MUNITIONS LIST

ML 7. Contd.

ML7. e. Protective and decontamination equipment, specially designed components therefor, and specially formulated chemical mixtures, as follows:

1. Equipment, specially designed or modified for military use, for defence against materials controlled by ML7.a. or c. and specially designed components therefor;
2. Equipment, specially designed or modified for military use, for the decontamination of objects contaminated with materials controlled by ML7.a. and specially designed components therefor;
3. Chemical mixtures specially developed/formulated for the decontamination of objects contaminated with materials controlled by ML7.a.;

Note *ML7.e.1. includes:*

a. Air conditioning units specially designed or modified for nuclear, biological or chemical filtration;

b. Protective clothing.

N.B. *For civil gas masks, protective and decontamination equipment see, also entry 1.A.4. on the Dual-Use List.*

f. Equipment, specially designed or modified for military use, for the detection or identification of materials controlled by ML7.a. or c. and specially designed components therefor;

Note *ML7.f. does not control personal radiation monitoring dosimeters.*

N.B. *See also entry 1.A.4. on the Dual-Use List.*

g. "Biopolymers" specially designed or processed for the detection or identification of CW agents controlled by ML7.a., and the cultures of specific cells used to produce them;

h. "Biocatalysts" for the decontamination or degradation of CW agents, and biological systems therefor, as follows:

1. "Biocatalysts" specially designed for the decontamination or degradation of CW agents controlled by ML7.a. resulting from directed laboratory selection or genetic manipulation of biological systems;
2. Biological systems, as follows: "expression vectors", viruses or cultures of cells containing the genetic information specific to the production of "biocatalysts" controlled by ML7.h.1.;

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MUNITIONS LIST

ML 7. Contd.

ML 7. i. "Technology" as follows:

1. "Technology" for the "development", "production" or " use" of toxicological agents, related equipment or components controlled by ML7.a. to ML7.f.;
2. "Technology" for the "development", "production" or "use" of "biopolymers" or cultures of specific cells controlled by ML7.g.;
3. "Technology" exclusively for the incorporation of "biocatalysts", controlled by ML7.h.1., into military carrier substances or military material.

Note 1 *ML7.a. and ML7.c. do not control:*

a. Cyanogen chloride (CAS 506-77-4);
b. Hydrocyanic acid (CAS 74-90-8);
c. Chlorine (CAS 7782-50-5);
d. Carbonyl chloride (phosgene) (CAS 75-44-5);
e. Diphosgene (trichloromethyl-chloroformate) (CAS 503-38-8);
f. Ethyl bromoacetate (CAS 105-36-2);
g. Xylyl bromide, ortho: (CAS 89-92-9), meta: (CAS 620-13-3), para: (CAS 104-81-4);
h. Benzyl bromide (CAS 100-39-0);
i. Benzyl iodide (CAS 620-05-3);
j. Bromo acetone (CAS 598-31-2);
k. Cyanogen bromide (CAS 506-68-3);
l. Bromo methylethylketone (CAS 816-40-0);
m. Chloro acetone (CAS 78-95-5);
n. Ethyl iodoacetate (CAS 623-48-3);
o. Iodo acetone (CAS 3019-04-3);
p. Chloropicrin (CAS 76-06-2).

Note 2 *The "technology", cultures of cells and biological systems listed in ML7.g., ML7.h.2. and ML7.i.3. are exclusive and these sub-items do not control "technology", cells or biological systems for civil purposes, such as agricultural, pharmaceutical, medical, veterinary, environmental, waste management, or in the food industry.*

MUNITIONS LIST

ML8. "Energetic materials", and related substances, as follows:

N.B. See also 1.C.11 on the Dual-Use List

Technical Notes

1. *For the purposes of this entry, mixture refers to a composition of two or more substances with at least one substance being listed in the ML8 sub-items.*
2. *Any substance listed in the ML8 sub-items is controlled by this list, even when utilized in an application other than that indicated. (e.g., TAGN is predominantly used as an explosive but can also be used either as a fuel or an oxidizer.)*

a. "Explosives", as follows, and mixtures thereof:
   1. ADNBF (aminodinitrobenzofuroxan or 7-amino-4,6-dinitrobenzofurazane-1-oxide) (CAS 97096-78-1);
   2. BNCP (cis-bis (5-nitrotetrazolato) tetra amine-cobalt (III) perchlorate) (CAS 117412-28-9);
   3. CL-14 (diamino dinitrobenzofuroxan or 5,7-diamino-4,6-dinitrobenzofurazane-1-oxide) (CAS 117907-74-1);
   4. CL-20 (HNIW or Hexanitrohexaazaisowurtzitane) (CAS 135285-90-4); chlathrates of CL-20 (see also ML8.g.3. and g.4. for its "precursors");
   5. CP (2-(5-cyanotetrazolato) penta amine-cobalt (III) perchlorate) (CAS 70247-32-4);
   6. DADE (1,1-diamino-2,2-dinitroethylene, FOX7);
   7. DATB (diaminotrinitrobenzene) (CAS 1630-08-6);
   8. DDFP (1,4-dinitrodifurazanopiperazine);
   9. DDPO (2,6-diamino-3,5-dinitropyrazine-1-oxide, PZO) (CAS 194486-77-6);
   10. DIPAM (3,3′-diamino-2,2′,4,4′,6,6′-hexanitrobiphenyl or dipicramide) (CAS 17215-44-0);
   11. DNGU (DINGU or dinitroglycoluril) (CAS 55510-04-8);
   12. Furazans, as follows:
      a. DAAOF (diaminoazoxyfurazan);
      b. DAAzF (diaminoazofurazan) (CAS 78644-90-3);
   13. HMX and derivatives (see also ML8.g.5. for its "precursors"), as follows:
      a. HMX (Cyclotetramethylenetetranitramine, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine, 1,3,5,7-tetranitro-1,3,5,7-tetraza-cyclooctane, octogen or octogene) (CAS 2691-41-0);
      b. difluoroaminated analogs of HMX;
      c. K-55 (2,4,6,8-tetranitro-2,4,6,8-tetraazabicyclo [3,3,0]-octanone-3, tetranitrosemiglycouril or keto-bicyclic HMX) (CAS 130256-72-3);
   14. HNAD (hexanitroadamantane) (CAS 143850-71-9);
   15. HNS (hexanitrostilbene) (CAS 20062-22-0);
   16. Imidazoles, as follows:
      a. BNNII (Octahydro-2,5-bis(nitroimino)imidazo [4,5-d]imidazole);
      b. DNI (2,4-dinitroimidazole) (CAS 5213-49-0);
      c. FDIA (1-fluoro-2,4-dinitroimidazole);
      d. NTDNIA (N-(2-nitrotriazolo)-2,4-dinitroimidazole);
      e. PTIA (1-picryl-2,4,5-trinitroimidazole);
   17. NTNMH (1-(2-nitrotriazolo)-2-dinitromethylene hydrazine);

MUNITIONS LIST

ML8.a. contd.

18. NTO (ONTA or 3-nitro-1,2,4-triazol-5-one) (CAS 932-64-9);
19. Polynitrocubanes with more than four nitro groups;
20. PYX (2,6-Bis(picrylamino)-3,5-dinitropyridine) (CAS 38082-89-2);
21. RDX and derivatives, as follows:
    a. RDX (cyclotrimethylenetrinitramine, cyclonite, T4, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitro-1,3,5-triaza-cyclohexane, hexogen or hexogene) (CAS 121-82-4);
    b. Keto-RDX (K-6 or 2,4,6-trinitro-2,4,6-triazacyclohexanone) (CAS 115029-35-1);
22. TAGN (triaminoguanidinenitrate) (CAS 4000-16-2);
23. TATB (triaminotrinitrobenzene) (CAS 3058-38-6) (see also ML8.g.7 for its "precursors");
24. TEDDZ (3,3,7,7-tetrabis(difluoroamine) octahydro-1,5-dinitro-1,5-diazocine);
25. Tetrazoles, as follows:
    a. NTAT (nitrotriazol aminotetrazole);
    b. NTNT (1-N-(2-nitrotriazolo)-4-nitrotetrazole);
26. Tetryl (trinitrophenylmethylnitramine) (CAS 479-45-8);
27. TNAD (1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin) (CAS 135877-16-6) (see also ML8.g.6. for its "precursors");
28. TNAZ (1,3,3-trinitroazetidine) (CAS 97645-24-4) (see also ML8.g.2. for its "precursors");
29. TNGU (SORGUYL or tetranitroglycoluril) (CAS 55510-03-7);
30. TNP (1,4,5,8-tetranitro-pyridazino[4,5-d]pyridazine) (CAS 229176-04-9);
31. Triazines, as follows:
    a. DNAM (2-oxy-4,6-dinitroamino-s-triazine) (CAS 19899-80-0);
    b. NNHT (2-nitroimino-5-nitro-hexahydro-1,3,5-triazine) (CAS 130400-13-4);
32. Triazoles, as follows:
    a. 5-azido-2-nitrotriazole;
    b. ADHTDN (4-amino-3,5-dihydrazino-1,2,4-triazole dinitramide) (CAS 1614-08-0);
    c. ADNT (1-amino-3,5-dinitro-1,2,4-triazole);
    d. BDNTA ([bis-dinitrotriazole]amine);
    e. DBT (3,3′-dinitro-5,5-bi-1,2,4-triazole) (CAS 30003-46-4);
    f. DNBT (dinitrobistriazole) (CAS 70890-46-9);
    g. NTDNA (2-nitrotriazole 5-dinitramide) (CAS 75393-84-9);
    h. NTDNT (1-N-(2-nitrotriazolo) 3,5-dinitrotriazole);
    i. PDNT (1-picryl-3,5-dinitrotriazole);
    j. TACOT (tetranitrobenzotriazolobenzotriazole) (CAS 25243-36-1);
33. Any explosive not listed elsewhere in ML8.a. with a detonation velocity exceeding 8,700 m/s at maximum density or a detonation pressure exceeding 34 GPa (340 kbar);
34. Other organic explosives not listed elsewhere in ML8.a. yielding detonation pressures of 25 GPa (250 kbar) or more that will remain stable at temperatures of 523K (250°C) or higher for periods of 5 minutes or longer.

MUNITIONS LIST

ML8. contd.

b. "Propellants", as follows:
   1. Any United Nations (UN) Class 1.1 solid "propellant" with a theoretical specific impulse (under standard conditions) of more than 250 seconds for non-metallized, or more than 270 seconds for aluminized compositions;
   2. Any UN Class 1.3 solid "propellant" with a theoretical specific impulse (under standard conditions) of more than 230 seconds for non-halogenized, 250 seconds for non-metallized compositions and 266 seconds for metallized compositions;
   3. "Propellants" having a force constant of more than 1,200 kJ/kg;
   4. "Propellants" that can sustain a steady-state linear burning rate of more than 38 mm/s under standard conditions (as measured in the form of an inhibited single strand) of 6.89 MPa (68.9 bar) pressure and 294K (21°C);
   5. Elastomer modified cast double base (EMCDB) "propellants" with extensibility at maximum stress of more than 5% at 233K (-40°C);
   6. Any "propellant" containing substances listed in ML8.a.

c. "Pyrotechnics", fuels and related substances, as follows, and mixtures thereof:
   1. Aircraft fuels specially formulated for military purposes;
   2. Alane (aluminum hydride) (CAS 7784-21-6);
   3. Carboranes; decaborane (CAS 17702-41-9); pentaboranes (CAS 19624-22-7 and 18433-84-6) and their derivatives;
   4. Hydrazine and derivatives, as follows (see also ML8.d.8. and d.9. for oxidising hydrazine derivatives):
      a. Hydrazine (CAS 302-01-2) in concentrations of 70% or more;
      b. Monomethyl hydrazine (CAS 60-34-4);
      c. Symmetrical dimethyl hydrazine (CAS 540-73-8);
      d. Unsymmetrical dimethyl hydrazine (CAS 57-14-7);
   5. Metal fuels in particle form whether spherical, atomized, spheroidal, flaked or ground, manufactured from material consisting of 99 % or more of any of the following:
      a. Metals and mixtures thereof, as follows:
         1. Beryllium (CAS 7440-41-7) in particle sizes of less than 60 μm;
         2. Iron powder (CAS 7439-89-6) with particle size of 3 μm or less produced by reduction of iron oxide with hydrogen;
      b. Mixtures, which contain any of the following:
         1. Zirconium (CAS 7440-67-7), magnesium (CAS 7439-95-4) or alloys of these in particle sizes of less than 60 μm;
         2. Boron (CAS 7440-42-8) or boron carbide (CAS 12069-32-8) fuels of 85% purity or higher and particle sizes of less than 60 μm;
   6. Military materials containing thickeners for hydrocarbon fuels specially formulated for use in flame throwers or incendiary munitions, such as metal stearates or palmates (e.g. octal (CAS 637-12-7)) and M1, M2, and M3 thickeners;
   7. Perchlorates, chlorates and chromates composited with powdered metal or other high energy fuel components;
   8. Spherical aluminum powder (CAS 7429-90-5) with a particle size of 60 μm or less, manufactured from material with an aluminum content of 99% or more;

MUNITIONS LIST

9. Titanium subhydride (TiH_n) of stoichiometry equivalent to n= 0.65-1.68.

MUNITIONS LIST

ML8. contd.

Note 1 *Aircraft fuels controlled by ML8.c.1. are finished products not their constituents.*

Note 2 *ML8.c.4.a. does not control hydrazine mixtures specially formulated for corrosion control.*

Note 3 *Explosives and fuels containing the metals or alloys listed in ML8.c.5. are controlled whether or not the metals or alloys are encapsulated in aluminum, magnesium, zirconium, or beryllium.*

Note 4 *ML8.c.5.b.2. does not control boron and boron carbide enriched with boron-10 (20% or more of total boron-10 content.)*

d. Oxidizers, as follows, and mixtures thereof:
   1. ADN (ammonium dinitramide or SR 12) (CAS 140456-78-6);
   2. AP (ammonium perchlorate) (CAS 7790-98-9);
   3. Compounds composed of fluorine and any of the following:
      a. Other halogens;
      b. Oxygen; or
      c. Nitrogen;
      Note *ML8.d.3 does not control chlorine trifluoride.*
   4. DNAD (1,3-dinitro-1,3-diazetidine) (CAS 78246-06-7);
   5. HAN (hydroxylammonium nitrate) (CAS 13465-08-2);
   6. HAP (hydroxylammonium perchlorate) (CAS 15588-62-2);
   7. HNF (hydrazinium nitroformate) (CAS 20773-28-8);
   8. Hydrazine nitrate (CAS 37836-27-4);
   9. Hydrazine perchlorate (CAS 27978-54-7);
   10. Liquid oxidisers comprised of or containing inhibited red fuming nitric acid (IRFNA) (CAS 8007-58-7);
       Note *ML8.d.10 does not control non-inhibited fuming nitric acid.*

MUNITIONS LIST

ML8. contd.

e. Binders, plasticizers, monomers, polymers, as follows:
   1. AMMO (azidomethylmethyloxetane and its polymers) (CAS 90683-29-7) (see also ML8.g.1. for its "precursors");
   2. BAMO (bisazidomethyloxetane and its polymers) (CAS 17607-20-4) (see also ML8.g.1. for its "precursors");
   3. BDNPA (bis (2,2-dinitropropyl)acetal) (CAS 5108-69-0);
   4. BDNPF (bis (2,2-dinitropropyl)formal) (CAS 5917-61-3);
   5. BTTN (butanetrioltrinitrate) (CAS 6659-60-5) (see also ML8.g.8. for its "precursors");
   6. Energetic monomers, plasticizers and polymers containing nitro, azido, nitrate, nitraza or difluoroamino groups specially formulated for military use;
   7. FAMAO (3-difluoroaminomethyl-3-azidomethyl oxetane) and its polymers;
   8. FEFO (bis-(2-fluoro-2,2-dinitroethyl) formal) (CAS 17003-79-1);
   9. FPF-1 (poly-2,2,3,3,4,4-hexafluoropentane-1,5-diol formal) (CAS 376-90-9);
   10. FPF-3 (poly-2,4,4,5,5,6,6-heptafluoro-2-tri-fluoromethyl-3-oxaheptane-1,7-diol formal);
   11. GAP (glycidylazide polymer) (CAS 143178-24-9) and its derivatives;
   12. HTPB (hydroxyl terminated polybutadiene) with a hydroxyl functionality equal to or greater than 2.2 and less than or equal to 2.4, a hydroxyl value of less than 0.77 meq/g, and a viscosity at 30°C of less than 47 poise (CAS 69102-90-5);
   13. Low (less then 10,000) molecular weight, alcohol functionalised, poly(epichlorohydrin); poly(epichlorohydrindiol) and triol;
   14. NENAs (nitratoethylnitramine compounds) (CAS 17096-47-8, 85068-73-1, 82486-83-7, 82486-82-6 and 85954-06-9);
   15. PGN (poly-GLYN, polyglycidylnitrate or poly(nitratomethyl oxirane) (CAS 27814-48-8);
   16. Poly-NIMMO (poly nitratomethylmethyloxetane) or poly-NMMO (poly[3-Nitratomethyl-3-methyloxetane]) (CAS 84051-81-0);
   17. Polynitroorthocarbonates;
   18. TVOPA (1,2,3-tris[1,2-bis(difluoroamino)ethoxy] propane or tris vinoxy propane adduct) (CAS 53159-39-0).

f. "Additives", as follows:
   1. Basic copper salicylate (CAS 62320-94-9);
   2. BHEGA (*bis*-(2-hydroxyethyl) glycolamide) (CAS 17409-41-5);
   3. BNO (butadienenitrileoxide) (CAS 9003-18-3);
   4. Ferrocene derivatives, as follows:
      a. Butacene (CAS 125856-62-4);
      b. Catocene (2,2-bis-ethylferrocenyl propane) (CAS 37206-42-1);
      c. Ferrocene carboxylic acids;
      d. n-butyl-ferrocene (CAS 319904-29-7);
      e. Other adducted polymer ferrocene derivatives;
   5. Lead beta-resorcylate (CAS 20936-32-7);
   6. Lead citrate (CAS 14450-60-3);
   7. Lead-copper chelates of beta-resorcylate or salicylates (CAS 68411-07-4);
   8. Lead maleate (CAS 19136-34-6);
   9. Lead salicylate (CAS 15748-73-9);

MUNITIONS LIST

ML8.f. contd.

10. Lead stannate (CAS 12036-31-6);
11. MAPO (tris-1-(2-methyl)aziridinyl phosphine oxide) (CAS 57-39-6); BOBBA 8 (bis(2-methyl aziridinyl) 2-(2-hydroxypropanoxy) propylamino phosphine oxide); and other MAPO derivatives;
12. Methyl BAPO (bis(2-methyl aziridinyl) methylamino phosphine oxide) (CAS 85068-72-0);
13. N-methyl-p-nitroaniline (CAS 100-15-2);
14. 3-Nitraza-1,5-pentane diisocyanate (CAS 7406-61-9);
15. Organo-metallic coupling agents, as follows:
    a. Neopentyl[diallyl]oxy, tri[dioctyl]phosphato-titanate (CAS 103850-22-2); also known as titanium IV, 2,2[bis 2-propenolato-methyl, butanolato, tris (dioctyl) phosphato] (CAS 110438-25-0); or LICA 12 (CAS 103850-22-2);
    b. Titanium IV, [(2-propenolato-1) methyl, n-propanolatomethyl] butanolato-1, tris[dioctyl] pyrophosphate or KR3538;
    c. Titanium IV, [(2-propenolato-1)methyl, n-propanolatomethyl] butanolato-1, tris(dioctyl)phosphate;
16. Polycyanodifluoroaminoethyleneoxide;
17. Polyfunctional aziridine amides with isophthalic, trimesic (BITA or butylene imine trimesamide), isocyanuric or trimethyladipic backbone structures and 2-methyl or 2-ethyl substitutions on the aziridine ring;
18. Propyleneimine (2-methylaziridine) (CAS 75-55-8);
19. Superfine iron oxide (Fe_2O_3) with a specific surface area more than 250 m^2/g and an average particle size of 3.0 nm or less;
20. TEPAN (tetraethylenepentaamineacrylonitrile) (CAS 68412-45-3); cyanoethylated polyamines and their salts;
21. TEPANOL (tetraethylenepentaamineacrylonitrileglycidol) (CAS 68412-46-4); cyanoethylated polyamines adducted with glycidol and their salts;
22. TPB (triphenyl bismuth) (CAS 603-33-8).

g. "Precursors", as follows:

N.B. In ML8.g. the references are to controlled "Energetic Materials" manufactured from these substances.

1. BCMO (bischloromethyloxetane) (CAS 142173-26-0) (see also ML8.e.1. and e.2.);
2. Dinitroazetidine-t-butyl salt (CAS 125735-38-8) (see also ML8.a.28.);
3. HBIW (hexabenzylhexaazaisowurtzitane) (CAS 124782-15-6) (see also ML8.a.4.);
4. TAIW (tetraacetyldibenzylhexaazaisowurtzitane) (see also ML8.a.4.);
5. TAT (1,3,5,7 tetraacetyl-1,3,5,7,-tetraaza cyclo-octane) (CAS 41378-98-7) (see also ML8.a.13.);
6. 1,4,5,8-tetraazadecalin (CAS 5409-42-7) (see also ML8.a.27.);
7. 1,3,5-trichlorobenzene (CAS 108-70-3) (see also ML8.a.23.);
8. 1,2,4-trihydroxybutane (1,2,4-butanetriol) (CAS 3068-00-6) (see also ML8.e.5.).

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ML8. contd.

Note 5 *For charges and devices see ML4.*

Note 6 *ML8. does not control the following substances unless they are compounded or mixed with the "energetic material" mentioned in ML8.a. or powdered metals in ML8.c.:*

a. *Ammonium picrate;*
b. *Black powder;*
c. *Hexanitrodiphenylamine;*
d. *Difluoroamine;*
e. *Nitrostarch;*
f. *Potassium nitrate;*
g. *Tetranitronaphthalene;*
h. *Trinitroanisol;*
i. *Trinitronaphthalene;*
j. *Trinitroxylene;*
k. *N-pyrrolidinone; 1-methyl-2-pyrrolidinone;*
l. *Dioctylmaleate;*
m. *Ethylhexylacrylate;*
n. *Triethylaluminium (TEA), trimethylaluminium (TMA), and otlher pyrophoric metal alkyls and aryls of lithium, sodium, magnesium, zinc or boron;*
o. *Nitrocelluose;*
p. *Nitroglycerin (or glyceroltrinitrate, trinitroglycerine) (NG);*
q. *2,4,6-trinitrotoluene (TNT);*
r. *Ethylenediaminedinitrate (EDDN);*
s. *Pentaerythritoltetranitrate (PETN);*
t. *Lead azide, normal and basic lead styphnate, and primary explosives or priming compositions containing azides or azide complexes;*
u. *Triethyleneglycoldinitrate (TEGDN);*
v. *2,4,6-trinitroresorcinol (styphnic acid);*
w. *Diethyldiphenyl urea; dimethylidiphenyl urea; methylethyldiphenyl urea [Centralites];*
x. *N,N-diphenylurea (unsymmetrical diphenylurea);*
y. *Methyl-N,N-diphenylurea (methyl unsymmetrical diphenylurea);*
z. *Ethyl-N,N-diphenylurea (ethyl unsymmetrical diphenylurea);*
aa. *2-Nitrodiphenylamine (2-NDPA);*
bb. *4-Nitrodiphenylamine (4-NDPA);*
cc. *2,2-dinitropropanol;*
dd. *Nitroguanidine (see 1.C.11.d. on the Dual-Use List).*

MUNITIONS LIST

ML9. Vessels of war, special naval equipment and accessories, as follows, and components therefor, specially designed for military use:
N.B. *For guidance and navigation equipment, see ML11, Note g.*

a. Combatant vessels and vessels (surface or underwater) specially designed or modified for offensive or defensive action, whether or not converted to non-military use, regardless of current state of repair or operating condition, and whether or not they contain weapon delivery systems or armour, and hulls or parts of hulls for such vessels;

b. Engines, as follows:
1. Diesel engines specially designed for submarines with both of the following characteristics:
a. A power output of 1.12 MW (1,500 hp.) or more; and
b. A rotary speed of 700 rpm or more;
2. Electric motors specially designed for submarines having all of the following characteristics:
a. A power output of more than 0.75 MW (1,000 hp.);
b. Quick reversing;
c. Liquid cooled; and
d. Totally enclosed;
3. Non-magnetic diesel engines specially designed for military use with a power output of 37.3 kW (50 hp.) or more and with a non-magnetic content in excess of 75% of total mass;

c. Underwater detection devices specially designed for military use and controls thereof;

d. Submarine and torpedo nets;

e. Deleted

f. Hull penetrators and connectors specially designed for military use that enable interaction with equipment external to a vessel;
Note *ML9.f. includes connectors for vessels which are of the single-conductor, multi-conductor, coaxial or waveguide type, and hull penetrators for vessels, both of which are capable of remaining impervious to leakage from without and of retaining required characteristics at marine depths exceeding 100 m; and fibre-optic connectors and optical hull penetrators specially designed for "laser" beam transmission regardless of depth. It does not include ordinary propulsive shaft and hydrodynamic control-rod hull penetrators.*

g. Silent bearings, with gas or magnetic suspension, active signature or vibration suppression controls, and equipment containing those bearings, specially designed for military use.

MUNITIONS LIST

ML10. "Aircraft", unmanned airborne vehicles, aero-engines and "aircraft" equipment, related equipment and components, specially designed or modified for military use, as follows:
N.B. *For guidance and navigation equipment, see ML11, Note g.*

a. Combat "aircraft" and specially designed components therefor;

b. Other "aircraft" specially designed or modified for military use, including military reconnaissance, assault, military training, transporting and airdropping troops or military equipment, logistics support, and specially designed components therefor;

c. 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.

d. Aero-engines specially designed or modified for military use, and specially designed components therefor;

e. Airborne equipment, including airborne refuelling equipment, specially designed for use with the "aircraft" controlled by ML10.a. or ML10.b. or the aero-engines controlled by ML10.d., and specially designed components therefor;

f. Pressure refuellers, pressure refuelling equipment, equipment specially designed to facilitate operations in confined areas and ground equipment, developed specially for "aircraft" controlled by ML10.a. or ML10.b., or for aero-engines controlled by ML10.d.;

g. Military crash helmets and protective masks and specially designed components therefor, pressurised breathing equipment and partial pressure suits for use in "aircraft", anti-g suits, liquid oxygen converters used for "aircraft" or missiles, and catapults and cartridge actuated devices for emergency escape of personnel from "aircraft";

h. Parachutes and related equipment, used for combat personnel, cargo dropping or "aircraft" deceleration, as follows:
1. Parachutes for:
   a. Pin point dropping of rangers;
   b. Dropping of paratroopers;
2. Cargo parachutes;
3. Paragliders, drag parachutes, drogue parachutes for stabilisation and attitude control of dropping bodies, (e.g. recovery capsules, ejection seats, bombs);
4. Drogue parachutes for use with ejection seat systems for deployment and inflation sequence regulation of emergency parachutes;
5. Recovery parachutes for guided missiles, drones or space vehicles;
6. Approach parachutes and landing deceleration parachutes;
7. Other military parachutes;

MUNITIONS LIST

8. Equipment specially designed for high altitude parachutists (e.g., suits, special helmets, breathing systems, navigation equipment);

ML10.i. Automatic piloting systems for parachuted loads; equipment specially designed or modified for military use for controlled opening jumps at any height, including oxygen equipment.

Note 1 *ML10.b. does not control "aircraft" or variants of those "aircraft" specially designed for military use which:*

a. Are not configured for military use and are not fitted with equipment or attachments specially designed or modified for military use; and

b. Have been certified for civil use by the civil aviation authority in a participating state.

Note 2 *ML10.d. does not control:*

a. Aero-engines designed or modified for military use which have been certified by civil aviation authorities in a participating state for use in "civil aircraft", or specially designed components therefor;

b. Reciprocating engines or specially designed components therefor, except those specially designed for unmanned airborne vehicles.

Note 3 *The control in ML10.b. and ML10.d. on specially designed components and related equipment for non-military "aircraft" or aero-engines modified for military use applies only to those military components and to military related equipment required for the modification to military use.*

ML11. Electronic equipment, not controlled elsewhere on the Munitions List, specially designed for military use and specially designed components therefor.

Note *ML11. includes:*

a. Electronic countermeasure and electronic counter-countermeasure equipment (i.e., equipment designed to introduce extraneous or erroneous signals into radar or radio communication receivers or otherwise hinder the reception, operation or effectiveness of adversary electronic receivers including their countermeasure equipment), including jamming and counter-jamming equipment;

b. Frequency agile tubes;

c. Electronic systems or equipment designed either for surveillance and monitoring of the electro-magnetic spectrum for military intelligence or security purposes or for counteracting such surveillance and monitoring;

d. Underwater countermeasures, including acoustic and magnetic jamming and decoy, equipment designed to introduce extraneous or erroneous signals into sonar receivers;

e. Data processing security equipment, data security equipment and transmission and signalling line security equipment, using ciphering processes;

MUNITIONS LIST

f. Identification, authentification and keyloader equipment and key management, manufacturing and distribution equipment.

g. Guidance and navigation equipment.

MUNITIONS LIST

ML12. High velocity kinetic energy weapon systems and related equipment, as follows, and specially designed components therefor:

a. Kinetic energy weapon systems specially designed for destruction or effecting mission-abort of a target;

b. Specially designed test and evaluation facilities and test models, including diagnostic instrumentation and targets, for dynamic testing of kinetic energy projectiles and systems.

N.B. *For weapon systems using sub-calibre ammunition or employing solely chemical propulsion, and ammunition therefor, see ML1. to ML4.*

Note 1 *ML12. includes the following when specially designed for kinetic energy weapon systems:*

a. Launch propulsion systems capable of accelerating masses larger than 0.1 g to velocities in excess of 1.6 km/s, in single or rapid fire modes;
b. Prime power generation, electric armour, energy storage, thermal management, conditioning, switching or fuel-handling equipment; and electrical interfaces between power supply, gun and other turret electric drive functions;
c. Target acquisition, tracking, fire control or damage assessment systems;
d. Homing seeker, guidance or divert propulsion (lateral acceleration) systems for projectiles.

Note 2 *ML12. controls weapon systems using any of the following methods of propulsion:*

a. Electromagnetic;
b. Electrothermal;
c. Plasma;
d. Light gas; or
e. Chemical (when used in combination with any of the above).

Note 3 *ML12. does not control "technology" for magnetic induction for continuous propulsion of civil transport devices.*

MUNITIONS LIST

ML13. Armoured or protective equipment and constructions and components, as follows:

a. Armoured plate as follows:
   1. Manufactured to comply with a military standard or specification; or
   2. Suitable for military use;

b. Constructions of metallic or non-metallic materials or combinations thereof specially designed to provide ballistic protection for military systems, and specially designed components therefor;

c. Military helmets;

d. Body armour and protective garments manufactured according to military standards or specifications, or equivalent, and specially designed components therefor.

N.B. For "fibrous or filamentary materials" used in the manufacture of body armour, see entry 1.C.10. on the Dual-Use List.

Note 1 ML13.b. includes materials specially designed to form explosive reactive armour or to construct military shelters.

Note 2 ML13.c. does not control conventional steel helmets, neither modified or designed to accept, nor equipped with any type of accessory device.

Note 3 ML13.d. does not control body armour or protective garments when accompanying their user for the user's own personal protection.

N.B. See also entry 1.A.5. on the Dual-Use List.

ML14. Specialised equipment for military training or for simulating military scenarios, simulators specially designed for training in the use of any firearm or weapon controlled by ML1. or ML2., and specially designed components and accessories therefor.

Technical Note
The term 'specialised equipment for military training' includes military types of attack trainers, operational flight trainers, radar target trainers, radar target generators, gunnery training devices, anti-submarine warfare trainers, flight simulators (including human-rated centrifuges for pilot/astronaut training), radar trainers, instrument flight trainers, navigation trainers, missile launch trainers, target equipment, drone "aircraft", armament trainers, pilotless "aircraft" trainers, mobile training units and training equipment for ground military operations.

Note 1 ML14. includes image generating and interactive environment systems for simulators when specially designed or modified for military use.

Note 2 ML14. does not control equipment specially designed for training in the use of hunting or sporting weapons.

MUNITIONS LIST

ML15. Imaging or countermeasure equipment, as follows, specially designed for military use, and specially designed components and accessories therefor:

a. Recorders and image processing equipment;
b. Cameras, photographic equipment and film processing equipment;
c. Image intensifier equipment;
d. Infrared or thermal imaging equipment;
e. Imaging radar sensor equipment;
f. Countermeasure or counter-countermeasure equipment for the equipment controlled by sub-items ML15.a. to ML15.e.

Note *ML15.f. includes equipment designed to degrade the operation or effectiveness of military imaging systems or to minimize such degrading effects.*

Note 1 *The term 'specially designed components' includes the following when specially designed for military use:*

a. Infrared image converter tubes;
b. Image intensifier tubes (other than first generation);
c. Microchannel plates;
d. Low-light-level television camera tubes;
e. Detector arrays (including electronic interconnection or read out systems);
f. Pyroelectric television camera tubes;
g. Cooling systems for imaging systems;
h. Electrically triggered shutters of the photochromic or electro-optical type having a shutter speed of less than 100 µs, except in the case of shutters which are an essential part of a high speed camera;
i. Fibre optic image inverters;
j. Compound semiconductor photocathodes.

Note 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 intensifer tubes" see entries ML1., ML2. and ML5.a.*

N.B. *See also entries 6.A.2.a.2. and 6.A.2.b. on the Dual-Use List.*

ML16. Forgings, castings and other unfinished products the use of which in a controlled product is identifiable by material composition, geometry or function, and which are specially designed for any products controlled by ML1.to ML4., ML6., ML9., ML10., ML12. or ML19.

MUNITIONS LIST

ML17. Miscellaneous equipment, materials and libraries, as follows, and specially designed components therefor:

a. Self-contained diving and underwater swimming apparatus, as follows:
   1. Closed or semi-closed circuit (rebreathing) apparatus specially designed for military use (i.e. specially designed to be non magnetic);
   2. Specially designed components for use in the conversion of open-circuit apparatus to military use;
   3. Articles designed exclusively for military use with self-contained diving and underwater swimming apparatus;

b. Construction equipment specially designed for military use;

c. Fittings, coatings and treatments for signature suppression, specially designed for military use;

d. Field engineer equipment specially designed for use in a combat zone;

e. "Robots", "robot" controllers and "robot" "end-effectors", having any of the following characteristics:
   1. Specially designed for military use;
   2. Incorporating means of protecting hydraulic lines against externally induced punctures caused by ballistic fragments (e.g., incorporating self-sealing lines) and designed to use hydraulic fluids with flash points higher than 839 K (566°C); or
   3. Specially designed or rated for operating in an electro-magnetic pulse (EMP) environment;

f. Libraries (parametric technical databases) specially designed for military use with equipment controlled by the Munitions List;

g. Nuclear power generating equipment or propulsion equipment, including "nuclear reactors", specially designed for military use and components therefor specially designed or modified for military use;

h. Equipment and material, coated or treated for signature suppression, specially designed for military use, other than those controlled elsewhere in the Munitions List;

i. Simulators specially designed for military "nuclear reactors";

j. Mobile repair shops specially designed or modified to service military equipment;

k. Field generators specially designed or modified for military use;

l. Containers specially designed or modified for military use;

m. Ferries, other than those controlled elsewhere in the Munitions List, bridges and pontoons, specially designed for military use;

n. Test models specially designed for the "development" of items controlled by ML4., ML6., ML9. or ML10.

Technical Notes

1. For the purpose of ML17., the term 'library' (parametric technical database) means a collection of technical information of a military nature, reference to which may enhance the performance of military equipment or systems.

MUNITIONS LIST

2. *For the purpose of ML17, 'modified' means any structural, electrical, mechanical, or other change that provides a non-military item with military capabilities equivalent to an item which is specially designed for military use.*

MUNITIONS LIST

ML18. Equipment for the production of products referred to in the Munitions List, as follows:

a. Specially designed or modified production equipment for the production of products controlled by the Munitions List, and specially designed components therefor;

b. Specially designed environmental test facilities and specially designed equipment therefor, for the certification, qualification or testing of products controlled by the Munitions List.

Technical Note
For the purposes of ML18., the term 'production' includes design, examination, manufacture, testing and checking.

Note 1 *ML18.a. and ML18.b. include the following equipment:*

a. Continuous nitrators;
b. Centrifugal testing apparatus or equipment having any of the following characteristics:
1. Driven by a motor or motors having a total rated horsepower of more than 298 kW (400 hp);
2. Capable of carrying a payload of 113 kg or more; or
3. Capable of exerting a centrifugal acceleration of 8 g or more on a payload of 91 kg or more;
c. Dehydration presses;
d. Screw extruders specially designed or modified for military explosive extrusion;
e. Cutting machines for the sizing of extruded propellants;
f. Sweetie barrels (tumblers) 1.85 m or more in diameter and having over 227 kg product capacity;
g. Continuous mixers for solid propellants;
h. Fluid energy mills for grinding or milling the ingredients of military explosives;
i. Equipment to achieve both sphericity and uniform particle size in metal powder listed in ML8.c.8.;
j. Convection current converters for the conversion of materials listed in ML8.c.3.

MUNITIONS LIST

ML18. *Note 2*

a. *The term 'products referred to in the Munitions List' includes:*
   1. *Products not controlled if inferior to specified concentrations as follows:*
      a. *Hydrazine (see ML8.c.4.);*
      b. *"Explosives" (see ML8.);*
   2. *Products not controlled if inferior to technical limits, (i.e., "superconductive" materials not controlled by 1.C.5. on the Dual-Use List; "superconductive" electromagnets not controlled by 3.A.1.e.3. on the Dual-Use List; "superconductive" electrical equipment excluded from control under ML20.b.);*
   3. *Metal fuels and oxidants deposited in laminar form from the vapour phase (see ML8.c.5.);*

b. *The term 'products referred to in the Munitions List' does not include:*
   1. *Signal pistols (see ML2.b.);*
   2. *The substances excluded from control under Note 3 to ML7.;*
   3. *Personal radiation monitoring dosimeters (see ML7.f.) and masks for protection against specific industrial hazards, see also Dual-Use List;*
   4. *Difluoroamine and potassium nitrate powder (see Note 6 to ML8.);*
   5. *Aero-engines excluded from control under ML10.;*
   6. *Conventional steel helmets not equipped with, or modified or designed to accept, any type of accessory device (see Note 2 to ML13.);*
   7. *Equipment fitted with industrial machinery, which is not controlled such as coating machinery not elsewhere specified and equipment for the casting of plastics;*
   8. *Muskets, rifles and carbines dated earlier than 1938, reproductions of muskets, rifles and carbines dated earlier than 1890, revolvers, pistols and machine guns dated earlier than 1890, and their reproductions.*

Note 3 *Note 2.b.8. of ML18. does not release from controls production equipment for non-antique small arms, even if used to produce reproductions of antique small arms.*

MUNITIONS LIST

ML19. Directed energy weapon systems (DEW), related or countermeasure equipment and test models, as follows, and specially designed components therefor:

a. "Laser" systems specially designed for destruction or effecting mission-abort of a target;

b. Particle beam systems capable of destruction or effecting mission-abort of a target;

c. High power radio-frequency (RF) systems capable of destruction or effecting mission-abort of a target;

d. Equipment specially designed for the detection or identification of, or defence against, systems controlled by ML19.a. to ML19.c.;

e. Physical test models and related test results for the systems, equipment and components controlled by this Item.

f. Continuous wave or pulsed "laser" systems specially designed to cause permanent blindness to unenhanced vision, i.e., to the naked eye or to the eye with corrective eyesight devices.

Note 1 *Directed energy weapon systems controlled by ML19. include systems whose capability is derived from the controlled application of:*

a. "Lasers" of sufficient continuous wave or pulsed power to effect destruction similar to the manner of conventional ammunition;
b. Particle accelerators which project a charged or neutral particle beam with destructive power;
c. High pulsed power or high average power radio frequency beam transmitters which produce fields sufficiently intense to disable electronic circuitry at a distant target.

Note 2 *ML19. includes the following when specially designed for directed energy weapon systems:*

a. Prime power generation, energy storage, switching, power conditioning or fuel-handling equipment;
b. Target acquisition or tracking systems;
c. Systems capable of assessing target damage, destruction or mission-abort;
d. Beam-handling, propagation or pointing equipment;
e. Equipment with rapid beam slew capability for rapid multiple target operations;
f. Adaptive optics and phase conjugators;
g. Current injectors for negative hydrogen ion beams;
h. "Space qualified" accelerator components;
i. Negative ion beam funnelling equipment;
j. Equipment for controlling and slewing a high energy ion beam;
k. "Space qualified" foils for neutralising negative hydrogen isotope beams.

MUNITIONS LIST

ML20. Cryogenic and "superconductive" equipment, as follows, and specially designed components and accessories therefor:

a. Equipment specially designed or configured to be installed in a vehicle for military ground, marine, airborne or space applications, capable of operating while in motion and of producing or maintaining temperatures below 103 K (- 170°C);
Note *ML20.a. includes mobile systems incorporating or employing accessories or components manufactured from non-metallic or non-electrical conductive materials, such as plastics or epoxy-impregnated materials.*

b. "Superconductive" electrical equipment (rotating machinery and transformers) specially designed or configured to be installed in a vehicle for military ground, marine, airborne or space applications, capable of operating while in motion.
Note *ML20.b. does not control direct-current hybrid homopolar generators that have single-pole normal metal armatures which rotate in a magnetic field produced by superconducting windings, provided those windings are the only superconducting component in the generator.*

ML21. "Software", as follows:

a. "Software" specially designed or modified for the "development", "production" or "use" of equipment or materials controlled by the Munitions List;

b. Specific "software", as follows:
1. "Software" specially designed for:
a. Modelling, simulation or evaluation of military weapon systems;
b. "Development", monitoring, maintenance or up-dating of "software" embedded in military weapon systems;
c. Modelling or simulating military operation scenarios, not controlled by ML14.;
d. Command, Communications, Control and Intelligence (C^3I) or Command, Communications, Control, Computer and Intelligence (C^4I) applications;
2. "Software" for determining the effects of conventional, nuclear, chemical or biological warfare weapons.
3. "Software", not controlled by ML21.a., b.1. or b.2., specially designed or modified to enable equipment not controlled by the Munitions List to perform the military functions of equipment controlled by ML5., ML7.f., ML9.c., ML9.e., ML10.e., ML11., ML14., ML15., ML17.i., or ML18.

MUNITIONS LIST

ML22. "Technology" as follows:

a. "Technology" according to the General Technology Note of the Munitions List for the "development", "production" or "use" of items controlled in the Munitions List, other than that "technology" controlled in ML7.

b. "Technology" specific to the design of, the assembly of components into, and the operation, maintenance and repair of complete production installations for products referred to in the Munitions List, even if the components of such production installations are not controlled.

Note 1

a. The term 'products referred to in the Munitions List' includes:

1. Products not controlled if inferior to specified concentrations as follows:

a. Hydrazine (see ML8.c.4.);

b. "Explosives" (see ML8.);

2. Products not controlled if inferior to technical limits, (i.e., "superconductive" materials not controlled by 1.C.5. on the Dual-Use List; "superconductive" electromagnets not controlled by 3.A.1.e.3. on the Dual-Use List; "superconductive" electrical equipment excluded from control under ML20.b.);

3. Metal fuels and oxidants deposited in laminar form from the vapour phase (see ML8.c.5.);

b. The term 'products referred to in the Munitions List' does not include:

1. Signal pistols (see ML2.b.);

2. The substances excluded from control under Note 3 to ML7.;

3. Personal radiation monitoring dosimeters (see ML7.f.) and masks for protection against specific industrial hazards, see also Dual-Use List;

4. Difluoroamine and potassium nitrate powder (see Note 6 to ML8.);

5. Aero-engines excluded from control under ML10.;

6. Conventional steel helmets not equipped with, or modified or designed to accept, any type of accessory device (see Note 2 to ML13.);

7. Equipment fitted with industrial machinery, which is not controlled such as coating machinery not elsewhere specified and equipment for the casting of plastics;

8. Muskets, rifles and carbines dated earlier than 1938, reproductions of muskets, rifles and carbines dated earlier than 1890, revolvers, pistols and machine guns dated earlier than 1890, and their reproductions;

Note 2 *Note 1.b.8. of ML22. does not release from control "technology" for non-antique small arms, even if used to produce reproductions of antique small arms.*

Note 3 *ML22. does not control "technology" for civil purposes, such as agricultural, pharmaceutical, medical, veterinary, environmental, waste management, or in the food industry.*

N.B. *See Note 4 to ML7.*

DEFINITIONS

DEFINITIONS OF TERMS USED IN THESE LISTS

This document contains the definitions of the terms used in these Lists, in alphabetical order.

Note 1 *Definitions apply throughout the Lists and their Annexes. The references are purely advisory and have no effect on the universal application of defined terms throughout these Lists and their Annexes.*

Note 2 *Words and terms contained in the List of Definitions 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. (See also 'Statements of Understanding and Validity Notes – Definition of Terms used in these Lists').*

DEFINITIONS

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

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

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

Cat 1 "Adapted for use in war"
ML 7 Any modification or selection (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) designed to increase the effectiveness in producing casualties in humans or animals, degrading equipment or damaging crops or the environment.

ML8. "Additives"
Substances used in explosive formulations to improve their properties.

Cat 1 "Aircraft"
Cat 7 & 9 A fixed wing, swivel wing, rotary wing (helicopter), tilt rotor or tilt-
ML 8, 9 & 10 wing airborne vehicle.

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

Cat 3 "Allocated by the ITU"
Cat 5 P1 The allocation of frequency bands according to the ITU Radio Regulations (Edition 1998) for primary, permitted and secondary services.
N.B. Additional and alternative allocations are not included.

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

DEFINITIONS

Cat 5 "Asymmetric algorithm "

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

Technical Note

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

Cat 5 "Asynchronous transfer mode" ("ATM")

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

Cat 5 "ATM"

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

Cat 6 "Automatic target tracking"

A processing technique that automatically determines and provides as output an extrapolated value of the most probable position of the target in real time.

Cat 3 "Basic gate propagation delay time"

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'.

Technical Notes

1. *"Basic gate propagation delay time" is not to be confused with the input/output delay time of a complex "monolithic integrated circuit".*
2. *'Family' consists of all integrated circuits to which all of the following are applied as their manufacturing methodology and specifications except their respective functions:*
   a. *The common hardware and software architecture;*
   b. *The common design and process technology; and*
   c. *The common basic characteristics.*

GTN "Basic scientific research"

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

Cat 7 "Bias" (accelerometer)

An accelerometer output when no acceleration is applied.

ML 7 "Biocatalysts"

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

Technical Note

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

DEFINITIONS

ML 7 "Biopolymers"

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;

Technical Notes

1. *'Anti-idiotypic antibodies' means antibodies which bind to the specific antigen binding sites of other antibodies;*
2. *'Monoclonal antibodies' means proteins which bind to one antigenic site and are produced by a single clone of cells;*
3. *'Polyclonal antibodies' means a mixture of proteins which bind to the specific antigen and are produced by more than one clone of cells;*
4. *'Receptors' means biological macromolecular structures capable of binding ligands, the binding of which affects physiological functions.*

Cat 2 "Camming" (axial displacement)

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

Cat 1 "Carbon fibre preforms"

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".

Cat 4 "CE"

"CE" is equivalent to "computing element".

Cat 6 "Chemical Laser"

A "laser" in which the excited species is produced by the output energy from a chemical reaction.

"Circuit element"

A single active or passive functional part of an electronic circuit, such as one diode, one transistor, one resistor, one capacitor, etc.

Cat 7 "Circulation-controlled anti-torque or circulation-controlled direction control systems"

Control systems using air blown over aerodynamic surfaces to increase or control the forces generated by the surfaces.

Cat 1 "Civil aircraft"
Cat 7 Those "aircraft" listed by designation in published airworthiness
Cat 9 certification lists by the civil aviation authorities to fly commercial civil
ML 10 internal and external routes or for legitimate civil, private or business use.

DEFINITIONS

Cat 1 "Commingled"

Filament to filament blending of thermoplastic fibres and reinforcement fibres in order to produce a fibre reinforcement "matrix" mix in total fibre form.

Cat 1 "Comminution"

A process to reduce a material to particles by crushing or grinding.

Cat 5 "Common channel signalling"

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

Cat 4 "Communications channel controller"

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.

Cat 1 "Composite"
Cat 2
Cat 6
Cat 8 & 9

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

Cat 3 "Composite theoretical performance" ("CTP")
Cat 4

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.*

Cat 2 "Compound rotary table"

A table allowing the workpiece to rotate and tilt about two non-parallel axes, which can be coordinated simultaneously for "contouring control".

Cat 4 "Computing element" ("CE")

The smallest computational unit that produces an arithmetic or logic result.

Cat 2 "Contouring control"

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

Cat 1 "Critical temperature"
Cat 3
Cat 6

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

DEFINITIONS

Cat 5 "Cryptography"

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

Technical Note

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

Cat 3 "CTP"
Cat 4 "CTP" is equivalent to "Composite theoretical performance".

Cat 7 "Data-Based Referenced Navigation" ("DBRN") Systems

Systems which use various sources of previously measured geo-mapping data integrated to provide accurate navigation information under dynamic conditions. Data sources include bathymetric maps, stellar maps, gravity maps, magnetic maps or 3-D digital terrain maps.

Cat 5 "Data signalling rate"

The rate, as defined in ITU Recommendation 53-36, taking into account that, for non-binary modulation, baud and bit per second are not equal. Bits for coding, checking and synchronisation functions are to be included.

Note *When determining the "data signalling rate", servicing and administrative channels shall be excluded.*

Technical Note

It is the maximum one-way rate, i.e., the maximum rate in either transmission or reception.

Cat 6 "Deformable Mirrors"

Mirrors:

a. Having a single continuous optical reflecting surface which is dynamically deformed by the application of individual torques or forces to compensate for distortions in the optical waveform incident upon the mirror; or
b. Having multiple optical reflecting elements that can be individually and dynamically repositioned by the application of torques or forces to compensate for distortions in the optical waveform incident upon the mirror.

"Deformable mirrors" are also known as adaptive optic mirrors.

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

Cat 1 "Diffusion bonding"
Cat 2 A solid state molecular joining of at least two separate metals into a

DEFINITIONS

Cat 9 single piece with a joint strength equivalent to that of the weakest material.

Cat 4 "Digital computer"
Cat 5 Equipment which can, in the form of one or more discrete variables, perform all of the following:
a. Accept data;
b. Store data or instructions in fixed or alterable (writable) storage devices;
c. Process data by means of a stored sequence of instructions which is modifiable; and
d. Provide output of data.

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

Cat 5 "Digital transfer rate"
The total bit rate of the information that is directly transferred on any type of medium. (See also "total digital transfer rate").

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

"Discrete component"
A separately packaged "circuit element" with its own external connections.

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

Cat 5 "Dynamic adaptive routing"
Automatic rerouting of traffic based on sensing and analysis of current actual network conditions.
Note *This does not include cases of routing decisions taken on predefined information.*

Cat 3 "Dynamic signal analysers"
"Signal analysers" which use digital sampling and tranformation techniques to form a Fourier spectrum display of the given waveform including amplitude and phase information.

Cat 1 "Effective gram"
"Effective gram" for plutonium isotope is defined as the isotope weight in grams.

DEFINITIONS

Cat 5 "Electronically steerable phased array antenna"
Cat 6 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.

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

Cat 2 "End-effectors"
ML 17 Grippers, active tooling units and any other tooling that is attached to the baseplate on the end of a "robot" manipulator arm.

Technical Note
'Active tooling units' are devices for applying motive power, process energy or sensing to a workpiece.

ML4 "Energetic materials"
ML8 Substances or mixtures that react chemically to release energy required for their intended application. "Explosives", "pyrotechnics" and "propellants" are subclasses of energetic materials.

Cat 6 "Equivalent Density"
The mass of an optic per unit optical area projected onto the optical surface.

Cat 4 "Expert systems"
Cat 7 Systems providing results by application of rules to data which are stored independently of the "programme" and capable of any of the following:
a. Modifying automatically the "source code" introduced by the user;
b. Providing knowledge linked to a class of problems in quasi-natural language; or
c. Acquiring the knowledge required for their development (symbolic training).

ML 8 "Explosives"
Solid, liquid or gaseous substances or mixtures of substances which, in their application as primary, booster, or main charges in warheads, demolition and other applications, are required to detonate.

ML 7 "Expression Vectors"
Carriers (e.g., plasmid or virus) used to introduce genetic material into host cells.

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DEFINITIONS

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

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

Cat 1 "Fibrous or filamentary materials"
Cat 8 Include:
a. Continuous monofilaments;
b. Continuous yarns and rovings;
c. Tapes, fabrics, random mats and braids;
d. Chopped fibres, staple fibres and coherent fibre blankets;
e. Whiskers, either monocrystalline or polycrystalline, of any length;
f. Aromatic polyamide pulp.

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

ML 15 "First generation image intensifier tubes"
Electrostatically focused tubes, employing input and output fibre optic or glass face plates, multi-alkali photocathodes (S-20 or S-25), but not microchannel plate amplifiers.

Cat 5 "Fixed"
The coding or compression algorithm cannot accept externally supplied parameters (eg., cryptographic or key variables) and cannot be modified by the user.

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

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

DEFINITIONS

Cat 6 "Focal plane array"

A linear or two-dimensional planar layer, or combination of planar layers, of individual detector elements, with or without readout electronics, which work in the focal plane.

Note *This definition does not include a stack of single detector elements or any two, three or four element detectors provided time delay and integration is not performed within the element.*

Cat 3 "Fractional bandwidth"

The "instantaneous bandwidth" divided by the centre frequency, expressed as a percentage.

Cat 5 "Frequency hopping "

A form of "spread spectrum" in which the transmission frequency of a single communication channel is made to change by a random or pseudo-random sequence of discrete steps.

Cat 3 "Frequency switching time"

Cat 5 The maximum time (i.e., delay) taken by a signal, when switched from one selected output frequency to another selected output frequency, to reach any of the following:

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

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

Cat 3 "Frequency synthesiser"

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

Cat 1 "Gas atomisation"

A process to reduce a molten stream of metal alloy to droplets of 500 µm diameter or less by a high pressure gas stream.

Cat 6 "Geographically dispersed"

Sensors are considered "geographically dispersed" when each location is distant from any other more than 1,500 m in any direction. Mobile sensors are always considered "geographically dispersed".

Cat 2 "Hot isostatic densification"

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

DEFINITIONS

Cat 4 "Hybrid computer"

Equipment which can perform all of the following:

a. Accept data;
b. Process data, in both analogue and digital representations; and
c. Provide output of data.

Cat 3 "Hybrid integrated circuit"

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

a. Containing at least one unencapsulated device;
b. Connected together using typical IC production methods;
c. Replaceable as an entity; and
d. Not normally capable of being disassembled.

Cat 4 "Image enhancement"

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

Cat 5 "Information security"

All the means and functions ensuring the accessibility, confidentiality or integrity of information or communications, excluding the means and functions intended to safeguard against malfunctions. This includes "cryptography", cryptanalysis, protection against compromising emanations and computer security.

Technical Note

'Cryptanalysis': the analysis of a cryptographic system or its inputs and outputs to derive confidential variables or sensitive data, including clear text. (ISO 7498-2-1988 (E), paragraph 3.3.18).

Cat 3 "Instantaneous bandwidth"

Cat 5P1 The bandwidth over which output power remains constant within 3 dB without adjustment of other operating parameters.

Cat 6 "Instrumented range"

The specified unambiguous display range of a radar.

Cat 6 "Interconnected radar sensors"

Two or more radar sensors are interconnected when they mutually exchange data in real time.

DEFINITIONS

GTN "In the public domain"
GSN This means "technology" or "software" which has been made available without restrictions upon its further dissemination.

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

Cat 6 "Intrinsic magnetic gradiometer"

A single magnetic field gradient sensing element and associated electronics the output of which is a measure of magnetic field gradient.

Cat 2 "Isostatic presses"

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

Cat 2, 3,5 "Laser"
6 & 9 An assembly of components which produce both spatially and
ML5, 9 & 23 temporally coherent light that is amplified by stimulated emission of radiation.

Cat 2 "Linearity"

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

Cat 4 "Local area network"

A data communication system having all of the following characteristics:

a. Allows an arbitrary number of independent data devices to communicate directly with each other; and
b. Is confined to a geographical area of moderate size (e.g., office building, plant, campus, warehouse).

Technical Note

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

Cat 6 "Magnetic gradiometers"

Are designed to detect the spatial variation of magnetic fields from sources external to the instrument. They consist of multiple "magnetometers" and associated electronics the output of which is a measure of magnetic field gradient. (See also "Intrinsic Magnetic Gradiometer")

Cat 6 "Magnetometers"

Are designed to detect magnetic fields from sources external to the instrument. They consist of a single magnetic field sensing element and associated electronics the output of which is a measure of the magnetic field.

DEFINITIONS

Cat 4 "Main storage"

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

Cat 1
Cat 2
Cat 8 & 9 "Matrix"

A substantially continuous phase that fills the space between particles, whiskers or fibres.

Cat 2 "Measurement uncertainty"

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).

Cat 1 "Mechanical alloying"

An alloying process resulting from the bonding, fracturing and rebonding of elemental and master alloy powders by mechanical impact. Non-metallic particles may be incorporated in the alloy by addition of the appropriate powders.

Cat 1 "Melt extraction"

A process to "solidify rapidly" and extract a ribbon-like alloy product by the insertion of a short segment of a rotating chilled block into a bath of a molten metal alloy.

Cat 1 "Melt spinning"

A process to "solidify rapidly" a molten metal stream impinging upon a rotating chilled block, forming a flake, ribbon or rod-like product.

Cat 3 "Microcomputer microcircuit"

A "monolithic integrated circuit" or "multichip integrated circuit" containing an arithmetic logic unit (ALU) capable of executing general purpose instructions from an internal storage, on data contained in the internal storage.
Technical Note
The internal storage may be augmented by an external storage.

DEFINITIONS

Cat 3 "Microprocessor microcircuit"

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

Technical Note

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

Note *This definition includes chip sets which are designed to operate together to provide the function of a "microprocessor microcircuit".*

"Microprogramme"

A sequence of elementary instructions maintained in a special storage, the execution of which is initiated by the introduction of its reference instruction register.

Cat 3 "Monolithic integrated circuit"

A combination of passive or active "circuit elements" or both which:

a. Are formed by means of diffusion processes, implantation processes or deposition processes in or on a single semiconducting piece of material, a so-called 'chip';
b. Can be considered as indivisibly associated; and
c. Perform the function(s) of a circuit.

Cat 6 "Monospectral imaging sensors"

Are capable of acquisition of imaging data from one discrete spectral band.

Cat 3 "Multichip integrated circuit"

Two or more "monolithic integrated circuits" bonded to a common "substrate".

Cat 4 "Multi-data-stream processing"

The "microprogramme" or equipment architecture technique which permits simultaneous processing of two or more data sequences under the control of one or more instruction sequences by means such as:

a. Single Instruction Multiple Data (SIMD) architectures such as vector or array processors;
b. Multiple Single Instruction Multiple Data (MSIMD) architectures;
c. Multiple Instruction Multiple Data (MIMD) architectures, including those which are tightly coupled, closely coupled or loosely coupled; or
d. Structured arrays of processing elements, including systolic arrays.

DEFINITIONS

Cat 5 "Multilevel security"

A class of system containing information with different sensitivities that simultaneously permits access by users with different security clearances and needs-to-know, but prevents users from obtaining access to information for which they lack authorization.

Technical Note

"Multilevel security" is computer security and not computer reliability which deals with equipment fault prevention or human error prevention in general.

Cat 6 "Multispectral imaging sensors"

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

Cat 4 "Network access controller"

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.

Cat 4 "Neural computer"

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

Cat 6 "Noise level"

An electrical signal given in terms of power spectral density. The relation between "noise level" expressed in peak-to-peak is given by $S^2_{pp} = 8N_O(f_2-f_1)$, where S_{pp} is the peak-to-peak value of the signal (e.g., nanoteslas), N_O is the power spectral density (e.g., (nanotesla)^2/Hz) and (f_2-f_1) defines the bandwidth of interest.

ML 17 "Nuclear reactor"

Includes the items within or attached directly to the reactor vessel, the equipment which controls the level of power in the core, and the components which normally contain or come into direct contact with or control the primary coolant of the reactor core.

Cat 2 "Numerical control"

The automatic control of a process performed by a device that makes use of numeric data usually introduced as the operation is in progress (Ref. ISO 2382).

DEFINITIONS

Cat 4 "Object code"
Cat 9 "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.

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

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

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

Cat 5 "Optical switching"
The routing of or switching of signals in optical form without conversion to electrical signals.

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

Cat 6 "Peak power"
Energy per pulse in joules divided by the pulse duration in seconds.

Cat 5 "Personalised smart card"
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.

Cat 7 "Power management"
Changing the transmitted power of the altimeter signal so that received power at the "aircraft" altitude is always at the minimum necessary to determine the altitude.

ML 8 "Precursors"
Speciality chemicals used in the manufacture of explosives.

DEFINITIONS

Cat 1 "Previously separated"
The application of any process intended to increase the concentration of the controlled isotope.

Cat 7 "Primary flight control"
"Aircraft" stability or manoeuvering control using force/moment generators, i.e. aerodynamic control surfaces or propulsive thrust vectoring.

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

GTN "Production"
Means all production stages, such as: product engineering, manufacture, integration, assembly (mounting), inspection, testing, quality assurance.

Cat 2 "Programme"
Cat 4 A sequence of instructions to carry out a process in, or convertible
Cat 5 & 6 into, a form executable by an electronic computer.

ML8 "Propellants"
Substances or mixtures that react chemically to produce large volumes of hot gases at controlled rates to perform mechanical work.

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

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

ML 4 "Pyrotechnic(s)"
ML 8 Mixtures of solid or liquid fuels and oxidizers which, when ignited, undergo an energetic chemical reaction at a controlled rate intended to produce specific time delays, or quantities of heat, noise, smoke, visible light or infrared radiation. Pyrophorics are a subclass of pyrotechnics, which contain no oxidizers but ignite spontaneously on contact with air.

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

DEFINITIONS

Cat 6 "Radar frequency agility"

Any technique which changes, in a pseudo-random sequence, the carrier frequency of a pulsed radar transmitter between pulses or between groups of pulses by an amount equal to or larger than the pulse bandwidth.

Cat 6 "Radar spread spectrum"

Any modulation technique for spreading energy originating from a signal with a relatively narrow frequency band, over a much wider band of frequencies, by using random or pseudo-random coding.

Cat 3 "Real-time bandwidth"

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

Cat 2, Cat 6 & 7 "Real time processing"

The processing of data by a computer system providing a required level of service, as a function of available resources, within a guaranteed response time, regardless of the load of the system, when stimulated by an external event.

Cat 5 Cat 6 Cat 9 GTN "Required"

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

Cat 2 "Resolution"

The least increment of a measuring device; on digital instruments, the least significant bit. (Reference: ANSI B-89.1.12)

ML 7 "Riot control agents"

Substances which produce temporary irritating or disabling physical effects which disappear within minutes of removal from exposure. There is no significant risk of permanent injury and medical treatment is rarely required.

Cat 2 Cat 8 ML 17 "Robot"

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

a. Is multifunctional;
b. Is capable of positioning or orienting material, parts, tools or special devices through variable movements in three dimensional space;
c. Incorporates three or more closed or open loop servo-devices which may include stepping motors; and

DEFINITIONS

"Robot" contd.

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

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

1. *Manipulation mechanisms which are only manually/teleoperator controllable;*
2. *Fixed sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed stops, such as pins or cams. The sequence of motions and the selection of paths or angles are not variable or changeable by mechanical, electronic or electrical means;*
3. *Mechanically controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is mechanically limited by fixed, but adjustable stops, such as pins or cams. The sequence of motions and the selection of paths or angles are variable within the fixed programme pattern. Variations or modifications of the programme pattern (e.g., changes of pins or exchanges of cams) in one or more motion axes are accomplished only through mechanical operations;*
4. *Non-servo-controlled variable sequence manipulation mechanisms which are automated moving devices, operating according to mechanically fixed programmed motions. The programme is variable but the sequence proceeds only by the binary signal from mechanically fixed electrical binary devices or adjustable stops;*
5. *Stacker cranes defined as Cartesian coordinate manipulator systems manufactured as an integral part of a vertical array of storage bins and designed to access the contents of those bins for storage or retrieval.*

Cat 1 "Rotary atomisation"

A process to reduce a stream or pool of molten metal to droplets to a diameter of 500 µm or less by centrifugal force.

Cat 2 "Run out" (out-of-true running)

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

Cat 7 "Scale factor" (gyro or accelerometer)

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

DEFINITIONS

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

Cat 6 "SHPL"
"SHPL" is equivalent to "Super High Power Laser".

Cat 3 "Signal analysers"
Apparatus capable of measuring and displaying basic properties of the single-frequency components of multi-frequency signals.

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

Both Lists "Software"
A collection of one or more "programmes" or "microprogrammes" fixed in any tangible medium of expression.

"Solidify rapidly"
A process involving the solidification of molten material at cooling rates exceeding 1,000 K/sec.

Cat 4 "Source code"
Cat 5 A convenient expression of one or more processes which may be
Cat 6 turned by a programming system into equipment executable
Cat 7 form ("object code" (or object language)).
Cat 9

Cat 7 "Spacecraft"
Cat 9 Active and passive satellites and space probes.

Cat 3 "Space qualified"
Cat 6 Products designed, manufactured and tested to meet the special electrical,
ML 23 mechanical or environmental requirements for use in the launch and deployment of satellites or high altitude flight systems operating at altitudes of 100 km or higher.

Cat 1 "Splat quenching"
A process to "solidify rapidly" a molten metal stream impinging upon a chilled block, forming a flake-like product.

Cat 5 "Spread spectrum"
The technique whereby energy in a relatively narrow-band communication channel is spread over a much wider energy spectrum.

DEFINITIONS

Cat 6 "Spread spectrum" radar - see "Radar spread spectrum"

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

Cat 2 "Stored programme controlled"
Cat 3 A control using instructions stored in an electronic storage which a
Cat 5 processor can execute in order to direct the performance of predetermined functions.
Technical Note
Equipment may be "stored programme controlled" whether the electronic storage is internal or external to the equipment.

Cat 3 "Substrate"
A sheet of base material with or without an interconnection pattern and on which or within which "discrete components" or integrated circuits or both can be located.

Cat 6 "Substrate blanks"
Monolithic compounds with dimensions suitable for the production of optical elements such as mirrors or optical windows.

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

Cat 1 "Superconductive"
Cat 3 Refers to materials,(i.e., metals, alloys or compounds) which can lose all
Cat 6 electrical resistance (i.e., which can attain infinite electrical conductivity
Cat 8 and carry very large electrical currents without Joule heating).
ML 18 & 20 *Technical Note*
The "superconductive" state of a material is individually characterised by a "critical temperature", a critical magnetic field, which is a function of temperature, and a critical current density which is, however, a function of both magnetic field and temperature.

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

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

DEFINITIONS

Cat 5 " Symmetric algorithm "

A cryptographic algorithm using an identical key for both encryption and decryption.

Technical Note

A common use of "symmetric algorithms" is confidentiality of data.

Cat 6 "System tracks"

Processed, correlated (fusion of radar target data to flight plan position) and updated aircraft flight position report available to the Air Traffic Control centre controllers.

Cat 4 "Systolic array computer"

A computer where the flow and modification of the data is dynamically controllable at the logic gate level by the user.

ML 7 "Tear gases"

Gases which produce temporary irritating or disabling effects which disappear within minutes of removal from exposure.

GTN & Both Lists "Technology"

Specific information necessary for the "development", "production" or "use" of a product. The information takes the form of technical data or technical assistance. Controlled "technology" is defined in the General Technology Note and in the Dual-Use List.

Technical Notes

1. *'Technical data' may take forms such as blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions written or recorded on other media or devices such as disk, tape, read-only memories.*
2. *'Technical assistance' may take forms such as instruction, skills, training, working knowledge, consulting services. 'Technical assistance' may involve transfer of 'technical data'.*

Cat 4 "Terminal interface equipment"

Equipment at which information enters or leaves the telecommunication system, e.g., telephone, data device, computer, facsimile device.

Cat 4 "Three dimensional Vector Rate"

The number of vectors generated per second which have 10 pixel poly line vectors, clip tested, randomly oriented, with either integer or floating point X-Y-Z coordinate values (whichever produces the maximum rate).

Cat 2 "Tilting spindle"

A tool-holding spindle which alters, during the machining process, the angular position of its centre line with respect to any other axis.

DEFINITIONS

Cat 6 "Time constant"

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

Cat 5 P1 "Time-modulated ultra-wideband"
Cat 5 P2

The technique in which very short precisely time-controlled RF pulses are modulated in accordance with communications data by shifting pulse positions (usually called Pulse Position Modulation, PPM) channelized or scrambled in accordance with pseudo-random noise codes by PPM, then transmitted and received in the direct pulse form without using any carrier frequencies, consequently having extremely low power density over ultra-wide frequency bands. It is also known as Impulse Radio.

Cat 7 "Total control of flight"

Automated control of "aircraft" state variables and flight path to meet mission objectives responding to real time changes in data regarding objectives, hazards or other "aircraft".

Cat 5 "Total digital transfer rate"

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

Cat 6 "Transfer laser"

A "laser" in which the lasing species is excited through the transfer of energy by collision of a non-lasing atom or molecule with a lasing atom or molecule species.

Cat 6 "Tunable"

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

GTN "Use"
Cat 1, 2, 4
Cat 5, 6, 7
Cat 8 & 9

Operation, installation (including on-site installation), maintenance (checking), repair, overhaul and refurbishing.

Cat 4 "User-accessible programmability"
Cat 5

The facility allowing a user to insert, modify or replace "programmes" by means other than:

Cat 6

a. A physical change in wiring or interconnections; or
b. The setting of function controls including entry of parameters.

DEFINITIONS

Cat 1 "Vacuum atomisation"

A process to reduce a molten stream of metal to droplets of a diameter of 500 μm or less by the rapid evolution of a dissolved gas upon exposure to a vacuum.

Cat 7 "Variable geometry airfoils"

Use trailing edge flaps or tabs, or leading edge slats or pivoted nose droop, the position of which can be controlled in flight.

Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS USED IN THESE LISTS

An acronym or abbreviation, when used as a defined term, will be found in 'Definitions of Terms used in these Lists'.

ACRONYM OR ABBREVIATION	MEANING
ABEC	Annular Bearing Engineers Committee
AGMA	American Gear Manufacturers' Association
AHRS	attitude and heading reference systems
ALU	arithmetic logic unit
ATC	air traffic control
C^3I	command, communications, control & intelligence
CAD	computer-aided-design
CAS	Chemical Abstracts Service
CDU	control and display unit
CEP	circular error probable
CNTD	controlled nucleation thermal deposition
CVD	chemical vapour deposition
CW	chemical warfare
CW (for lasers)	continuous wave
DEW	directed energy weapon systems
DME	distance measuring equipment
DS	directionally solidified
EB-PVD	electron beam physical vapour deposition
EBU	European Broadcasting Union
ECM	electro-chemical machining
ECR	electron cyclotron resonance
EDM	electrical discharge machines
EEPROMS	electrically erasable programmable read only memory
EIA	Electronic Industries Association
EMC	electromagnetic compatibility
EMCDB	elastomer modified cast double based propellants
FFT	Fast Fourier Transform
GLONASS	global navigation satellite system
GPS	global positioning system
HBT	hetero-bipolar transistors
HDDR	high density digital recording
HEMT	high electron mobility transistors
ICAO	International Civil Aviation Organisation
IEC	International Electro-technical Commission
IEEE	Institute of Electrical and Electronic Engineers
IFOV	instantaneous-field-of-view
ILS	instrument landing system
IRIG	inter-range instrumentation group

Acronyms and Abbreviations

ACRONYM OR ABBREVIATION	MEANING
ISAR	inverse synthetic aperture radar
ISO	International Organization for Standardization
ITU	International Telecommunication Union
JIS	Japanese Industrial Standard
JT	Joule-Thomson
LIDAR	light detection and ranging
LRU	line replaceable unit
MAC	message authentication code
Mach	ratio of speed of an object to speed of sound (after Ernst Mach)
MLS	microwave landing systems
MOCVD	metal organic chemical vapour deposition
MRI	magnetic resonance imaging
MTBF	mean-time-between-failures
Mtops	million theoretical operations per second
MTTF	mean-time-to-failure
NBC	Nuclear, Biological and Chemical
NDT	non-destructive test
PAR	precision approach radar
PIN	personal identification number
ppm	parts per million
PSD	power spectral density
QAM	quadrature-amplitude-modulation
RF	radio frequency
RPV	remotely piloted air vehicles
SACMA	Suppliers of Advanced Composite Materials Association
SAR	synthetic aperture radar
SC	single crystal
SLAR	sidelooking airborne radar
SMPTE	Society of Motion Picture and Television Engineers
SRA	shop replaceable assembly
SRAM	static random access memory
SRM	SACMA Recommended Methods
SSB	single sideband
SSR	secondary surveillance radar
TCSEC	trusted computer system evaluation criteria
TIR	total indicated reading
UTS	ultimate tensile strength
VOR	very high frequency omni-directional range
YAG	yttrium/aluminum garnet

STATEMENTS OF UNDERSTANDING AND VALIDITY NOTES

Intangible Transfers* of Software and Technology (WA-GWG (01) DE 7 Version 2.0)

Participating States recognise that it is important to have comprehensive controls on listed "software" and "technology", including controls on intangible transfers. National export control legislation should therefore permit controls on transfers of listed "software" and "technology" irrespective of the way in which the transfer takes place.** Participating States also recognise that it is important to continue the mutual exchange within the Wassenaar Arrangement on the experiences gained concerning the implementation and enforcement of these national provisions on the control of intangible transfers. New developments should thus be taken into account in order to meet all risks connected with this issue.

* "Transfers" in this context is understood in the sense of the Initial Elements. The term covers exports from one country to another.

** "irrespective of the way in which the transfer takes place" means, at a minimum:
- tangible transfers
- intangible transfers via transmission of listed software and technology by electronic media, fax or telephone.

MUNITIONS LIST

ML 8
Statement of Understanding
It is understood that specially formulated pharmaceutical products containing ML8. materials are not controlled.

ML 10 (NF (95) WG2/2)
Absence of items from the Munitions List and absence of configuration for military use would mean that an aircraft would not be considered military.

DUAL-USE LIST OF GOODS AND TECHNOLOGIES

General Technology Note (NF (95) CA WP 1)

Governments agree that the transfer of "technology" according to the General Technology Note, for "production" or "development" of items on this list shall be treated with vigilance in accordance with national policies and the aims of this regime.

Statements of Understanding and Validity Notes

General Technology Note (WG2 GTN TWG/WP1 Revised 2)

It is understood that Member Governments are expected to exercise controls on intangible "technology" as far as the scope of their legislation will allow.

General Software Note (NF (95) CA WP 1)

Governments agree that the transfer of "software", for "production" or "development" of items on this list shall be treated with vigilance in accordance with national policies and the aims of this regime.

Statement of Understanding - medical equipment (NF (96) DG PL/WP1)

Participating countries agree that equipment specially designed for medical end-use that incorporates an item controlled in the Dual-Use List is not controlled.

Category 2

2.B.2.
Validity Note The control of items in 2.B.2. is valid until 5 December 2005 and its renewal will require unanimous consent.

Category 3

3.A.3.
Validity Note The control of items described in 3.A.3. is valid until 5 December 2005 and its renewal will require unanimous consent.

3.D.4.
Validity Note: The control of "software" described in 3.D.4. is valid until 5 December 2005 and its renewal will require unanimous consent.

Category 3 and Category 5 - Part 1

ITU decontrol Notes to 3.A.1.b.1., 3.A.1.b.2., 3.A.1.b.8. and 5.E.1.c.4.b.

Statement of Understanding
Participating States agree that the definition "Allocated by the ITU" will always reflect the current edition of the ITU Radio Regulations and hence agree that the edition in this definition will be amended immediately when necessary.

Category 5 - Part 1

The control of radio equipment described in 5.A.1.b.4. is valid until 5 December 2005 and its renewal will require unanimous consent.

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