L.N. 183 of 1999

Import and Export (Strategic Commodities) Regulations (Amendment of Schedules 1 and 2) Order 1999

(Made under section 6B of the Import and Export Ordinance (Cap. 60))

1. Commencement

This Order shall come into operation, if the Legislative Council does not, by resolution, repeal the Order under section 6B of the Import and Export Ordinance (Cap. 60) before the expiry of the period to repeal it, on a day to be appointed by the Director-General of Trade by notice published in the Gazette after the expiry of that period.

2. Strategic commodities

Schedule 1 to the Import and Export (Strategic Commodities) Regulations (Cap. 60 sub. leg.) is amended---

(a) in the Munitions List---

(i) in ML8(a)(24), by repealing "dinitrobenzofuroxan" and substituting "dinitrobenzofurozan";

(ii) in ML8(a)(27), by repealing "octanone-3" and substituting "octa-3-one";

(iii) in ML10(a), (b), (c) and (e), by repealing "specially designed components therefor" and substituting "components therefor specially designed or modified for military use";

(iv) by repealing ML10(d) and substituting---

"(d) Unmanned airborne vehicles and related equipment, specially designed or modified for military use, as follows, and specially designed components therefor:

(1) Unmanned airborne vehicles including remotely piloted air vehicles (RPVs) and autonomous programmable vehicles;

(2) Associated launchers and ground support equipment;

(3) Related equipment for command and control;";

(v) in ML15, by repealing Note 2 and substituting---

"2. ML15 does not control "first generation image intensifier tubes" or equipment specially designed to incorporate "first generation image intensifier tubes".

N.B.:

For the status of weapons sights incorporating "first generation image intensifier tubes" see ML1 and ML5(a).";

(b) in the Dual-use Goods List, in the entry relating to the "NUCLEAR TECHNOLOGY NOTE (NTN)" by repealing everything from "The transfer of "technology" directly" up to and including "as will the goods." and substituting---

"The "technology" directly associated with any goods controlled in Category 0 is

controlled according to the provisions of Category 0.";
(c) in the Dual-use Goods List, by repealing the entry relating to "GENERAL SOFTWARE NOTE (GSN)" and substituting---
"GENERAL SOFTWARE NOTE (GSN)
The Lists do not control "software" which is either:
(1) Generally available to the public by being:
(a) Sold from stock at retail selling points without restriction, by means of:
(1) Over-the-counter transactions;
(2) Mail order transactions; or
(3) Telephone call transactions; and
(b) Designed for installation by the user without further substantial support by the supplier; or
N.B.:
Entry (1) of the General Software Note does not release "software" controlled by Category 5--
Part 2.
(2) "In the public domain".";
(d) in the Dual-use Goods List, by repealing Category 0 and substituting---

"CATEGORY 0---NUCLEAR MATERIALS,
FACILITIES, AND EQUIPMENT
0A Systems, Equipment and Components
0A001 "Nuclear reactors" and specially designed or prepared equipment and components therefor, as follows:
(a) "Nuclear reactors" 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 0A001(h), 'nuclear reactor internals' means any major structure within a reactor vessel which has one or more functions such as supporting the core, maintaining fuel alignment, directing primary coolant flow, providing radiation shields for the reactor vessel, and guiding in-core instrumentations.
(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";
0B Test, Inspection and Production Equipment
0B001 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:
(1) Gas centrifuges;
(2) Complete rotor assemblies;
(3) Rotor tube cylinders with a wall thickness of 12 mm or less, a diameter of between 75 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 UF6 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%;
Note:
In 0B001(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 * 106 m and a "specific tensile strength" greater than 76.2 * 103 m.
(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 m3/min 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 controlled by 0B001(c)(3) and designed for a buffer gas in-leakage rate of less than 1 000 cm3/min;
(5) Heat exchangers made of aluminium, copper, nickel, or alloys containing more than 60 weight percent 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 100 kPa;
(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 UF6", 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 m3/min, made of or protected by "materials resistant to corrosion by UF6", and rotary shaft seals therefor;
(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 153 K

(-120蚓) or less;
(b) Cryogenic refrigeration units capable of temperatures of 153 K
(-120蚓) or less;
(c) Separation nozzle or vortex tube units for the separation of UF6 from carrier gas;
(d) UF6 cold traps capable of temperatures of 253 K (-20蚓) 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 material (e.g. glass, fluorocarbon polymers, polyphenyl sulphate, polyether sulfone and resin-impregnated graphite);

(5) Feed preparation systems for producing high purity uranium chloride solution consisting of dissolution, solvent extraction and/or ion exchange equipment for purification and electrolytic cells for reducing the uranium U+6 or U+4 to U+3;

(6) Uranium oxidation systems for oxidation of U+3 to U+4;
(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蚓) to 473 K (200蚓);

(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蚓) to 473 K (200蚓) 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;

(5) "Lasers" or "laser" systems for the separation of uranium isotopes with a spectrum frequency stabilizer for operation over extended periods of time;

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 蚓) 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 of 153 K (-120 蚓)

or less;

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

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

(6) "Lasers" or "laser" systems for the separation of uranium isotopes with a spectrum frequency stabilizer 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, ionizer, and beam accelerator made of suitable non-magnetic materials (e.g. graphite, stainless steel, or copper) and capable of providing a total ion beam current of 50 mA or greater;

(2) Ion collector plates for collection of enriched or depleted uranium ion beams, consisting of two or more slits and pockets and made of suitable non-magnetic materials (e.g. graphite or stainless steel);

(3) Vacuum housings for uranium electromagnetic separators made of non-magnetic materials (e.g. stainless steel) and designed to operate at pressures of 0.1 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; and

(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; and

(b) Current or voltage regulation better than 0.01% over a period of 8 hours;

N.B.:

See also 3A226.

0B002 Specially designed or prepared auxiliary systems, equipment and components, as follows, for isotope separation plant controlled by 0B001, 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 5 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 ionization sources; and

(4) Collector system suitable for isotopic analysis;

0B003 Plant for the conversion of uranium and equipment specially designed or prepared therefor, as follows:
(a) Systems for the conversion of uranium ore concentrates to UO3;
(b) Systems for the conversion of UO3 to UF6;
(c) Systems for the conversion of UO3 to UO2;
(d) Systems for the conversion of UO2 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;
0B004 Plant for the production or concentration of heavy water, deuterium and deuterium compounds and specially designed or prepared equipment and components therefor, as follows:
(a) Plant for the production of heavy water, deuterium or deuterium compounds, as follows:
(1) Water-hydrogen sulphide exchange plants;
(2) Ammonia-hydrogen exchange plants;
(b) Equipment and components, as follows:
(1) Water-hydrogen sulphide exchange towers 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 m3/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;

0B005 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 solid fuel.
0B006 Plant for the reprocessing of irradiated "nuclear reactor" fuel elements, and specially designed or prepared equipment and components therefor;
Note:
0B006 includes:
(a) Plant for the reprocessing of irradiated "nuclear reactor" fuel elements including equipment and components which normally come into direct contact with and directly control the irradiated fuel and the major nuclear material and fission product processing streams;
(b) 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;
(c) Dissolvers, critically safe tanks (e.g. small diameter, annular or slab tanks) specially designed or prepared for the dissolution of irradiated "nuclear reactor" fuel, which are capable of withstanding hot, highly corrosive liquids, and which can be remotely loaded and maintained;
(d) 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";
(e) 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 0C004) of at least two percent;
2. A maximum diameter of 175 mm for cylindrical vessels; or
3. A maximum width of 75 mm for either a slab or annular vessel.
(f) Complete systems specially designed or prepared for the conversion of plutonium nitrate to plutonium oxide;

(g) Complete systems specially designed or prepared for the production of plutonium metal;
(h) Process control instrumentation specially designed or prepared for monitoring or controlling the reprocessing of irradiated "natural uranium", "depleted uranium" or "special fissile materials".
0C Materials
0C001 "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:
0C001 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;
(c) Alloys containing less than 5% thorium;
(d) Ceramic products containing thorium, which have been manufactured for non-nuclear use.
0C002 "Special fissile materials";
Note:
0C002 does not control four "effective grammes" or less when contained in a sensing component in instruments.
0C003 Deuterium, heavy water (deuterium oxide) and other compounds of deuterium, and mixtures and solutions containing deuterium, in which the isotopic ratio of deuterium to hydrogen exceeds 1:5 000;
0C004 Graphite, nuclear grade, having a purity level of less than 5 parts per million 'boron equivalent' and with a density greater than 1.5 g/cm3;
Note:
In 0C004, 'boron equivalent' (BE) is defined as the sum of BEZ for impurities (excluding BEcarbon since carbon is not considered an impurity) including boron, where:
BEz(ppm) = CF * Concentration of element Z in ppm;
where CF is the conversion
szAB

factor = ---------
sBAZ

and sB and sz are the thermal neutron capture cross sections (in barns) for naturally occurring boron and element Z respectively; and AB and AZ are the atomic masses of naturally occurring boron and element Z respectively.

0C005 Specially prepared compounds or powders for the manufacture of gaseous diffusion barriers, resistant to corrosion by UF6 (e.g. nickel or alloy containing 60 weight percent or more nickel, aluminium oxide and fully fluorinated hydrocarbon polymers), having a purity of 99.9 weight percent 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;

0D Software

0D001 "Software" specially designed or modified for the "development", "production" or "use" of goods controlled by this Category;

0E Technology

0E001 "Technology" according to the Nuclear Technology Note for the "development", "production" or "use" of goods controlled by this Category;";

(e) in the Dual-use Goods List, in Category 1, in sub-category 1A, in 1A102, by repealing "systems controlled by 9A004 or 9A104;" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104;";

(f) in the Dual-use Goods List, in Category 1, in sub-category 1B---

(i) by repealing 1B115 and substituting---

"1B115 "Production equipment" for the production, handling or acceptance testing of liquid propellants or propellant constituents controlled by 1C011, 1C111 or on the Munitions List, and specially designed components therefor;

Note:

For equipment specially designed for the production of military propellants or propellant constituents, see the Munitions List.";

(ii) by adding---

"1B117 "Production equipment" for the production, handling or acceptance testing of solid propellants or propellant constituents controlled by 1C011, 1C111 or on the Munitions List, as follows:

N.B.:

See also 1B115.

Notes:

1. For equipment specially designed for the production of military propellants or propellant constituents, see the Munitions List.

2. 1B117 does not control equipment for the "production", handling and acceptance

testing of boron carbide.
3. The only batch mixers, continuous mixers and fluid energy mills controlled in 1B117 are those controlled in 1B117(a) to (d).
4. Forms of metal powder "production equipment" not specified in 1B117(d) are to be evaluated in accordance with 1B117(e).
(a) Batch mixers with provision for mixing under vacuum in the range from zero to 13.326 kPa, and with temperature control capability of the mixing chamber and having:
(1) A total volumetric capacity of 110 litres or more; and
(2) At least one mixing/kneading shaft mounted off center;
(b) Continuous mixers with provision for mixing under vacuum in the range from zero to 13.326 kPa, and with temperature control capability of the mixing chamber and having:
(1) Two or more mixing/kneading shafts; and
(2) Capability to open the mixing chamber;
(c) Fluid energy mills usable for grinding or milling propellant or propellant constituents specified in 1C011 or 1C111, or on the Munitions List;
(d) Metal powder "production equipment" usable for the "production", in a controlled environment, of spherical or atomized materials specified in 1C011 or 1C111(a)(1) or (2), or on the Munitions List including:
(1) Plasma generators (high frequency arc-jet) usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment;
(2) Electroburst equipment usable for obtaining sputtered or spherical metallic powders with organization of the process in an argon-water environment;
(3) Equipment usable for the "production" of spherical aluminium powders by powdering a melt in an inert medium (e.g. nitrogen);
(e) "Production equipment" for the production, handling, mixing, curing, casting, pressing, machining, extruding or acceptance testing of solid propellants or propellant constituents described in 1C011 or 1C111, or on the Munitions List, other than those described in 1B117(a) to (d);
(f) Specially designed components for the equipment controlled in 1B117(a) to (e);";
(g) in the Dual-use Goods List, in Category 1, in sub-category 1C---
(i) in 1C111(c)(1), by repealing "Butacene;" and substituting "Butacene in the Munitions List ML8(e)(11);";
(ii) in 1C111(c), by adding---
"(6) Ferrocene derivatives other than those controlled by the Munitions List;";
(iii) in 1C111, by repealing the Note and substituting---
"Notes:

1. The following materials, whether or not encapsulated in aluminium, beryllium, magnesium, or zirconium are subject to control:
(a) Spherical aluminium powder with particles of uniform diameter of 60 mm or less and an aluminium content of 99 percent or greater;
(b) Zirconium, beryllium, boron, magnesium and alloys of these, in particle sizes of less
than 60 mm, whether spherical, atomized, spheroidal, flaked or ground consisting 99% or more by weight of any of the above mentioned metals;
(c) Iron powder with average particle size of
3 mm or less produced by hydrogen reduction of iron oxide.
2. For propellants and constituent chemicals for propellants not controlled by 1C111, see the Munitions List.";

(iv) by adding---

"1C118 Titanium-stabilized duplex stainless steel (Ti-DSS) having:
(a) All of the following characteristics:
(1) Containing 17.0--23.0 weight percent chromium and 4.5--7.0 weight percent nickel; and
(2) A ferritic-austenitic microstructure (also referred to as a two-phase microstructure) of which at least 10 percent is austenite by volume (according to ASTM E-1181-87 or national equivalents); and
(b) 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;";

(v) in 1C351, by adding "N.B.: See also 1C450(c)." under "Human pathogens, zoonoses and "toxins", as follows:";

(vi) by adding "N.B.: See also 1C450(c)(10)." under 1C351(d)(4);

(vii) by adding "N.B.: See also 1C450(c)(11)." under 1C351(d)(5);

(viii) in 1C450(b)(5)(b), by repealing "Proponated" and substituting "Protonated";

(ix) by adding "N.B.: See also 1C351(d)(4)." under 1C450(c)(10);

(x) by adding "N.B.: See also 1C351(d)(5)." under 1C450(c)(11);

(h) in the Dual-use Goods List, in Category 1, in sub-category 1E---

(i) by repealing 1E001 and substituting---

"1E001 "Technology" according to the General Technology Note for the "development" or "production" of items controlled by 1A001(b), 1A001(c), 1A002, 1A003,

1A004, 1A005, 1A102, 1B or 1C;";

(ii) by repealing 1E101 and substituting---

"1E101 "Technology" according to the General Technology Note for the "use" of goods controlled by 1A102, 1B001, 1B101, 1B115, 1B116, 1B117, 1C001, 1C007, 1C011, 1C101, 1C107, 1C111 to 1C118, 1D101 or 1D103;";

(i) in the Dual-use Goods List, in Category 2, in sub-category 2B---

(i) by repealing 2B001(a)(1) and substituting---

"(1) Positioning accuracy with all compensations available equal to or less (better) than 4.5 mm according to ISO 230/2 (1997) or national equivalents along any linear axis; and";

(ii) by repealing 2B001(b)(1)(a) and substituting---

"(a) Positioning accuracy with all compensations available equal to or less (better) than 4.5 mm according to ISO 230/2 (1997) or national equivalents along any linear axis; and";

(iii) by repealing 2B001(b)(3) and substituting---

"(3) A positioning accuracy for jig boring machines, with all compensations available, equal to or less (better) than 3 mm according to ISO 230/2 (1997) or national equivalents along any linear axis;";

(iv) by repealing 2B001(c)(1)(a) and substituting---

"(a) Positioning accuracy with all compensations available equal to or less (better) than 3 mm according to ISO 230/2 (1997) or national equivalents along any linear axis; and";

(v) by repealing 2B002;

(vi) in 2B004(a), by repealing "within the closed cavity and possessing a chamber cavity" and substituting "within the closed cavity and a chamber cavity";

(vii) in 2B109, in Technical Note 2, by repealing "for systems controlled by 9A007(a)." and substituting "for systems controlled by 9A005, 9A007(a) or 9A105(a).";

(viii) by adding at the end of the table of "DEPOSITION TECHNIQUES---TECHNICAL NOTE"---

"TABLE---DEPOSITION TECHNIQUES---STATEMENT OF UNDERSTANDING

It is understood that the following technical information, accompanying the table of deposition techniques, is for use as appropriate.

1. "Technology" for pretreatments of the substrates listed in the Table, as follows:

(a) Chemical stripping and cleaning bath cycle parameters, as follows:

(1) Bath composition:

(a) For the removal of old or defective coatings, corrosion product or foreign deposits;

(b) For preparation of virgin substrates;

(2) Time in bath;
(3) Temperature of bath;
(4) Number and sequences of wash cycles;
(b) Visual and macroscopic criteria for acceptance of the cleaned part;
(c) Heat treatment cycle parameters, as follows:
(1) Atmosphere parameters, as follows:
(a) Composition of the atmosphere;
(b) Pressure of the atmosphere;
(2) Temperature for heat treatment;
(3) Time of heat treatment;
(d) Substrate surface preparation parameters, as follows:
(1) Grit blasting parameters, as follows:
(a) Grit composition;
(b) Grit size and shape;
(c) Grit velocity;
(2) Time and sequence of cleaning cycle after grit blast;
(3) Surface finish parameters;
(e) Masking technique parameters, as follows:
(1) Material of mask;
(2) Location of mask.
2. "Technology" for in situ quality assurance techniques for evaluation of the coating processes listed in the Table, as follows:
(a) Atmosphere parameters, as follows:
(1) Composition of the atmosphere;
(2) Pressure of the atmosphere;
(b) Time parameters;
(c) Temperature parameters;
(d) Thickness parameters;
(e) Index of refraction parameters;
(f) Control of composition.
3. "Technology" for post deposition treatments of the coated substrates listed in the Table, as follows:
(a) Shot peening parameters, as follows:
(1) Shot composition;
(2) Shot size;
(3) Shot velocity;
(b) Post shot peening cleaning parameters;
(c) Heat treatment cycle parameters, as follows:

(1) Atmosphere parameters, as follows:
(a) Composition of the atmosphere;
(b) Pressure of the atmosphere;
(2) Time-temperature cycles;
(d) Post heat treatment visual and macroscopic criteria for acceptance of the coated substrates.
4. "Technology" for quality assurance techniques for the evaluation of the coated substrates listed in the Table, as follows:
(a) Statistical sampling criteria;
(b) Microscopic criteria for:
(1) Magnification;
(2) Coating thickness uniformity;
(3) Coating integrity;
(4) Coating composition;
(5) Coating and substrates bonding;
(6) Microstructural uniformity;
(c) Criteria for optical properties assessment (measured as a function of wavelength):
(1) Reflectance;
(2) Transmission;
(3) Absorption;
(4) Scatter.
5. "Technology" and parameters related to specific coating and surface modification processes listed in the Table, as follows:
(a) For Chemical Vapour Deposition:
(1) Coating source composition and formulation;
(2) Carrier gas composition;
(3) Substrate temperature;
(4) Time-temperature-pressure cycles;
(5) Gas control and part manipulation;
(b) For Thermal Evaporation---Physical Vapour Deposition:
(1) Ingot or coating material source composition;
(2) Substrate temperature;
(3) Reactive gas composition;
(4) Ingot feed rate or material vaporisation rate;
(5) Time-temperature-pressure cycles;
(6) Beam and part manipulation;
(7) "Laser" parameters, as follows:

(a) Wave length;
(b) Power density;
(c) Pulse length;
(d) Repetition ratio;
(e) Source;
(f) Substrate orientation;
(c) For Pack Cementation:
(1) Pack composition and formulation;
(2) Carrier gas composition;
(3) Time-temperature-pressure cycles;
(d) For Plasma Spraying:
(1) Powder composition, preparation and size distributions;
(2) Feed gas composition and parameters;
(3) Substrate temperature;
(4) Gun power parameters;
(5) Spray distance;
(6) Spray angle;
(7) Cover gas composition, pressure and flow rates;
(8) Gun control and part manipulation;
(e) For Sputter Deposition:
(1) Target composition and fabrication;
(2) Geometrical positioning of part and target;
(3) Reactive gas composition;
(4) Electrical bias;
(5) Time-temperature-pressure cycles;
(6) Triode power;
(7) Part manipulation;
(f) For ion Implantation:
(1) Beam control and part manipulation;
(2) Ion source design details;
(3) Control techniques for ion beam and deposition rate parameters;
(4) Time-temperature-pressure cycles;
(g) For Ion Plating:
(1) Beam control and part manipulation;
(2) Ion source design details;
(3) Control techniques for ion beam and deposition rate parameters;
(4) Time-temperature-pressure cycles;
(5) Coating material feed rate and vaporisation rate;

(6) Substrate temperature;
(7) Substrate bias parameters.";
(j) in the Dual-use Goods List, in Category 3, in sub-category 3A---
(i) in the Note to 3A002(a)(2), by repealing "recommended by the International Radio Consultative Committee (CCIR)" and substituting "recommended by the International Telecommunication Union (ITU)";
(ii) in 3A002(a)(5), by repealing "N.B.: See also 3A202.";
(iii) by repealing 3A202;
(k) in the Dual-use Goods List, in Category 3, in sub-category 3E---
(i) in 3E002(b), by repealing "quantum well or super lattice devices;" and substituting "quantum well and super lattice device;";
(ii) in 3E201, by repealing "3A202,";
(l) in the Dual-use Goods List, in Category 4, in sub-category 4A---
(i) by adding under 4A001(b)---
"Note:
4A001(b) does not control electronic computers and related equipment when accompanying their user for the user's personal use.";
(ii) in the Note 3 to 4A003(a), by repealing "by use of shared storage" and substituting "by using shared storage";
(iii) in 4A003(b), by repealing "710 million theoretical operations per second (Mtops);" and substituting "2 000 million theoretical operations per second (Mtops);";
(iv) in 4A003(c), by repealing "modified to be capable of enhancing" and substituting "modified for enhancing";
(v) in Note 1 to 4A003(c), by repealing ", 4A003(e) or 4A003(f)" and substituting "or 4A003(e)";
(vi) by repealing 4A003(f);
(vii) by repealing the Note to 4A003(g) and substituting---
"Note:
4A003(g) does not control internal interconnection equipment (e.g. backplanes, buses), passive interconnection equipment, "network access controllers" or "communications channel controllers".";
(viii) in 4A101 and 4A102, by repealing "systems controlled by 9A004 or 9A104;" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104;";
(m) in the Dual-use Goods List, in Category 4, in sub-category 4D by adding under 4D003(c)---
"Note:

4D003(c) does not control "software" when accompanying its user for the user's personal use.";
(n) in the Dual-use Goods List, in Category 4, in the "TECHNICAL NOTE ON "COMPOSITE THEORETICAL PERFORMANCE" ("CTP")", in Notes 5 to Step 3 by repealing "This aggregation does not apply to "electronic assemblies" described by 4A003(d)." and substituting "This aggregation does not apply to "electronic assemblies" described by 4A003(c).";
(o) in the Dual-use Goods List, by repealing Category 5 and substituting---
"CATEGORY 5---TELECOMMUNICATIONS AND "INFORMATION SECURITY"
Part 1---Telecommunications
Notes:
1. The control status of components, "lasers", test and "production" equipment and "software" therefor which are specially designed for telecommunications equipment or systems is determined in Category 5, Part 1.
2. "Digital computers", related equipment or "software", when essential for the operation and support of telecommunications equipment described in this Category, are regarded as specially designed components, provided they are the standard models customarily supplied by the manufacturer. This includes operation, administration, maintenance, engineering or billing computer systems.
5A1 Systems, Equipment and Components
5A001 (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 蚓) to 397 K (124 蚓);
Note:
5A001(a)(3) applies only to electronic equipment.
Note:
5A001(a)(2) and 5A001(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 optimize 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" or "frequency agility" (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 cellular radio equipment operating in civil bands.
Note:
5A001(b)(3) does not control equipment designed to operate at an output power of 1.0 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;
Note:
5A001(b)(4) does not control cellular radio equipment operating in civil bands.
(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, specified by the manufacturer as being capable of withstanding a proof test tensile stress of 2 * 109 N/m2 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 and relative humidity 40%.
N.B.:
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).
2. For fibre optic hull penetrators or connectors, see 8A002(c).
(d) "Electronically steerable phased array antennae" operating above 31 GHz;
Note:
5A001(d) does not control "electronically steerable phased array antennae" for landing systems with instruments meeting ICAO standards covering microwave landing systems (MLS).
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 mV/m at a distance of 500 m.
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 controlled by Category 5---Part 1;
Note:
5B001(a) 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 1.5 Gbit/s;
(2) Equipment employing a "laser" and having any of the following:
(a) A transmission wavelength exceeding 1 750 nm;
(b) Performing "optical amplification";
(c) Employing coherent optical transmission or coherent optical detection techniques

(also called optical heterodyne or homodyne techniques); or
(d) Employing analogue techniques and having a bandwidth exceeding
2.5 GHz;
Note:
5B001(b)(2)(d) does not control equipment specially designed for the "development" 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:
5B001(b)(4)(b) does not control equipment specially designed for the "development" 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;
5C1 Materials
None;
5D1 Software
5D001 (a) "Software" specially designed or modified for the "development", "production" or "use" of equipment, functions or features controlled by Category 5---Part 1;
(b) "Software" specially designed or modified to support "technology" controlled by 5E001;
(c) Specific "software" as follows:
(1) "Software" specially designed or modified to provide characteristics, functions or features of equipment controlled by 5A001 or 5B001;
(2) "Software" which provides the capability of recovering "source code" of telecommunications "software" controlled by 5D001;
(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 1.5 Gbit/s;
(2) Equipment employing a "laser" and having any of the following:
(a) A transmission wavelength exceeding 1 750 nm; or

(b) Employing analogue techniques and having a bandwidth exceeding 2.5 GHz;
Note:
5D001(d)(2)(b) does not control equipment specially designed for the "development" of commercial TV systems.
(3) Equipment employing "optical switching"; or
(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;
Note:
5D001(d)(4)(b) does not control equipment specially designed for the "development" of equipment designed or modified for operation in any ITU allocated band.
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" controlled by Category 5--- Part 1;
(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" or "frequency agility" (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 1.5 Gbit/s;
(2) Equipment employing a "laser" and having any of the following:
(a) A transmission wavelength exceeding 1 750 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 equipment specially designed for the "development" 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;
Note:
5E001(c)(4)(b) does not control equipment specially designed for the "development" 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;

5E101 "Technology" according to the General Technology Note for the "development", "production" or "use" of equipment controlled by 5A101;

Part 2---"Information Security"

Notes:

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.
2. Category 5---Part 2 does not control products when accompanying their user for the user's personal use.
3. Cryptography Note:

5A002 and 5D002 do not control items 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:
(1) Over-the-counter transactions;
(2) Mail order transaction;
(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 items are accessible and will be provided, upon request, to the appropriate authority in the exporter's country 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 unauthorized 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) Factorization of integers in excess of 512 bits (e.g., RSA);
(2) Computation of discrete logarithms in a multiplicative group of a finite field of size greater than 512 bits (e.g., Diffie-Hellman over Z/pZ); or
(3) Discrete logarithms in a group other than mentioned in 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) Deleted;
(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" or the hopping code for "frequency agility" 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) Communications cable systems designed or modified using mechanical, electrical or electronic means to detect surreptitious intrusion;
Note:
5A002 does not control:
(a) "Personalized smart cards" where the cryptographic capability is restricted for use in equipment or systems excluded from control under Note (b) to (f) of this Note;
N.B.:
If a "personalized 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 television 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:
(1) 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 of unboosted cordless operation (i.e. a single, unrelayed hop between terminal and home basestation) is less than 400 metres according to the manufacturer's specifications.

5B2 Test, Inspectionand Production Equipment

5B002 (a) Equipment specially designed for:

(1) The "development" of equipment or functions controlled by Category 5--- Part 2, including measuring or test equipment;

(2) The "production" of equipment or functions controlled by Category 5--- Part 2, including measuring, test, repair or production equipment;

(b) Measuring equipment specially designed to evaluate and validate the "information security" functions controlled by 5A002 or 5D002;

5C2 Materials

None;

5D2 Software

5D002 (a) "Software" specially designed or modified for the "development", "production" or "use" of equipment or "software" controlled by Category 5---Part 2;

(b) "Software" specially designed or modified to support "technology" controlled by 5E2;

(c) Specific "software", as follows:

(1) "Software" having the characteristics, or performing or simulating the functions of the equipment controlled by 5A002 or 5B002;

(2) "Software" to certify "software" controlled by 5D002(c)(1);

Note:

5D002 does not control:

(a) "Software" required for the "use" of equipment excluded from control under the Note to 5A002;

(b) "Software" providing any of the functions of equipment excluded from control under the Note to 5A002.

5E2 Technology

5E002 (a) "Technology" according to the General Technology Note for the "development", "production" or "use" of equipment or "software" controlled by Category 5---Part 2;";

(p) in the Dual-use Goods List, in Category 6, in sub-category 6A---

(i) in 6A001(a)(2)(e)(1), by adding "or" at the end;

(ii) in 6A001(a)(2)(e)(2), by repealing "or" at the end;

(iii) by repealing 6A001(a)(2)(e)(3);

(iv) in 6A001(a)(2), by adding---

"(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;";

(v) in the Note to 6A003(a)(1), by repealing "cameras for normal civil purposes." and substituting "cameras designed for civil purposes.";

(vi) in 6A004(c)(2), by repealing "Substrates, substrates having surface coatings" and substituting "Raw substrates, processed substrates having surface coatings";

(vii) in 6A005(a)(6), by repealing "Gas discharge and ion "lasers" (i.e., krypton ion or argon ion "lasers")" and substituting "Krypton ion or argon ion "lasers" ";

(viii) in 6A005(c)(2)(c)(3)(a)(2)(a), by repealing "single-mode" and substituting "single-transverse mode";

(ix) in 6A005(c)(2)(c)(3)(a)(2)(b), by repealing "multimode" and substituting "multiple-transverse mode";

(x) in 6A006(h), by repealing "manufactured from "superconductive" materials:" and substituting "manufactured from "superconductive" materials and having all of the following:";

(xi) in 6A006(h)(1), by repealing "Designed for operation" and substituting "Being designed for operation";

(xii) in 6A006(h)(2), by repealing "Designed for sensing" and substituting "Being designed for sensing";

(xiii) in 6A007(a), by repealing "Gravity meters for ground use" and substituting "Gravity meters designed or modified for ground use";

(xiv) in 6A007(b), by repealing "Gravity meters for mobile platforms for ground, marine, submersible, space or airborne use," and substituting "Gravity meters designed for mobile platforms,";

(xv) by repealing 6A107 and substituting---

"6A107 Gravity meters (gravimeters) and components for gravity meters and gravity gradiometers, as follows:

(a) Gravity meters, other than those controlled by 6A007(b), designed or modified for airborne or marine use, and having a static or operational accuracy of 0.7 mgal or less (better), and having a time-to-ready-state registration of two minutes or less;

(b) Specially designed components for gravity meters controlled by 6A007(b) or 6A107(a) and gravity gradiometers controlled by 6A007(c);";

(xvi) in 6A108(a), by repealing "systems controlled by 9A004 or 9A104;" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104;";

(q) in the Dual-use Goods List, in Category 6, in sub-category 6D, by repealing 6D003(a)(3) and substituting---

"(3) "Software" specially designed for acoustic beam forming for the "real time processing" of acoustic data for passive reception using bottom or bay cable systems;
(4) "Source code" for the "real time processing" of acoustic data for passive reception using bottom or bay cable systems;";
(r) in the Dual-use Goods List, in Category 7, in sub-category 7A, in 7A103(b), 7A105, 7A106, 7A115 and 7A116, by repealing "systems controlled by 9A004 or 9A104" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104";
(s) in the Dual-use Goods List, in Category 7, in sub-category 7B---
(i) by repealing 7B003 and substituting---
"7B003 Equipment specially designed for the "production" of equipment controlled by 7A, including:
N.B.:
See also 7B103.
(a) Inertial measurement unit testers (IMU module);
(b) IMU platform testers;
(c) IMU stable element handling fixtures;
(d) IMU platform balance fixtures;
(e) Gyro tuning test stations;
(f) Gyro dynamic balance stations;
(g) Gyro run-in/motor test stations;
(h) Gyro evacuation and filling stations;
(i) Centrifuge fixture for gyro bearings;
(j) Accelerometer axis align stations;
(k) Accelerometer test stations;";
(ii) by adding---
"7B101 "Production equipment", and other test, calibration and alignment equipment, other than that described in 7B003, 7B102 and 7B104, designed or modified to be used with equipment controlled by 7A001 to 7A004 or 7A101 to 7A104, including:
N.B.:
See also 7B003, 7B102 and 7B104.
(a) Inertial measurement unit testers (IMU module);
(b) IMU platform testers;
(c) IMU stable element handling fixtures;
(d) IMU platform balance fixtures;
(e) Gyro tuning test stations;
(f) Gyro dynamic balance stations;
(g) Gyro run-in/motor test stations;

(h) Gyro evacuation and filling stations;
(i) Centrifuge fixtures for gyro bearings;
(j) Accelerometer axis align stations;
(k) Accelerometer test stations;";

(iii) by repealing 7B102 and substituting---

"7B102 Equipment, other than those controlled by 7B002, designed or modified to characterize mirrors, for laser gyro equipment, as follows:
(a) Scatterometers having a measurement accuracy of 10 ppm or less (better);
(b) Reflectometers having a measurement accuracy of 50 ppm or less (better); or
(c) Profilometers having a measurement accuracy of 0.5 nm or less (better);";

(iv) by adding---

"7B104 Equipment, designed or modified to be used with equipment controlled by 7A001 to 7A004, or 7A101 to 7A104, as follows:
N.B.:
See also 7B101.
Notes:
1. 7B104(a) does not control balancing machines designed or modified for dental or other medical equipment.
2. 7B104(c) and 7B104(d) do not control rotary tables designed or modified for machine tools or for medical equipment.
3. Rate tables not controlled by 7B104(c) and providing the characteristics of a positioning table are to be evaluated according to 7B104(d).
4. Equipment that has the characteristics specified in 7B104(d) which also meets the characteristics of 7B104(c) will be treated as equipment specified in 7B104(c).

(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; and

(4) Capable of balancing to a residual specific unbalance of 0.2 gram-mm per kg of rotor mass;

(b) Indicator heads (sometimes known as balancing instrumentation) designed or modified for use with machines specified in 7B104(a);

(c) Motion simulators/rate tables (equipment capable of simulating motion) having all of the following characteristics:

(1) Two axes or more;

(2) Slip rings capable of transmitting electrical power and/or signal

information; and

(3) Having any of the following characteristics:

(a) For any single axis:

(1) Capable of rates of rotation of 400 degrees/sec or more, or 30 degrees/sec or less; and

(2) A rate resolution equal to or less than 6 degrees/sec and an accuracy equal to
or less than 0.6 degrees/sec; or

(b) Having a worst case rate stability equal to or better (less) than plus or minus 0.05% averaged over 10 degrees or more; or

(c) A positioning accuracy equal to or better than 5 arc-second;

(d) Positioning tables (equipment capable of precise rotary position in any axis) having the following characteristics:

(1) Two axes or more; and

(2) A positioning accuracy equal to or better than 5 arc-second;

(e) Centrifuges able to impart accelerations above 100 g and having slip rings capable of transmitting electrical power and signal information;";

(t) in the Dual-use Goods List, in Category 7, in sub-category 7D---

(i) in 7D002, by repealing "navigation equipment or Attitude and Heading Reference Systems (AHRS) including inertial equipment not controlled by 7A003 or 7A004;" and substituting "navigation equipment, including inertial equipment not controlled by 7A003 or 7A004, or Attitude and Heading Reference Systems (AHRS);";

(ii) by repealing 7D101 and substituting---

"7D101 "Software" specially designed for the "use" of equipment controlled by 7A001 to 7A006, 7A101 to 7A106, 7A115, 7B001, 7B002, 7B003, 7B101, 7B102, 7B103, or 7B104;";

(iii) in 7D103, by repealing "systems controlled by 9A004 or 9A104;" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104;";

(u) in the Dual-use Goods List, in Category 7, in sub-category 7E, by repealing 7E101 and substituting---

"7E101 "Technology", other than "technology" controlled by 7E003, according to the General Technology Note for the "use" of equipment controlled by 7A001 to 7A006, 7A101 to 7A106, 7A115 to 7A117, 7B001, 7B002, 7B003, 7B101, 7B102, 7B103, 7B104, 7D101 to 7D103;";

(v) in the Dual-use Goods List, in Category 9, in sub-category 9A---

(i) in 9A003, by repealing "for gas turbine engine propulsion systems, as follows:" and substituting "for the following gas turbine engine propulsion

systems:";

(ii) in 9A105(b), 9A107 and 9A119, by repealing "usable in "missiles"," and substituting "usable in complete rocket systems or unmanned air vehicles, capable of a range of at least 300 km,";

(iii) in 9A110 and 9A115, by repealing "systems controlled by 9A004 or 9A104" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104";

(w) in the Dual-use Goods List, in Category 9, in sub-category 9B, in 9B116, by repealing "systems, sub-systems, and components controlled by 9A004 to 9A009," and substituting "space launch vehicles controlled by 9A004, or systems, sub-systems, and components controlled by 9A005 to 9A009,";

(x) in the Dual-use Goods List, in Category 9, in sub-category 9D, in 9D103, by repealing "systems controlled by 9A004 or 9A104" and substituting "space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104";

(y) in the Dual-use Goods List, in Category 9, in sub-category 9E, in 9E102, by repealing "goods controlled by 9A004 to 9A011," and substituting "space launch vehicles controlled by 9A004, or goods controlled by 9A005 to 9A011,";

(z) in the Definitions of Terms---

(i) by repealing the N.B. to the Definition of Terms and substituting---

"Notes:

1. Definitions apply throughout both the Munitions List and Dual-use Goods List. The references are purely advisory and have no effect on the universal application of defined terms throughout these Lists.

2. Words and terms contained in the Definitions of Terms only take the defined meaning where this is indicated by their being enclosed in quotations marks (" "). Elsewhere, words and terms take their commonly accepted (dictionary) meanings, unless a local definition for a particular control is given.";

(ii) by adding---

"5 "Asymmetric algorithm" (非對稱演算法)

A cryptographic algorithm using different, mathematically-related keys for encryption and decryption.

N.B.:

A common use of "asymmetric algorithms" is key management.";

(iii) by repealing the definition of "Asynchronous transfer mode" ("ATM") and substituting---

"5 "Asynchronous transfer mode" ("ATM") (非同步式輸送模式)

A transfer mode in which the information is organized into cells; it is asynchronous in the sense that the recurrence of cells depends on the required or instantaneous

bit rate.";

(iv) by repealing the definition of "ATM" and substituting---

"5 "ATM"

"ATM" is equivalent to "Asynchronous transfer mode".";

(v) by repealing the definition of "Basic gate propagation delay time" and substituting---

"3 "Basic gate propagation delay time" (基本閘傳遞延遲時間)

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.:

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

Technical Note:

'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.";

(vi) by repealing the definition of "Biopolymers" and substituting---

"ML7 "Biopolymers" (生物聚合物)

Biological macromolecules as follows:

(a) Enzymes for specific chemical or biochemical reactions;

(b) Antibodies, monoclonal, polyclonal or anti-idiotypic;

(c) Specially designed or specially processed receptors;

N.B.:

1. 'Anti-idiotypic antibodies' means antibodies which bind to the specific antigen binding sites of other antibodies.

2. 'Monoclonal antibodies' means proteins which bind to one antigenic site and are produced by a single clone of cells.

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

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

(vii) by repealing the definition of "Boron equivalent";

(viii) by adding---

"1 "Carbon fibre preforms" (碳纖維預製成形品)

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".";

(ix) by repealing the definition of "CCITT";

(x) by repealing the definition of "CE" and substituting---

"4 "CE"

"CE" is equivalent to "computing element".";

(xi) by repealing the definition of "Civil aircraft" and substituting---

"1 7 9 "Civil aircraft" (民用飛機)

ML10 Those "aircraft" listed by designation in 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. (See also "aircraft")";

(xii) by repealing the definition of "Communications channel controller" and substituting---

"4 "Communications channel controller" (通訊頻道控制器)

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.";

(xiii) by repealing the definition of "Composite theoretical performance" ("CTP") and substituting---

"3 4 "Composite theoretical performance" ("CTP") (合成理論效能)

A measure of computational performance given in millions of theoretical operations per second (Mtops), calculated using the aggregation of "computing elements".

N.B.:

See Category 4, Technical Note.";

(xiv) by repealing the definition of "CTP" and substituting---

"3 4 "CTP"

"CTP" is equivalent to "Composite theoretical performance".";

(xv) by repealing the definition of "Effective gramme" of "special fissile material" or "other fissile material" and substituting---

"0 1 "Effective gramme" (有效克) of "special fissile material" (特別可裂變物料)

(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.";

(xvi) by repealing the definition of "Electronically steerable phased array antenna" and substituting---

"5 6 "Electronically steerable phased array antenna" (電子控向相位陣列天線)

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

(xvii) by adding---

"ML15 "First generation image intensifier tubes" (第一代影像強化管)

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

(xviii) by repealing the definition of "Gateway";

(xix) by repealing the definition of "Integrated Services Digital Network" ("ISDN");

(xx) by repealing the definition of "ISDN";

(xxi) by adding---

"0 "Materials resistant to corrosion by UF6" (可抵抗 UF6 腐蝕的物料)

These may be copper, stainless steel, aluminium, aluminium oxide, aluminium alloys, nickel or alloy containing 60 weight percent or more nickel and UF6--- resistant fully fluorinated hydrocarbon polymers, as appropriate for the type of separation process.";

(xxii) by repealing the definition of "Measurement uncertainty" and substituting---

"2 "Measurement uncertainty" (測量精度誤差)

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 (Reference: ISO 10360-2, or VDI/VDE 2617).";

(xxiii) by repealing the definition of "Network access controller" and substituting---

"4 "Network access controller" (網絡存取控制器)

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.";

(xxiv) by repealing the definition of "Nuclear reactor" and substituting---

"0 "Nuclear reactor" (核反應堆)

"ML17 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.";

(xxv) by repealing the definition of "Object code" and substituting---

"4 9 "Object code" (目標碼)

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

(xxvi) by repealing the definition of "Other fissile materials";

(xxvii) by repealing the definition of "Personalized smart card" and substituting---

"5 "Personalized smart card" (個人化智慧卡)

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.";

(xxviii) in the definition of "Production equipment", by repealing "9" and substituting "1 7 9";

(xxix) by repealing the definition of "SDH";

(xxx) by repealing the definition of "Software" and substituting---

"GSN "Software" (軟件)

All A collection of one or more "programmes" or "microprogrammes" fixed in any tangible medium of expression.";

(xxxi) by repealing the definition of "SONET";

(xxxii) by repealing the definition of "Spectral efficiency";

(xxxiii) by repealing the definition of "Spread spectrum" and substituting---

"5 "Spread spectrum" (展頻)

The technique whereby energy in a relatively narrow-band communication channel is spread over a much wider energy spectrum.";

(xxxiv) by repealing the definition of "Switch fabric";

(xxxv) by repealing the definition of "Synchronous Digital Hierarchy" ("SDH");

(xxxvi) by repealing the definition of "Synchronous Optical Network" ("SONET");

(xxxvii) by adding---

"1 5 "Symmetric algorithm" (對稱演算法)

A cryptographic algorithm using an identical key for both encryption and decryption.
N.B.:
A common use of "symmetric algorithms" is confidentiality of data.".

3. Schedule 2 amended

Schedule 2 is amended---

(a) in paragraph 1(c), by repealing "5C002,";

(b) in paragraph 1(d), by repealing "3A202, 2A225," and substituting "3A225,".

Alan N. LAI
Director-General of Trade
6 July 1999

Explanatory Note

This Order revises Schedule 1 to the Import and Export (Strategic Commodities) Regulations (Cap. 60 sub. leg.) (which contains lists of Strategic Commodities) and rectifies certain printing errors occur in Schedule 2 to the Regulations.