 200 9

8421 19 700 9

9031 10 000 0

9031 20 000 0

9031 80 (except for civil craft)

7B102 Reflectometers specially designed to characterise mirrors, for "laser" gyros, having a measurement accuracy of 50 ppm or less (better).

7B102 9031 80 (except for civil craft)

7B103 "Capacities" and " the industrial equipment " such as:

a.specially designed "production facilities" for equipment specified hi 7A117.

b. The industrial equipment or other testing facility, calibrations and the adjustments which are distinct from listed in items with 7B001 on 7B003, developed and modified for use with the equipment controllable on item 7A.

7B103 8803 90 (except for civil craft)

9306 30 300 0

9306 90 100

7C Materials

None

7D Software

7DOO1 "Software" specially designed or modified for the "development" or "production" of equipment specified in 7A. or 7B.

7D001

7D002 "Source code" for the "use" of any inertial navigation equipment including inertial equipment not controlled by 7A003 or 7A004, or Attitude and Heading Reference Systems (AHRS).

Note: 7D002 does not control "source code"for the "use" of gimballedAHRS.

Technical Note:

AHRS generally differ from inertial navigation systems (INS) in that an AHRS provides attitude and heading information and normally does not provide the acceleration, velocity and position information associated -with an INS.

7D002

7D003Other "software", as follows:

a."Software" specially designed or modified to improve the operational performance or reduce the navigational error of systems to the levels specified in 7A003 or 7AQ04;

b."Source code" for hybrid integrated systems which improves the operational performance or reduces the navigational error of systems to the level specified in 7A003 by continuously combining inertial data with any of4he following navigation data:

1. Doppler radar velocity;
2. Global navigation satellite systems (i.e., GPS or GLONASS) reference data; or
3. Terrain data from data bases;

c."Source code" for integrated avionics or mission systems which combine sensor data and employ "expert systems";

d."Source code" for the "development" of any of the following:

1. Digital flight management systems for "total control of flight";
2. Integrated propulsion and flight control systems;
3. Fly-by-wire or fly-by-light control systems;
4. Fault-tolerant or self-reconfiguring "active flight control systems";
5. Airborne automatic direction finding equipment;
6. Air data systems based on surface static data; or
7. Raster-type head-up displays or three dimensional displays;

e.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" whose "technology" is specified in 7E004.b., 7E004.C.1. or 7E004.C.2.

7D003

7D101 "Software" specially designed or modified for the "use" of equipment specified in 7A001 to 7A006, 7A101 to 7A106, 7A115, 7A116.3., 7A116.b., 7B001, 7B002, 7B003, 7B102 or 7B103.

7D101

7D102Integration "software" as follows:

a.Integration "software" for the equipment specified in 7A103.b.;

b.Integration "software" specially designed for the equipment specified in

7A003 or 7A103.a.

c. The integrated "software" specially developed or modified for the equipment, controllable on item 7A103.c.

7D102

7D103"Software" specially designed for modelling or simulation of the "guidance sets" specified in 7A117 or for their design integration with the space launch vehicles specified in 9A004 or sounding rockets specified in 9A104.

Note: "Software" specified in 7D103 remains controlled when combined with specially designed hardware specified in 4A102.

7D103

7D 8523

7E Technology

7E001 "Technology" according to the General Technology Note for the "development" of equipment or "software" specified in 7A, 7B or 7D.

7E001

7E002"Technology" according to the General Technology Note for the "production" of equipment specified in 7A or 7B.

7E002

7E003"Technology" according to the General Technology Note for the repair, refurbishing or overhaul of equipment specified in 7A001 to 7A004.

Note: 7E003 does not control maintenance "technology" directly associated with calibration, removal or replacement of damaged or unserviceable LRUs and SRAs of a "civil aircraft" as described in Maintenance Level I or Maintenance Level II

N.B.: See Technical Notes to 7BOO1

7E003

7E004 Other "technology", as follows:

a."Technology" for the "development" or "production" of:

1. Airborne automatic direction finding equipment operating at frequencies exceeding 5 MHz;
2. Air data systems based on surface static data only, i.e., which dispense with conventional air data probes;
3. Raster-type head-up displays or three dimensional displays for "aircraft";
4. Inertial navigation systems or gyro-astro compasses containing accelerometers or gyros specified in 7A001 or 7A002;
5. Electric actuators (i.e., electromechanical, electrohydrostatic and integrated actuator package) specially designed for "primary flight control";
6. "Flight control optical sensor array" specially designed for implementing "active flight control systems";

b."Development" "technology", as follows, for "active flight control systems" (including fly-by-wire or fly-by-light):

1. Configuration design for interconnecting multiple microelectronic processing elements (on-board computers) to achieve "real time processing" for control law implementation;
2. Control law compensation for sensor location or dynamic airframe loads, i.e., compensation for sensor vibration environment or for variation of sensor location from the centre of gravity;
3. Electronic management of data redundancy or systems redundancy for fault detection, fault tolerance, fault isolation or reconfiguration;

Note: 7E004.b.3. does not control" technology" for the design of physical redundancy.

4.Flight controls which permit inflight reconfiguration of force and moment controls for real time autonomous air vehicle control;

5. Integration of digital flight control, navigation and propulsion control data into a digital flight management system for "total control of flight";

Note: 7E004.b.5. does not control:

a."Development" "technology" for integration of digital flight control, navigation and propulsion control data into a digital flight management system for "flight path optimisation";

b."Development" "technology"for "aircraft"flight instrument systems integrated solely for VOR, DME, ILS or MLS navigation or approaches.

6.Full authority digital flight control or multisensor mission management systems employing "expert systems";

N.B.: For "technology "for Full A uthority Digital Engine Control ("FADEC"), see 9E003.O.9.

c. "Technology" for the "development" of helicopter systems, as follows:

1.Multi-axis fly-by-wire or fly-by-light controllers which combine the functions of at least two of the following into one controlling element:

a.Collective controls;

b.Cyclic controls;

c.Yaw controls;

2. "Circulation-controlled anti-torque or circulation-controlled directional control systems";
3. Rotor blades incorporating "variable geometry airfoils" for use in systems using individual blade control.

7E004

7E101 " "Technology" according to the General Technology Note for the "use" of equipment specified in 7A001 to 7A006, 7A101 to 7A106, 7A115 to 7A117, 7B001, 7B002, 7B003, 7B102, 7B103, 7D101 to 7D103.

7E101

7E102 "Technology" for protection of avionics and electrical

subsystems against electromagnetic pulse (EMP) and electromagnetic interference (EMI) hazards, from external sources, as follows:

a.Design "technology" for shielding systems;

b.Design "technology" for the configuration of hardened electrical circuits and subsystems;

c.Design "technology" for the determination of hardening criteria of 7E102.a. and 7E102.b.

7E102

7E104"Technology" for the integration of the flight control, guidance, and propulsion data into a flight management system for optimization of rocket system trajectory.

7E104

CATEGORY 8
MARINE

8A Systems, Equipment and Components

8A001 Submersible vehicles and surface vessels, as follows:

Note: For the control status of equipment for submersible vehicles, see:

Category 5, Part 2 "Information Security"for encrypted communication equipment;

Category 6 for sensors;

Categories 7 and 8 for navigation equipment;

Category 8A for underwater equipment.

a.Manned, tethered submersible vehicles designed to operate at depths exceeding 1,000 m;

b.Manned, untethered submersible vehicles, having any of the following:

1.Designed to 'operate autonomously' and having a lifting capacity of all the following:

a.10% or more of their weight in air; and

b.I5kNormore;

2. Designed to operate at depths exceeding 1,000 m; or
3. Having all of the following:

a.Designed to carry a crew of 4 or more;

b.Designed to 'operate autonomously' for 10 hours or more;

c.Having a 'range' of 25 nautical miles or more; and

d.Having a length of 21 m or less;

Technical Notes:

1. For the purposes of8AOOl.b., 'operate autonomously' means fully submerged, without snorkel, all systems working and cruising at minimum speed at which the submersible can safely control its depth dynamically by using its depth planes only, with no need for a support vessel or support base on the surface, sea-bed or shore, and containing a propulsion system for submerged or surface use.
2. For the purposes of 8AOOl.b., 'range'means half the

maximum distance a submersible vehicle can cover.

c.Unmanned, tethered submersible vehicles designed to operate at depths exceeding 1,000m, having any of the following:

1. Designed for self-propelled manoeuvre using propulsion motors or thrusters specified in 8A002.a.2.; or
2. Having a fibre optic data link;

d.Unmanned, untethered submersible vehicles, having any of the following:

1. Designed for deciding a course relative to any geographical reference without real time human assistance;
2. Having an acoustic data or command link; or
3. Having a fibre optic data or command link exceeding 1,000 m;

e.Ocean salvage systems with a lifting capacity exceeding 5 MN for salvaging objects from depths exceeding 250 m and having any of the following:

1. Dynamic positioning systems capable of position keeping within 20 m of a given point provided by the navigation system; or
2. Seafloor navigation and navigation integration systems for depths exceeding 1,000m with positioning accuracies to within 10 m of a predetermined point;

f.Surface-effect vehicles (fully skirted variety) having all of the following characteristics:

1. A maximum design speed, fully loaded, exceeding 30 knots in a significant wave height of 1.25 m (Sea State 3) or more;
2. A cushion pressure exceeding 3,830 Pa; <u>and</u>
3. A light-ship-to-full-load displacement ratio of less than 0.70;

g.Surface-effect vehicles (rigid sidewalls) with a maximum design speed, fully loaded, exceeding 40 knots in a significant wave height of 3.25 m (Sea State 5) or more;

h. Hydrofoil vessels with active systems for automatically controlling foil systems, with a maximum design speed, fully loaded, of 40 knots or more in a significant wave height of 3.25 m (Sea State 5) or more;

i. 'Small waterplane area vessels' having any of the following:

1. A full load displacement exceeding 500 tonnes with a maximum design speed, fully loaded, exceeding 35 knots in a significant wave height of 3.25 m (Sea State 5) or more; or

2. A full load displacement exceeding 1,500 tonnes with a maximum design speed, fully loaded, exceeding 25 knots hi a significant wave height of 4 m (Sea State 6) or more.

<u>Technical Note:</u>

A 'small waterplane area vessel' is defined by the following formula:

waterplane area at an operational design draught less than 2 x (displaced volume at the operational 2/3 design draught).

8A001 a. 8906 90 100 0
8906 90 990 0
8A001 b. 1. 8906 90 100 0
8906 90 990 0
8A001 b. 2. 8906 90 100 0
8906 90 990 0
8A001 b. 3. 8906 90 100 0
8906 90 990 0
8A001 c. 1. 8906 90 100 0
8906 90 990 0
8A001 c. 2. 8906 90 100 0
8906 90 990 0
8A001 d. 1. 8906 90 100 0
8906 90 990 0
8A001 d. 2. 8906 90 100 0
8906 90 990 0
8A001 d. 3. 8906 90 100 0
8906 90 990 0
8A001 e. 8905 90 900 0
8526 91 800 0(except for civil craft)
8A001 f. 8906 90 100 0
8906 90 990 0
8A001 g. 8906 90 100 0
8906 90 990 0
8A001 h. 8906 90 100 0
8906 90 990 0
8A001 i. 8906 90 100 0
8906 90 990 0

8A002 Systems and equipment, as follows:

Note: For underwater communications systems, see Category 5, Part 1 - Telecommunications.

a. Systems and equipment, specially designed or modified for submersible vehicles, 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;

b.Systems specially designed or modified for the automated control of the motion of submersible vehicles specified in 8A001 using navigation data and having closed loop servo-controls:

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;

c.Fibre optic hull penetrators or connectors;

d.Underwater vision systems, as follows:

1.Television systems and television cameras, as follows:

a.Television systems (comprising camera, monitoring and signal transmission equipment) having a limiting resolution when measured in air of more than 800 lines and specially designed or modified for remote operation with a submersible vehicle;

b.Underwater television cameras having a limiting resolution when measured in air of more than 1,100 lines;

8525 30 900 0

c.Low light level television cameras specially designed or modified for underwater use containing all of the following:

1. Image intensifier tubes specified in 6A002.a.2.a.; and

2. More than 150,000 "active pixels" per solid state area array;

Technical Note:

Limiting resolution in television is a measure of horizontal resolution usually expressed in terms of the maximum number of lines per picture height discriminated on a test chart, using IEEE Standard 208/1960 or any equivalent standard.

2.Systems, specially designed or modified for remote operation with an underwater vehicle, employing techniques to minimise the effects of back scatter, including range-gated illuminators or "laser" systems;

e.Photographic still cameras specially designed or modified for underwater use below 150 m having a film format of 35 mm or larger, and having any of the following:

1. Annotation of the film with data provided by a source external to the camera;

2. Automatic back focal distance correction; or

3. Automatic compensation control specially designed to permit an underwater camera housing to be usable at depths exceeding 1,000 m;

f.Electronic imaging systems, specially designed or modified for underwater use, capable of storing digitally more than 50 exposed images;

g.Light systems, as follows, specially designed or modified for underwater use:

1. Stroboscopic light systems capable of a light output energy of more than 3 00 J per flash and a flash rate of more than 5 flashes per second;

2. Argon arc light systems specially designed for use below 1,000 m;

h. "Robots" specially designed for underwater use, controlled by using a dedicated "stored programme controlled" computer, having any of the following:

1. 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

2. 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 "fibrous or filamentary" "composite" materials in their structural members;

i. Remotely controlled articulated manipulators specially designed or modified for use with submersible vehicles, having any of the following:

1. Systems which control the manipulator using the information from sensors which measure the torque or force applied to an external object, or tactile sense between the manipulator and an external object; or

2. Controlled by proportional master-slave techniques or by using a dedicated "stored programme controlled" computer, and having 5 degrees of freedom of movement or more;

Note: Only functions having proportional control using positional feedback or by using a dedicated "storedprogramme controlled" computer are counted when determining the number of degrees of freedom of movement.

']. Air independent power systems, specially designed for underwater use, as follows:

1.Brayton or Rankine cycle engine air independent power systems having any of the following:

a.Chemical scrubber or absorber systems specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;

b.Systems specially designed to use a monoatomic gas;

c.Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz, or special mounting devices for shock mitigation; or

d.Systems specially designed:

1. To pressurise the products of reaction or for fuel reformation;
2. To store the products of the reaction; and
3. To discharge the products of the reaction against a pressure of 100 kPa or more;

2.Diesel cycle engine air independent systems, having all of the following:

a.Chemical scrubber or absorber systems specially designed to remove carbon dioxide, carbon monoxide and particulates from recirculated engine exhaust;

b.Systems specially designed to use a monoatomic gas;

c.Devices or enclosures specially designed for underwater noise reduction in frequencies below 10 kHz or special mounting devices for shock mitigation; and

d.Specially designed exhaust systems that do not exhaust continuously the products of combustion;

3.Fuel cell air independent power systems with an output exceeding 2 kW 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;

b.Systems specially designed:

1. To pressurise the products of reaction or for fuel reformation;
2. To store the products of the reaction; and
3. To discharge the products of the reaction against a pressure of 100 kPa or more;

4.Stirling cycle engine air independent power systems, having all of the following:

a.Devices or enclosures specially designed for underwater noise reduction in frequencies below 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;

k. Skirts, seals and fingers, having any of the following:

1. Designed for cushion pressures of 3,830 Pa or more, operating in a significant wave height of 1.25 m (Sea State 3) or more and specially designed for surface effect vehicles (fully skirted variety) specified in 8A001 .f.; or
2. Designed for cushion pressures of 6,224 Pa or more, operating in a significant wave height of 3.25 m (Sea State 5) or more and specially designed for surface effect vehicles (rigid sidewalls) specified in 8A001 .g.;
1. Lift fans rated at more than 400 kW specially designed for surface effect vehicles specified in SAOOl.f. or SAOOl.g.;

m. Fully submerged subcavitating or supercavitating hydrofoils specially designed for vessels specified in 8A001.h.;

n. Active systems specially designed or modified to control automatically the sea-induced motion of vehicles or vessels specified in SAOOl.f., SAOOl.g., 8A001.h. or SAOOl.i.;

o. Propellers, power transmission systems, power generation systems and noise reduction systems, as follows:

1. Water-screw propeller or power transmission systems, as follows, specially designed for surface effect vehicles (fully skirted or rigid sidewall variety), hydrofoils or small waterplane area vessels specified in SAOOl.f., SAOOl.g., SAOOl.h. orSAOOl.i.:

a.Supercavitating, super-ventilated, partially-submerged or surface piercing propellers rated at more than 7.5 MW;

b.Contrarotating propeller systems rated at more than 15 MW;

c.Systems employing pre-swirl or post-swirl

c. The systems serving for smoothing of a stream, running on the engine with use of methods of elimination of whirlwinds of a stream before its formation;

d. Reducer superficial, high capacity (To-factor exceeds size 300):

e. Systems of transfer of capacity with the transmission shaft, including components from "composite" materials and capable to transfer more than 1 MWt

2.Water-screw propeller, power generation systems or transmission systems designed for use on vessels, as follows:

a.Controllable-pitch propellers and hub assemblies rated at more than 30

MW;

b.Internally liquid-cooled electric propulsion engines with a power output exceeding 2.5 MW;

c."Superconductive" propulsion engines, or permanent magnet electric propulsion engines, with a power output exceeding 0.1 MW;

d.Power transmission shaft systems, incorporating "composite" material components, capable of transmitting more than 2 MW;

e.Ventilated or base-ventilated propeller systems rated at more than 2.5 MW;

3.Noise reduction systems designed for use on vessels of 1,000 tonnes displacement or more, as follows:

a.Systems that attenuate underwater noise at frequencies below 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, 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, and incorporating electronic control systems capable of actively reducing equipment vibration by the generation of anti-noise or anti-vibration signals directly to the source;

p. Pumpjet propulsion systems having a power output exceeding 2.5 MW using divergent nozzle and flow conditioning vane techniques to improve propulsive efficiency or reduce propulsion-generated underwater-radiated noise;

q. Self-contained, closed or semi-closed circuit (rebreathing) diving and underwater swimming apparatus.

Note: 8A002.q. does not control an individual apparatus for personal use when accompanying its user.

8A002 a. 1. 8906 90 990 0
8526 91 800 0
8905 90 100 0
8A002 a. 2. 8501 33 000 9
8501 34 500 0
8501 34 980 0
8A002 a. 3. 8536 90 100 0
8536 90 850 0
9013 90 900 0
7326 90 980 0
8544 70 000 0
9001 10
8A002 b. 9014 20 800 0 (except for civil craft)
8A002 c. 9013 90 900 0
7326 90 980 0
8544 70 000 0
9001 10

8A002 d. 1. a 8525 80 190 0
8A002 d. 1. b 8525 80 300 0
8A002 d. 1. c 8525 80 300 0
8A002 d. 2. 8526 92 000 9 (except for civil craft)
8526 91 (except for civil craft)
9031 80 910 0
8A002 e. 9006 53
9006 59 000
8A002 f. 9030 84 000 9
8525 50 000 0 (except for civil craft)
8A002 g. 1. 9029 20 900 0
9405 40 990 9
9405 40 100 9
9405 40 390 9
8A002 g. 2. 9405 40 990 9
9405 40 390 9
9405 40 100 9
8A002 h. 8479 89 970 9
8486 10 000
8486 20
8486 30
8486 40 000
8479 90 960 0
8479 50 000 0
8A002 i. 8479 89 970 9
8479 90 960 0
8479 50 000 0
8A002 j. 1. 8408 10 (Only military purpose)
8409 99 000 9 (Only used in the military purposes)
8A002 j. 2. 8408 10 (Only military purpose)
8409 99 000 9 (Only used in the military purposes)
8A002 j. 3. 8408 10 (Only used in the military purposes)
8409 99 000 9 (Only used in the military purposes)
8A002 j. 4. 8408 10 (Only used in the military purposes)
8409 99 000 9(Only used in the military purposes)
8A002 k. 8479 90 960 0
8906 90 100 0
8906 90 990 0
8A002 l. 8412 39 000 0
8412 80 800 0
8487 10 900 0
8414 59 200 0
8A002 m. 8479 90 960 0
7325 99 900 0
7326 90 980 0

7616 99
8108 90 900 0
8A002 n. 8526 10 900 0
9014 80 000 0
8A002 o. 1. a. 8408 10 (Only used in the military purposes)
8487 10 900 0
8A002 o. 1. b. 8412 29 200 9
8412 29 890 9
8487 10 900 0
8A002 o. 1. c. 8412 29 200 9
8A002 o. 1. d. 8483 40 300 0
8A002 o. 1. e. 8483 10 950 0
8A002 o. 2. a 8487 10 900 0
8A002 o. 2. b. 8501 34 980 0
8501 34 500 0
8A002 o. 2. c. 8501 20 000 9
8A002 o. 2. d. 8483 10 950 0
8A002 o. 2. e. 8487 10 900 0
8A002 o. 3. a. 8409 99 000 9 (Only used in the military purposes)
8412 29 200 9
4016 10 000 0 (except used for civil craft)
4016 99 990 9
4017 00 900 0
8A002 o. 3. b. 8412 29 200 9
8479 89 970 9
8543 20 000 0
8543 70 900 9
8A002 p. 8412 29 200 9
8A002 q. 8906 90 990 0
9020 00 000 0

SB Test, Inspection and Production Equipment

8B001 Water tunnels, having a background noise of less than 100 dB (reference 1 uPa, 1 Hz), in the frequency range from 0 to 500 Hz, designed for measuring acoustic fields generated by a hydro-flow around propulsion system models.

8B001 9031 20 000 0

8C Materials

8C001 'Syntactic foam' designed for underwater use, having all of the following:

a.Designed for marine depths exceeding 1,000 m; and

b.A density less than 561 kg/m .

Technical Note:

'Syntactic foam' consists of hollow spheres of plastic or glass embedded in a resin matrix.

8C001 3921 90 900 0

8D Software

8D001 "Software" specially designed or modified for the "development", "production" or"use" of equipment or materials specified in 8A, 8B or 8C.

8D001

8D002 Specific "software" specially designed or modified for the "development", "production", repair, overhaul or refurbishing (re-machining) of propellers specially designed for underwater noise reduction.

8D002

8D 8523 40

8523 29

8523 51

8523 59

8523 80

8E Technology

8E001"Technology" according to the General Technology Note for the "development" or "production" of equipment or materials specified in 8A, 8B or 8C.

8E001

8E002 Other "technology", as follows:

a."Technology" for the "development", "production", repair, overhaul or refurbishing (re-machining) of propellers specially designed for underwater noise reduction;

b."Technology" for the overhaul or refurbishing of equipment specified in 8 AGO 1, 8A002.b., 8A002.J., 8A002.0. or 8A002.p.

8E002

CATEGORY 9
PROPULSION SYSTEMS, SPACE VEHICLES AND RELATED EQUIPMENT

9A Systems, equipment and components

N .B.: For propulsion systems designed or rated against neutron or transient ionizing radiation, see the Military Goods Controls.

9A001 Aero gas turbine engines incorporating any of the "technologies" specified in 9E003.a., as follows:

N.B.: SEE ALSO 9A101.

a.Not certified for the specific "civil aircraft" for which they are intended;

b.Not certified for civil use by the aviation authorities in a "participating state";

c.Designed to cruise at speeds exceeding Mach 1.2 for more than thirty minutes.

9A001 8411 11 000 0

8411 81 000

8411 82

9A002'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 8411 82 600 1

8411 82 600 9

8411 82 800 0

9A003Specially designed assemblies and components, incorporating any of the "technologies" specified in 9E003.a., for the following gas turbine engine propulsion systems:

a.Specified in 9A001;

b.Whose design or production origins are either non-"participating states" or unknown to the manufacturer.

9A003 8411 99 00

9A004Space launch vehicles and "spacecraft".

N.B.: SEE ALSO 9A104.

Note: 9A004 does not control pay loads.

N.B.: For the control status of products contained in "spacecraft" payloads, see the appropriate Categories.

9A004 8802 60 100 0

8802 60 900 0

9306 90

9A005Liquid rocket propulsion systems containing any of the systems or components specified in 9A006 .

N.B.: SEE ALSO 9A105 and 9A119

9A005 8412 10 000 9

9A006Systems and components specially designed for liquid rocket propulsion systems, as follows: N.B.: SEE ALSO 9A106 and 9A108.

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;

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 x lO"""" cm2 or smaller for non-circular orifices) 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/cm3 and tensile strengths exceeding 48 MPa.

9A006 a. 8412 90 800 0
9A006 b. 8412 90 800 0
9A006 c. 7311 00
8413 19 000 0
8419 60 000 0
9A006 d. 8413 19 000 0
9A006 e. 8412 90 200 0
9A006 f. 8412 90 800 0
8479 89 980 0
8412 29 890 9
9A006 g. 8411 99 009 0
9306 90 900 0
8412 90 009 0
9A006 h. 3801
8412 90
9306 90

9A007 Solid rocket propulsion systems with any of the following:

N.B.: SEE ALSO 9A119.

a.Total impulse capacity exceeding 1.1 MNs;

b.Specific impulse of 2.4 kNs/kg or more when the nozzle flow is expanded to ambient sea level conditions for an adjusted chamber pressure of 7 MPa;

c.Stage mass fractions exceeding 88% and propellant solid loadings exceeding 86%;

d.Any of the components specified in 9A008; or

e.Insulation and propellant bonding systems using direct-bonded motor designs to provide a 'strong mechanical bond' or a barrier to chemical migration between the solid propellant and case insulation material.

Technical Note: For the purposes of9A007.e., a 'strong mechanical bond' means bond strength equal to or more than propellant strength.

9A007 8412 10 000 9

9A008Components, as follows, specially designed for solid rocket propulsion systems:

N.B.: SEE ALSO 9A108.

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;

Technical Note:

For the purposes of 9A008.a., a 'strong mechanical bond' means bond strength equal to or more than propellant strength.

b.Filament-wound "composite" motor cases exceeding 0.61 m in diameter or having structural efficiency ratios (PV/W) exceeding 25 km;

Technical Note:

The 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°/s2 or more.

9A008 a. 8412 90 200 0
8803 90 900 0
4016 10 900 0
4016 99 880 9
4017 00 900 0
9A008 b. 9306 90
8803 90 900 0
9A008 c. 9306 90
8803 90 900 0
9A008 d. 8412 90 200 0
9306 90

9A009 Hybrid rocket propulsion systems with:

N.B.: SEE ALSO 9A109 and 9A119.

"a. Total impulse capacity exceeding 1.1 MNs; or

b. Thrust levels exceeding 220 kN in vacuum exit conditions.

9A009 8412 10 000 9
8412 90 200 0

9AO10 Specially designed components, systems and structures for launch vehicles, launch vehicle propulsion systems or "spacecraft", as follows:

N.B.: SEEALSO1A002AND9A110.

a.Components and structures each exceeding 10 kg, specially designed for launch vehicles manufactured using metal "matrix", "composite", organic "composite", ceramic "matrix" or mtermetallic reinforced materials specified in 1C007 or ICO 10;

Note: The -weight cut-off is not relevant for nose cones.

b.Components and structures specially designed for launch vehicle propulsion systems specified in 9A005 to 9A009 manufactured using metal matrix, composite, organic composite, ceramic matrix or intermetallic reinforced materials specified in 1C007 or 1C010;

c.Structural components and isolation systems specially designed to control actively the dynamic response or distortion of "spacecraft" structures;

d.Pulsed liquid rocket engines with thrust-to-weight ratios equal to or more than 1 kN/kg and a response time (the time required to achieve 90% of total rated thrust from start up) of less than 30ms.

9A010 a 2804 50 100 0

2818 20 000 0
2849 20 000 0
3801
3926 90 980 2
6815 99 100 0
6903 10 000 0
7019 19
7019 11 000 0
7019 12 000 0
7019 40 000 0
7019 51 000 0
7019 52 000 0
7019 59 000 0
8101 99 100 0
8102 95 000 0
8108 90 300 0
8108 90 600 0
8108 90 500 0
8412 90
8803 90 900 0
9306 90
9A010 b. 2804 50 100 0
2818 20 000 0
2849 20 000 0
3801
3926 90 980 2
6815 99 100 0
6903 10 000 0
7019 11 000 0
7019 12 000 0
7019 19
7019 40 000 0
7019 51 000 0
7019 52 000 0
7019 59 000 0
8101 99 100 0
8102 95 000 0
8108 90 300 0
8108 90 500 0
8108 90 600 0
8412 90
8803 90 900 0
9306 90
9A010 c. 8803 90 900 0
9306 90

9A010 d. 8412 10 000 9

9A011 Ramjet, scramjet or combined cycle engines and specially designed components therefor.

N.B.: SEE ALSO 9A111 and 9A118.

9A011 8412 10 000 9

9A012 the Pilotless air vehicles possessing following characteristics:

a. Independent management of flight and navigating opportunities (as, the autopilot with inertial navigating system); or

b. An opportunity controllable by the operator (dispatching service) flight outside of a visibility limit (for example, telecontrol).

9A012 8802 20 000 0

8802 30 000 0

8802 40 000 9

9306 90

9A101Lightweight turboj et and turbofan engines (including turbocompound engines) usable in "missiles", other than those specified in 9A001, as follows;

a.Engines having both of the following characteristics:

1. Maximum thrust value greater than 1,000 N (achieved un-installed) excluding civil certified engines with a maximum thrust value greater than 8,890 N (achieved un-installed), <u>and</u>

2. Specific fuel consumption of 0.13 kg/N/hr or less (at sea level static and standard conditions); or

b. Engines designed or modified for use in "missiles".

9A101 a. 8411 11 000 0 (except for civil aircraft)

9A101 b. 8411 11 000 0 (except for civil aircraft)

9A104 Rockets-probes with a resource not less than 300 km.

9A104 Sounding rockets, capable of a range of at least 300 km.

N.B.: SEE ALSO 9A004.

9A104 8802 60 100 0

9306 90

8802 60 900 0

9A105 Liquid propellant rocket engines, as follows:

N.B.: SEE ALSO 9A119.

a.Liquid propellant rocket engines usable in "missiles", other than those specified in 9A005, having a total impulse capacity of 1.1 MNs or greater;

b.Liquid propellant rocket engines, usable in complete rocket systems or unmanned air vehicles, capable of a range of 300 km, other than those specified in 9A005 or 9A105.a., having a total impulse capacity of 0.841 MNs or greater.

9A105 8412 10 000 9

9A106Systems or components, other than those specified in 9A006, usable in "missiles", as follows, specially designed for liquid rocket propulsion systems:

a.Ablative liners for thrust or combustion chambers;

b.Rocket nozzles;

c.Thrust vector control sub-systems;

Technical Note:

Examples of methods of achieving thrust vector control specified in 9A106.C. are:

1. Flexible nozzle;
2. Fluid or secondary gas injection;
3. Movable engine or nozzle;
4. Deflection of exhaust gas stream (jet vanes or probes); or_
5. Thrust tabs.

d. Liquid and slurry propellant (including oxidisers) control systems, and specially designed components therefor, designed or modified to operate in vibration environments of more than 10 g rms between 20 Hz and 2,000 Hz.

Note: The only servo valves and pumps specified in 9A106. d., are the following:

a.Servo valves designed for flow rates of 24 litres per minute or greater, at an absolute pressure of 7 MPa or greater, that have an actuator response time of less than 100 ms;

b.Pumps, for liquidpropellants, -with shaft speeds equal to or greater than 8,000 r.p. m. or with discharge pressures equal to or greater than 7 MPa.

9A106 a. 8412 90 200 0
8803 90 900 0
9306 90
9A106 b. 9306 90
8803 90 900 0
9A106 c. 8412 90 200 0
9A106 d, a 8481 10 990 0
9026 90 000 0
9032 81 000 9
9A106 d, b 8413 19 000 0
8413 30 200 9
8413 30 800 9

9A107 Solid propellant rocket engines, usable in complete rocket systems or unmanned air vehicles, capable of a range of 300 km, other than those specified in 9A007, having total impulse capacity of 0.841 MNs or greater.

N.B.: SEE ALSO 9A119.

9A107 8412 10 000

9A108Components, other than those specified hi 9A008, usable in "missiles", as follows, specially

designed for solid rocket propulsion systems:

a.Rocket motor cases, "interior lining" and "insulation" therefor;

b.Rocket nozzles;

c.Thrust vector control sub-systems.

Technical Note:

Examples of methods of achieving thrust vector control specified in

9A108.C. are:

1. Flexible nozzle;
2. Fluid or secondary gas injection;
3. Movable engine or nozzle;
4. Deflection of exhaust gas stream (jet vanes or probes); or.
5. Thrust tabs.

9A108 a, b, c. 8412 90 200 0
8803 90 900 0
9306 90
8412 90 200 0

9A109 Hybrid rocket motors, usable in "missiles", other than those specified in 9A009, and specially designed components therefor.

N.B.: SEEALSO9A119.

9A109 8412 10 000 9
8412 90 200 0

9A110Composite structures, laminates and manufactures thereof, other than those specified in

9A010, specially designed for use in space launch vehicles specified in 9A004 or sounding rockets specified in 9A104 or the subsystems specified in 9A005, 9A007, 9A105.a., 9A106 to9A108, 9A116or 9A119.

N.B.: SEE ALSO 1A002.

9A110 2804 50 100 0
2818 20 000 0
3801
3926 90 980 9
6815 99 100 0
6903 10 000 0
8108 90 600 0
(except used for civil aircraft)
8102 95 000 0
8108 90 300 0
8108 90 600 0
(except used for civil aircraft)
7019 39 000

9A111Pulse jet engines, usable in "missiles", and specially designed components therefor.

N.B.: SEE ALSO 9A011 and9A118.

9A111 8412 10 000 9

9A115 Launch support equipment, designed or modified for space

launch vehicles specified in 9A004 or sounding rockets specified in 9A104, as follows:

a.Apparatus and devices for handling, control, activation or launching;

b.Vehicles for transport, handling, control, activation or launching.

9A115 a. 8479 89 970 9

9031 20 000 0

9031 80 980 0

9A115 b. 9031 80 980 0

9A116Reentry vehicles, usable in "missiles", and equipment designed or modified therefor, as follows:

a.Reentry vehicles;

b.Heat shields and components therefor fabricated of ceramic or ablative materials;

c.Heat sinks and components therefor fabricated of light-weight, high heat capacity materials;

d. Electronic equipment specially designed for reentry vehicles.

9A116 a. 8803 90 900 0

9306 90

9A116 b. 8803 90 900 0

9306 90

9A116 c. 8803 90 900 0

9306 90

9A116 d. 9014 20 800 0

9306 90

8541 10 000 9

9A117 Staging mechanisms, separation mechanisms, and interstages, usable in "missiles".

9A117 8803 90 900 0

9306 90

9A118Devices to regulate combustion usable in engines, which are usable in "missiles", specified in 9A011 or 9A111.

9A119Individual rocket stages, usable hi complete rocket systems or unmanned air vehicles, capable of a range of 300 km, other than those specified in 9A005, 9A007, 9A009, 9A105,9A107and9A109.

9A119 8803 90
9306 90

9B Test, Inspection and product equipment

9BOO1 Specially designed equipment, tooling and fixtures, as follows, for manufacturing or measuring gas turbine blades, vanes or tip shroud castings:

a.Directional solidification or single crystal casting equipment;

b.Ceramic cores or shells;

9B001 a. 8411 99 009 0 (except for civil craft)
8479 89 600
9B001 b. 6903 90 900 0

9B002On-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 incorporating "technologies" specified in 9E003.a.

9B002 9031 80 910 0
8537 10 100 0
8537 10 910
9032 89 000 0 (except for civil craft)

9B003Equipment 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 8459 61
8459 69
9024 10
9031 20 000 0

9B004Tools, dies or fixtures for the solid state joining of "superalloy", titanium or intermetallic airfoil-to-disk combinations described in 9E003.a.3. or 9E003.a.6. for gas turbines.

9B004 8515 80 110 0
8515 90 000 0
8515 80 190 0
8466

9B005On-line (real time) control systems, instrumentation (including sensors) or automated data acquisition and processing equipment, specially designed for use with any of the following wind tunnels or devices:

N.B.: SEE ALSO 9B105.

a.Wind tunnels designed for speeds of Mach 1.2 or more, except those specially designed for educational purposes and having a test section size (measured laterally) of less than250 mm;

Technical Note:

Test section size in 9B005.a. means the diameter of the circle, or the side of the square, or the longest side of the rectangle, at the largest test section location.

b.Devices for simulating flow-environments at speeds exceeding Mach 5,

including hot shot tunnels, plasma arc tunnels, shock tubes, shock tunnels, gas tunnels and light gas guns; or

c.Wind tunnels or devices, other than two-dimensional sections, capable of simulating 6

Reynolds number flows exceeding 25 x 10 .

9B005 a. 9031 20 000 0

9B005 b. 9031 20 000 0

9B005 c. 9031 20 000 0

9B006Acoustic vibration test equipment capable of producing sound pressure levels of 160 dB or more (referenced to 20 (aPa) with a rated output of 4 kW or more at a test cell temperature exceeding 1,273 K (1,000°C), and specially designed quartz heaters therefor.

N.B.: SEE ALSO 9B106.

9B006 9031 20 000 0

9B007Equipment specially designed for inspecting the integrity of rocket motors using non-destructive test (NDT) techniques other than planar X-ray or basic physical or chemical analysis.

9B007 9022 90

9024 10 9031

9B008Transducers specially designed for the direct measurement of the wall skin friction of the test flow with a stagnation temperature exceeding 833 K (560°C).

9B008 9025 19 800 0 (except for civil craft)

9027 80 970 0

9B009Tooling specially designed for producing turbine engine powder metallurgy rotor components capable of operating at stress levels of 60% of ultimate tensile strength (UTS) or more and metal temperatures of 873 K (600°C) or more.

9B009 8462 99 100 0

9B105Wind tunnels for speeds of Mach 0.9 or more, usable for "missiles" and their subsystems.

N.B.: SEE ALSO 9B005.

9B105 9031 20 000 0

9B106 Environmental chambers and anechoic chambers, as follows:

a.Environmental chambers capable of simulating the following flight conditions:

1. Vibration environments of 10 g rms or greater between 20 Hz and 2,000 Hz and imparting forces of 5 kN or greater; <u>and</u>
2. Altitudes of 15,000m or greater; or
3. Temperature range of at least 223 K (-50°C) to 398 K (+ 125°C);

b.Anechoic chambers capable of simulating the following flight conditions:

1. Acoustic environments at an overall sound pressure level of 140 dB or greater

(referenced to 20 uPa) or with a rated power output of 4 kW or greater; and

2. Altitudes of 15,000 m or greater; or
3. Temperature range of at least 223 K (-50°C) to 3 98 K (+ 125°C).

9B106 a. 9031 20 000 0

9B106 b. 9031 20 000 0

9B115Specially designed "production equipment" for the systems, sub-systems and components specified in 9A005 to 9A009, 9A011, 9A101, 9A105 to 9A109, 9A111, 9A116to9A119.

9B115 9031 20 000 0

9B116Specially designed "production facilities" for the space launch vehicles specified in 9A004, or systems, sub-systems, and components specified in 9A005 to 9A009, 9A011, 9A101, 9A104 to 9A109, 9A111, or 9A116 to 9A119.

9B116 8805 10

9B117Test benches and test stands for solid or liquid propellant rockets or rocket motors, having either of the following characteristics:

a.The capacity to handle more than 90 kN of thrust; or

b.Capable of simultaneously measuring the three axial thrust components.

9B117 9031 20 000 0

9C Materials

9C110Resin impregnated fibre prepregs and metal coated fibre preforms therefor, for composite structures, laminates and manufactures specified in 9A110, made either with organic matrix or metal matrix utilising fibrous or filamentary reinforcements having a "specific tensile strength" greater than 7.62 x 104 m and a "specific modulus" greater than 3.18 x 106 rn.

N.B.: SEE ALSO 1C010 and 1C210.

Note: The only resin impregnated fibre prepregs specified in entry PC] 10 are those using resins with a glass transition temperature (Tg), after cure, exceeding 418 K (145°C) as determined by ASTM D4065 or equivalent.

9C110 3921 90 190 9

3921 90 300 0

3921 90 550 0

3926 90 980 9

6815 10 100 0

6815 99 100 0

6903 10 000 0

7019

8101 96 000 0

8101 99

8104 90 000 0

8108 90 900 0

9DSoftware

9D001"Software" specially designed or modified for the "development" of equipment or "technology" specified in 9A, 9B or 9E003.

9D001

9D002"Software" specially designed or modified for the "production" of equipment specified in 9A or 9B.

9D002

9D003"Software" specially designed or modified for the "use" of "full authority digital electronic engine controls" ("FADEC") for propulsion systems specified in 9A or equipment specified in 9B, as follows:

a."Software" in digital electronic controls for propulsion systems, aerospace test facilities or air breathing aero-engine test facilities;

b.Fault-tolerant "software" used in "FADEC" systems for propulsion systems and associated test facilities.

9D003

9D004Other "software", as follows:

a.2D or 3D viscous "software" validated with wind tunnel or flight test data required for detailed engine flow modelling;

b."Software" for testing aero gas turbine engines, assemblies or components, specially designed to collect, reduce and analyse data in real time, and capable of feedback control, including the dynamic adjustment of test articles or test conditions, as the test is in progress;

c."Software" specially designed to control directional solidification or single crystal casting;

d."Software" in "source code", "object code" or machine code required for the "use" of active compensating systems for rotor blade tip clearance control.

Note: 9D004.d. does not control "software" embedded in uncontrolled equipment or required for maintenance activities associated with the calibration or repair or updates to the active compensating clearance control system.

9D004

9D101"Software" specially designed or modified for the "use" of goods specified in 9B105, 9B106, 9B116 or 9B117.

9D101

9D103"Software" specially designed for modelling, simulation or design integration of the space launch vehicles specified in 9A004 or sounding rockets specified in 9A104, or the subsystems specified in 9A005, 9A007, 9A105.a., 9A106, 9A108, 9A116 or 9A119.

Note: "Software" specified in 9D103 remains controlled when combined with specially designed hardware specified in 4A102.

9D103

9D104"Software" specially designed or modified for the "use" of goods specified in 9AOO1, 9A005,

9A006.d., 9A006.g., 9A007.a., 9A008.d., 9A009.a., 9A010.d., 9A011, 9A101, 9A105, 9A106.C., 9A106.d., 9A107, 9A108.C., 9A109, 9A111, 9A115.a., 9A116.d., 9A117 or 9A118.

9D104

9D105"Software" which coordinates the function of more than one subsystem, specially designed or modified for "use" in space launch vehicles

specified in 9A004 or sounding rockets specified in9A104.

9D105

9E Technology

Note: "Development" or "production " "technology" specified in 9E001 to 9E003 for gas turbine engines remains controlled when used as "use" "technology" for repair, rebuild and overhaul. Excluded from control are: technical data, drawings or documentation for maintenance activities directly associated with calibration, removal or replacement of damaged or unserviceable line replaceable units, including replacement of whole engines or engine modules.

9E001 "Technology" according to the General Technology Note for the "development" of equipment or "software" specified in 9A001.C., 9A004 to 9A011, 9B or 9D

9E001

9E002 "Technology" according to the General Technology Note for the "production" of equipment specified in 9A001.C., 9A004 to 9A011, or 9B.

N.B.: For "technology" for the repair of controlled structures, laminates or materials, see IE002.f.

9E002

9E003 Other "technology", as follows:

a. "Technology" "required" for the "development" or "production" of any of the following gas turbine engine components or systems:

1. Gas turbine blades, vanes or tip shrouds made from directionally solidified (DS) or single crystal (SC) alloys 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. Multiple domed combustors operating at average burner outlet temperatures exceeding 1,813 K (1,540°C) or combustors incorporating thermally decoupled combustion liners, non-metallic liners or non-metallic shells;
3. Components manufactured from any of the following:

a.Organic "composite" materials designed to operate above 588 K (315°C);

b.Metal "matrix" "composite", ceramic "matrix", intermetallic or intermetallic reinforced materials specified in 1C007; or

c."Composite" material specified in ICO 10 and manufactured with resins specified in 1 COOS.

4. Uncooled turbine blades, vanes, tip-shrouds or other components designed to operate at gas path temperatures of 1,323 K (1,050°C) or more;
5. Cooled turbine blades, vanes or tip-shrouds, other than those described in 9E003.a.l., exposed to gas path temperatures of 1,643 K (1,370°C) or more;
6. Airfoil-to-disk blade combinations using solid state joining;
7. Gas turbine engine components using "diffusion bonding" "technology" specified in2E003.b.;

8. Damage tolerant gas turbine engine rotating components using powder metallurgy materials controlled by lC002.b.;
9. "FADEC" for gas turbine and combined cycle engines and their related diagnostic components, sensors and specially designed components;
10. Adjustable flow path geometry and associated control systems for:

a.Gas generator turbines;

b.Fan or power turbines;

c.Propelling nozzles;

Note I: Adjustable flow path geometry and associated control systems in 9E003.a.lO. do not include inlet guide vanes, variable pitch fans, variable stators or bleed valves for compressors.

Note 2: 9E003.a.lO. does not control "development" or "production" "technology" for adjustable flow path geometry for reverse thrust.

11.Wide chord hollow fan blades without part-span support;

b."Technology" "required" for the "development" or "production" of any of the following:

1. Wind tunnel aero-models equipped with non-intrusive sensors capable of transmitting data from the sensors to the data acquisition system; or
2. "Composite" propeller blades or propfans capable of absorbing more than 2,000 kW at flight speeds exceeding Mach 0.55;

c."Technology" "required" for the "development" or "production" of gas turbine engine components using "laser", water jet, ECM or EDM hole drilling processes to produce holes having any of the following sets of characteristics:

1.All of the following:

a.Depths more than four times their diameter;

b.Diameters less than 0.76 mm; and

c.Incidence angles equal to or less than 25°; or

2.All of the following:

a.Depths more than five times their diameter;

b.Diameters less than 0.4 mm; and

c.Incidence angles of more than 25°;

Technical Note:

For the purposes of 9E003.c., incidence angle is measured from a plane tangential to the airfoil surface at the point where the hole axis enters the airfoil surface.

d."Technology" "required" for any of the following:

1. The "development" of helicopter power transfer systems or tilt rotor or tilt wing "aircraft" power transfer systems; or
2. The "production" of helicopter power transfer systems

or tilt rotor or tilt wing "aircraft" power transfer systems;

e.1. "Technology" for the "development" or "production" of reciprocating diesel engine ground vehicle propulsion systems having all of the following:

a.A 'box volume' of 1.2 m or less;

b.An overall power output of more than 750 kW based on 80/1269/EEC, ISO 2534 or national equivalents; and

c.A power density of more than 700 kW/m of box volume;

Technical Note:

'Box volume' in 9E003.e.l.a is the product of three perpendicular dimensions measured in the following way:

Length: The length of the crankshaft from front flange to flywheel face;

Width: The widest of the following:

a.The outside dimension from valve cover to valve cover;

b.The dimensions of the outside edges of the cylinder heads; or

c.The diameter of the flywheel housing;

Height: The largest of the following:

a.The dimension of the crankshaft centre-line to the top planeofthe valve cover (or cylinder head) plus twice the stroke; or

b.The diameter of the flywheel housing.

2."Technology" "required" for the "production" of specially designed components, as follows, for high output diesel engines:

a."Technology" "required" for the "production" of engine systems having all of the following components employing ceramics materials specified in 1C007:

1. Cylinder liners;
2. Pistons;
3. Cylinder heads; and
4. One or more other components (including exhaust ports, turbochargers, valve guides, valve assemblies or insulated fuel injectors);

b."Technology" "required" for the "production" of turbocharger systems, with single-stage compressors having all of the following:

1. Operating at pressure ratios of 4:1 or higher;
2. A mass flow in the range from 30 to 130 kg per minute; and
3. Variable flow area capability within the compressor or turbine sections;

c."Technology" "required" for the "production" of fuel injection systems with a specially designed multifile! (e.g., diesel or jet fuel) capability covering a viscosity range from diesel fuel (2.5 cSt at 310.8 K (37.8°C)) down to gasoline fuel (0.5 cSt at 310.8 K (37.8°C)), having both of the following:

1. Injection amount in excess of 230 mm per injection per cylinder; and
2. Specially designed electronic control features

for switching governor characteristics automatically depending on fuel property to provide the same torque characteristics by using the appropriate sensors;

3."Technology" "required" for the "development" or "production" of high output diesel engines for solid, gas phase or liquid film (or combinations thereof) cylinder wall lubrication, permitting operation to temperatures exceeding 723 K (450°C), measured on the cylinder wall at the top limit of travel of the top ring of the piston.

Technical Note:

High output diesel engines: diesel engines with a specified brake mean effective pressure of 1.8 MPa or more at a speed of 2,300 r.p.m., provided the rated speed is 2,300 r.p.m. or more.

9E003

9E101"Technology" according to the General Technology Note for the "development" or "production" of goods specified in 9A101, 9A104 to 9A111 or 9A115 to 9A119.

9E101

9E102"Technology" according to the General Technology Note for the "use" of space launch vehicles specified in 9A004, or goods specified in 9A005 to 9A011, 9A101, 9A104 to 9A111,9A115 to 9A119,96105, 9B106, 9B115, 9B116, 9B117, 9D101 or9D103.

9E102

The goods and technologies of military application (purpose)

(further - the Munitions list)

The General remark on technology

The export of "technology" which is "required" for the "development", "production" or "**use**" of items controlled in the Munitions list is controlled according to the provisions in the Munitions list entries. This "technology" remains under control even when applicable to any uncontrolled item.

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

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

The general chemical remark:

Chemical substances are listed under the name and reference number of Abstract service in chemistry (CAS). Chemical substances of the identical structural formula (including hydrates) are supervised irrespective of reference number (CAS number) and names. Reference numbers are given for the help in definition of controllable quantity of substances irrespective of the given nomenclature, i.e. whether one chemical substance or the whole mix is supervised. Reference numbers should not

be used as unique identifiers as some forms of the described chemical substances have various reference numbers, and the mixes containing described substance, can have various numbers also.

ML1.* Arms and automatic weapons with a calibre of 12.7 mm (calibre 0.50 inches) or less and accessories, as follows, and specially designed components therefor:

a. Rifles, carbines, revolvers, pistols, machine pistols and machine guns:

Note ML1.a. does not control the following: 2. Reproductions of muskets, rifles and carbines the originals of which were manufactured earlier than 1890; 2. Revolvers, pistols and machine guns manufactured earlier than 1890, and their reproductions;

Note: ML(1) does not supervise the following:

2. Muskets, rifles and the carbines made till 1890, and their reproduction;

2. Revolvers, pistols and machine guns,

(b) The Following smooth-bore weapon:

1. Smooth-bore weapons specially designed for military **use**;;

2. Other smooth-bore weapon, such type as:

(a) Completely automatic;

(b) Semi-automatic or type reciprocating движенья;

(c) Weapons using caseless ammunition;;

(d) Silencers, special gun-mountings, clips and flash suppressers for arms controlled by sub-items ML1.a., ML1.b. or ML1.c.

(e) the Smooth-bore weapon, other, than is specified in item ML1 (b) and specially designed components to it. Such weapon should not look like the weapon specially designed for military application and should not concerns to automatically weapon;

Note 1: ML1 (e) does not supervise pneumatic or cartridge (explosive action) a gun or the pistols designed as industrial tools or means for painless killing of animals;

Note 1: ML1 does not supervise the fire-arms specially designed for use with a single ammunition and which is unable to shoot a controllable ammunition.

ML1. The smooth-bore weapon with calibre is less 20 mm, other arms and automatic weapon with calibre 12,7 mm (calibre of 0,50 inches) or less, and also following cannon accessories and components specially designed for it:

(a) Rifles, carbines, revolvers, pistols, automatic pistols and machine guns:

Note: ML1 (a) does not supervise the following:

1. Muskets, rifles and the carbines made till 1890, and their reproduction;

2. Revolvers, pistols and machine guns,

(b) The follows smooth-bore weapon:

1. The smooth-bore weapon specially developed for military application;
2. Other smooth-bore weapon, such type as:
(a) Completely automatic;
(b) Semi-automatic or type reciprocating движенья;
(h) the Weapon using безгильзовые an ammunition;
(i) the Mufflers, special nozzles, clips, sights and пламегасители for the arms, controllable by subitems ML1 (a), ML1 (b) or ML1 (c).
(j) the Smooth-bore weapon, other, than is specified in item ML1 (b) and specially designed components to it. Such weapon should not look like the weapon specially designed for military application and should not concerns to automatic type of the weapon;

Note 1: ML1 (e) does not supervise pneumatic or cartridge (explosive action) a gun or the pistols designed as industrial tools or means for painless killing of animals;

Note 1: ML1 does not supervise the fire-arms specially designed for use with a single ammunition and which is unable to shoot a controllable ammunition.

ML1. 9303
9305
9301
9302 00 000 0
9013 10 000 0

ML2. Armament or weapons with a calibre greater than 12.7 mm (calibre 0.50 inches), projectors and accessories, as follows, and specially designed components therefor:
a. Guns, howitzers, cannon, mortars, anti-tank weapons, projectile launchers, military flame throwers, recoilless rifles and signature reduction devices therefor;
*Note ML2.a. includes injectors, metering devices, storage tanks and other specially designed components for **use** with liquid propelling charges for any of the equipment controlled by ML 2.a..*
b. Military smoke, gas and pyrotechnic projectors or generators.
Note ML 2.b. does not control signal pistols.
(e) Sights for the weapon.
ML2. 9301
9013 10 000 0 ML3.
An ammunition and devices of installation of a detonator, and components specially designed for them, such as:
(a)ML3. Ammunition, and specially designed components therefor, for the weapons controlled by ML1., ML2. or ML12.
(b) Devices of installation of the detonator, specially developed for the ammunition controllable ML3 (a).
Note 1 Specially designed components include:
a. Metal or plastic fabrications such as primer anvils, bullet cups, cartridge links, rotating bands and munitions metal parts;
b. Safing and arming devices, fuses, sensors and initiation devices ;

c. Power supplies with high one-time operational output;
d. Combustible cases for charges;
e. Submunitions including bomblets, minelets and terminally guided projectiles.
Note 2 ML3. does not control ammunition crimped without a projectile (blank star) and dummy ammunition with a pierced powder chamber.
Note 3: ML3 (a) does not supervise the cartridges specially developed for any the following purposes:

(a) Alarm;
(b) For scaring away of birds; or
(c) the Arson of the candle for burning gas on oil wells.

ML3. 9305

ML4. Bombs, torpedoes, rockets, missiles, and related equipment and accessories, as follows, specially designed for military **use**, and specially designed components therefor:

Note: For systems of prompting and the navigating equipment, see ML11, the Note g.

a. Bombs, torpedoes, grenades, smoke canisters, rockets, mines, missiles, depth charges, demolition-charges, demolition-devices and demolition-kits, "military pyrotechnics", cartridges and simulators (i.e. equipment simulating the characteristics of any of these items);

Note ML4.a. includes:
1. Smoke grenades, fire bombs, incendiary bombs and explosive devices;
2. Missile rocket nozzles and re-entry vehicle nosetips. Equipment specially designed for the handling, control, activation, powering with one-time operational output, launching, laying, sweeping, discharging, decoying, jamming, detonation or detection of items controlled by ML4.a.
Note ML 4.b. includes:
1. Mobile gas liquefying equipment capable of producing 1,000 kg or more per day of gas in liquid form;
2. Buoyant electric conducting cable suitable for sweeping magnetic mines.

Technical note: the Manual devices limited by the design only for detection of metal objects and unable to distinguish mines from other metal objects, are not considered as the devices specially designed for definition of the products controllable ML4 (a).

ML4. 9306

ML5. Fire control, and related alerting and warning equipment, and related systems and countermeasure equipment, as follows, specially designed for military **use**, and specially designed components and accessories therefor:
a. Weapon sights, bombing computers, gun laying equipment and weapon control systems;
b. Target acquisition, designation, range-finding, surveillance or tracking systems; detection, data fusion, recognition or identification equipment; and sensor integration equipment;
c. Countermeasure equipment for items controlled by ML5.a. and ML5.b.

(d) the Field equipment for carrying out of check and adjustment, specially intended for the products controllable ML5 (a) and ML5 (b).

ML5 (b).

ML6. Ground vehicles and components for them:

N.B.: For systems of prompting and the navigating equipment, see ML11, the Note g.

ML6. Ground vehicles and components therefor specially designed or modified for military **use**.

Technical Note

For the purposes of ML6. the term ground vehicles includes trailers.

Note 1 ML6. includes:

(b) All wheel vehicles, suitable for use in the outlanders conditions, made or equipped by materials for maintenance of ballistic protection of III level (NI) 01.08.01, from September, 1985 or the comparable national standard) or other higher level;

N.B.: See also ML13 (a)

a. Tanks and other military armed vehicles and military vehicles fitted with mountings for arms or equipment for mine laying or the launching of munitions controlled under ML4;

b. Armoured vehicles;

c. Amphibious and deep water fording vehicles;

d. Recovery vehicles and vehicles for towing or transporting ammunition or weapon systems and associated load handling equipment.

*Note 2 Modification of a ground vehicle for military **use** entails a structural, electrical or mechanical change involving one or more specially designed military components. Such components include:*

a. Pneumatic tyre casings of a kind specially designed to be bullet-proof or to run when deflated;

b. Tyre inflation pressure control systems, operated from inside a moving vehicle;

c. Armoured protection of vital parts, (e.g., fuel tanks or vehicle cabs);

d. Special reinforcements for mountings for weapons.

Note 3 ML6. does not control civil automobiles or bank trucks having armoured protection.

ML6. 8710 00 000 0

ML7 Chemical or biological toxic agents, "riot control agents", radioactive materials, related equipment, components and materials as follows:

a. Biological agents and radioactive materials "adapted for use in war" to produce casualties in humans or animals, degrade equipment or damage crops or the environment;

b. Chemical warfare (CW) agents including:

1. CW nerve agents:

a. O-Alkyl (equal to or less than C10, including cycloalkyl) alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) — phosphonofluoridates, such as:

1. Sarin (GB):O-Isopropyl methylphosphonofluoridate (CAS 107-44-8); and

2. Soman (GD):O-Pinacolyl methylphosphonofluoridate (CAS 96-64-0);
b. O-Alkyl (equal to or less than C10, including cycloalkyl) N,N-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphoramidocyanidates, such as:
Tabun (GA):O-Ethyl N,N-dimethylphosphoramidocyanidate (CAS 77-81-6);
c. O-Alkyl (H or equal to or less than C10, including cycloalkyl) S-2-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl)-aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonothiolates and corresponding alkylated and protonated salts, such as:
VX: O-Ethyl S-2-diisopropylaminoethyl methyl phosphonothiolate (CAS 50782-69-9);
2. CW vesicant agents:
a. Sulphur mustards, such as:
d. 2-Chloroethylchloromethylsulphide (CAS 2625-76-5);
e. Bis(2-chloroethyl) sulphide (CAS 505-60-2);
f. Bis(2-chloroethylthio) methane (CAS 63869-13-6);
g. 1,2-bis (2-chloroethylthio) ethane (CAS 3563-36-8);
h. 1,3-bis (2-chloroethylthio) -n-propane (CAS 63905-10-2);
i. 1,4-bis (2-chloroethylthio) -n-butane (CAS 142868-93-7);
j. 1,5-bis (2-chloroethylthio) -n-pentane (CAS 142868-94-8);
k. Bis (2-chloroethylthiomethyl) ether (CAS 63918-90-1);
l. Bis (2-chloroethylthioethyl) ether (CAS 63918-89-8);
b. Lewisites, such as:
1. 2-chlorovinyldichloroarsine (CAS 541-25-3);
2. Tris (2-chlorovinyl) arsine (CAS 40334-70-1);
3. Bis (2-chlorovinyl) chloroarsine (CAS 40334-69-8);
c. Nitrogen mustards, such as:
1. HN1: bis (2-chloroethyl) ethylamine (CAS 538-07-8);
2. HN2: bis (2-chloroethyl) methylamine (CAS 51-75-2);
3. HN3: tris (2-chloroethyl) amine (CAS 555-77-1);
3. CW incapacitating agents, such as:
a. 3-Quinuclidinyl benzilate (BZ) (CAS 6581-06-2);
4. CW defoliants, such as:
a. Butyl 2-chloro-4-fluorophenoxyacetate (LNF);
b. 2,4,5-trichlorophenoxyacetic acid mixed with 2,4-dichlorophenoxyacetic acid (Agent Orange).
c. CW binary precursors and key precursors, as follows:
1. Alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) Phosphonyl Difluorides, such as:
DF: Methyl Phosphonyldifluoride (CAS 676-99-3);
2. O-Alkyl (H or equal to or less than C10, including cycloalkyl) O-2-dialkyl (Methyl, Ethyl, n-
Propyl or Isopropyl) aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonites and
corresponding alkylated and protonated salts, such as:
3.QL: O-Ethyl-2-di-isopropylaminoethyl methylphosphonite (CAS 57856-11-8);
4. Chlorosarin: O-Isopropyl methylphosphonochloridate (CAS 1445-76-7);

5. Chlorosoman: O-Pinacolyl methylphosphonochloridate (CAS 7040-57-5);
d. "Riot control agents", active constituent chemicals and combinations thereof, including:
1. α-Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8);
2. [(2-chlorophenyl) methylene] propanedinitrile, (o-Chlorobenzylidenemalononitrile (CS) (CAS 2698-41-1);
3. 2-Chloro-1-phenylethanone, Phenylacyl chloride (ω-chloroacetophenone) (CN) (CAS 532-27-4);
4. Dibenz-(b,f)-1,4-oxazephine, (CR) (CAS 257-07-8);
5. 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9);
6. N-Nonanoylmorpholine, (MPA) (CAS 5299-64-9);
Note 1 ML7.d. does not control "riot control agents" individually packaged for personal self-defence purposes;
Note 2 ML7.d. does not control active constituent chemicals and combinations thereof identified and packaged for food production or medical purposes.
i. Equipment specially designed or modified for military use, for the dissemination of any of the following and specially designed components therefor:
1. Materials or agents controlled by ML7.a., ML7.b. or ML7d.; or
2. CW made up of precursors controlled by ML7.c.
j. Protective and decontamination equipment, specially designed components therefor, and specially formulated chemical mixtures, as follows:
1. Equipment specially designed or modified for military use, for defence against materials controlled by ML7.a., ML7.b. or ML7.d. and specially designed components therefor;
2. Equipment specially designed or modified or modified for military use, for the decontamination of objects contaminated with materials controlled by ML7.a. or ML7.b. and specially designed components therefor;
3. Chemical mixtures specially developed/formulated for the decontamination of objects contaminated with materials controlled by ML7.a. or ML7.b.;
Note ML7.f.1. includes:
a. Air conditioning units specially designed or modified for nuclear, biological or chemical filtration;
b. Protective clothing.

NB: For civil gas masks, protective and decontamination equipment see also entry 1A004 on the EU Dual - Use List.
k. Equipment specially designed or modified for military use, for the detection or identification of materials controlled by ML7.a. or ML7.b. or ML7.d. and specially designed components therefor;
Note ML7.g. does not control personal radiation monitoring dosimeters.
NB: See also entry 1A004 on the EU Dual - Use List.
(1). "Biopolymers" specially designed or processed for the detection or identification of CW agents controlled by ML7.b., and the cultures of specific cells used to produce them;
m. "Biocatalysts" for the decontamination or degradation of CW agents, and biological systems therefor, as follows:
1. "Biocatalysts" specially designed for the decontamination or degradation of CW agents controlled by ML7.b. resulting from directed laboratory selection or genetic manipulation of biological systems;
2. Biological systems, as follows: "expression vectors", viruses or cultures of cells containing the genetic information specific to the production of "biocatalysts" controlled by ML7.i.1.;
Note 1 ML7.b. and ML7.d. do not control:
a. Cyanogen chloride (CAS 506-77-4). See 1C450.a.5. on the EU Dual - Use List;
b. Hydrocyanic acid (CAS 74-90-8);
c. Chlorine (CAS 7782-50-5);
d. Carbonyl chloride (phosgene) (CAS 75-44-5). See 1C450.a.4. on the EU Dual - Use List;
e. Diphosgene (trichloromethyl-chloroformate) (CAS 503-38-8);
f. Deleted;
g. Xylyl bromide, ortho: (CAS 89-92-9), meta: (CAS 620-13-3), para: (CAS 104-81-4);
h. Benzyl bromide (CAS 100-39-0);
i. Benzyl iodide (CAS 620-05-3);
j. Bromo acetone (CAS 598-31-2);
k. Cyanogen bromide (CAS 506-68-3);
l. Bromo methylethylketone (CAS 816-40-0);
m. Chloro acetone (CAS 78-95-5);
n. Ethyl iodoacetate (CAS 623-48-3);
o. Iodo acetone (CAS 3019-04-3);
p. Chloropicrin (CAS 76-06-2). See 1C450.a.7. on the EU Dual - Use List.
Note 2 The cultures of cells and biological systems listed in ML7.h. and ML7.i.2. are exclusive and these sub-items do not control cells or biological systems for civil purposes, such as agricultural, pharmaceutical, medical, veterinary, environmental, waste management, or in the food industry

ML7. a. 1. 2931 00
ML7. a. 1. a. 2931 00 950 0
ML7. a. 1. b. 2931 00 950 0
ML7. a. 1. c. 2931 00 950 0

ML7. a. 2. a. 1. 2930 50 000 0
ML7. a. 2. a. 2. 2930 50 000 0
ML7. a. 2. a. 3. 2930 50 000 0
ML7. a. 2. a. 4. 2930 50 000 0
ML7. a. 2. a. 5. 2930 50 000 0
ML7. a. 2. a. 6. 2930 50 000 0
ML7. a. 2. a. 7. 2930 50 000 0
ML7. a. 2. a. 8. 2930 50 000 0
ML7. a. 2. a. 9. 2930 50 000 0
ML7. a. 2. b. 1. 2931 00 950 0
ML7. a. 2. b. 2. 2931 00 950 0
ML7. a. 2. b. 3. 2931 00 950 0
ML7. a. 2. c. 1. 2921 19 800 0
ML7. a. 2. c. 2. 2921 19 800 0
ML7. a. 2. c. 3. 2921 19 800 0
ML7. a. 3. 2933 39 990 0
ML7. a. 4. 2931 00
ML7. b. 1
ML7. b. 2. 2931 00
ML7. b. 3. 2931 00 950 0
ML7. b. 4. 2931 00 950 0

ML8 "Energetic materials", and related substances, as follows:

N.B.: See also 1C011 of the Dual-use Goods List.

Technical Notes:

1. For the purposes of this entry, 'mixture' refers to a composition of two or more substances with at least one substance being listed in the ML8 sub-items.

2. Any substance listed in the ML8 sub-items is controlled by this list, even when utilized in an application other than that indicated. (e.g. TAGN is predominantly used as an explosive but can also be used either as a fuel or an oxidizer.)

(a) "Explosives", as follows, and mixtures thereof:

(1) ADNBF (aminodinitrobenzofuroxan or 7-amino-4, 6-dinitrobenzofurazane-1-oxide) (CAS 97096-78-1);

(2) BNCP (cis-bis (5-nitrotetrazolato) tetra amine-cobalt (III) perchlorate) (CAS 117412-28-9);

(3) CL-14 (diamino dinitrobenzofuroxan or 5, 7-diamino-4, 6-dinitrobenzofurazane-1-oxide) (CAS 117907-74-1);

(4) CL-20 (HNIW or Hexanitrohexaazaisowurtzitane) (CAS 135285-90-4); chlathrates of CL-20 (see also ML8(g)(3) and ML8(g)(4) for its "precursors");

(5) CP (2-(5-cyanotetrazolato) penta amine-cobalt (III) perchlorate) (CAS 70247-32-4);

(6) DADE (1,1-diamino-2,2-dinitroethylene, FOX7);

(7) DATB (diaminotrinitrobenzene) (CAS 1630-08-6);

(8) DDFP (1,4-dinitrodifurazanopiperazine);

(9) DDPO (2,6-diamino-3,5-dinitropyrazine-1-oxide, PZO) (CAS 194486-77-6);

(10) DIPAM (3,3'-diamino-2,2',4,4',6,6'-hexanitrobiphenyl or dipicramide) (CAS 17215-44-0);

(11) DNGU (DINGU or dinitroglycoluril) (CAS 55510-04-8);

(12) Furazans, as follows:

(a) DAAOF (diaminoazoxyfurazan);

(b) DAAzF (diaminoazofurazan) (CAS 78644-90-3);

(13) HMX and derivatives (see also ML8(g)(5) for its "precursors"), as follows:

(a) HMX (Cyclotetramethylenetetranitramine, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine, 1,3,5,7-tetranitro-1,3,5,7-tetraza-cyclooctane, octogen or octogene) (CAS 2691-41-0);

(b) difluoroaminated analogs of HMX;

(c) K-55 (2,4,6,8-tetranitro-2,4,6,8-tetraazabicyclo [3,3,0]-octanone-3, tetranitrosemiglycouril or keto-bicyclic HMX) (CAS 130256-72-3);

(14) HNAD (hexanitroadamantane) (CAS 143850-71-9);

(15) HNS (hexanitrostilbene) (CAS 20062-22-0);

(16) Imidazoles, as follows:

(a) BNNII (Octahydro-2,5-bis(nitroimino) imidazo [4,5-d]imidazole);

(b) DNI (2,4-dinitroimidazole) (CAS 5213-49-0);

(c) FDIA (1-fluoro-2,4-dinitroimidazole);

(d) NTDNIA (N-(2-nitrotriazolo)-2,4-dinitroimidazole);

(e) PTIA (1-picryl-2,4,5-trinitroimidazole);

(17) NTNMH (1-(2-nitrotriazolo)-2-dinitromethylene hydrazine);

(18) NTO (ONTA or 3-nitro-1,2,4-triazol-5-one) (CAS 932-64-9);

(19) Polynitrocubanes with more than four nitro groups;

(20) PYX (2,6-Bis (picrylamino)-3,5-dinitropyridine) (CAS 38082-89-2);

(21) RDX and derivatives, as follows:

(a) RDX (cyclotrimethylenetrinitramine, cyclonite, T4, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitro-1,3,5-triaza-cyclohexane, hexogen or hexogene) (CAS 121-82-4);

(b) Keto-RDX (K-6 or 2,4,6-trinitro-2,4,6-triazacyclohexanone) (CAS 115029-35-1);

(22) TAGN (triaminoguanidinenitrate) (CAS 4000-16-2);

(23) TATB (triaminotrinitrobenzene) (CAS 3058-38-6) (see also ML8(g)(7) for its "precursors");

(24) TEDDZ (3,3,7,7-tetrabis (difluoroamine) octahydro-1,5-dinitro-1,5-diazocine);

(25) Tetrazoles, as follows:

(a) NTAT (nitrotriazol aminotetrazole);

(b) NTNT (1-N-(2-nitrotriazolo)-4-nitrotetrazole);

(26) Tetryl (trinitrophenylmethylnitramine) (CAS 479-45-8);

(27) TNAD (1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin) (CAS 135877-16-6) (see also ML8(g)(6) for its "precursors");

(28) TNAZ (1,3,3-trinitroazetidine) (CAS 97645-24-4) (see also ML8(g)(2) for its "precursors");

(29) TNGU (SORGUYL or tetranitroglycoluril) (CAS 55510-03-7);

(30) TNP (1,4,5,8-tetranitro-pyridazino [4,5-d] pyridazine) (CAS 229176-04-9);

(31) Triazines, as follows:

(a) DNAM (2-oxy-4,6-dinitroamino-s-triazine) (CAS 19899-80-0);

(b) NNHT (2-nitroimino-5-nitro-hexahydro-1,3,5-triazine) (CAS 130400-13-4);

(32) Triazoles, as follows:

(a) 5-azido-2-nitrotriazole;

(b) ADHTDN (4-amino-3,5-dihydrazino-1,2,4-triazole dinitramide) (CAS 1614-08-0);

(c) ADNT (1-amino-3,5-dinitro-1,2,4-triazole);

(d) BDNTA ([bis-dinitrotriazole] amine);

(e) DBT (3,3'-dinitro-5,5-bi-1,2,4-triazole) (CAS 30003-46-4);

(f) DNBT (dinitrobistriazole) (CAS 70890-46-9);

(g) NTDNA (2-nitrotriazole 5-dinitramide) (CAS 75393-84-9);

(h) NTDNT (1-N-(2-nitrotriazolo) 3,5-dinitrotriazole);

(i) PDNT (1-picryl-3,5-dinitrotriazole);

(j) TACOT (tetranitrobenzotriazolobe nzotriazole) (CAS 25243-36-1);

(33) Any explosive not listed elsewhere in ML8(a) with a detonation velocity exceeding 8700 m/s at maximum density or a detonation pressure exceeding 34 GPa (340 kbar);

(34) Other organic explosives not listed elsewhere in ML8

(a) yielding detonation pressures of 25 GPa (250 kbar) or more that will remain stable at temperatures of 532 K (250^0C) or higher for periods of 5 minutes or longer;

(b) "Propellants", as follows:

(1) Any United Nations (UN) Class 1.1 solid "propellant" with a theoretical specific impulse (under standard conditions) of more than 250 seconds for non-metallized compositions, or more than 270 seconds for aluminized compositions;

(2) Any UN Class 1.3 solid "propellant" with a theoretical specific impulse (under standard conditions) of more than 230 seconds for non-halogenized compositions, 250 seconds for non-metallized compositions and 266 seconds for metallized compositions;

(3) "Propellants" having a force constant of more than 1200 kJ/kg;

(4) "Propellants" that can sustain a steady-state linear burning rate of more than 38 mm/s under standard conditions (as measured in the form of an inhibited single strand) of 6.89 MPa (68.9 bar) pressure and 294 K (21^0C);

(5) Elastomer modified cast double base (EMCDB) "propellants" with extensibility at maximum stress of more than 5% at 233 K (-40^0C);

(6) Any "propellant" containing substances listed in ML8(a);

(c) "Pyrotechnics", fuels and related substances, as follows, and mixtures thereof:

(1) Aircraft fuels specially formulated for military purposes;

(2) Alane (aluminum hydride) (CAS 7784-21-6);

(3) Carboranes; decaborane (CAS 17702-41-9); pentaboranes (CAS 19624-22-7 and 18433-84-6) and their derivatives;

(4) Hydrazine and derivatives, as follows (see also ML8(d)(8) and ML8(d)(9) for oxidizing hydrazine derivatives):

(a) Hydrazine (CAS 302-01-2) in concentrations of 70% or more;

(b) Monomethyl hydrazine (CAS 60-34-4);

(c) Symmetrical dimethyl hydrazine (CAS 540-73-8);

(d) Unsymmetrical dimethyl hydrazine (CAS 57-14-7);

(5) Metal fuels in particle form whether spherical, atomized, spheroidal, flaked or ground, manufactured from material consisting of 99% or more of any of the following:

(a) Metals and mixtures thereof, as follows:

(1) Beryllium (CAS 7440-41-7) in particle sizes of less than 60 μm;

(2) Iron powder (CAS 7439-89-6) with particle size of 3 μm or less produced by reduction of iron oxide with hydrogen;

(b) Mixtures, which contain any of the following:

(1) Zirconium (CAS 7440-67-7), magnesium (CAS 7439-95-4) or alloys of these in particle sizes of less than 60 μm;

(2) Boron (CAS 7440-42-8) or boron carbide (CAS 12069-32-8) fuels of 85% purity or higher and particle sizes of less than 60 μm;

(6) Military materials containing thickeners for hydrocarbon fuels specially formulated for use in flame throwers or incendiary munitions, such as metal stearates or palmates (e.g. octal (CAS 637-12-7)) and M1, M2 and M3 thickeners;

(7) Perchlorates, chlorates and chromates composited with powdered metal or other high energy fuel components;

(8) Spherical aluminum powder (CAS 7429-90-5) with a particle size of 60 μm or less, manufactured from material with an aluminum content of 99% or more;

(9) Titanium subhydride (TiH_n) of stoichiometry equivalent to n=0.65-1.68

Note 1: Aircraft fuels controlled by ML8(c)(1) are finished products not their constituents

Note 2: ML8(c)(4)(a) does not control hydrazine mixtures specially formulated for corrosion control.

Note 3: Explosives and fuels containing the metals or alloys listed in ML8(c)(5) are controlled whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium, or beryllium.

Note 4: ML8(c)(5)(b)(2) does not control boron and boron carbide enriched with boron-10 (20% or more of total boron-10 content).

Oxidizers, as follows, and mixtures thereof:

(1) ADN (ammonium dinitramide or SR 12) (CAS 140456-78-6);

(2) AP (ammonium perchlorate) (CAS 7790-98-9);

(3) Compounds composed of fluorine and any of the following:

(a) Other halogens;

(b) Oxygen; or

(c) Nitrogen;

***Notes:* 1**. ML8(d)(3) does not control Chlorine Trifluoride. See 1C238 in the double use list.

(4) DNAD (1,3-dinitro-1,3-diazetidine) (CAS 78246-06-7);

(5) HAN (hydroxylammonium nitrate) (CAS 13465-08-2);

(6) HAP (hydroxylammonium perchlorate) (CAS 15588-62-2);

(7) HNF (hydrazinium nitroformate) (CAS 20773-28-8);

(8) Hydrazine nitrate (CAS 37836-27-4);

(9) Hydrazine perchlorate (CAS 27978-54-7);

(10) Liquid oxidizers comprised of or containing inhibited red fuming nitric acid (IRFNA) (CAS 8007-58-7);

Note: ML8(d)(10) does not control non-inhibited fuming nitric acid.

Binders, plasticizers, monomers, polymers, as follows:

(1) AMMO (azidomethylmethyloxetane and its polymers) (CAS 90683-29-7) (see also ML8(g)(1) for its "precursors");

(2) BAMO (bisazidomethyloxetane and its polymers) (CAS 17607-20-4) (see also ML8(g)(1) for its "precursors");

(3) BDNPA (bis (2,2-dinitropropyl) acetal) (CAS 5108-69-0);

(4) BDNPF (bis (2,2-dinitropropyl) formal) (CAS 5917-61-3);

(5) BTTN (butanetrioltrinitrate) (CAS 6659-60-5) (see also ML8(g)(8) for its "precursors");

(6) Energetic monomers, plasticizers and polymers containing nitro, azido, nitrate, nitraza or difluoroamino groups specially formulated for military use;

(7) FAMAO (3-difluoroaminomethyl-3-azidomethyl oxetane) and its polymers;

(8) FEFO (bis-(2-fluoro-2,2-dinitroethyl) formal) (CAS 17003-79-1);

(9) FPF-1 (poly-2,2,3,3,4,4-hexafluoropentane-1,5-diol formal) (CAS 376-90-9);

(10) FPF-3 (poly-2,4,4,5,5,6,6-heptafluoro-2-tri-fluoromethyl-3-oxaheptane-1,7-diol formal);

(11) GAP (glycidylazide polymer) (CAS 143178-24-9) and its derivatives;

(12) HTPB (hydroxyl terminated polybutadiene) with a hydroxyl functionality equal to or greater than 2.2 and less than or equal to 2.4, a hydroxyl value of less than 0.77 meq/g, and a viscosity at 30° C of less than 47 poise (CAS 69102-90-5);

(13) Low (less than 10000) molecular weight, alcohol functionalized, poly (epichlorohydrin); poly (epichlorohydrindiol) and triol;

(14) NENAs (nitratoethylnitramine compounds) (CAS 17096-47-8, 85068-73-1, 82486-83-7, 82486-82-6 and 85954-06-9);

(15) PGN (poly-GLYN, polyglycidylnitrate) or poly (nitratomethyl oxirane) (CAS 27814-48-8);

(16) Poly-NIMMO (poly nitratomethylmethyloxetane) or poly-NMMO (poly [3-Nitratomethyl-3-methyloxetane]) (CAS 84051-81-0);

(17) Polynitroorthocarbonates;

(18) TVOPA (1,2,3-tris [1,2-bis (difluoroamino) ethoxy] propane or tris vinoxy propane adduct) (CAS 53159-39-0);

"Additives", as follows:

(1) Basic copper salicylate (CAS 62320-94-9);

(2) BHEGA (bis-(2-hydroxyethyl) glycolamide) (CAS 17409-41-5);

(3) BNO (butadienenitrileoxide) (CAS 9003-18-3);

(4) Ferrocene derivatives, as follows:

(a) Butacene (CAS 125856-62-4);

(b) Catocene (2,2-bis-ethylferrocenyl propane) (CAS 37206-42-1);

(c) Ferrocene carboxylic acids;

(d) n-butyl-ferrocene (CAS 31904-29-7); (L.N. 95 of 2006)

(e) Other adducted polymer ferrocene derivatives;

(5) Lead beta-resorcylate (CAS 20936-32-7);

(6) Lead citrate (CAS 14450-60-3);

(7) Lead-copper chelates of beta-resorcylate or salicylates (CAS 68411-07-4);

(8) Lead maleate (CAS 19136-34-6);

(9) Lead salicylate (CAS 15748-73-9);

(10) Lead stannate (CAS 12036-31-6);

(11) MAPO (tris-1-(2-methyl) aziridinyl phosphine oxide) (CAS 57-39-6); BOBBA 8 (bis (2-methyl aziridinyl) 2-(2-hydroxypropanoxy) propylamino phosphine oxide); and other MAPO derivatives;

(12) Methyl BAPO (bis (2-methyl aziridinyl) methylamino phosphine oxide) (CAS 85068-72-0);

(13) N-methyl-p-nitroaniline (CAS 100-15-2);

(14) 3-Nitraza-1,5-pentane diisocyanate (CAS 7406-61-9);

(15) Organo-metallic coupling agents, as follows:

(a) Neopentyl[diallyl]oxy, tri [dioctyl] phosphato-titanate (CAS 103850-22-2); also known as titanium IV, 2,2 [bis 2-propenolato-methyl, butanolato, tris (dioctyl) phosphato] (CAS 110438-25-0); or LICA 12 (CAS 103850-22-2);

(b) Titanium IV, [(2-propenolato-1) methyl, n-propanolatomethyl] butanolato-1, tris [dioctyl] pyrophosphate or KR3538;

(c) Titanium IV, [(2-propenolato-1)methyl, n-propanolatomethyl] butanolato-1, tris (dioctyl) phosphate;

(16) Polycyanodifluoroamin oethyleneoxide;

(17) Polyfunctional aziridine amides with isophthalic, trimesic (BITA or butylene imine trimesamide), isocyanuric or trimethyladipic backbone structures and 2-methyl or 2-ethyl substitutions on the aziridine ring;

(18) Propyleneimine (2-methylaziridine) (CAS 75-55-8);

(19) Superfine iron oxide (Fe_2O_3) with a specific surface area more than 250 m^2/g and an average particle size of 3.0 nm or less;

(20) TEPAN (tetraethylenepentaamineacrylonitrile) (CAS 68412-45-3); cyanoethylated polyamines and their salts;

(21) TEPANOL (tetraethylenepentaamineacrylonitrileglycidol) (CAS 68412-46-4); cyanoethylated polyamines adducted with glycidol and their salts;

(22) TPB (triphenyl bismuth) (CAS 603-33-8);

(g) "Precursors", as follows:

N.B.: In ML8(g) the references are to controlled "energetic materials" manufactured from these substances.

(1) BCMO (bischloromethyloxetane) (CAS 142173-26-0) (see also ML8(e)(1) and ML8(e)(2));

(2) Dinitroazetidine-t-butyl salt (CAS 125735-38-8) (see also ML8(a)(28));

(3) HBIW (hexabenzylhexaazaisowurtzitane) (CAS 124782-15-6) (see also ML8(a)(4));

(4) TAIW (tetraacetyldibenzylhexaazaisowurtzitane) (see also ML8(a)(4));

(5) TAT (1,3,5,7 tetraacetyl-1,3,5,7,-tetraaza cyclo-octane) (CAS 41378-98-7) (see also ML8(a)(13));

(6) 1,4,5,8-tetraazadecalin (CAS 5409-42-7) (see also ML8(a)(27));

(7) 1,3,5-trichlorobenzene (CAS 108-70-3) (see also ML8(a)(23));

(8) 1,2,4-trihydroxybutane (1,2,4-butanetriol) (CAS 3068-00-6) (see also ML8(e)(5));

Note 5 For charges and devices, see ML4.

Note 6. ML8 does not control the following substances unless they are compounded or mixed with the "energetic materials" mentioned in ML8(a) or powdered metals in ML8(c):

(a) Ammonium picrate;

(b) Black powder;

(c) Hexanitrodiphenylamine;

(d) Difluoroamine;

(e) Nitrostarch;

(f) Potassium nitrate;

(g) Tetranitronaphthalene;

(h) Trinitroanisol;

(i) Trinitronaphthalene;

(j) Trinitroxylene;

(k) N-pyrrolidinone; 1-methyl-2-pyrrolidinone;

(l) Dioctylmaleate;

(m) Ethylhexylacrylate;

(n) Triethylaluminium (TEA), trimethylaluminium (TMA), and other pyrophoric metal alkyls and aryls of lithium, sodium, magnesium, zinc or boron;

(o) Nitrocelluose;

(p) Nitroglycerin (or glyceroltrinitrate, trinitroglycerine) (NG);

(q) 2,4,6-trinitrotoluene (TNT);

(r) Ethylenediaminedinitrate (EDDN);

(s) Pentaerythritoltetranitrate (PETN);

(t) Lead azide, normal and basic lead styphnate, and primary explosives or priming compositions containing azides or azide complexes;

(u) Triethyleneglycoldinitrate (TEGDN);

(v) 2,4,6-trinitroresorcinol (styphnic acid);

(w) Diethyldiphenyl urea; dimethylidiphenyl urea; methylethyldiphenyl urea [Centralites];

(x) N,N-diphenylurea (unsymmetrical diphenylurea);

(y) Methyl-N,N-diphenylurea (methyl unsymmetrical diphenylurea);

(z) Ethyl-N,N-diphenylurea (ethyl unsymmetrical diphenylurea);

(aa) 2-Nitrodiphenylamine (2-NDPA);

(bb) 4-Nitrodiphenylamine (4-NDPA);

(cc) 2,2-dinitropropanol;

(dd) Nitroguanidine (see also 1C011(d) of the Dual-use Goods List).

ML9. Vessels of war, special naval equipment and accessories, as follows, and components therefor, specially designed for military use:

N.B.: For guidance and navigation equipment, see Note 7 to ML11. (L.N. 65 of 2004; L.N. 95 of 2006)

(a) Combatant vessels and vessels (surface or underwater) specially designed or modified for offensive or defensive action, whether or not converted to non-military use, regardless of current state of repair or operating condition, and whether or not they contain weapon delivery systems or armour, and hulls or parts of hulls for such vessels; (L.N. 132 of 2001)

(b) Engines, as follows:

(1) Diesel engines specially designed for submarines with both of the following characteristics:

(a) A power output of 1.12 MW (1500 hp.) or more; and

(b) A rotary speed of 700 rpm or more;

(2) Electric motors specially designed for submarines having all of the following characteristics:

(a) A power output of more than 0.75 MW (1000 hp.);

(b) Quick reversing;

(c) Liquid cooled; and

(d) Totally enclosed;

(3) Non-magnetic diesel engines specially designed for military use with a power output of 37.3 kW (50 hp.) or more and with a non-magnetic content in excess of 75% of total mass;

(c) Underwater detection devices specially designed for military use and controls thereof;

(d) Submarine and torpedo nets;

(e) Deleted; (L.N. 65 of 2004)

(f) Hull penetrators and connectors specially designed for military use that enable interaction with equipment external to a vessel;

Note: ML9(f) includes connectors for vessels which are of the single-conductor, multi-conductor, coaxial or waveguide type, and hull penetrators for vessels, both of which are capable of remaining impervious to leakage from without and of retaining required characteristics at marine depths exceeding 100 m; and fibre-optic connectors and optical hull penetrators specially designed for "laser" beam transmission regardless of depth. It does not include ordinary propulsive shaft and hydrodynamic control-rod hull penetrators.

(g) Silent bearings, with gas or magnetic suspension, active signature or vibration suppression controls, and equipment containing those bearings, specially designed for military use;

ML9. 8906 10 000 0

ML 10. "Aircraft", "lighter-than-air vehicles", unmanned airborne vehicles, aero-engines and "aircraft" equipment, related equipment and components, specially designed or modified for military use, as follows: (L.N. 95 of 2006)

N.B.: For guidance and navigation equipment, see Note 7 to ML11. (L.N. 65 of 2004; L.N. 95 of 2006)

(a) Combat "aircraft" and specially designed components therefor; (L.N. 183 of 1999; L.N. 65 of 2004)

(b) Other "aircraft" and "lighter-than-air vehicles" specially designed or modified for military use, including military reconnaissance, assault, military training, transporting

and airdropping troops or military equipment, logistics support, and specially designed components therefor; (L.N. 183 of 1999; L.N. 65 of 2004; L.N. 95 of 2006)

(c) Unmanned airborne vehicles and related equipment, specially designed or modified for military use, as follows, and specially designed components therefor: (L.N. 65 of 2004)

(1) Unmanned airborne vehicles including remotely piloted air vehicles (RPVs), autonomous programmable vehicles and "lighter-than-air vehicles"; (L.N. 95 of 2006)

(2) Associated launchers and ground support equipment;

(3) Related equipment for command and control; (L.N. 183 of 1999)

(d) Aero-engines specially designed or modified for military use, and specially designed components therefor; (L.N. 183 of 1999; L.N. 65 of 2004)

(e) Airborne equipment, including airborne refuelling equipment, specially designed for use with the "aircraft" controlled by ML10(a) or ML10(b) or the aero-engines controlled by ML10(d), and specially designed components therefor; (L.N. 183 of 1999; L.N. 65 of 2004)

(f) Pressure refuellers, pressure refuelling equipment, equipment specially designed to facilitate operations in confined areas and ground equipment, developed specially for "aircraft" controlled by ML10(a) or ML10(b), or for aero-engines controlled by ML10(d); (L.N. 65 of 2004)

(g) Military crash helmets and protective masks and specially designed components therefor, pressurised breathing equipment and partial pressure suits for use in "aircraft", anti-g suits, liquid oxygen converters used for "aircraft" or missiles, and catapults and cartridge actuated devices for emergency escape of personnel from "aircraft"; (L.N. 65 of 2004)

(h) Parachutes and related equipment, used for combat personnel, cargo dropping or "aircraft" deceleration, as follows, and specially designed components therefor: (L.N. 65 of 2004; L.N. 95 of 2006)

(1) Parachutes for:

(a) Pin point dropping of rangers; (L.N. 132 of 2001)

(b) Dropping of paratroopers;

(2) Cargo parachutes;

(3) Paragliders, drag parachutes, drogue parachutes for stabilisation and attitude control of dropping bodies, (e.g., recovery capsules, ejection seats, bombs);

(4) Drogue parachutes for use with ejection seat systems for deployment and inflation sequence regulation of emergency parachutes;

(5) Recovery parachutes for guided missiles, drones or space vehicles;

(6) Approach parachutes and landing deceleration parachutes;

(7) Other military parachutes;

(8) Equipment specially designed for high altitude parachutists (e.g. suits, special helmets, breathing systems, navigation equipment); (L.N. 65 of 2004)

(i) Automatic piloting systems for parachuted loads; equipment specially designed or modified for military use for controlled opening jumps at any height, including oxygen equipment;

Note1: ML10(b) does not control "aircraft" or variants of those "aircraft" specially designed for military use which:

(a) Are not configured for military use and are not fitted with equipment or attachments specially designed or modified for military use; and

(b) Have been certified for civil use by the civil aviation authority in a "participating state".

Note 2. ML10(d) does not control: (L.N. 65 of 2004)

(a) Aero-engines designed or modified for military use which have been certified by the civil aviation authority in a "participating state' for use in "civil aircraft", or specially designed components therefor;

(b) Reciprocating engines or specially designed components therefor, except those specially designed for unmanned airborne vehicles. (L.N. 65 of 2004)

Note 3. The control in ML10(b) and ML10(d) on specially designed components and related equipment for non-military "aircraft" or aero-engines modified for military use applies only to those military components and to military related equipment required for the modification to military use. (L.N. 65 of 2004)

ML10. 8802 11
8802 11 000 0
8802 12 000 0
8802 20 000 0
8802 30 000 0
8802 40 000 9
8802 60
8803 10 000 0 (except civil aircraft)
8803 20 000 0 (except civil aircraft)
8803 30 000 0 (except civil aircraft)
8803 90 (except civil aircraft)
8804 00 000 0
8412 10 000 9
9020 00 000 0
8805 (except civil aircraft)
8407 10 000 0 (except civil aircraft)
8408 90
8409 10 000 0
8411
8412 (except civil aircraft)

ML11(a) includes:

1. Electronic countermeasure and electronic counter-countermeasure equipment (i.e., equipment designed to introduce extraneous or erroneous signals into radar or radio communication receivers or otherwise hinder the reception, operation or effectiveness of adversary electronic receivers including their countermeasure equipment), including jamming and counter-jamming equipment;

2. Frequency agile tubes;

3. Electronic systems or equipment designed either for surveillance and monitoring of the electro-magnetic spectrum for military intelligence or security purposes, or for counteracting such surveillance and monitoring;

4. Underwater countermeasures, including acoustic and magnetic jamming and decoy equipment designed to introduce extraneous or erroneous signals into sonar receivers;

5. Data processing security equipment, data security equipment and transmission and signalling line security equipment, using ciphering processes;

6. Identification, authentification and keyloader equipment and key management, manufacturing and distribution equipment;

7. Guidance and navigation equipment.

(b) Global Navigation Satellite Systems (GNSS) jamming equipment;

ML12. High velocity kinetic energy weapon systems and related equipment, as follows, and specially designed components therefor:
a. Kinetic energy weapon systems specially designed for destruction or effecting mission-abort of a target;
b. Specially designed test and evaluation facilities and test models, including diagnostic instrumentation and targets, for dynamic testing of kinetic energy projectiles and systems.
N.B. *For weapon systems using sub-calibre ammunition or employing solely chemical propulsion, and ammunition therefor, see ML1.to ML4.*
Note 1 *ML12. includes the following when specially designed for kinetic energy weapon systems:*
a. Launch propulsion systems capable of accelerating masses larger than 0.1 g to velocities in excess of 1.6 km/s, in single or rapid fire modes;
b. Prime power generation, electric armour, energy storage, thermal management, conditioning, switching or fuel-handling equipment; and electrical interfaces between power supply, gun and other turret electric drive functions;
c. Target acquisition, tracking, fire control or damage assessment systems;
d. Homing seeker, guidance or divert propulsion (lateral acceleration) systems for projectiles. *Note 2* *ML12. controls weapon systems using any of the following methods of propulsion:*
a. Electromagnetic;
b. Electrothermal;
c. Plasma;
d. Light gas; or
e. Chemical (when used in combination with any of the above).
Note 3 *ML12.* d*oes not control "technology" for magnetic induction for continuous propulsion of civil transport devices.*
ML12.
ML13. Armoured or protective equipment and constructions and components, as follows:
(a) Armoured plate as follows:
(1) Manufactured to comply with a military standard or specification; or
(2) Suitable for military use;
(b) Constructions of metallic or non-metallic materials or combinations thereof specially designed to provide ballistic protection for military systems, and specially designed components therefor; (L.N. 132 of 2001)
(c) Military helmets;
(d) Body armour and protective garments manufactured according to military standards or specifications, or equivalent, and specially designed components therefor; (L.N. 65 of 2004)
N.B.: For "fibrous or filamentary materials" used in the manufacture of body armour, see 1C010 of the Dual-use Goods List. (L.N. 65 of 2004)
Note 1: ML13(b) includes materials specially designed to form explosive reactive armour or to construct military shelters.
Note 2: ML13(c) does not control conventional steel helmets, neither modified or designed to accept, nor equipped with any type of accessory device.
Note 3: ML13(d) does not control body armour or protective garments when accompanying their user for the user's own personal protection. (L.N. 65 of 2004)

N.B.: See also 1A005 of the Dual-use Goods List.

ML13

ML14 Specialised equipment for military training or for simulating military scenarios, simulators specially designed for training in the use of any firearm or weapon controlled by ML1 or ML2, and specially designed components and accessories therefor; (L.N. 65 of 2004)

Technical Note: The term "specialised equipment for military training" includes military types of attack trainers, operational flight trainers, radar target trainers, radar target generators, gunnery training devices, anti-submarine warfare trainers, flight simulators (including human-rated centrifuges for pilot/astronaut training), radar trainers, instrument flight trainers, navigation trainers, missile launch trainers, target equipment, drone "aircraft", armament trainers, pilotless "aircraft" trainers, mobile training units and training equipment for ground military operations. (L.N. 65 of 2004)

Notes:

1. ML14 includes image generating and interactive environment systems for simulators when specially designed or modified for military use.
2. ML14 does not control equipment specially designed for training in the use of hunting or sporting weapons. (L.N. 65 of 2004)

ML14.

ML15. Imaging or countermeasure equipment, as follows, specially designed for military use, and specially designed components and accessories therefor:

(a) Recorders and image processing equipment;
(b) Cameras, photographic equipment and film processing equipment;
(c) Image intensifier equipment;
(d) Infrared or thermal imaging equipment;
(e) Imaging radar sensor equipment;
(f) Countermeasure or counter-countermeasure equipment for the equipment controlled by ML15(a) to ML15(e);

Note: ML15(f) includes equipment designed to degrade the operation or effectiveness of military imaging systems or to minimize such degrading effects.

Notes: 1. The term "specially designed components" includes the following when specially designed for military use:

(a) Infrared image converter tubes;
(b) Image intensifier tubes (other than first generation);
(c) Microchannel plates;
(d) Low-light-level television camera tubes;
(e) Detector arrays (including electronic interconnection or read out systems);
(f) Pyroelectric television camera tubes;
(g) Cooling systems for imaging systems;
(h) Electrically triggered shutters of the photochromic or electro-optical type having a shutter speed of less than 100 us, except in the case of shutters which are an essential part of a high speed camera;
(i) Fibre optic image inverters;
(j) Compound semiconductor photocathodes.

2. ML15 does not control "first generation image intensifier tubes" or equipment specially designed to incorporate "first generation image intensifier tubes". (L.N. 183 of 1999)

N.B.: For the status of weapons sights incorporating "first generation image intensifier tubes" see ML1, ML2 and ML5(a). (L.N. 183 of 1999; L.N. 65 of 2004)

N.B.: See also 6A002(a)(2) and 6A002(b) of the Dual-use Goods List.

ML15.

ML16. Forgings, castings and other unfinished products the **use** of which in a controlled product is identifiable by material composition, geometry or function, and which are specially designed for any products controlled by ML1. to ML4., ML6., ML9., ML10., ML 12. or ML19.

ML17 Miscellaneous equipment, materials and libraries, as follows, and specially designed components therefor:

(a) Self-contained diving and underwater swimming apparatus, as follows:

(1) Closed or semi-closed circuit (rebreathing) apparatus specially designed for military use (i.e. specially designed to be non-magnetic);

(2) Specially designed components for use in the conversion of open-circuit apparatus to military use;

(3) Articles designed exclusively for military use with self-contained diving and underwater swimming apparatus;

(b) Construction equipment specially designed for military use;

(c) Fittings, coatings and treatments for signature suppression, specially designed for military use;

(d) Field engineer equipment specially designed for use in a combat zone;

(e) "Robots", "robot" controllers and "robot" "end-effectors", having any of the following characteristics:

(1) Specially designed for military use;

(2) Incorporating means of protecting hydraulic lines against externally induced punctures caused by ballistic fragments (e.g., incorporating self-sealing lines) and designed to use hydraulic fluids with flash points higher than 839 K (566 ^{0}C); or

(3) Specially designed or rated for operating in an electro-magnetic pulse (EMP) environment;

(f) Libraries (parametric technical databases) specially designed for military use with equipment controlled by the Munitions List;

(g) Nuclear power generating equipment or propulsion equipment, including "nuclear reactors", specially designed for military use and components therefor specially designed or modified for military use;

(h) Equipment and material, coated or treated for signature suppression, specially designed for military use, other than those controlled elsewhere in the Munitions List;

(i) Simulators specially designed for military "nuclear reactors";

(j) Mobile repair shops specially designed or modified to service military equipment; (L.N. 65 of 2004)

(k) Field generators specially designed or modified for military use; (L.N. 132 of 2001; L.N. 65 of 2004)

(l) Containers specially designed or modified for military use; (L.N. 65 of 2004)

(m) Ferries, other than those controlled elsewhere in the Munitions List, bridges and pontoons, specially designed for military use; (L.N. 65 of 2004; L.N. 95 of 2006)

(n) Test models specially designed for the "development" of items controlled by ML4, ML6, ML9 or ML10; and (L.N. 132 of 2001; L.N. 95 of 2006)

(o) Laser protection equipment (e.g., eye and sensor protection) specially designed for military use; (L.N. 95 of 2006)

***Technical Notes**:* (L.N. 65 of 2004)

1. For the purpose of ML17, the term 'library' (parametric technical database) means a collection of technical information of a military nature, reference to which may enhance the performance of military equipment or systems. (L.N. 65 of 2004)

2. For the purpose of ML17, 'modified' means any structural, electrical, mechanical, or other change that provides a non-military item with military capabilities equivalent to an item which is specially designed for military use. (L.N. 65 of 2004)

ML17.

ML18. Equipment for the production of products referred to in the Munitions List, as follows: (L.N. 65 of 2004)

(a) Specially designed or modified production equipment for the production of products controlled by the Munitions List, and specially designed components therefor;

(b) Specially designed environmental test facilities and specially designed equipment therefor, for the certification, qualification, or testing of products controlled by the Munitions List;

***Technical Note**:* For the purposes of ML18, the term 'production' includes design, examination, manufacture, testing and checking. (L.N. 65 of 2004)

Notes:

1. ML18(a) and ML18(b) include the following equipment:

(a) Continuous nitrators;

(b) Centrifugal testing apparatus or equipment having any of the following characteristics;

(c) Dehydration presses;

(d) Screw extruders specially designed or modified for military explosive extrusion;

(e) Cutting machines for the sizing of extruded propellants;

(f) Sweetie barrels (tumblers) 1.85 m or more in diameter and having over 227 kg product capacity;

(g) Continuous mixers for solid propellants;

(h) Fluid energy mills for grinding or milling the ingredients of military explosives;

(i) Equipment to achieve both sphericity and uniform particle size in metal powder listed in ML8(c)(8); (L.N. 65 of 2004)

(j) Convection current converters for the conversion of materials listed in ML8(c)(3); (L.N. 65 of 2004)

2. (a) The term "Products referred to in the Munitions List" includes:

(1) Products not controlled if inferior to specified concentrations as follows:

(a) Hydrazine (see ML8(c)(4)); (L.N. 65 of 2004)

(b) "Explosives" (see ML8); (L.N. 65 of 2004)

(2) Products not controlled if inferior to technical limits, (i.e., "superconductive" materials not controlled by 1C005 of the Dual-use Goods List; "superconductive" electromagnets not controlled by 3A001(e)(3) of the Dual-use Goods List; "superconductive" electrical equipment excluded from control under ML20(b));

(3) Metal fuels and oxidants deposited in laminar form from the vapour phase (see ML8(c)(5)); (L.N. 65 of 2004)

(b) The term "Products referred to in the Munitions List" does not include:

(1) Signal pistols (see ML2(b));

(2) The substances excluded from control under Note 1 to ML7; (L.N. 95 of 2006)

(3) Personal radiation monitoring dosimeters (see ML7(g)) and masks for protection against specific industrial hazards (see also Dual-use Goods List); (L.N. 95 of 2006)

(4) Difluoroamine and potassium nitrate powder (see Note 6 to ML8); (L.N. 65 of 2004)

(5) Aero-engines excluded from control under ML10;

(6) Conventional steel helmets not equipped with, or modified or designed to accept, any type of accessory device (see Note 2 to ML13);

(7) Equipment fitted with industrial machinery, which is not controlled such as coating machinery not elsewhere specified and equipment for the casting of plastics;

(8) Muskets, rifles and carbines dated earlier than 1938, reproductions of muskets, rifles and carbines dated earlier than 1890, revolvers, pistols and machine guns dated earlier than 1890, and their reproductions; (L.N. 132 of 2001)

3. Note 2(b)(8) to ML18 does not release from controls production equipment for non-antique small arms, even if used to produce reproductions of antique small arms. (L.N. 132 of 2001; L.N. 65 of 2004)

ML18.

ML19. Directed energy weapon systems (DEW), related or countermeasure equipment and test models, as follows, and specially designed components therefor:

(a) "Laser" systems specially designed for destruction or effecting mission-abort of a target;

(b) Particle beam systems capable of destruction or effecting mission-abort of a target;

(c) High power radio-frequency (RF) systems capable of destruction or effecting mission-abort of a target;

(d) Equipment specially designed for the detection or identification of, or defence against, systems controlled by ML19(a), ML19(b) or ML19(c);

(e) Physical test models and related test results for the systems, equipment and components controlled by this Item;

(f) Continuous wave or pulsed "laser" systems specially designed to cause permanent blindness to unenhanced vision, i.e. to the naked eye or to the eye with corrective eyesight devices; (L.N. 132 of 2001)

Notes:

1. Directed energy weapon systems controlled by ML19 include systems whose capability is derived from the controlled application of:

(a) "Lasers" of sufficient continuous wave or pulsed power to effect destruction similar to the manner of conventional ammunition;

(b) Particle accelerators which project a charged or neutral particle beam with destructive power;

(c) High pulsed power or high average power radio frequency beam transmitters which produce fields sufficiently intense to disable electronic circuitry at a distant target.

2. ML19 includes the following when specially designed for directed energy weapon systems:

(a) Prime power generation, energy storage, switching, power conditioning or fuel-handling equipment;

(b) Target acquisition or tracking systems;

(c) Systems capable of assessing target damage, destruction or mission-abort;

(d) Beam-handling, propagation or pointing equipment;

(e) Equipment with rapid beam slew capability for rapid multiple target operations;

(f) Adaptive optics and phase conjugators;

(g) Current injectors for negative hydrogen ion beams;

(h) "Space qualified" accelerator components;

(i) Negative ion beam funnelling equipment;

(j) Equipment for controlling and slewing a high energy ion beam;

(k) "Space qualified" foils for neutralising negative hydrogen isotope beams.

ML19.

ML20. Cryogenic and "superconductive" equipment, as follows, and specially designed components and accessories therefor:

a. Equipment specially designed or configured to be installed in a vehicle for military ground, marine, airborne or space applications, capable of operating while in motion and of producing or maintaining temperatures below 103 K (- 170°C);
Note *ML20.a. includes mobile systems incorporating or employing accessories or components manufactured from non-metallic or non-electrical conductive materials, such as plastics or epoxy-impregnated materials.*
b. "Superconductive" electrical equipment (rotating machinery and transformers) specially designed or configured to be installed in a vehicle for military ground, marine, airborne or space applications, capable of operating while in motion.
Note ML20.b. does not control direct-current hybrid homopolar generators that have single-pole normal metal armatures which rotate in a magnetic field produced by superconducting windings, provided those windings are the only superconducting component in the generator.
ML20.
ML21. "Software", as follows:
a. "Software" specially designed or modified for the "development", "production" or "use" of equipment or materials controlled by the Munitions List;
b. Specific "software", as follows:
1. "Software" specially designed for:
a. Modelling, simulation or evaluation of military weapon systems;
b. "Development", monitoring, maintenance or up-dating of "software" embedded in military weapon systems;
c. Modelling or simulating military operation scenarios, not controlled by ML14.;
d. Command, Communications, Control and Intelligence (C^3I) applications;
2. "Software" for determining the effects of conventional, nuclear, chemical or biological warfare weapons.
ML22 "Technology" as follows:
a. "Technologies", according to the General note on the technologies of the Munition list intended for "working out", "manufacture" or "application" of the products specified in the Munition list except "technologies", supervised according to point ML7.
b. "Technologies", characteristic for working out, assemblage of components for, and operation, maintenance service and repair of the finished plants intended for products, specified in the Munition list even if components of such plants are not subject to the control.
Note 1:
(a) the Term includes «the products mentioned in the Munition list»:
1. The products which are not supervised because of small quantity, established at comparison with specified concentration, such as:
(a) Gidrazin (see ML8 (4.);
(b) "Explosives" (see ML8);
2. The products which are not supervised for the reason not of achievement of technical restrictions, (for example, "the superconducting" materials which are not supervised by point 1C005 of the List of double appointment; "the superconducting" electromagnets which are not supervised by point 3A001 (3)

3. The list of double appointment; "the superconducting" electric equipment released from the control agrees ML20 (b);

3. Metal fuel and oxidizers from the steam phase, besieged in the layered form (see ML8 (5.);

(b) the Term does not include «the products mentioned in the military list»:

1. Rackets (see ML2 (b);

2. The substances released from the control according to the Note 3 to ML7;

3. Individual radiating dosimeters (see ML7 (f) and the protective masks used at industrial danger, see also the List of double appointment; 4. 4. 4. 4.Difluoroamine and powder nitrate kaliya (the Note 6 to ML8 see);

5.The aviation engines released from the control it agree ML10;

6. The usual steel helmets which have been not equipped, not modified or not designed for equipment, any type of auxiliary devices (the Note 2 to ML13 see).

7. The equipment equipped with not controllable industrial units, such as units for drawing of the coverings, not specified in the list, and the equipment for plastic casting;

8. Muskets, rifles and the carbines made till 1938, a reproduction of muskets, rifles and carbines, whose originals have been made till 1890, revolvers, pistols and the machine guns made till 1890, and their reproduction;

Note 2: Note 1 (b) 8. From ML22 does not release from the control the industrial equipment for manufacture of not antique small arms even if it is used for manufacture of reproductions of antique small arms.

Note 3: ML22 does not supervise "the technologies" used for such civil purposes, as agriculture, pharmaceutics, medicine, veterinary science, preservation of the environment, the food-processing industry or a waste management

Note: See Note 2 to ML7