MUNITIONS LIST

Note 1 *Terms in "quotations" are defined terms. Refer to 'Definitions of Terms used in these Lists' annexed to this List.*

Note 2 *In some instances chemicals are listed by name and CAS number. The list applies to chemicals of the same structural formula (including hydrates) regardless of name or CAS number. CAS numbers are shown to assist in identifying a particular chemical or mixture, irrespective of nomenclature. CAS numbers cannot be used as unique identifiers because some forms of the listed chemical have different CAS numbers, and mixtures containing a listed chemical may also have different CAS numbers.*

ML1. Smooth bore, other arms and ammunition including rifles, weapons with a calibre of less than 20 mm, other arms and automatic weapons with a calibre of 12.7 mm (calibre 0.50 inches) or less and accessories, as follows, and specially designed components therefor:

a. Rifles, carbines, revolvers, pistols, machine pistols and machine guns;

Note *ML1.a. does not apply to the following:*

a. Muskets, rifles and carbines manufactured earlier than 1938;

b. Reproductions of muskets, rifles and carbines the originals of which were manufactured earlier than 1890;

c. Revolvers, pistols and machine guns manufactured earlier than 1890, and their reproductions.

b. Smooth bore, other arms and ammunition including rifles, weapons as follows:

1. Smooth bore, other arms and ammunition including rifles, weapons specially designed for military use;
2. Other Smooth bore, other arms and ammunition including rifles, weapons as follows:
   a. Fully automatic type weapons;
   b. Semi-automatic or pump-action type weapons;

c. Weapons using caseless ammunition;

d. Silencers, special gun-mountings, clips, weapons sights and flash suppressors for arms specified by ML1.a., ML1.b. or ML1.c.

Note 1 *ML1. does not apply to smooth-bore weapons used for hunting or sporting purposes. These weapons must not be specially designed for military use or of the fully automatic firing type.*

Note 2 *ML1. does not apply to firearms specially designed for dummy ammunition and which are incapable of firing any ammunition specified by ML3.*

Note 3 *ML1. does not apply to weapons using non-centre fire cased ammunition and which are not of the fully automatic firing type.*

Note 4 *ML1.d. does not apply to optical weapon sights without electronic image processing, with a magnification of 4 times or less, provided they are not specially designed or modified for military use.*

* The Russian Federation and Ukraine view this list as a reference list drawn up to help in the selection of dual-use goods which could contribute to the indigenous development, production or enhancement of conventional munitions capabilities.

ML2. Smooth bore, other arms and ammunition including rifles, weapons with a calibre of 20 mm or more, other weapons or armament with a calibre greater than 12.7 mm (calibre 0.50 inches), projectors and accessories, as follows, and specially designed components therefor:

a. Guns, howitzers, cannon, mortars, anti-tank weapons, projectile launchers, military flame throwers, rifles, recoilless rifles, smooth bore, other arms and ammunition including rifles, weapons and signature reduction devices therefor;

Note 1 *ML2.a. includes injectors, metering devices, storage tanks and other specially designed components for use with liquid propelling charges for any of the equipment specified by ML2.a.*

Note 2 *ML2.a. does not apply to weapons as follows:*
- *a. Muskets, rifles and carbines, manufactured earlier than 1938;*
- *b. Reproductions of muskets, rifles and carbines, the originals of which were manufactured earlier than 1890;*
- *c. Guns, howitzers, cannons and mortars, manufactured earlier than 1890.*

Note 3 *ML2.a. does not apply to hand-held projectile launchers specially designed to launch tethered projectiles having no high explosive charge or communications link, to a range of less than or equal to 500 m.*

b. Smoke, gas and pyrotechnic projectors or generators, specially designed or modified for military use;

Note *ML2.b. does not apply to signal pistols.*

c. Weapons sights and weapon sight mounts, having all of the following:
1. Specially designed for military use; and
2. Specially designed for weapons specified in ML2.a.;

d. Mountings specially designed for the weapons specified in ML2.a.

ML3. Ammunition and fuze setting devices, as follows, and specially designed components therefor:

a. Ammunition for weapons specified by ML1., ML2. or ML12.;
b. Fuze setting devices specially designed for ammunition specified by ML3.a.

Note 1 *Specially designed components specified by ML3. include:*
- *a. Metal or plastic fabrications such as primer anvils, bullet cups, cartridge links, rotating bands and munitions metal parts;*
- *b. Safing and arming devices, fuzes, sensors and initiation devices ;*
- *c. Power supplies with high one-time operational output;*
- *d. Combustible cases for charges;*
- *e. Submunitions including bomblets, minelets and terminally guided projectiles.*

Note 2 *ML3.a. does not apply to ammunition crimped without a projectile (blank star) and dummy ammunition with a pierced powder chamber.*

Note 3 *ML3.a. does not apply to cartridges specially designed for any of the following purposes:*

a. Signalling;

b. Bird scaring; or

c. Lighting of gas flares at oil wells.

ML4. Bombs, torpedoes, rockets, missiles, other explosive devices and charges and related equipment and accessories, as follows, and specially designed components therefor:

N.B.1. *For guidance and navigation equipment, see ML11.*

N.B.2. *For Aircraft Missile Protection Systems (AMPS), see ML4.c.*

a. Bombs, torpedoes, grenades, smoke canisters, rockets, mines, missiles, depth charges, demolition-charges, demolition-devices, demolition-kits, "pyrotechnic" devices, cartridges and simulators (i.e., equipment simulating the characteristics of any of these items), specially designed for military use;

Note *ML4.a. includes:*

a. Smoke grenades, fire bombs, incendiary bombs and explosive devices;

b. Missile rocket nozzles and re-entry vehicle nosetips.

b. Equipment having all of the following:

1. Specially designed for military use; and
2. Specially designed for 'activities' relating to any of the following:
   a. Items specified by ML4.a.; or
   b. Improvised Explosive Devices (IEDs).

Technical Note

For the purpose of ML4.b.2. 'activities' applies to handling, launching, laying, controlling, discharging, detonating, activating, powering with one-time operational output, decoying, jamming, sweeping, detecting, disrupting or disposing.

Note 1 *ML4.b. includes:*

a. Mobile gas liquefying equipment capable of producing 1,000 kg or more per day of gas in liquid form;

b. Buoyant electric conducting cable suitable for sweeping magnetic mines.

Note 2 *ML4.b. does not apply to hand-held devices limited by design solely to the detection of metal objects and incapable of distinguishing between mines and other metal objects.*

c. Aircraft Missile Protection Systems (AMPS).

Note *ML4.c. does not apply to AMPS having all of the following:*

a. Any of the following missile warning sensors:

1. Passive sensors having peak response between 100-400 nm; or

2. Active pulsed Doppler missile warning sensors;

b. Countermeasures dispensing systems;

c. Flares, which exhibit both a visible signature and an infrared signature, for decoying surface-to-air missiles; and

d. Installed on "civil aircraft" and having all of the following:

1. The AMPS is only operable in a specific "civil aircraft" in which the specific AMPS is installed and for which any of the following has been issued:

a. A civil Type Certificate; or

b. An equivalent document recognised by the International Civil Aviation Organisation (ICAO);

2. The AMPS employs protection to prevent unauthorised access to "software"; and

3. The AMPS incorporates an active mechanism that forces the system not to function when it is removed from the "civil aircraft" in which it was installed.

ML5. Fire control, and related alerting and warning equipment, and related systems, test and alignment and countermeasure equipment, as follows, specially designed for military use, and specially designed components and accessories therefor:

a. Weapon sights, bombing computers, gun laying equipment and weapon control systems;

b. Target acquisition, designation, range-finding, surveillance or tracking systems; detection, data fusion, recognition or identification equipment; and sensor integration equipment;

c. Countermeasure equipment for items specified by ML5.a. or ML5.b.;

Note *For the purposes of ML5.c., countermeasure equipment includes detection equipment.*

d. Field test or alignment equipment, specially designed for items specified by ML5.a., ML5.b. or ML5.c.

ML6. Ground vehicles and components, as follows:

N.B. *For guidance and navigation equipment, see ML11.*

a. Ground vehicles and components therefor, specially designed or modified for military use;

Technical Note
For the purposes of ML6.a. the term ground vehicles includes trailers.

b. Other ground vehicles and components, as follows:

1. All-wheel drive vehicles capable of off-road use which have been manufactured or fitted with materials or components to provide ballistic protection to level III (NIJ 0108.01, September 1985, or comparable national standard) or better;

2. Components having all of the following:
   a. Specially designed for vehicles specified in ML6.b.1.; and
   b. Providing ballistic protection to level III (NIJ 0108.01, September 1985, or comparable national standard) or better.

N.B. *See also ML13.a.*

Note 1 *ML6.a. includes:*

a. Tanks and other military armed vehicles and military vehicles fitted with mountings for arms or equipment for mine laying or the launching of munitions specified by ML4;

b. Armoured vehicles;

c. Amphibious and deep water fording vehicles;

d. Recovery vehicles and vehicles for towing or transporting ammunition or weapon systems and associated load handling equipment.

Note 2 *Modification of a ground vehicle for military use specified by ML6.a. entails a structural, electrical or mechanical change involving one or more components that are specially designed for military use. Such components include:*

a. Pneumatic tyre casings of a kind specially designed to be bullet-proof;
b. Armoured protection of vital parts, (e.g., fuel tanks or vehicle cabs);
c. Special reinforcements or mountings for weapons;
d. Black-out lighting.

Note 3 *ML6. does not apply to civil automobiles, or trucks designed or modified for transporting money or valuables, having armoured or ballistic protection.*

Note 4 *ML6. does not apply to vehicles that meet all of the following;*

a. Were manufactured before 1946;
b. Do not have items specified by the Munitions List and manufactured after 1945, except for reproductions of original components or accessories for the vehicle; and
c. Do not incorporate weapons specified in ML1., ML2. or ML4. unless they are inoperable and incapable of discharging a projectile.

ML7. Chemical or biological toxic agents, "riot control agents", radioactive materials, related equipment, components and materials, as follows:

a. Biological agents or radioactive materials, "adapted for use in war" to produce casualties in humans or animals, degrade equipment or damage crops or the environment;

b. Chemical warfare (CW) agents, including:

1. CW nerve agents:

a. O-Alkyl (equal to or less than C_{10}, including cycloalkyl) alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) - phosphonofluoridates, such as:
Sarin (GB):O-Isopropyl methylphosphonofluoridate (CAS 107-44-8); and
Soman (GD):O-Pinacolyl methylphosphonofluoridate (CAS 96-64-0);

b. O-Alkyl (equal to or less than C10, including cycloalkyl) N,N-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphoramidocyanidates, such as: Tabun (GA):O-Ethyl N,N-dimethylphosphoramidocyanidate (CAS 77-81-6);

c. O-Alkyl (H or equal to or less than C10, including cycloalkyl) S-2-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl)-aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonothiolates and corresponding alkylated and protonated salts, such as:
VX: O-Ethyl S-2-diisopropylaminoethyl methyl phosphonothiolate (CAS 50782-69-9);

ML7. b. 2. CW vesicant agents:

a. Sulphur mustards, such as:
1. 2-Chloroethylchloromethylsulphide (CAS 2625-76-5);
2. Bis(2-chloroethyl) sulphide (CAS 505-60-2);
3. Bis(2-chloroethylthio) methane (CAS 63869-13-6);
4. 1,2-bis (2-chloroethylthio) ethane (CAS 3563-36-8);
5. 1,3-bis (2-chloroethylthio) -n-propane (CAS 63905-10-2);
6. 1,4-bis (2-chloroethylthio) -n-butane (CAS 142868-93-7) ;

7. 1,5-bis (2-chloroethylthio) -n-pentane (CAS 142868-94-8);
8. Bis (2-chloroethylthiomethyl) ether (CAS 63918-90-1);
9. Bis (2-chloroethylthioethyl) ether (CAS 63918-89-8);

b. Lewisites, such as:
1. 2-chlorovinyldichloroarsine (CAS 541-25-3);
2. Tris (2-chlorovinyl) arsine (CAS 40334-70-1);
3. Bis (2-chlorovinyl) chloroarsine (CAS 40334-69-8);

c. Nitrogen mustards, such as:
1. HN1: bis (2-chloroethyl) ethylamine (CAS 538-07-8);
2. HN2: bis (2-chloroethyl) methylamine (CAS 51-75-2);
3. HN3: tris (2-chloroethyl) amine (CAS 555-77-1);

ML7. b. 3. CW incapacitating agents, such as:
a. 3-Quinuclidinyl benzilate (BZ) (CAS 6581-06-2);

ML7. b. 4. CW defoliants, such as:
a. Butyl 2-chloro-4-fluorophenoxyacetate (LNF);
b. 2,4,5-trichlorophenoxyacetic acid (CAS 93-76-5) mixed with 2,4-dichlorophenoxyacetic acid (CAS 94-75-7) (Agent Orange (CAS 39277-47-9));

ML7. c. CW binary precursors and key precursors, as follows:
1. Alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) Phosphonyl Difluorides, such as: DF: Methyl Phosphonyldifluoride (CAS 676-99-3);
2. O-Alkyl (H or equal to or less than C_{10}, including cycloalkyl) O-2-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl) aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonites and corresponding alkylated and protonated salts, such as:
QL: O-Ethyl-2-di-isopropylaminoethyl methylphosphonite (CAS 57856-11-8);
3. Chlorosarin: O-Isopropyl methylphosphonochloridate (CAS 1445-76-7);
4. Chlorosoman: O-Pinacolyl methylphosphonochloridate (CAS 7040-57-5);

ML7. d. "Riot control agents", active constituent chemicals and combinations thereof, including:
1. α-Bromobenzeneacetonitrile, (Bromobenzyl cyanide) (CA) (CAS 5798-79-8);
2. [(2-chlorophenyl) methylene] propanedinitrile, (o-Chlorobenzylidenemalononitrile) (CS) (CAS 2698-41-1);
3. 2-Chloro-1-phenylethanone, Phenylacyl chloride (ω-chloroacetophenone) (CN) (CAS 532-27-4);
4. Dibenz-(b,f)-1,4-oxazephine, (CR) (CAS 257-07-8);
5. 10-Chloro-5,10-dihydrophenarsazine, (Phenarsazine chloride), (Adamsite), (DM) (CAS 578-94-9);
6. N-Nonanoylmorpholine, (MPA) (CAS 5299-64-9);

Note 1 *ML7.d. does not apply to "riot control agents" individually packaged for personal self defence purposes.*

Note 2 *ML7.d. does not apply to active constituent chemicals, and combinations thereof, identified and packaged for food production or medical purposes.*

ML7. e. Equipment, specially designed or modified for military use, designed or modified for the dissemination of any of the following, and specially designed components therefor:
1. Materials or agents specified by ML7.a., ML7.b. or ML7.d.; or
2. CW agents made up of precursors specified by ML7.c.;

ML7. f. Protective and decontamination equipment, specially designed or modified for military use, components and chemical mixtures, as follows:
1. Equipment designed or modified for defence against materials specified by ML7.a., ML7.b. or d., and specially designed components therefor;
2. Equipment designed or modified for decontamination of objects contaminated with materials specified by ML7.a. or ML7.b., and specially designed components therefor;
3. Chemical mixtures specially developed or formulated for the decontamination of objects contaminated with materials specified by ML7.a. or ML7.b.;

Note *ML7.f.1. includes:*
a. Air conditioning units specially designed or modified for nuclear, biological or chemical filtration;
b. Protective clothing.

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

ML7. g. Equipment, specially designed or modified for military use designed or modified for the detection or identification of materials specified by ML7.a., ML7.b. or ML7.d., and specially designed components therefor;
Note *ML7.g. does not apply to personal radiation monitoring dosimeters.*

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

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

ML7. i. "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 specified by ML7.b. resulting from directed laboratory selection or genetic manipulation of biological systems;
2. Biological systems containing the genetic information specific to the production of "biocatalysts" specified by ML7.i.1., as follows:
   a. "Expression vectors";
   b. Viruses;
   c. Cultures of cells.

Note 1 *ML7.b. and ML7.d. do not apply to the following:*
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. Not used since 2004
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 cultures of cells and biological systems specified by ML7.h. and ML7.i.2. are exclusive and these sub-items do not apply to cells or biological systems for civil purposes, such as agricultural, pharmaceutical, medical, veterinary, environmental, waste management, or in the food industry.*

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

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

N.B.2. *For charges and devices, see ML4 and 1.A.8. on the Dual-Use List.*

Technical Notes
1. *For the purposes of ML8., 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 subject to this list, even when utilised 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.)*

ML8. 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) (CAS 145250-81-3);
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);

ML8. a.
17. NTNMH (1-(2-nitrotriazolo)-2-dinitromethylene hydrazine);
18. NTO (ONTA or 3-nitro-1,2,4-triazol-5-one) (CAS 932-64-9);
19. Polynitrocubanes with more than four nitro groups;
20. PYX (2,6-Bis(picrylamino)-3,5-dinitropyridine) (CAS 38082-89-2);
21. RDX and derivatives, as follows:
    a. RDX (cyclotrimethylenetrinitramine, cyclonite, T4, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitro-1,3,5-triaza-cyclohexane, hexogen or hexogene) (CAS 121-82-4);
    b. Keto-RDX (K-6 or 2,4,6-trinitro-2,4,6-triazacyclohexanone) (CAS 115029-35-1);
22. TAGN (triaminoguanidinenitrate) (CAS 4000-16-2);
23. TATB (triaminotrinitrobenzene) (CAS 3058-38-6) (see also ML8.g.7 for its "precursors");
24. TEDDZ (3,3,7,7-tetrabis(difluoroamine) octahydro-1,5-dinitro-1,5-diazocine);
25. Tetrazoles as follows:
    a. NTAT (nitrotriazol aminotetrazole);
    b. NTNT (1-N-(2-nitrotriazolo)-4-nitrotetrazole);
26. Tetryl (trinitrophenylmethylnitramine) (CAS 479-45-8);
27. TNAD (1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin) (CAS 135877-16-6) (see also ML8.g.6. for its "precursors");
28. TNAZ (1,3,3-trinitroazetidine) (CAS 97645-24-4) (see also ML8.g.2. for its "precursors");
29. TNGU (SORGUYL or tetranitroglycoluril) (CAS 55510-03-7);
30. TNP (1,4,5,8-tetranitro-pyridazino[4,5-d]pyridazine) (CAS 229176-04-9);
31. Triazines as follows:
    a. DNAM (2-oxy-4,6-dinitroamino-s-triazine) (CAS 19899-80-0);
    b. NNHT (2-nitroimino-5-nitro-hexahydro-1,3,5-triazine) (CAS 130400-13-4);
32. Triazoles as follows:
    a. 5-azido-2-nitrotriazole;
    b. ADHTDN (4-amino-3,5-dihydrazino-1,2,4-triazole dinitramide) (CAS 1614-08-0);
    c. ADNT (1-amino-3,5-dinitro-1,2,4-triazole);

d. BDNTA ([bis-dinitrotriazole]amine);
e. DBT (3,3′-dinitro-5,5-bi-1,2,4-triazole) (CAS 30003-46-4);
f. DNBT (dinitrobistriazole) (CAS 70890-46-9);
g. Not used since 2010
h. NTDNT (1-N-(2-nitrotriazolo) 3,5-dinitrotriazole);
i. PDNT (1-picryl-3,5-dinitrotriazole);
j. TACOT (tetranitrobenzotriazolobenzotriazole) (CAS 25243-36-1);

33. Explosives not listed elsewhere in ML8.a. and having any of the following:
    a. Detonation velocity exceeding 8,700 m/s, at maximum density, or
    b. Detonation pressure exceeding 34 GPa (340 kbar);

34. Organic explosives not listed elsewhere in ML8.a. and having all of the following:
    a. Yielding detonation pressures of 25 GPa (250 kbar) or more; and
    b. Remaining stable at temperatures of 523K (250^{o}C) or higher, for periods of 5 minutes or longer;

ML8. 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^{o}C);
5. Elastomer Modified Cast Double Base (EMCDB) "propellants" with extensibility at maximum stress of more than 5% at 233K (-40^{o}C);
6. Any "propellant" containing substances specified by ML8.a.;
7. "Propellants", not specified elsewhere in the Munitions List, specially designed for military use;

ML8. 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 as follows and mixtures thereof:
        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 containing 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; or
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 aluminium powder (CAS 7429-90-5) with a particle size of 60 μm or less, manufactured from material with an aluminium content of 99% or more;
9. Titanium subhydride (TiH_n) of stoichiometry equivalent to n= 0.65-1.68;

ML8. c. cont.

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

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

Note 3 *ML8.c.5 applies to explosives and fuels, whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium, or beryllium.*

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

Note 5 *ML8.c.5.b. only applies to metal fuels in particle form when they are mixed with other substances to form a mixture formulated for military purposes such as liquid propellant slurries, solid propellants, or pyrotechnic mixtures.*

ML8. 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 1 *ML8.d.3. does not apply to chlorine trifluoride (CAS 7790-91-2).*

Note 2 *ML8.d.3. does not apply to nitrogen trifluoride (CAS 7783-54-2) in its gaseous state.*

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 apply to non-inhibited fuming nitric acid.*

ML8. e. Binders, plasticizers, monomers and 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 or polymers, specially formulated for military use and containing any of the following:
   a. Nitro groups;
   b. Azido groups;
   c. Nitrate groups;
   d. Nitraza groups; or
   e. Difluoroamino groups;

ML8. e.

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. Alcohol functionalised poly(epichlorohydrin) with a molecular weight less than 10,000, as follows:
    a. Poly(epichlorohydrindiol);
    b. Poly(epichlorohydrintriol).
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);

ML8. 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);
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 including:

Ferrocene carboxylic acid（CAS 1271-42-7),
1,1'-Ferrocenedicarboxylic acid (CAS 1293-87-4);

d. n-butyl-ferrocene (CAS 31904-29-7);
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);
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);

ML8. f. 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) (CAS 1317-60-8) 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);

ML8. g. "Precursors" as follows:

N.B. *In ML8.g. the references are to specified "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.) (CAS 182763-60-6);

5. TAT (1,3,5,7 tetraacetyl-1,3,5,7,-tetraaza cyclo-octane) (CAS 41378-98-7) (see also ML8.a.13.);
6. 1,4,5,8-tetraazadecalin (CAS 5409-42-7) (see also ML8.a.27.);
7. 1,3,5-trichlorobenzene (CAS 108-70-3) (see also ML8.a.23.);
8. 1,2,4-trihydroxybutane (1,2,4-butanetriol) (CAS 3068-00-6) (see also ML8.e.5.).

Note 5 Not used since 2009

Note 6 *ML8. does not apply to the following substances unless they are compounded or mixed with the "energetic material" specified by ML8.a. or powdered metals specified by ML8.c.:*

a. Ammonium picrate (CAS 131-74-8);
b. Black powder;
c. Hexanitrodiphenylamine (CAS 131-73-7);
d. Difluoroamine (CAS 10405-27-3);
e. Nitrostarch (CAS 9056-38-6);
f. Potassium nitrate (CAS 7757-79-1);
g. Tetranitronaphthalene;
h. Trinitroanisol;
i. Trinitronaphthalene;

ML8. *Note 6* cont.

j. Trinitroxylene;
k. N-pyrrolidinone; 1-methyl-2-pyrrolidinone (CAS 872-50-4);
l. Dioctylmaleate (CAS 142-16-5);
m. Ethylhexylacrylate (CAS 103-11-7);
n. Triethylaluminium (TEA) (CAS 97-93-8), trimethylaluminium (TMA) (CAS 75-24-1), and other pyrophoric metal alkyls and aryls of lithium, sodium, magnesium, zinc or boron;
o. Nitrocellulose (CAS 9004-70-0);
p. Nitroglycerin (or glyceroltrinitrate, trinitroglycerine) (NG) (CAS 55-63-0);
q. 2,4,6-trinitrotoluene (TNT) (CAS 118-96-7);
r. Ethylenediaminedinitrate (EDDN) (CAS 20829-66-7);
s. Pentaerythritoltetranitrate (PETN) (CAS 78-11-5);
t. Lead azide (CAS 13424-46-9), normal lead styphnate (CAS 15245-44-0) and basic lead styphnate (CAS 12403-82-6), and primary explosives or priming compositions containing azides or azide complexes;
u. Triethyleneglycoldinitrate (TEGDN) (CAS 111-22-8);
v. 2,4,6-trinitroresorcinol (styphnic acid) (CAS 82-71-3);
w. Diethyldiphenylurea; (CAS 85-98-3); dimethyldiphenylurea; (CAS 611-92-7), methylethyldiphenylurea; [Centralites]
x. N,N-diphenylurea (unsymmetrical diphenylurea) (CAS 603-54-3);
y. Methyl-N,N-diphenylurea (methyl unsymmetrical diphenylurea) (CAS 13114-72-2);
z. Ethyl-N,N-diphenylurea (ethyl unsymmetrical diphenylurea) (CAS 64544-71-4);
aa. 2-Nitrodiphenylamine (2-NDPA) (CAS 119-75-5);
bb. 4-Nitrodiphenylamine (4-NDPA) (CAS 836-30-6);
cc. 2,2-dinitropropanol (CAS 918-52-5);

dd. Nitroguanidine (CAS 556-88-7) (see 1.C.11.d. on the Dual-Use List).

Note 7 *ML8. does not apply to ammonium perchlorate (ML8.d.2.) and NTO (ML8.a.18.), specially shaped and formulated for civil-use gas generation devices and meeting all of the following:*

a. Compounded or mixed, with non-active thermoset binders or plasticizers;
b. Having a maximum of 80% ammonium perchlorate (ML8.d.2.) in mass of active material;
c. Having less than or equal to 4 g of NTO (ML8.a.18.); and
d. Having an individual mass of less than 250 g.

ML9. Vessels of war (surface or underwater), special naval equipment, accessories, components and other surface vessels, as follows:

N.B. For guidance and navigation equipment, see ML11.

a. Vessels and components, as follows:
   1. Vessels (surface or underwater) specially designed or modified for 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, and components therefor specially designed for military use;

   2. Surface vessels, other than those specified in ML9.a.1., having any of the following, fixed or integrated into the vessel:
      a. Automatic weapons having a calibre of 12.7 mm or greater specified in ML1., or weapons specified in ML2., ML4., ML12. or ML19., or 'mountings' or hard points for such weapons;

         Technical Note
         'Mountings' refers to weapon mounts or structural strengthening for the purpose of installing weapons.

      b. Fire control systems specified in ML5.;

      c. Having all of the following:
         1. 'Chemical, Biological, Radiological and Nuclear (CBRN) protection'; and
         2. 'Pre-wet or wash down system' designed for decontamination purposes; or

         Technical Notes
         1. 'CBRN protection' is a self contained interior space containing features such as over-pressurization, isolation of ventilation systems, limited ventilation openings with CBRN filters and limited personnel access points incorporating air-locks.
         2. 'Pre-wet or wash down system' is a seawater spray system capable of simultaneously wetting the exterior superstructure and decks of a vessel.

      d. Active weapon countermeasure systems specified in ML4.b., ML5.c. or ML11.a. and having any of the following:

1. 'CBRN protection';
2. Hull and superstructure, specially designed to reduce the radar cross section;
3. Thermal signature reduction devices, (e.g., an exhaust gas cooling system), excluding those specially designed to increase overall power plant efficiency or to reduce the environmental impact; or
4. A degaussing system designed to reduce the magnetic signature of the whole vessel;

ML9. b. Engines and propulsion systems, as follows, specially designed for military use and components therefor specially designed for military use:

1. Diesel engines specially designed for submarines and having all of the following:
   a. Power output of 1.12 MW (1,500 hp) or more; and
   b. Rotary speed of 700 rpm or more;
2. Electric motors specially designed for submarines and having all of the following:
   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 having all of the following:
   a. Power output of 37.3 kW (50 hp) or more; and
   b. Non-magnetic content in excess of 75% of total mass;

4. 'Air Independent Propulsion' (AIP) systems specially designed for submarines;

   Technical Note
   'Air Independent Propulsion' (AIP) allows a submerged submarine to operate its propulsion system, without access to atmospheric oxygen, for a longer time than the batteries would have otherwise allowed. For the purposes of ML9.b.4., AIP does not include nuclear power.

ML9. c. Underwater detection devices, specially designed for military use, controls therefor and components therefor specially designed for military use;

d. Anti-submarine nets and anti-torpedo nets, specially designed for military use;

e. Not used since 2003;

f. Hull penetrators and connectors, specially designed for military use, that enable interaction with equipment external to a vessel, and components therefor specially designed for military use;

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. ML9.f. does not apply to ordinary propulsive shaft and hydrodynamic control-rod hull penetrators.

g. Silent bearings having any of the following, components therefor and equipment containing those bearings, specially designed for military use:
   1. Gas or magnetic suspension;
   2. Active signature controls; or
   3. Vibration suppression controls.

ML10. "Aircraft", "lighter-than-air vehicles", "Unmanned Aerial Vehicles" ("UAVs"), aero-engines and "aircraft" equipment, related equipment, and components, as follows, specially designed or modified for military use:

N.B. *For guidance and navigation equipment, see ML11.*

a. Manned "aircraft" and "lighter-than-air vehicles", and specially designed components therefor;

b. Not used since 2011

c. Unmanned aircraft and related equipment, as follows, and specially designed components therefor:
   1. "UAVs", Remotely Piloted Air Vehicles (RPVs), autonomous programmable vehicles and unmanned "lighter-than-air vehicles";
   2. Launchers, recovery equipment and ground support equipment;
   3. Equipment designed for command or control;

d. Propulsion aero-engines and specially designed components therefor;

e. Airborne equipment, including airborne refuelling equipment, specially designed for use with the "aircraft" specified by ML10.a. or the aero-engines specified 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" specified by ML10.a. or for aero-engines specified 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, paragliders and related equipment, as follows, and specially designed components therefor:
   1. Parachutes not specified elsewhere in the Munitions List;
   2. Paragliders;
   3. Equipment specially designed for high altitude parachutists (e.g., suits, special helmets, breathing systems, navigation equipment);

i. Controlled opening equipment or automatic piloting systems, designed for parachuted loads.

Note 1 *ML10.a. does not apply to "aircraft" and "lighter-than-air vehicles" or variants of those "aircraft", specially designed for military use and which are all of the following:*

a. Not a combat aircraft;

b. Not configured for military use and not fitted with equipment or attachments specially designed or modified for military use; and

c. Certified for civil use by the civil aviation authority in a participating state.

Note 2 *ML10.d. does not apply to:*

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 "UAVs".

Note 3 *For the purposes of ML10.a. and ML10.d., 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.*

Note 4 *For the purposes of ML10.a., military use includes: combat, military reconnaissance, assault, military training, logistics support, and transporting and airdropping troops or military equipment.*

Note 5 *ML10.a. does not apply to "aircraft" that meet all of the following:*

a. Were first manufactured before 1946;

b. Do not incorporate items specified by the Munitions List, unless the items are required to meet safety or airworthiness standards of a Participating State; and

c. Do not incorporate weapons specified by the Munitions List, unless inoperable and incapable of being returned to operation.

ML11. Electronic equipment, not specified elsewhere on the Munitions List, as follows, and specially designed components therefor:

a. Electronic equipment specially designed for military use;

Note *ML11.a. 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 and Transmitter Blocks.

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;

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

g. Guidance and navigation equipment;

h. Digital troposcatter-radio communications transmission equipment;

i. Digital demodulators specially designed for signals intelligence;

j. "Automated Command and Control Systems".".

N.B. For "software" associated with military "Software" Defined Radio (SDR), see ML21.

b. Global Navigation Satellite Systems (GNSS) jamming equipment.

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

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

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

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

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

a. Launch propulsion systems capable of accelerating masses larger than 0.1 g to velocities in excess of 1.6 km/s, in single or rapid fire modes;

b. Prime power generation, electric armour, energy storage, thermal management, conditioning, switching or fuel-handling equipment; and electrical interfaces between power supply, gun and other turret electric drive functions;

c. Target acquisition, tracking, fire control or damage assessment systems;

d. Homing seeker, guidance or divert propulsion (lateral acceleration) systems for projectiles.

Note 2 ML12. applies to 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).

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

a. Armoured plate, having any of the following:
   1. Manufactured to comply with a military standard or specification; or
   2. Suitable for military use;

   N.B. For body armour plate, see ML13.d.2.

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. Helmets manufactured according to military standards or specifications, or comparable national standards, and specially designed components therefor (i.e., helmet shell, liner and comfort pads);

d. Body armour or protective garments, and components therefor, as follows:
   1. Soft body armour or protective garments, manufactured to military standards or specifications, or to their equivalents, and specially designed components therefor;

      Note For the purposes of ML13.d.1., military standards or specifications include, at a minimum, specifications for fragmentation protection.

   2. Hard body armour plates providing ballistic protection equal to or greater than level III (NIJ 0101.06, July 2008) or national equivalents.

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

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

Note 3 ML13.c. and d. do not apply to helmets, body armour or protective garments, when accompanying their user for the user's own personal protection.

Note 4 The only helmets specially designed for bomb disposal personnel that are specified by ML13. are those specially designed for military use.

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

N.B. 2 For "fibrous or filamentary materials" used in the manufacture of body armour and helmets, see entry 1.C.10. 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 specified 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 apply to equipment specially designed for training in the use of hunting or sporting weapons.*

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 specified by ML15.a. to ML15.e.

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

Note 1 *In ML15., 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;
. 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 apply to "first generation image intensifier tubes" or equipment specially designed to incorporate "first generation image intensifier tubes".*

N.B. *For the classification of weapons sights incorporating "first generation image intensifier tubes" see ML1., ML2. and ML5.a.*

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

ML16. Forgings, castings and other unfinished products, specially designed for items specified by ML1.to ML4., ML6., ML9., ML10., ML12. or ML19.

Note *ML16. applies to unfinished products when they are identifiable by material composition, geometry or function.*

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;

   Technical Note

   Electro-magnetic pulse does not refer to unintentional interference caused by electromagnetic radiation from nearby equipment (e.g., machinery, appliances or electronics) or lightning.

f. 'Libraries' (parametric technical databases) specially designed for military use with equipment specified 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 specified 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 specified elsewhere in the Munitions List, bridges and pontoons, specially designed for military use;
n. Test models specially designed for the "development" of items specified by ML4., ML6., ML9. or ML10.;
o. Laser protection equipment (e.g., eye and sensor protection) specially designed for military use;
p. "Fuel cells", other than those specified elsewhere in the Munitions List, specially designed or 'modified' for military use.

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.*
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.*

ML18. Production equipment and components, as follows:

a. Specially designed or modified 'production' equipment for the 'production' of products specified 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 specified by the Munitions List.

Technical Note

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

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

. Continuous nitrators;
b. Centrifugal testing apparatus or equipment, having any of the following:
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.

ML19. Directed Energy Weapon (DEW) systems, 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 specified by ML19.a. to ML19.c.;
e. Physical test models for the systems, equipment and components, specified by ML19.
f. "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 *DEW systems specified by ML19. include systems whose capability is derived from the controlled application of:*

a. "Lasers" of sufficient 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 DEW 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.

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 and capable of operating while in motion.

Note *ML20.b. does not apply to 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 components in the generator.*