

CATEGORY 1-SPECIAL MATERIALS AND RELATED EQUIPMENT

(L.N. 226 of 2009)

1A SYSTEMS, EQUIPMENT AND COMPONENTS

- 1A001 Components made from fluorinated compounds, as follows: (L.N. 65 of 2004)
- (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 controlled by 1C009(b) or 1C009(c);
  - (b) Piezoelectric polymers and copolymers made from vinylidene fluoride materials controlled by 1C009(a):
    - (1) In sheet or film form; and
    - (2) With a thickness exceeding 200  $\mu$  m;
  - (c) Seals, gaskets, valve seats, bladders or diaphragms made from fluoroelastomers containing at least one vinyl ether group as a constitutional unit, specially designed for "aircraft", aerospace or 'missile' use; (L.N. 132 of 2001)

*Note:*

'Missile' in 1A001(c) means complete rocket systems and unmanned aerial vehicle systems. (L.N. 254 of 2008)

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

*N.B.:*

See also 1A202, 9A010 and 9A110.

- (a) An organic "matrix" and materials specified in 1C010(c), 1C010(d) or 1C010(e); (L.N. 254 of 2008)
- (b) A metal or carbon "matrix", and any of the following:
  - (1) Carbon "fibrous or filamentary materials" having:
    - (a) A "specific modulus" exceeding  $10.15 \times 10^6$  m; *and*
    - (b) A "specific tensile strength" exceeding  $17.7 \times 10^4$  m;
  - (2) Materials specified in 1C010(c); (L.N. 254 of 2008)

*Notes:*

1. 1A002 does not include composite structures or laminates, made from epoxy resin impregnated carbon "fibrous or filamentary materials", for the repair of "civil aircraft" structures or laminates, provided the size does not exceed 100 cm  $\times$  100 cm.
2. 1A002 does not include finished or semi-finished items, specially designed for purely civilian applications as follows:
  - (a) Sporting goods;
  - (b) Automotive industry;
  - (c) Machine tool industry; and
  - (d) Medical applications. (L.N. 254 of 2008)
3. 1A002(b)(1) does not include finished or semi-finished items that contain a maximum of two dimensions of interwoven filaments and are specially designed for applications as follows:
  - (a) Metal heat-treatment furnaces for tempering metals; *and*
  - (b) Silicon boule production equipment. (L.N. 226 of 2009)

- 1A003 Manufactures of non-"fusible" aromatic polyimides in film, sheet, tape or ribbon form having any of the following: (L.N. 226 of 2009)

- (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.

*N.B.:*

For "fusible" aromatic polyimides in any form, see 1C008(a)(3). (L.N. 226 of 2009)

1A004 Protective and detection equipment and components, not specially designed for military use, as follows:

*N.B.:*

See also 2B351 and 2B352.

(a) Gas masks, filter canisters and decontamination equipment for gas masks and filter canisters, designed or modified for defence against any of the following, and specially designed components for those gas masks, filter canisters and decontamination equipment:

- (1) Biological agents "adapted for use in war";
- (2) Radioactive materials "adapted for use in war";
- (3) Chemical warfare (CW) agents;
- (4) "Riot control agents", including:
  - (a)  $\alpha$ -Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8);
  - (b) (2-chlorophenyl) methylene propanedinitrile, (o-Chlorobenzylidenemalononitrile) (CS) (CAS 2698-41-1);
  - (c) 2-Chloro-1-phenylethanone, Phenylacetyl chloride(  $\omega$ -chloroacetophenone) (CN) (CAS 532-27-4);
  - (d) Dibenz-(b,f)-1,4-oxazaphine, (CR) (CAS 257-07-8);
  - (e) 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9); *and*
  - (f) N-Nonanoylmorpholine, (MPA) (CAS 5299-64-9);

(b) Protective suits, gloves and shoes specially designed or modified for defence against any of the following:

- (1) Biological agents "adapted for use in war";
- (2) Radioactive materials "adapted for use in war";
- (3) Chemical warfare (CW) agents; (L.N. 226 of 2009)

(c) Nuclear, biological and chemical (NBC) detection systems specially designed or modified for detection or identification of any of the following, and specially designed components for those systems:

- (1) Biological agents "adapted for use in war";
- (2) Radioactive materials "adapted for use in war";
- (3) Chemical warfare (CW) agents; *and* (L.N. 226 of 2009)

(d) Electronic equipment designed for automatically detecting or identifying the presence of "explosives" residues and utilizing 'trace detection' techniques (e.g. surface acoustic wave, ion mobility spectrometry, differential mobility spectrometry and mass spectrometry);

*Technical Note:*

The term 'trace detection' means the capability to detect less than 1 ppm vapour, or 1 mg solid or liquid.

*Notes:*

1. 1A004(d) does not include equipment specially designed for laboratory use.
2. 1A004(d) does not include non-contact walk-through security portals. (L.N. 226 of 2009)

*Note:*

1A004 does not include:

- (a) Personal radiation monitoring dosimeters; *and*
- (b) Equipment limited by design or function to protect against hazards specific to residential safety and civil industries, such as mining, quarrying, agriculture, pharmaceuticals, medical, veterinary, environmental, waste management, or to the food industry. (L.N. 226 of 2009)

*Technical Notes:*

1. 1A004 includes equipment and components that have been identified, successfully tested to national standards or otherwise proven effective, for the detection of or defence against radioactive materials "adapted for use in war", biological agents "adapted for use in war", chemical warfare agents, 'simulants' or "riot control agents", even if such equipment or components are used in civil industries, such as mining, quarrying, agriculture, pharmaceuticals, medical, veterinary, environmental, waste management, or in the food industry.
2. 'Simulant': a substance or material that is used in place of toxic agent (chemical or biological) in training, research, testing or evaluation.

(L.N. 254 of 2008)

1A005 Body armour, and specially designed components therefor, not manufactured to military standards or specifications, nor to their equivalents in performance; (L.N. 132 of 2001)

*N.B.:*

See also the Munitions List.

For "fibrous or filamentary materials" used in the manufacture of body armour, see 1C010. (L.N. 65 of 2004)

*Notes:*

1. 1A005 does not control body armour or protective garments when accompanying their user for the user's own personal protection. (L.N. 65 of 2004)
2. 1A005 does not control body armour designed to provide frontal protection only from both fragment and blast from non-military explosive devices.

1A006 Equipment, specially designed or modified for the disposal of improvised explosive devices, as follows, and specially designed components and accessories for those equipment:

- (a) Remotely operated vehicles; *and*
- (b) 'Disruptors';

*Technical Note:*

'Disruptors': devices specially designed for the purpose of preventing the operation of an explosive device by projecting a liquid, solid or frangible projectile.

*N.B.:*

For equipment specially designed for military use for the disposal of improvised explosive devices, see also ML4.

*Note:*

1A006 does not include equipment when accompanying its operator.

(L.N. 254 of 2008)

1A007 Equipment and devices, specially designed to initiate charges, and devices containing energetic materials, by electrical means, as follows:

- (a) Explosive detonator firing sets designed to drive explosive detonators specified in 1A007(b); *and*

(b) Electrically driven explosive detonators, as follows:

- (1) Exploding bridge (EB);
- (2) Exploding bridge wire (EBW);
- (3) Slapper; *and*
- (4) Exploding foil initiators (EFI);

*Technical Notes:*

1. The word initiator or igniter is sometimes used in place of the word detonator.
2. For the purpose of 1A007(b) the detonators of concern all utilize a small electrical conductor (bridge, bridge wire, or foil) that explosively vaporizes when a fast, high-current electrical pulse is passed through it. In non-slapper types, the exploding conductor starts a chemical detonation in a contacting high explosive material such as PETN (pentaerythritoltetranitrate). In slapper detonators, the explosive vaporization of the electrical conductor drives a flyer or slapper across a gap, and the impact of the slapper on an explosive starts a chemical detonation. The slapper in some designs is driven by magnetic force. The term exploding foil detonator may refer to either an EB or a slapper-type detonator. Also, the word initiator is sometimes used in place of the word detonator.

*N.B.:*

For equipment and devices specially designed for military use, see the Munitions List. See also 3A229 and 3A232. (L.N. 226 of 2009)

(L.N. 254 of 2008)

1A008 Charges, devices and components, as follows:

- (a) 'Shaped charges' having all of the following:
  - (1) Net Explosive Quantity (NEQ) greater than 90 g;
  - (2) Outer casing diameter equal to or greater than 75mm;
- (b) Linear shaped cutting charges having all of the following, and specially designed components for those cutting charges:
  - (1) An explosive load greater than 40 g/m;
  - (2) A width of 10 mm or more;
- (c) Detonating cord with explosive core load greater than 64 g/m;
- (d) Cutters, other than those specified in 1A008(b), and severing tools, together having a Net Explosive Quantity (NEQ) greater than 3.5 kg;

*Technical Note:*

The term 'shaped charges' means explosive charges shaped to focus the effects of the explosive blast.

(L.N. 226 of 2009)

1A102 Resaturated pyrolyzed carbon-carbon components designed for space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104;

(L.N. 132 of 2001; L.N. 95 of 2006)

1A202 Composite structures, other than those controlled by 1A002, in the form of tubes and having both of the following characteristics: (L.N. 95 of 2006)

*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" controlled by 1C010(a) or 1C010(b) or 1C210(a) or with carbon prepreg materials controlled by 1C210(c);
- (L.N. 95 of 2006)

(L.N. 65 of 2004)

- 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;
- 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; (L.N. 132 of 2001)
- 1A227 High-density (lead glass or other) radiation shielding windows, having all of the following characteristics, and specially designed frames therefor:  
 (a) A 'cold area' greater than 0.09 m<sup>2</sup>;  
 (b) A density greater than 3 g/cm<sup>3</sup>; 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. (L.N. 132 of 2001)

## 1B TEST, INSPECTION AND PRODUCTION EQUIPMENT

- 1B001 Equipment for the production of fibres, preregs, preforms or "composites" controlled by 1A002 or 1C010, 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 1B001(b), 'missile' means complete rocket systems and unmanned aerial vehicle systems. (L.N. 254 of 2008)
- (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:*  
 For the purpose of 1B001(c) the technique of interlacing includes knitting. (L.N. 65 of 2004)  
*Note:*  
 1B001(c) 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 controlled by 1C010(e) by the hot melt method;
  - (f) Non-destructive inspection equipment specially designed for "composite" materials, as follows:
    - (1) X-ray tomography systems for three dimensional defect inspection; *and*
    - (2) Numerically controlled ultrasonic testing machines of which the motions for positioning transmitters or receivers or both are simultaneously coordinated and programmed in four or more axes to follow the three dimensional contours of the component under inspection; (L.N. 254 of 2008)
- 1B002 Equipment for producing metal alloys, metal alloy powder or alloyed materials, specially designed to avoid contamination and specially designed for use in one of the processes specified in 1C002(c)(2); (L.N. 132 of 2001)  
*N.B.:*  
 See also 1B102. (L.N. 65 of 2004)
- 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 structures specified in 1B003(a) or for engines specified in 1B003(b); (L.N. 226 of 2009)
- 1B101 Equipment, other than that controlled by 1B001, for the "production" of structural composites as follows; and specially designed components and accessories therefor:  
*N.B.:*  
 See also 1B201.  
*Note:*  
 Components and accessories controlled by 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 or fibre placement machines, of which the motions for positioning, wrapping and winding fibres can be coordinated and programmed in three or more axes, designed to fabricate composite structures or laminates from fibrous or filamentary materials, and coordinating and programming controls; (L.N. 226 of 2009)
  - (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; and

- (3) Equipment for the wet-spinning of refractory ceramics (such as aluminium oxide);
- (d) Equipment designed or modified for special fibre surface treatment or for producing prepregs and preforms controlled by 9C110; (L.N. 65 of 2004)

*Note:*

Equipment covered in 1B101(d) includes rollers, tension stretchers, coating equipment, cutting equipment and clicker dies.

1B102 Metal powder "production equipment", other than that controlled by 1B002, and components as follows: (L.N. 95 of 2006)

*N.B.:*

See also 1B115(b).

- (a) Metal powder "production equipment" usable for the "production", in a controlled environment, of spherical or atomized materials controlled by 1C011(a), 1C011(b), 1C111(a)(1), 1C111(a)(2) or in the Munitions List;
- (b) Specially designed components for "production equipment" controlled by 1B002 or 1B102(a); (L.N. 95 of 2006)

*Note:*

1B102 includes:

- (a) Plasma generators (high frequency ar-cjet) 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 usable for the "production" of spherical aluminium powders by powdering a melt in an inert medium (e.g. nitrogen).

(L.N. 65 of 2004)

1B115 Equipment, other than that controlled by 1B002 or 1B102, for the "production" of propellants or propellant constituents, as follows, and specially designed components therefor: (L.N. 95 of 2006)

- (a) "Production equipment" for the "production", handling or acceptance testing of liquid propellants or propellant constituents controlled by 1C011(a), 1C011(b), 1C111 or in the Munitions List;
- (b) "Production equipment" for the "production", handling, mixing, curing, casting, pressing, machining, extruding or acceptance testing of solid propellants or propellant constituents controlled by 1C011(a), 1C011(b), 1C111 or in the Munitions List; (L.N. 95 of 2006)

*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.

*Notes:*

1. For equipment specially designed for the production of military goods, see the Munitions List.
2. 1B115 does not control equipment for the "production", handling and acceptance testing of boron carbide.

(L.N. 65 of 2004)

1B116 Specially designed nozzles for producing pyrolytically derived materials formed on a mould, mandrel or other substrate from precursor gases which decompose in the 1573

K (1300<sup>0</sup>C) to 3 173 K (2900<sup>0</sup>C) temperature range at pressures of 130 Pa to 20 kPa;

- 1B117 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, and specially designed components therefor:  
(a) A total volumetric capacity of 110 litres or more; and  
(b) At least one mixing/kneading shaft mounted off centre;  
(L.N. 65 of 2004)
- 1B118 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 any of the following, and specially designed components therefor:  
(a) Two or more mixing or kneading shafts; or  
(b) A single rotating shaft which oscillates and having kneading teeth/pins on the shaft as well as inside the casing of the mixing chamber;  
(L.N. 65 of 2004)
- 1B119 Fluid energy mills usable for grinding or milling substances controlled by 1C011(a), 1C011(b), 1C111 or in the Munitions List, and specially designed components therefor;  
(L.N. 65 of 2004; L.N. 95 of 2006)
- 1B201 Filament winding machines, other than those controlled by 1B001 or 1B101, and related equipment, as follows: (L.N. 95 of 2006)  
(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 mm and 400 mm and lengths of 600 mm or greater;  
(b) Coordinating and programming controls for the filament winding machines controlled by 1B201(a); (L.N. 95 of 2006)  
(c) Precision mandrels for the filament winding machines controlled by 1B201(a); (L.N. 132 of 2001; L.N. 95 of 2006)
- 1B225 Electrolytic cells for fluorine production with an output capacity greater than 250 g of fluorine per hour;  
(L.N. 65 of 2004)
- 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.
- 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 that column;

- 1B228 Hydrogen-cryogenic distillation columns having all of the following characteristics:
- (a) Designed to operate with internal temperatures of 35 K (-238<sup>0</sup>C) or less;
  - (b) Designed to operate at an internal pressure of 0.5 to 5 MPa; (L.N. 65 of 2004)
  - (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 H<sub>2</sub>-compatible; and (L.N. 132 of 2001)
  - (d) With internal diameters of 1 m or greater and effective lengths of 5 m or greater;
- 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 0B004.
- (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; and
    - (3) With a diameter of 1.8 m or greater;
  - (b) 'Internal contactors' for the water-hydrogen sulphide exchange tray columns controlled by 1B229(a); (L.N. 95 of 2006)  
*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 countercurrent 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. (L.N. 132 of 2001)
- 1B230 Pumps capable of circulating solutions of concentrated or dilute potassium amide catalyst in liquid ammonia (KNH<sub>2</sub>/NH<sub>3</sub>), having all of the following characteristics:
- (a) Airtight (i.e., hermetically sealed);
  - (b) A capacity greater than 8.5 m<sup>3</sup>/h; and
  - (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;
- (L.N. 65 of 2004)
- 1B231 Tritium facilities or plants, and equipment therefor, as follows: (L.N. 65 of 2004)
- (a) Facilities or plant for the production, recovery, extraction, concentration, or handling of tritium;
  - (b) Equipment for tritium facilities or plant, as follows:
    - (1) Hydrogen or helium refrigeration units capable of cooling to 23 K (-250<sup>0</sup>C) or less, with heat removal capacity greater than 150 watts; or
    - (2) Hydrogen isotope storage and purification systems using metal hydrides as the storage, or purification medium;

- 1B232 Turboexpanders or turboexpander-compressor sets having both of the following characteristics:  
 (a) Designed for operation with an outlet temperature of 35 K (-238<sup>0</sup>C) or less; and  
 (b) Designed for a throughput of hydrogen gas of 1000 kg/h or greater;  
 (L.N. 65 of 2004)
- 1B233 Lithium isotope separation facilities or plants, and equipment therefor, as follows:  
 (L.N. 65 of 2004)  
 (a) Facilities or plant for the separation of lithium isotopes;  
 (b) Equipment for the separation of lithium isotopes, as follows:  
 (1) Packed liquid-liquid exchange columns specially designed for lithium amalgams;  
 (2) Mercury or lithium amalgam pumps; (L.N. 65 of 2004)  
 (3) Lithium amalgam electrolysis cells;  
 (4) Evaporators for concentrated lithium hydroxide solution;

## 1C MATERIALS

### *Technical Note:*

Metals and alloys:

Unless provision to the contrary is made, the words 'metals' and 'alloys' in 1C001 to 1C012 cover crude and semi-fabricated forms, as follows:

Crude forms:

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

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

- (a) Wrought or worked materials fabricated by rolling, drawing, extruding, forging, impact extruding, pressing, graining, atomizing, 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; (L.N. 65 of 2004)
- (b) Cast material produced by casting in sand, die, metal, plaster or other types of moulds, including high pressure castings, sintered forms, and forms made by powder metallurgy.

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

- 1C001 Materials specially designed for use as absorbers of electromagnetic waves, or intrinsically conductive polymers, as follows:

*N.B.:*

See also 1C101.

- (a) Materials for absorbing frequencies exceeding  $2 \times 10^8$  Hz but less than  $3 \times 10^{12}$  Hz;

Notes:

1. 1C001(a) does not control:

- (a) Hair type absorbers, constructed of natural or synthetic fibres, with non-magnetic loading to provide absorption;
- (b) Absorbers having no magnetic loss and whose incident surface is 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  $\pm 15\%$  of the centre frequency of the incident energy, and not capable of withstanding temperatures exceeding 450 K (177<sup>0</sup>C); or
    - (b) Ceramic materials providing more than 20% echo compared with metal over a bandwidth exceeding  $\pm 15\%$  of the centre frequency of the incident energy, and not capable of withstanding temperatures exceeding 800 K (527<sup>0</sup>C);

Technical Note:

Absorption test samples for 1C001(a) Note 1(c)(1) should be a square at least 5 wavelengths of the centre frequency on a side and positioned in the far field of the radiating element.

- (2) Tensile strength less than  $7 \times 10^6$  N/m<sup>2</sup>; and
- (3) Compressive strength less than  $14 \times 10^6$  N/m<sup>2</sup>;
- (d) Planar absorbers made of sintered ferrite, having:
  - (1) A specific gravity exceeding 4.4; and
  - (2) A maximum operating temperature of 548 K (275<sup>0</sup>C).
- 2. Nothing in Note 1 releases magnetic materials to provide absorption when contained in paint. (L.N. 132 of 2001)
- (b) Materials for absorbing frequencies exceeding  $1.5 \times 10^{14}$  Hz but less than  $3.7 \times 10^{14}$  Hz and not transparent to visible light;
- (c) Intrinsically conductive polymeric materials with a 'bulk electrical conductivity' exceeding 10000 S/m (Siemens per metre) or a 'sheet (surface) resistivity' of less than 100 ohms/square, based on any of the following polymers: (L.N. 95 of 2006)
  - (1) Polyaniline;
  - (2) Polypyrrole;
  - (3) Polythiophene;
  - (4) Poly phenylene-vinylene; or
  - (5) Poly thienylene-vinylene;

*Technical Note:*

'Bulk electrical conductivity' and 'sheet (surface) resistivity' should be determined using ASTM D-257 or national equivalents. (L.N. 95 of 2006)

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 Notes:*

1. The metal alloys in 1C002 are those containing a higher percentage by weight of the stated metal than of any other element.
2. Stress-rupture life should be measured in accordance with ASTM standard E-139 or national equivalents.
3. Low cycle fatigue life should be measured in accordance with ASTM Standard

E-606 'Recommended Practice for Constant-Amplitude Low-Cycle Fatigue Testing' or national equivalents. Testing should be axial with an average stress ratio equal to 1 and a stress-concentration factor ( $K_t$ ) equal to 1. The average stress is defined as maximum stress minus minimum stress divided by maximum stress.

- (a) Aluminides, 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;
- (b) Metal alloys, as follows, made from material controlled by 1C002(c):
  - (1) Nickel alloys with:
    - (a) A stress-rupture life of 10000 hours or longer at 923 K (650<sup>0</sup>C) at a stress of 676 MPa; or
    - (b) A low cycle fatigue life of 10000 cycles or more at 823 K (550<sup>0</sup>C) at a maximum stress of 1095 MPa;
  - (2) Niobium alloys with:
    - (a) A stress-rupture life of 10000 hours or longer at 1073 K (800<sup>0</sup>C) at a stress of 400 MPa; or
    - (b) A low cycle fatigue life of 10000 cycles or more at 973 K (700<sup>0</sup>C) at a maximum stress of 700 MPa;
  - (3) Titanium alloys with:
    - (a) A stress-rupture life of 10000 hours or longer at 723 K (450<sup>0</sup>C) at a stress of 200 MPa; or
    - (b) A low cycle fatigue life of 10000 cycles or more at 723 K (450<sup>0</sup>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<sup>0</sup>C); or
    - (b) 415 MPa or more at 298 K (25<sup>0</sup>C);
  - (5) Magnesium alloys with:
    - (a) 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 particulate material, having all of the following characteristics:
  - (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  $\mu$  m in 10<sup>9</sup> alloy particles;
    - (b) Niobium alloys (Nb-Al-X or Nb-X-Al, Nb-Si-X or Nb-X-Si, Nb-Ti-X or Nb-X-Ti);
    - (c) Titanium alloys (Ti-Al-X or Ti-X-Al);
    - (d) Aluminium alloys (Al-Mg-X or Al-X-Mg, Al-Zn-X or Al-X-Zn, Al-Fe-X or Al-X-Fe); or
    - (e) Magnesium alloys (Mg-Al-X or Mg-X-Al);
  - (2) Made in a controlled environment by any of the following processes:

- (a) "Vacuum atomization"; (L.N. 65 of 2004)
  - (b) "Gas atomization"; (L.N. 65 of 2004)
  - (c) "Rotary atomization"; (L.N. 65 of 2004)
  - (d) "Splat quenching";
  - (e) "Melt spinning" and "comminution";
  - (f) "Melt extraction" and "comminution"; or
  - (g) "Mechanical alloying"; and
  - (3) Capable of forming materials controlled by 1C002(a) or 1C002(b);
  - (d) Alloyed materials, having all of the following characteristics:
    - (1) Made from any of the composition systems specified in 1C002(c)(1);
    - (2) In the form of uncomminuted flakes, ribbons or thin rods; and (L.N. 65 of 2004)
    - (3) Produced in a controlled environment by any of the following:
      - (a) "Splat quenching";
      - (b) "Melt spinning"; or
      - (c) "Melt extraction"; (L.N. 132 of 2001)
- 1C003 Magnetic metals, of all types and of whatever form, having any of the following characteristics:
- (a) Initial relative permeability of 120000 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  $5 \times 10^{-4}$ ; or
    - (2) A magnetomechanical coupling factor (k) of more than 0.8; or
  - (c) Amorphous or nanocrystalline alloy strips, having all of the following 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  $2 \times 10^{-4}$  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.
- 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  $17.5 \text{ g/cm}^3$ ;
  - (b) An elastic limit exceeding 880 MPa; (L.N. 132 of 2001)
  - (c) An ultimate tensile strength exceeding 1270 MPa; and
  - (d) An elongation exceeding 8%;
- 1C005 "Superconductive" "composite" conductors in lengths exceeding 100 m or with a mass exceeding 100 g, as follows:
- (a) "Superconductive" "composite" conductors containing one or more niobium-titanium 'filaments', having all of the following characteristics:
    - (1) Embedded in a "matrix" other than a copper or copper-based mixed "matrix";

- (2) Having a cross-section area less than  $0.28 \times 10^{-4} \text{ mm}^2$  ( $6 \mu\text{m}$  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 characteristics:
  - (1) A "critical temperature" at zero magnetic induction exceeding 9.85 K ( $-263.31^\circ\text{C}$ );
  - (2) Remaining in the "superconductive" state at a temperature of 4.2 K ( $-268.96^\circ\text{C}$ ) when exposed to a magnetic field oriented in any direction perpendicular to the longitudinal axis of conductor and corresponding to a magnetic induction of 12 T with critical current density exceeding  $1750 \text{ A/mm}^2$  on overall cross-section of the conductor; *and*
- (c) "Superconductive" "composite" conductors consisting of one or more "superconductive" 'filaments' which remain "superconductive" above 115 K ( $-158.16^\circ\text{C}$ );

*Technical Note:*

For the purpose of 1C005, 'filaments' may be in wire, cylinder, film, tape or ribbon form.

(L.N. 254 of 2008)

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: (L.N. 132 of 2001)
 

Technical Note: (L.N. 132 of 2001)

For the purpose of 1C006(a)(1), silahydrocarbon oils contain exclusively silicon, hydrogen and carbon.

    - (a) A flash point exceeding 477 K ( $204^\circ\text{C}$ );
    - (b) A pour point at 239 K ( $-34^\circ\text{C}$ ) or less;
    - (c) A viscosity index of 75 or more; and
    - (d) A thermal stability at 616 K ( $343^\circ\text{C}$ ); or
  - (2) Chlorofluorocarbons, having all of the following:
 

Technical Note: (L.N. 132 of 2001)

For the purpose of 1C006(a)(2), chlorofluorocarbons contain exclusively carbon, fluorine and chlorine.

    - (a) No flash point;
    - (b) An autogenous ignition temperature exceeding 977 K ( $704^\circ\text{C}$ );
    - (c) A pour point at 219 K ( $-54^\circ\text{C}$ ) or less;
    - (d) A viscosity index of 80 or more; and
    - (e) A boiling point at 473 K ( $200^\circ\text{C}$ ) 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
  - (2) Fluorinated silicone fluids with a kinematic viscosity of less than  $5000 \text{ mm}^2/\text{s}$  ( $5000 \text{ centistokes}$ ) measured at 298 K ( $25^\circ\text{C}$ );
- (c) Damping or flotation fluids with a purity exceeding 99.8%, containing less than 25 particles of  $200 \mu\text{m}$  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 thereof:
    - (a) Monomeric forms of perfluoropolyalkylether-triazines or perfluoroaliphatic-ethers;
    - (b) Perfluoroalkylamines;
    - (c) Perfluorocycloalkanes; or
    - (d) Perfluoroalkanes;
  - (2) Density at 298 K (25<sup>0</sup>C) of 1.5 g/ml or more;
  - (3) In a liquid state at 273 K (0<sup>0</sup>C); and
  - (4) Containing 60% or more by weight of fluorine;

*Technical Note:*

For the purpose of 1C006:

- (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 ASTM D-97 or national equivalents;
- (c) Viscosity index is determined using the method described in ASTM D-2270 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 of M-10 tool steel, 52100 steel and naval bronze (60% Cu, 39% Zn, 0.75% Sn). The chamber is purged with nitrogen, sealed at atmospheric pressure and the temperature raised to and maintained at  $644 \pm 6$  K ( $371 \pm 6$ <sup>0</sup>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<sup>2</sup> of ball surface;
  - (2) The change in original viscosity as determined at 311 K (38<sup>0</sup>C) is less than 25%; and
  - (3) The total acid or base number is less than 0.40;
- (e) Autogenous ignition temperature is determined using the method described in ASTM E-659 or national equivalents.

1C007 Ceramic 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 5000 ppm, an average particle size equal to or less than 5 μm and no more than 10% of the particles larger than 10 μm;
- (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:

1C007(b) does not control abrasives.

- (c) Ceramic-ceramic "composite" materials with a glass or oxide-"matrix" and reinforced with fibres having all of the following:
  - (1) Made from any of the following materials:
    - (a) Si-N;
    - (b) Si-C;
    - (c) Si-Al-O-N; or
    - (d) Si-O-N; and
  - (2) Having a specific tensile strength exceeding  $12.7 \times 10^3$  m; (L.N. 132 of 2001)
- (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 controlled by 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)  $\text{Al}_2\text{O}_3$ ; or
  - (2) Si-C-N;

*Note:*  
1C007(f) does not control "composites" containing fibres from these systems with a fibre tensile strength of less than 700 MPa at 1273 K (1000°C) or fibre tensile creep resistance of more than 1% creep strain at 100 MPa load and 1273 K (1000°C) for 100 hours.

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 ( $T_g$ ) exceeding 513 K (240°C); (L.N. 95 of 2006)
- Note:*  
1C008(a) includes substances in liquid or solid "fusible" form, including resin, powder, pellet, film, sheet, tape and ribbon. (L.N. 226 of 2009)
- N.B.:*  
For non-"fusible" aromatic polyimides in film, sheet, tape or ribbon form, see 1A003. (L.N. 226 of 2009)
- (b) Thermoplastic liquid crystal copolymers having a heat distortion temperature exceeding 523 K (250°C) measured according to ISO 75-2(2004), method A, or national equivalents, with a load of  $1.80 \text{ N/mm}^2$  and composed of: (L.N. 95 of 2006; L.N. 254 of 2008)
    - (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) (Repealed L.N. 254 of 2008)
- (d) Polyarylene ketones;
- (e) Polyarylene sulphides, where the arylene group is biphenylene, triphenylene or combinations thereof;
- (f) Polybiphenylenethersulphone having a glass transition temperature ( $T_g$ ) exceeding 513 K (240°C); (L.N. 95 of 2006)

*Technical Note:*

The glass transition temperature ( $T_g$ ) for 1C008 materials is determined using the method described in ISO 11357-2 (1999) or national equivalents. (L.N. 95 of 2006)

- 1C009 Unprocessed 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;

- 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 and 9C110. (L.N. 254 of 2008)

- (a) Organic "fibrous or filamentary materials", having all of the following:
  - (1) A "specific modulus" exceeding  $12.7 \times 10^6$  m; and
  - (2) A "specific tensile strength" exceeding  $23.5 \times 10^4$  m;

*Note:*

1C010(a) does not control polyethylene.

- (b) Carbon "fibrous or filamentary materials", having all of the following:
  - (1) A "specific modulus" exceeding  $12.7 \times 10^6$  m; and
  - (2) A "specific tensile strength" exceeding  $23.5 \times 10^4$  m;

*Technical Note:*

Properties for materials described in 1C010(b) should be determined using Suppliers of Advance Composite Materials Association (SACMA) recommended methods SRM 12 to 17, ISO 10618(2004) 10.2.1 Method A or national equivalent tow tests and based on lot average. (L.N. 226 of 2009)

*Note:*

1C010(b) does not include fabric made from "fibrous or filamentary materials" for the repair of "civil aircraft" structures or laminates, in which the size of individual sheets does not exceed 100 cm × 100 cm. (L.N. 254 of 2008)

- (c) Inorganic "fibrous or filamentary materials", having all of the following:
  - (1) A "specific modulus" exceeding  $2.54 \times 10^6$  m; and
  - (2) A melting, softening, decomposition or sublimation point exceeding 1922 K (1 649°C) in an inert environment;

*Note:*

1C010(c) does not control:

1. 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  $10 \times 10^6$  m.
2. Molybdenum and molybdenum alloy fibres.
3. Boron fibres.

4. Discontinuous ceramic fibres with a melting, softening, decomposition or sublimation point lower than 2043 K (1770<sup>0</sup>C) in an inert environment.
- (d) "Fibrous or filamentary materials":
  - (1) Composed of any of the following:
    - (a) Polyetherimides controlled by 1C008(a); or
    - (b) Materials controlled by 1C008(b) to 1C008(f); or
  - (2) Composed of materials controlled by 1C010(d)(1)(a) or 1C010(d)(1)(b) and "commingled" with other fibres controlled by 1C010(a), 1C010(b) or 1C010(c); (L.N. 65 of 2004)
- (e) 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" controlled by 1C010(a), 1C010(b) or 1C010(c);
  - (2) Made from organic or carbon "fibrous or filamentary materials":
    - (a) With a "specific tensile strength" exceeding  $17.7 \times 10^4$  m;
    - (b) With a "specific modulus" exceeding  $10.15 \times 10^6$  m;
    - (c) Not controlled by 1C010(a) or 1C010(b); and
    - (d) When impregnated with materials controlled by 1C008 or 1C009(b), having a glass transition temperature ( $T_g$ ) exceeding 383 K (110<sup>0</sup>C) or with phenolic or epoxy resins, having a glass transition temperature ( $T_g$ ) equal to or exceeding 418 K (145<sup>0</sup>C);

*Note:*

1C010(e) does not include: (L.N. 254 of 2008)

1. Epoxy resin "matrix" impregnated carbon "fibrous or filamentary materials" (prepregs) for the repair of "civil aircraft" structures or laminates, in which the size of individual sheets of prepreg does not exceed 100 cm × 100 cm; *and* (L.N. 254 of 2008)
2. Prepregs when impregnated with phenolic or epoxy resins having a glass transition temperature ( $T_g$ ) less than 433 K (160<sup>0</sup>C) and a cure temperature lower than the glass transition temperature.

*Technical Note:*

The glass transition temperature ( $T_g$ ) for 1C010(e) materials is determined using the method described in ASTM D-3418 using the dry method. The glass transition temperature for phenolic and epoxy resins is determined using the method described in ASTM D-4065 at a frequency of 1 Hz and a heating rate of 2 K (°C) per minute using the dry method.

1C011 Metals and compounds, as follows:

*N.B.:*

See also Munitions List and 1C111.

- (a) Metals in particle sizes of less than 60 μm whether spherical, atomized, spheroidal, flaked or ground, manufactured from material consisting of 99% or more of zirconium, magnesium and alloys of these: (L.N. 65 of 2004)

*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 1C011(a) are controlled whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium or beryllium. (L.N. 132 of 2001)

- (b) Boron or boron carbide of 85% purity or higher and a particle size of 60  $\mu\text{m}$  or less;  
*Note:* (L.N. 132 of 2001)  
 The metals or alloys listed in 1C011(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); (L.N. 132 of 2001)
- 1C012 Materials as follows: (L.N. 132 of 2001)  
*Technical Note:*  
 These materials are typically used for nuclear heat sources. (L.N. 132 of 2001)
- (a) Plutonium in any form with a plutonium isotopic assay of plutonium-238 of more than 50% by weight;  
*Note:*  
 1C012(a) does not control:
    - (1) Shipments with a plutonium content of 1 g or less;
    - (2) Shipments of 3 "effective grams" or less when contained in a sensing component in instruments. (L.N. 132 of 2001)
  - (b) "Previously separated" neptunium-237 in any form;  
*Note:*  
 1C012(b) does not control shipments with a neptunium-237 content of 1 g or less.
- 1C101 Materials and devices for reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures, other than those controlled by 1C001, usable in 'missiles' and their subsystems; (L.N. 95 of 2006)  
*Notes:*
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.
  2. 1C101 does not include coatings when specially used for the thermal control of satellites.
- Technical Note:*  
 In 1C101, 'missiles' means complete rocket systems and "unmanned aerial vehicle" systems capable of a range exceeding 300 km. (L.N. 95 of 2006)
- 1C102 Resaturated pyrolyzed carbon-carbon materials designed for space launch vehicles controlled by 9A004 or sounding rockets controlled by 9A104;  
 (L.N. 132 of 2001; L.N. 95 of 2006)
- 1C107 Graphite and ceramic materials, other than those controlled by 1C007, as follows: (L.N. 95 of 2006)
- (a) Fine grain graphites with a bulk density of at least 1.72 g/cc measured at 15°C and having a grain size of  $100 \times 10^{-6}\text{m}$  (100  $\mu\text{m}$ ) or less, usable for rocket nozzles and re-entry vehicle nose tips, which can be machined to any of the following products:
    - (1) Cylinders having a diameter of 120 mm or greater and a length of 50 mm or greater;
    - (2) Tubes having an inner diameter of 65 mm or greater and a wall thickness of

25 mm or greater and a length of 50 mm or greater; or  
(3) Blocks having a size of 120 mm x 120 mm x 50 mm or greater;

*N.B.:*

See also 0C004. (L.N. 95 of 2006)

(b) Pyrolytic or fibrous reinforced graphites, usable for rocket nozzles and reentry vehicle nose tips usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104;

*N.B.:*

See also 0C004. (L.N. 254 of 2008)

(c) Ceramic composite materials (dielectric constant less than 6 at any frequency from 100 MHz to 100 GHz) for use in radomes usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104; (L.N. 254 of 2008)

(d) Bulk machinable silicon-carbide reinforced unfired ceramic, usable for nose tips usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104; (L.N. 254 of 2008)

(e) Reinforced silicon-carbide ceramic composites, usable for nose tips, reentry vehicles and nozzle flaps usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104; (L.N. 254 of 2008)

1C111 Propellants and constituent chemicals for propellants, other than those controlled by 1C011, as follows:

(a) Propulsive substances:

(1) Spherical aluminium powder, other than that controlled by the Munitions List, with particles of uniform diameter of less than 200  $\mu$  m 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  $\mu$  m, according to ISO 2591:1988 or national equivalents such as JIS Z8820;

*Technical Note:*

A particle size of 63  $\mu$  m (ISO R-565) corresponds to 250 mesh (Tyler) or 230 mesh (ASTM standard E-11). (L.N. 132 of 2001)

(2) Metal fuels, other than that controlled by the Munitions List, in particle sizes of less than 60  $\mu$  m, whether spherical, atomized, spheroidal, flaked or ground, consisting 97% or more by weight of any of the following:

(a) Zirconium;

(b) Beryllium;

(c) Magnesium; or

(d) Alloys of the metals controlled by (a) to (c) above;

*Technical Note:*

The natural content of hafnium in the zirconium (typically 2% to 7%) is counted with the zirconium. (L.N. 132 of 2001)

(3) Oxidizer substances usable in liquid propellant rocket engines as follows: (L.N. 254 of 2008)

(a) Dinitrogen trioxide (CAS 10544-73-7);

(b) Nitrogen dioxide (CAS 10102-44-0)/dinitrogen tetroxide (CAS 10544-72-6);

(c) Dinitrogen pentoxide (CAS 10102-03-1);

(d) Mixed Oxides of Nitrogen (MON);

*Technical Note:*

Mixed Oxides of Nitrogen (MON) are solutions of Nitric Oxide (NO)

in Dinitrogen Tetroxide/Nitrogen Dioxide ( $N_2O_4/NO_2$ ) that can be used in missile systems. There are a range of compositions that can be denoted as  $MON_i$  or  $MON_{ij}$ , where  $i$  and  $j$  are integers representing the percentage of Nitric Oxide in the mixture (e.g.  $MON_3$  contains 3% Nitric Oxide,  $MON_{25}$  25% Nitric Oxide. An upper limit is  $MON_{40}$ , 40% by weight).

*Note:*

1C111(a)(3)(d) does not control Nitrogen Trifluoride ( $NF_3$ ) in a gaseous state as it is not usable for missile applications. (L.N. 65 of 2004)

- (e) See the Munitions List for Inhibited Red Fuming Nitric Acid (IRFNA); (L.N. 65 of 2004)
- (f) See the Munitions List and 1C238 for compounds composed of fluorine and one or more of other halogens, oxygen or nitrogen; (L.N. 65 of 2004)
- (4) Hydrazine derivatives as follows:
  - N.B.:*
  - See also Munitions List. (L.N. 226 of 2009)
  - (a) Trimethylhydrazine;
  - (b) Tetramethylhydrazine;
  - (c) N,N diallylhydrazine;
  - (d) Allylhydrazine;
  - (e) Ethylene dihydrazine;
  - (f) Monomethylhydrazine dinitrate;
  - (g) Unsymmetrical dimethylhydrazine nitrate;
  - (h) Hydrazinium azide;
  - (i) Dimethylhydrazinium azide;
  - (j) Hydrazinium dinitrate; (L.N. 226 of 2009)
  - (k) Diimido oxalic acid dihydrazine;
  - (l) 2-hydroxyethylhydrazine nitrate (HEHN);
  - (m) See the Munitions List for Hydrazinium perchlorate;
  - (n) Hydrazinium diperchlorate;
  - (o) Methylhydrazine nitrate (MHN);
  - (p) Diethylhydrazine nitrate (DEHN); *and*
  - (q) 3,6-dihydrazino tetrazine nitrate (DHTN);

*Technical Note:*

3,6-dihydrazino tetrazine nitrate (DHTN) is also referred to as 1,4-dihydrazine nitrate. (L.N. 254 of 2008)

- (b) Polymeric substances:
  - (1) Carboxy-terminated polybutadiene (including carboxyl-terminated polybutadiene) (CTPB);
  - (2) Hydroxy-terminated polybutadiene (including hydroxyl-terminated polybutadiene) (HTPB), other than that controlled by the Munitions List;
  - (3) Polybutadiene-acrylic acid (PBAA);
  - (4) Polybutadiene-acrylic acid-acrylonitrile (PBAN);
  - (5) Polytetrahydrofuran polyethylene glycol (TPEG);

*Technical Note:*

Polytetrahydrofuran polyethylene glycol (TPEG) is a block co-polymer of poly 1,4-Butanediol and polyethylene glycol (PEG). (L.N. 254 of 2008)

- (c) Other propellant additives and agents:
  - (1) See the Munitions List for carboranes, decaboranes, pentaboranes and

- derivatives thereof; (L.N. 65 of 2004; L.N. 95 of 2006)
- (2) Triethylene glycol dinitrate (TEGDN) (CAS 111-22-8);
  - (3) 2-Nitrodiphenylamine (CAS 119-75-5);
  - (4) Trimethylolethane trinitrate (TMETN) (CAS 3032-55-1);
  - (5) Diethylene glycol dinitrate (DEGDN) (CAS 693-21-0);
  - (6) Ferrocene derivatives as follows:
    - (a) See the Munitions List for catocene;
    - (b) Ethyl ferrocene;
    - (c) Propyl ferrocene (CAS 1273-89-8);
    - (d) See the Munitions List for n-butyl ferrocene;
    - (e) Pentyl ferrocene (CAS 1274-00-6);
    - (f) Dicyclopentyl ferrocene (CAS 20773-28-8);
    - (g) Dicyclohexyl ferrocene;
    - (h) Diethyl ferrocene;
    - (i) Dipropyl ferrocene;
    - (j) Dibutyl ferrocene (CAS 1274-08-4);
    - (k) Dihexyl ferrocene (CAS 93894-59-8);
    - (l) Acetyl ferrocenes;
    - (m) See the Munitions List for ferrocene carboxylic acids;
    - (n) See the Munitions List for butacene;
    - (o) Other ferrocene derivatives usable as rocket propellant burning rate modifiers, other than those controlled by the Munitions List; (L.N. 95 of 2006)
  - (7) 4,5 diazidomethyl-2-methyl-1,2,3-triazole (iso-DAMTR); (L.N. 226 of 2009)

*Note:*

For propellants and constituent chemicals for propellants not controlled by 1C111, see the Munitions List. (L.N. 65 of 2004; L.N. 95 of 2006)

(L.N. 254 of 2008)

- 1C116 Maraging steels having an ultimate tensile strength of 1500 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; (L.N. 226 of 2009)

*N.B.:*

See also 1C216. (L.N. 226 of 2009)

*Technical Note:*

Maraging steels are iron alloys generally characterized by high nickel, very low carbon content and use substitutional elements or precipitates to produce strengthening and age-hardening of the alloy. (L.N. 254 of 2008)

- 1C117 Tungsten, molybdenum and alloys of these metals in the form of uniform spherical or atomized particles of 500 μm diameter or less with a purity of 97% or greater for fabrication of rocket motor components usable in "missiles", space launch vehicles specified in 9A004 or sounding rockets specified in 9A104, i.e. heat shields, nozzle substrates, nozzle throats and thrust vector control surfaces;

(L.N. 254 of 2008)

- 1C118 Titanium-stabilized duplex stainless steel (Ti-DSS) having all of the following: (L.N. 65 of 2004)

(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) Having a titanium content of greater than 0.10 weight percent; and (L.N. 132 of 2001)
- (3) A ferritic-austenitic microstructure (also referred to as a two-phase microstructure) of which at least 10 percent is austenite by volume (according to ASTM E-1181-87 or national equivalents); and (L.N. 132 of 2001)
- (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; (L.N. 183 of 1999)

1C202 Alloys, other than those controlled by 1C002(b)(3) or (b)(4), as follows: (L.N. 95 of 2006)

- (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<sup>0</sup>C); and
  - (2) In the form of tubes or cylindrical solid forms (including forgings) with an outside diameter of more than 75 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<sup>0</sup>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.

(L.N. 65 of 2004)

1C210 'Fibrous or filamentary materials' or preregs, other than those controlled by 1C010(a), (b) or (e), as follows: (L.N. 95 of 2006)

- (a) Carbon or aramid 'fibrous or filamentary materials' having either of the following characteristics:
  - (1) A "specific modulus" of  $12.7 \times 10^6$  m or greater; or
  - (2) A "specific tensile strength" of  $235 \times 10^3$  m or greater;

*Note:*

1C210(a) 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  $3.18 \times 10^6$  m or greater; and
  - (2) A "specific tensile strength" of  $76.2 \times 10^3$  m or greater;
- (c) Thermoset resin impregnated continuous "yarns", "rovings", "tows" or "tapes" with a width of 15 mm or less (preregs), made from carbon or glass 'fibrous or filamentary materials' controlled by 1C210(a) or (b); (L.N. 95 of 2006)

*Technical Note:*

The resin forms the matrix of the composite.

*Note:*

In 1C210, 'fibrous or filamentary materials' is restricted to continuous "monofilaments", "yarns", "rovings", "tows" or "tapes".

(L.N. 65 of 2004)

- 1C216 Maraging steel, other than that controlled by 1C116, 'capable of' an ultimate tensile strength of 2050 MPa or more at 293 K (20°C); (L.N. 95 of 2006)  
*Note:*  
1C216 does not control forms in which all linear dimensions are 75 mm or less.  
*Technical Notes:*  
1. The phrase maraging steel 'capable of' encompasses maraging steel before or after heat treatment.  
2. Maraging steels are iron alloys generally characterized by high nickel, very low carbon content and use substitutional elements or precipitates to produce strengthening and age-hardening of the alloy. (L.N. 254 of 2008)  
(L.N. 65 of 2004)
- 1C225 Boron enriched in the boron-10 (<sup>10</sup>B) isotope to greater than its natural isotopic abundance, as follows: elemental boron, compounds, mixtures containing boron, manufactures thereof, waste or scrap of any of the foregoing;  
*Note:*  
In 1C225, mixtures containing boron include boron loaded materials.  
*Technical Note:*  
The natural isotopic abundance of boron-10 is approximately 18.5 weight percent (20 atom percent). (L.N. 132 of 2001)
- 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 an inside diameter between 100 mm and 300 mm; and  
(b) A mass greater than 20 kg;  
*Note:*  
1C226 does not control manufactures specially designed as weights or gamma-ray collimators.  
(L.N. 65 of 2004)
- 1C227 Calcium having both of the following characteristics:  
(a) Containing less than 1000 parts per million by weight of metallic impurities other than magnesium; and  
(b) Containing less than 10 parts per million by weight of boron;  
(L.N. 65 of 2004)
- 1C228 Magnesium having both of the following characteristics:  
(a) Containing less than 200 parts per million by weight of metallic impurities other than calcium; and  
(b) Containing less than 10 parts per million by weight of boron;  
(L.N. 65 of 2004)
- 1C229 Bismuth 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  
(L.N. 65 of 2004)
- 1C230 Beryllium 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: (L.N. 65 of 2004)

- (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. (L.N. 65 of 2004)

(L.N. 65 of 2004)

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;

(L.N. 132 of 2001)

1C232 Helium-3 ( $^3\text{He}$ ), mixtures containing helium-3, and products or devices containing any of the foregoing;

*Note:*

1C232 does not control a product or device containing less than 1 g of helium-3.

(L.N. 65 of 2004)

1C233 Lithium enriched in the lithium-6 ( $^6\text{Li}$ ) isotope to greater than its natural isotopic abundance, and products or devices containing enriched lithium, as follows: elemental lithium, alloys, compounds, mixtures containing lithium, manufactures thereof, waste or scrap of any of the foregoing;

*Note:*

1C233 does not control thermoluminescent dosimeters.

*Technical Note:*

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

(L.N. 65 of 2004)

1C234 Zirconium with a hafnium content of less than 1 part hafnium to 500 parts zirconium by weight, as follows: metal, alloys containing more than 50% zirconium by weight, compounds, manufactures thereof, waste or scrap of any of the foregoing;

*Note:*

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

(L.N. 65 of 2004)

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  $1.48 \times 10^3$  GBq (40 Ci) of tritium.

(L.N. 65 of 2004)

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.

(L.N. 65 of 2004)

- 1C237 Radium-226 (<sup>226</sup>Ra), radium-226 alloys, radium-226 compounds, mixtures containing radium-226, manufactures thereof, and products or devices containing any of the foregoing;

*Note:*

1C237 does not control the following:

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

(L.N. 65 of 2004)

- 1C238 Chlorine trifluoride (ClF<sub>3</sub>);

- 1C239 High explosives, other than those controlled by the Munitions List, or substances or mixtures containing more than 2% thereof, with a crystal density greater than 1.8 gm/cm<sup>3</sup> and having a detonation velocity greater than 8000 m/s;

- 1C240 Nickel powder and porous nickel metal, other than those controlled by 0C005, as follows: (L.N. 95 of 2006)

- (a) Nickel powder having both of the following characteristics:
  - (1) A nickel purity content of 99.0% or greater by weight; and
  - (2) A mean particle size of less than 10 micrometres measured by American Society for Testing and Materials (ASTM) B330 standard;
- (b) Porous nickel metal produced from materials controlled by 1C240(a); (L.N. 95 of 2006)

*Note:*

1C240 does not control the following:

- (a) Filamentary nickel powders;
- (b) Single porous nickel sheets with an area of 1000 cm<sup>2</sup> 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.

(L.N. 65 of 2004)

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

*N.B.:*

See also 1C450;

See also the Munitions List.

- (1) Thiodiglycol (111-48-8);
- (2) Phosphorus oxychloride (10025-87-3);
- (3) Dimethyl methylphosphonate (756-79-6);
- (4) Methyl phosphonyldifluoride (676-99-3) in the Munitions List;
- (5) Methyl phosphonyl dichloride (676-97-1);
- (6) Dimethylphosphite (868-85-9);

- (7) Phosphorus trichloride (7719-12-2);
- (8) Trimethyl phosphite (121-45-9);
- (9) Thionyl chloride (7719-09-7);
- (10) 3-Hydroxy-1-methylpiperidine (3554-74-3);
- (11) N,N-Diisopropyl-(beta)-aminoethyl chloride (96-79-7);
- (12) N,N-Diisopropyl-(beta)-aminoethane thiol (5842-07-9);
- (13) 3-Quinuclidinol (1619-34-7);
- (14) Potassium fluoride (7789-23-3);
- (15) 2-Chloroethanol (107-07-3);
- (16) Dimethylamine (124-40-3);
- (17) Diethyl ethylphosphonate (78-38-6);
- (18) Diethyl-N,N-dimethylphosphoramidate (2404-03-7);
- (19) Diethyl phosphite (762-04-9);
- (20) Dimethylamine hydrochloride (506-59-2);
- (21) Ethyl phosphinyl dichloride (1498-40-4);
- (22) Ethyl phosphonyl dichloride (1066-50-8);
- (23) Ethyl phosphonyl difluoride (753-98-0) in the Munitions List; (L.N. 65 of 2004)
- (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) O-Ethyl-2-di-isopropylaminoethyl methylphosphonite (57856-11-8) in the Munitions List; (L.N. 95 of 2006; L.N. 254 of 2008)
- (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);
- (55) Methyl phosphonic acid (993-13-5); (L.N. 95 of 2006)
- (56) Diethyl methylphosphonate (683-08-9); (L.N. 95 of 2006)

- (57) N,N-Dimethyl aminophosphoryl dichloride (677-43-0); (L.N. 95 of 2006)
- (58) Triisopropyl phosphite (116-17-6); (L.N. 95 of 2006)
- (59) Ethyl diethanolamine (139-87-7); (L.N. 95 of 2006)
- (60) O,O-Diethyl phosphorothioate (2465-65-8); (L.N. 95 of 2006)
- (61) O,O-Diethyl phosphorodithioate (298-06-6); (L.N. 95 of 2006)
- (62) Sodium hexafluorosilicate (16893-85-9); (L.N. 95 of 2006)
- (63) Methyl phosphonothioic dichloride (676-98-2); (L.N. 95 of 2006)

1C351 Human 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 virus; (L.N. 65 of 2004)
  - (22) Louping ill virus; (L.N. 65 of 2004)
  - (23) Murray Valley encephalitis virus; (L.N. 65 of 2004)
  - (24) Omsk haemorrhagic fever virus; (L.N. 65 of 2004)
  - (25) Oropouche virus; (L.N. 65 of 2004)
  - (26) Powassan virus; (L.N. 65 of 2004)
  - (27) Rocio virus; (L.N. 65 of 2004)
  - (28) St Louis encephalitis virus; (L.N. 65 of 2004)
  - (29) Hendra virus (Equine morbillivirus); (L.N. 65 of 2004)
  - (30) South American haemorrhagic fever (Sabia, Flexal, Guanarito); (L.N. 65 of 2004)
  - (31) Pulmonary & renal syndrome-haemorrhagic fever viruses (Seoul, Dobrava, Puumala, Sin Nombre); (L.N. 65 of 2004)
  - (32) Nipah virus (L.N. 65 of 2004)
- (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*, epsilon toxin producing types;
 

*Note:*  
1C351(c)(14) is limited to epsilon toxin producing strains of *Clostridium perfringens*, it does not control other *Clostridium perfringens* strains to be used as positive control cultures for food testing and quality control. (L.N. 65 of 2004)
  - (15) Enterohaemorrhagic *Escherichia coli*, serotype O157 and other verotoxin producing serotypes; (L.N. 65 of 2004)
- (d) "Toxins", as follows, and "sub-units of toxins" thereof:
  - (1) Botulinum toxins;
 

*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 authorized by a state authority to be marketed as medical products. (L.N. 132 of 2001)
  - (2) *Clostridium perfringens* toxins;
  - (3) Conotoxin;
  - (4) Ricin;
  - (5) Saxitoxin;
  - (6) Shiga toxin;
  - (7) *Staphylococcus aureus* toxins;
  - (8) Tetrodotoxin;
  - (9) Verotoxin and shiga-like ribosome inactivating proteins; (L.N. 254 of 2008)
  - (10) Microcystin (Cyanginosin);
  - (11) Aflatoxin;
  - (12) Abrin; (L.N. 65 of 2004)
  - (13) Cholera toxin; (L.N. 65 of 2004)
  - (14) Diacetoxyscirpenol toxin; (L.N. 65 of 2004)
  - (15) T-2 toxin; (L.N. 65 of 2004)

- (16) HT-2 toxin; (L.N. 65 of 2004)
- (17) Modeccin toxin; (L.N. 65 of 2004)
- (18) Volkensin toxin; (L.N. 65 of 2004)
- (19) Viscum Album Lectin 1 (Viscumin); (L.N. 65 of 2004)
- (e) 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, as follows:
  - (1) *Coccidioides immitis*; *and*
  - (2) *Coccidioides posadasii*; (L.N. 254 of 2008)

*Note:*

1C351 does not control "vaccines" or "immunotoxins". (L.N. 95 of 2006)  
(L.N. 65 of 2004)

1C352 Animal pathogens, as follows:

- (a) Viruses, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material including living material which has been deliberately inoculated or contaminated with such cultures, as follows:
  - (1) African swine fever virus;
  - (2) Avian influenza virus, which are:
    - (a) Uncharacterised; or
    - (b) Defined in Annex I(2) EC Directive 2005/94/EC (O.J.L. 10, 14.1.2006, p.16) as having high pathogenicity, as follows: (L.N. 65 of 2004; L.N. 226 of 2009)
      - (1) Type A viruses with an IVPI (intravenous pathogenicity index) in 6 week old chickens of greater than 1.2; or
      - (2) Type A viruses of the subtypes H5 or H7 with genome sequences codified for multiple basic amino acids at the cleavage site of the haemagglutinin molecule similar to that observed for other HPAI viruses, indicating that the haemagglutinin molecule can be cleaved by a host ubiquitous protease; (L.N. 226 of 2009)
  - (3) Bluetongue virus;
  - (4) Foot and mouth disease virus;
  - (5) Goat pox virus;
  - (6) Porcine herpes virus (Aujeszky's disease);
  - (7) Swine fever virus (Hog cholera virus);
  - (8) Lyssa virus;
  - (9) Newcastle disease virus;
  - (10) Peste des petits ruminants virus;
  - (11) Porcine enterovirus type 9 (swine vesicular disease virus);
  - (12) Rinderpest virus;
  - (13) Sheep pox virus;
  - (14) Teschen disease virus;
  - (15) Vesicular stomatitis virus;
  - (16) Lumpy skin disease virus; (L.N. 65 of 2004)
  - (17) African horse sickness virus; (L.N. 65 of 2004)
- (b) *Mycoplasma*, 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: (L.N. 254 of 2008)
  - (1) *Mycoplasma mycoides* subspecies *mycoides* SC (small colony); *and*

(2) *Mycoplasma capricolum* subspecies *capripneumoniae*; (L.N. 254 of 2008)

*Note:*

1C352 does not control "vaccines". (L.N. 95 of 2006)

1C353 Genetic elements and genetically modified organisms, as follows:

- (a) Genetically modified organisms or genetic elements that contain nucleic acid sequences associated with the pathogenicity of organisms specified in 1C351(a), 1C351(b), 1C351(c), 1C351(e), 1C352 or 1C354; *and*
- (b) Genetically modified organisms or genetic elements that contain nucleic acid sequences coding for any of the "toxins" specified in 1C351(d) or "sub-units of toxins" of those "toxins";

*Technical Notes:*

1. Genetic elements include, inter alia, chromosomes, genomes, plasmids, transposons and vectors whether genetically modified or unmodified.
2. Nucleic acid sequences associated with the pathogenicity of any of the "microorganisms" specified in 1C351(a), 1C351(b), 1C351(c), 1C351(e), 1C352 or 1C354 means any sequence specific to the specified "microorganism" that:
  - (a) In itself or through its transcribed or translated products represents a significant hazard to human, animal or plant health; *or*
  - (b) Is known to enhance the ability of a specified "microorganism", or any other organism into which it may be inserted or otherwise integrated, to cause serious harm to human, animal or plant health.

*Note:*

1C353 does not include nucleic acid sequences associated with the pathogenicity of enterohaemorrhagic *Escherichia coli*, serotype O157 and other verotoxin producing strains, other than those coding for the verotoxin, or for its sub-units.

(L.N. 254 of 2008)

1C354 Plant pathogens, as follows:

- (a) Viruses, whether natural, enhanced or modified, either in the form of "isolated live cultures" or as material (including living material) which has been deliberately inoculated or contaminated with such cultures, as follows:
  - (1) Potato Andean latent tymovirus;
  - (2) Potato spindle tuber viroid; (L.N. 95 of 2006)
- (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: (L.N. 95 of 2006)
  - (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) *Xanthomonas oryzae* pv. *oryzae* (*Pseudomonas campestris* pv. *oryzae*); (L.N. 95 of 2006)
  - (4) *Clavibacter michiganensis* subsp. *Sepedonicus* (*Corynebacterium michiganensis* subsp. *Sepedonicum* or *Corynebacterium Sepedonicum*); (L.N. 95 of 2006)
  - (5) *Ralstonia solanacearum* Races 2 and 3 (*Pseudomonas solanacearum* Races 2 and 3 or *Burkholderia solanacearum* Races 2 and 3); (L.N. 95 of 2006)
- (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: (L.N. 95 of 2006)

- (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);

1C450 Toxic chemicals and toxic chemical precursors, as follows: (L.N. 95 of 2006)  
*N.B.:* See also 1C350, 1C351(d) and the Munitions List.

(a) Toxic chemicals, as follows:

- (1) Amiton: O,O-Diethyl S-[2-(diethylamino) ethyl] phosphorothiolate (78-53-5) and corresponding alkylated or protonated salts;
- (2) PFIB: 1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-1-propene (382-21-8);
- (3) BZ: 3-Quinuclidinyl benzilate (6581-06-2);  
*N.B.:* See also the Munitions List.
- (4) Phosgene: Carbonyl dichloride (75-44-5);
- (5) Cyanogen chloride (506-77-4);
- (6) Hydrogen cyanide (74-90-8);
- (7) Chloropicrin: Trichloronitromethane (76-06-02);

(b) Toxic chemical precursors, as follows:

- (1) Chemicals, other than those controlled by the Munitions List or by 1C350, containing a phosphorus atom to which is bonded one methyl, ethyl, or propyl (normal or iso) group but not further carbon atoms; except:  
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 controlled by 1C350;
- (4) N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethyl-2-chlorides and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethyl chloride or N,N-Diisopropyl-(beta)-aminoethyl chloride hydrochloride which are controlled by 1C350;
- (5) N,N-Dialkyl [methyl, ethyl or propyl (normal or iso)] aminoethane-2-ols and corresponding protonated salts, other than N,N-Diisopropyl-(beta)-aminoethanol (96-80-0) and N,N-Diethylaminoethanol (100-37-8) which are controlled by 1C350; except:
  - (a) N,N-Dimethylaminoethanol (108-01-0) and corresponding protonated salts;
  - (b) Protonated salts of N,N-Diethylaminoethanol (100-37-8); (L.N. 183 of 1999)
- (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 controlled by 1C350;
- (7) Ethyldiethanolamine (139-87-7);
- (8) Methyldiethanolamine (105-59-9);

(c) (Repealed L.N. 65 of 2004)

## ID SOFTWARE

- 1D001 "Software" specially designed or modified for the "development", "production" or "use" of equipment controlled by 1B001 to 1B003;
- 1D002 "Software" for the "development" of organic "matrix", metal 'matrix" or carbon "matrix" laminates or "composites";
- 1D003 "Software" specially designed or modified to enable equipment to perform the functions of equipment specified in 1A004(c) or 1A004(d);  
(L.N. 254 of 2008; L.N. 226 of 2009)
- 1D101 "Software" specially designed or modified for the "use" of goods controlled by 1B101, 1B102, 1B115 or 1B117 to 1B119;  
(L.N. 132 of 2001; L.N. 65 of 2004; L.N. 95 of 2006)
- 1D103 "Software" specially designed for analysis of reduced observables such as radar reflectivity, ultraviolet/infrared signatures and acoustic signatures;
- 1D201 "Software" specially designed for the "use" of goods controlled by 1B201;

## 1E TECHNOLOGY

- 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, 1A006(b), 1A007, 1A102, 1B or 1C;  
(L.N. 183 of 1999; L.N. 226 of 2009)
- 1E002 Other "technology", as follows:
- (a) "Technology" for the "development" or "production" of polybenzothiazoles or polybenzoxazoles;
  - (b) "Technology" for the "development" or "production" of fluoroelastomer compounds containing at least one vinyl ether 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) 1000 ppm for single oxides or carbides; or
        - (2) 5000 ppm for complex compounds or single nitrides; and
      - (c) Being any of the following:
        - (1) Zirconia with an average particle size equal to or less than 1  $\mu$  m and no more than 10% of the particles larger than 5  $\mu$  m;
        - (2) Other base materials with an average particle size equal to or less

than 5  $\mu\text{m}$  and no more than 10% of the particles larger than 10  $\mu\text{m}$ ; 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  $\mu\text{m}$ ; and
  - (c) Continuous or chopped fibres less than 10  $\mu\text{m}$  in diameter; (L.N. 132 of 2001)

- (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 controlled by 1C001;
- (f) "Technology" for the repair of "composite" structures, laminates or materials controlled by 1A002, 1C007(c) or 1C007(d);

*Note:*

1E002(f) does not control "technology" for the repair of "civil aircraft" structures using carbon "fibrous or filamentary materials" and epoxy resins, contained in aircraft manufacturers' manuals.

- (g) 'Libraries' (parametric technical databases) specially designed or modified to enable equipment to perform the functions of equipment specified in 1A004(c) or 1A004(d); (L.N. 226 of 2009)

*Technical Note:*

For the purpose of 1E002(g), the term 'Libraries' (parametric technical databases) means a collection of technical information, reference to which may enhance the performance of relevant equipment or systems. (L.N. 254 of 2008)

1E101 "Technology" according to the General Technology Note for the "use" of goods controlled by 1A102, 1B001, 1B101, 1B102, 1B115 to 1B119, 1C001, 1C101, 1C107, 1C111 to 1C117, 1D101 or 1D103;

(L.N. 183 of 1999; L.N. 65 of 2004)

1E102 "Technology" according to the General Technology Note for the "development" of "software" controlled by 1D001, 1D101 or 1D103;

(L.N. 226 of 2009)

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";

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 1573 K (1300°C) to 3 173 K (2900°C) temperature range at pressures of 130 Pa to 20 kPa;

*Note:*

1E104 includes "technology" for the composition of precursor gases, flow-rates and process control schedules and parameters.

- 1E201 "Technology" according to the General Technology Note for the "use" of goods specified in 1A002, 1A007, 1A202, 1A225 to 1A227, 1B201, 1B225 to 1B233, 1C002(b)(3) or (b)(4), 1C010(b), 1C202, 1C210, 1C216, 1C225 to 1C240 or 1D201;  
(L.N. 226 of 2009)
- 1E202 "Technology" according to the General Technology Note for the "development" or "production" of goods specified in 1A007, 1A202 or 1A225 to 1A227;  
(L.N. 226 of 2009)
- 1E203 "Technology" according to the General Technology Note for the "development" of "software" controlled by 1D201;