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COMMISSION DELEGATED DIRECTIVE (EU) 2025/290

of 4 October 2024

amending Directive 2009/43/EC of the European Parliament and of the Council as regards the updating of the list of defence-related products in line with the updated Common Military List of the European Union of 19 February 2024

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/43/EC of the European Parliament and of the Council of 6 May 2009 simplifying the terms and conditions of transfers of defence-related products within the Community [1], and in particular Article 13 thereof,

Whereas:

(1) Directive 2009/43/EC applies to defence-related products as set out in the Annex thereto. That Annex is to strictly correspond to the Common Military List of the European Union.

(2) The Common Military List of the European Union was adopted by the Council on 19 March 2007 and has been updated several times. On 19 February 2024, the Council adopted an updated Common Military List of the European Union [2]. It is therefore necessary to update the list of defence-related products set out in the Annex to Directive 2009/43/EC.

(3) Directive 2009/43/EC should therefore be amended accordingly.

(4) In accordance with the Joint Political Declaration of 28 September 2011 of Member States and the Commission on explanatory documents [3], Member States have undertaken to accompany, in justified cases, the notification of their transposition measures with one or more documents explaining the relationship between the components of a directive and the corresponding parts of national transposition instruments,

HAS ADOPTED THIS DIRECTIVE:

Article 1

The Annex to Directive 2009/43/EC is replaced by the text set out in the Annex to this Directive.

Article 2

1. Member States shall adopt and publish, by 31 May 2025 at the latest, the laws, regulations and administrative provisions necessary to comply with this Directive. They shall forthwith communicate to the Commission the text of those provisions.

They shall apply those provisions from 5 June 2025.

[1] OJ L 146, 10.6.2009, p.1. ELI: http://data.europa.eu/eli/dir/2009/43/oj.

[2] Common Military List of the European Union adopted by the Council on 19 February 2024 (equipment covered by Council Common Position 2008/944/CFSP defining common rules governing the control of exports of military technology and equipment) (updating and replacing the Common Military List of the European Union adopted by the Council on 20 February 2023) (OJ C, C/2024/1945, 1.3.2024, ELI: http://data.europa.eu/eli/C/2024/1945/oj).

[3] OJ C 369, 17.12.2011, p. 14.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 3

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Article 4

This Directive is addressed to the Member States.

Done at Brussels, 4 October 2024.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX

LIST OF DEFENCE-RELATED PRODUCTS

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

Note 2 *In some instances chemicals are listed by name and Chemical abstract service (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.*

ML ([1])1 **Smooth-bore 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:**

Note *ML1. does not apply to:*

a. Firearms specially designed for dummy ammunition and which are incapable of discharging a projectile;

b. Firearms 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;

c. Weapons using non-centre fire cased ammunition and which are not of the fully automatic firing type;

d. 'Deactivated firearms'.

Technical Note

For the purposes of ML1. Note d., a 'deactivated firearm' is a firearm that has been made incapable of firing any projectile by processes defined by the national authority of the EU Member State or the Wassenaar Arrangement Participating State. These processes irreversibly modify the essential elements of the firearm. According to national laws and regulations, deactivation of the firearm may be attested by a certificate delivered by a competent authority and may be marked on the firearm by a stamp on an essential part.

a. Rifles and combination guns, handguns, machine, sub-machine and volley guns;

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

a. Rifles and combination guns, manufactured earlier than 1938;

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

c. Handguns, volley guns and machine guns manufactured earlier than 1890, and their reproductions;

d. Rifles or handguns, specially designed to discharge an inert projectile by compressed air or CO_2;

e. Handguns specially designed for any of the following:

1. Slaughtering of domestic animals; or

2. Tranquilising of animals.

b. Smooth-bore weapons as follows:

1. Smooth-bore weapons specially designed for military use;
2. Other smooth-bore weapons as follows:
   a. Fully automatic type weapons;
   b. Semi-automatic or pump-action type weapons;

   Note *ML1.b.2. does not apply to weapons specially designed to discharge an inert projectile by compressed air or CO2.*

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

a. Smooth-bore weapons manufactured earlier than 1938;

b. Reproductions of smooth-bore weapons, the originals of which were manufactured earlier than 1890;

c. 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;

([1]) Military List.

d. Smooth-bore weapons specially designed for any of the following:

1. Slaughtering of domestic animals;

2 Tranquilizing of animals;

3. Seismic testing;

4. Firing of industrial projectiles; or

5. Disrupting Improvised Explosive Devices (IEDs).

N.B. For disruptors, see ML4. and entry 1.A.6 on the EU Dual-Use List.

c. Weapons using caseless ammunition;

d. Accessories designed for arms specified by ML1.a., ML1.b. or ML1.c., as follows:

1. Detachable cartridge magazines;

2. Sound suppressors or moderators;

3. 'Gun-mountings';

Technical Note

For the purposes of ML1.d.3., a 'gun-mounting' is a fixture designed to mount a gun onto a ground vehicle, 'aircraft', vessel or structure.

4. Flash suppressors;

5. Optical weapon-sights with electronic image processing;

6. Optical weapon-sights specially designed for military use.

ML2 **Smooth-bore 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 specially designed or modified for military use 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 and smooth-bore weapons;

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. Rifles, smooth-bore weapons and combination guns, manufactured earlier than 1938;

b. Reproductions of rifles, smooth-bore weapons and combination guns, the originals of which were manufactured earlier than 1890;

c. Guns, howitzers, cannons and mortars, manufactured earlier than 1890;

d. 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;

e. Smooth-bore weapons specially designed for any of the following:

1. Slaughtering of domestic animals;

2. Tranquilizing of animals;

3. Seismic testing;

4. Firing of industrial projectiles; or

5. Disrupting Improvised Explosive Devices (IEDs);

N.B. For disruptors, see ML4. and entry 1.A.6 on the EU Dual-Use List.

f. 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. Projectors, specially designed or modified for military use, as follows:

1. Smoke canister projectors;

2. Gas canister projectors;

3. Pyrotechnics projectors;

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

c. Accessories specially designed for the weapons specified in ML2.a., as follows:

1. Weapons sights and weapon sight mounts, specially designed for military use;

2. Signature reduction devices;
3. Mountings;
4. Detachable cartridge magazines;

d. Not used since 2019

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 any of the following:*

a. Ammunition crimped without a projectile (blank star);

b. Dummy ammunition with a pierced powder chamber;

c. Other blank and dummy ammunition, not incorporating components designed for live ammunition; or

d. Components specially designed for blank or dummy ammunition, specified in this Note 2.a., b. or c.

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, submunitions therefor 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 or rocket nozzles and re-entry vehicle nosetips.

NB: For grenade or canister ammunition for weapons or projectors specified in ML1 or ML2 and submunitions specially designed for ammunition, see ML3.

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;

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 issued by civil aviation authorities of one or more EU Member States or Wassenaar Arrangement Participating States; 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, surveillance 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. Other fire control, surveillance and warning equipment, and related systems, as follows:

1. Target acquisition, designation, range-finding, surveillance or tracking systems;

2. Detection, recognition or identification equipment;

3. Data fusion or 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;

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;

e. Trailers.

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.

b. Other ground vehicles and components, as follows:

1. Vehicles having all of the following:

a. Manufactured or fitted with materials or components to provide ballistic protection equal to or better than level III (NIJ [2] 0108.01, September 1985), or 'equivalent standards';

b. A transmission to provide drive to both front and rear wheels simultaneously, including those for vehicles having additional wheels for load bearing purposes whether driven or not;

c. Gross Vehicle Weight Rating (GVWR) greater than 4 500 kg; and

d. Designed or modified for off-road use;

2. Components having all of the following:

a. Specially designed for vehicles specified in ML6.b.1.; and

b. Providing ballistic protection equal to or better than level III (NIJ 0108.01, September 1985), or 'equivalent standards'.

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

Note 1 *ML6 does not apply to civil vehicles designed or modified for transporting money or valuables.*

Note 2 *ML6. does not apply to vehicles that meet all of the following;*

a. Were manufactured before 1946;

b. Do not have items specified in this Annex 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 agents, 'biological agents', 'riot control agents', radioactive materials, related equipment, components and materials, as follows:**

a. 'Biological agents' or radioactive materials selected or modified to increase their effectiveness in producing casualties in humans or animals, degrading equipment or damaging 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 C_{10}, 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 C_{10}, including cycloalkyl) S-2-dialkyl (Methyl, Ethyl, n-Propyl or Isopropyl)-aminoethyl alkyl (Methyl, Ethyl, n-Propyl or Isopropyl) phosphonothiolates and corresponding alkylated and protonated salts, such as:

VX: O-Ethyl S-2-diisopropylaminoethyl methyl phosphonothiolate (CAS 50782-69-9);

2. CW vesicant agents:

a. Sulphur mustards, such as:

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);

[2] National Institute of Justice (USA) in charge with standard categorization.

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

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

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

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

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 O-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);

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.*

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.;

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 ML7.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 entry 1.A.4 on the EU Dual-Use List.*

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 entry 1.A.4 on the EU Dual-Use List.*

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;

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., and 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 entry 1.C.11 on the EU Dual-Use List.*

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

Note *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 oxidiser).*

Technical Notes

1. *For the purposes of ML8., excluding ML8.c.11. or ML8.c.12.,'mixture' refers to a composition of two or more substances with at least one substance being listed in the ML8 sub-items.*

2. *For the purposes of ML8., particle size is the mean particle diameter on a weight or volume basis. International or equivalent national standards will be used in sampling and determining particle size.*

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, FOX-7) (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 (DAAF, DAAFox, or diaminoazoxyfurazan);
      b. DAAzF (diaminoazofurazan) (CAS 78644-90-3);
   13. HMX and derivatives (see also ML8.g.5. for its 'precursors'), as follows:
      a. HMX (Cyclotetramethylenetetranitramine, octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine, 1,3,5,7-tetranitro-1,3,5,7-tetraza-cyclooctane, octogen or octogene) (CAS 2691-41-0);
      b. difluoroaminated analogs of HMX;
      c. K-55 (2,4,6,8-tetranitro-2,4,6,8-tetraazabicyclo [3,3,0]-octanone-3, tetranitrosemiglycouril or keto-bicyclic HMX) (CAS 130256-72-3);
   14. HNAD (hexanitroadamantane) (CAS 143850-71-9);
   15. HNS (hexanitrostilbene) (CAS 20062-22-0);
   16. Imidazoles as follows:
      a. BNNII (Octahydro-2,5-bis(nitroimino)imidazo [4,5-d]imidazole);
      b. DNI (2,4-dinitroimidazole) (CAS 5213-49-0);
      c. FDIA (1-fluoro-2,4-dinitroimidazole);
      d. NTDNIA (N-(2-nitrotriazolo)-2,4-dinitroimidazole);
      e. PTIA (1-picryl-2,4,5-trinitroimidazole);
   17. NTNMH (1-(2-nitrotriazolo)-2-dinitromethylene hydrazine);
   18. NTO (ONTA or 3-nitro-1,2,4-triazol-5-one) (CAS 932-64-9);
   19. Polynitrocubanes with more than four nitro groups;
   20. PYX (2,6-Bis(picrylamino)-3,5-dinitropyridine) (CAS 38082-89-2);
   21. RDX and derivatives, as follows:
      a. RDX (cyclotrimethylenetrinitramine, cyclonite, T4, hexahydro-1,3,5-trinitro-1,3,5-triazine, 1,3,5-trinitro-1,3,5-triaza-cyclohexane, hexogen or hexogene) (CAS 121-82-4);
      b. Keto-RDX (K-6 or 2,4,6-trinitro-2,4,6-triazacyclohexanone) (CAS 115029-35-1);
   22. TAGN (triaminoguanidinenitrate) (CAS 4000-16-2);
   23. TATB (triaminotrinitrobenzene) (CAS 3058-38-6) (see also ML8.g.7 for its 'precursors');
   24. TEDDZ (3,3,7,7-tetrabis(difluoroamine) octahydro-1,5-dinitro-1,5-diazocine);
   25. Tetrazoles as follows:
      a. NTAT (nitrotriazol aminotetrazole);
      b. NTNT (1-N-(2-nitrotriazolo)-4-nitrotetrazole);
   26. Tetryl (trinitrophenylmethylnitramine) (CAS 479-45-8);
   27. TNAD (1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin) (CAS 135877-16-6) (see also ML8.g.6. for its 'precursors');
   28. TNAZ (1,3,3-trinitroazetidine) (CAS 97645-24-4) (see also ML8.g.2. for its 'precursors');
   29. TNGU (SORGUYL or tetranitroglycoluril) (CAS 55510-03-7);

30. TNP (1,4,5,8-tetranitro-pyridazino[4,5-d]pyridazine) (CAS 229176-04-9);
31. Triazines as follows:
    a. DNAM (2-oxy-4,6-dinitroamino-s-triazine) (CAS 19899-80-0);
    b. NNHT (2-nitroimino-5-nitro-hexahydro-1,3,5-triazine) (CAS 130400-13-4);
32. Triazoles as follows:
    a. 5-azido-2-nitrotriazole;
    b. ADHTDN (4-amino-3,5-dihydrazino-1,2,4-triazole dinitramide) (CAS 1614-08-0);
    c. ADNT (1-amino-3,5-dinitro-1,2,4-triazole);
    d. BDNTA ([bis-dinitrotriazole]amine);
    e. DBT (3,3′-dinitro-5,5-bi-1,2,4-triazole) (CAS 30003-46-4);
    f. DNBT (dinitrobistriazole) (CAS 70890-46-9);
    g. 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. Not used since 2013;
35. DNAN (2,4-dinitroanisole) (CAS 119-27-7);
36. TEX (4,10-Dinitro-2,6,8,12-tetraoxa-4,10-diazaisowurtzitane);
37. GUDN (Guanylurea dinitramide) FOX-12 (CAS 217464-38-5);
38. Tetrazines as follows:
    a. BTAT (Bis(2,2,2-trinitroethyl)-3,6-diaminotetrazine);
    b LAX-112 (3,6-diamino-1,2,4,5-tetrazine-1,4-dioxide);
39. Energetic ionic materials melting between 343 K (70 °C) and 373 K (100 °C) and with detonation velocity exceeding 6 800 m/s or detonation pressure exceeding 18 GPa (180 kbar);
40. BTNEN (Bis(2,2,2-trinitroethyl)-nitramine) (CAS 19836-28-3);
41. FTDO (5,6-(3',4'-furazano)- 1,2,3,4-tetrazine-1,3-dioxide);
42. EDNA (Ethylenedinitramine) (CAS 505-71-5);
43. TKX-50 (Dihydroxylammonium 5,5'-bistetrazole-1,1'-diolate);

Note *ML8.a. includes 'explosive co-crystals'.*

Technical Note
For the purposes of ML8.a. Note, an 'explosive co-crystal' is a solid material consisting of an ordered three dimensional arrangement of two or more explosive molecules, where at least one is specified in ML8.a.

b. 'Propellants' as follows:
    1. Any solid 'propellant' with a theoretical specific impulse (under standard conditions) of more than:
        a. 240 seconds for non-metallized, non-halogenized 'propellant';
        b. 250 seconds for non-metallized, halogenized 'propellant'; or
        c. 260 seconds for metallized 'propellant';
    2. Not used since 2013;
    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 294 K (21 °C);
    5. Elastomer Modified Cast Double Base (EMCDB) 'propellants' with extensibility at maximum stress of more than 5 % at 233 K (- 40°C);
    6. Any 'propellant' containing substances specified by ML8.a.;
    7. 'Propellants', not specified elsewhere in this Annex, specially designed for military use;
c. 'Pyrotechnics', fuels and related substances, as follows, and 'mixtures' thereof:
    1. 'Aircraft' fuels specially formulated for military purposes;
    Note 1 *ML8.c.1 does not apply to the following 'aircraft' fuels: JP-4, JP-5, and JP-8.*
    Note 2 *'Aircraft' fuels specified by ML8.c.1. are finished products, not their constituents.*

2. Alane (aluminium hydride) (CAS 7784-21-6);
3. Boranes, as follows, and their derivatives:
   a. Carboranes;
   b. Borane homologues, as follows:
      1. Decaborane (14) (CAS 17702-41-9);
      2. Pentaborane (9) (CAS 19624-22-7);
      3. Pentaborane (11) (CAS 18433-84-6);
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);

   Note *ML8.c.4.a. does not apply to hydrazine 'mixtures' specially formulated for corrosion control.*
5. Metal fuels, fuel 'mixtures' or 'pyrotechnic' 'mixtures', in particle form whether spherical, atomised, 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;

   Note 1 *ML8.c.5. applies to 'explosives' and fuels, whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium, or beryllium.*

   Note 2 *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'.*

   Note 3 *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.)*
6. Military materials, containing thickeners for hydrocarbon fuels, specially formulated for use in flame throwers or incendiary munitions, such as metal stearates (e.g. octal (CAS 637-12-7)) or palmitates;
7. Perchlorates, chlorates and chromates, composited with powdered metal or other high energy fuel components;
8. Spherical or spheroidal aluminium powder (CAS 7429-90-5) with a particle size of 60 μm or less and 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;
10. Liquid high energy density fuels not specified in ML8.c.1., as follows:
    a. Mixed fuels, that incorporate both solid and liquid fuels (e.g. boron slurry), having a mass-based energy density of 40 MJ/kg or greater;
    b. Other high energy density fuels and fuel additives (e.g. cubane, ionic solutions, JP-7, JP-10), having a volume-based energy density of 37,5 GJ per cubic meter or greater, measured at 293 K (20 °C) and one atmosphere (101,325 kPa) pressure;

    Note *ML8.c.10.b. does not apply to fossil refined fuels or biofuels, or fuels for engines certified for use in civil aviation.*
11. 'Pyrotechnic' and pyrophoric materials, as follows:
    a. 'Pyrotechnic' or pyrophoric materials specifically formulated to enhance or control the production of radiated energy in any part of the IR spectrum;
    b. Mixtures of magnesium, polytetrafluoroethylene (PTFE) and a vinylidene difluoride-hexafluoropropylene copolymer (e.g. MTV);

12. Fuel mixtures, 'pyrotechnic' mixtures or 'energetic materials', not specified elsewhere in ML8, having all of the following:
    a. Containing greater than 0,5 % of particles of any of the following:
        1. Aluminium;
        2. Beryllium;
        3. Boron;
        4. Zirconium;
        5. Magnesium; or
        6. Titanium;
    b. Particles specified by ML8.c.12.a. with a size less than 200 nm in any direction; and
    c. Particles specified by ML8.c.12.a. with a metal content of 60 % or greater;

    Note *ML8.c.12. includes thermites.*

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.*

        Note 3 *ML8.d.3. does not apply to iodine pentafluoride (CAS 7783-66-6).*
    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.*

e. Binders, plasticisers, 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 (3,3-bis(azidomethyl)oxetane 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;
    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), poly-NMMO or 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);
19. 4,5 diazidomethyl-2-methyl-1,2,3-triazole (iso- DAMTR);
20. PNO (Poly(3-nitrato oxetane));
21. TMETN (Trimethylolethane trinitrate) (CAS 3032-55-1);

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 and ferrocene carboxylic acid esters;
    d. n-butyl-ferrocene (CAS 31904-29-7);
    e. Other adducted polymer ferrocene derivatives not specified elsewhere in ML8.f.4. ;
    f. Ethyl ferrocene (CAS 1273-89-8);
    g. Propyl ferrocene;
    h. Pentyl ferrocene (CAS 1274-00-6);
    i. Dicyclopentyl ferrocene;
    j. Dicyclohexyl ferrocene;
    k. Diethyl ferrocene (CAS 1273-97-8);
    l. Dipropyl ferrocene;
    m. Dibutyl ferrocene (CAS 1274-08-4);
    n. Dihexyl ferrocene (CAS 93894-59-8);
    o. Acetyl ferrocene (CAS 1271-55-2)/1,1'-diacetyl ferrocene (CAS 1273-94-5);
5. Lead beta-resorcylate (CAS 20936-32-7) or copper beta-resorcylate (CAS 70983-44-7);
6. Lead citrate (CAS 14450-60-3);
7. Lead-copper chelates of beta-resorcylate or salicylates (CAS 68411-07-4);
8. Lead maleate (CAS 19136-34-6);
9. Lead salicylate (CAS 15748-73-9);
10. Lead stannate (CAS 12036-31-6);
11. MAPO (tris-1-(2-methyl)aziridinyl phosphine oxide) (CAS 57-39-6); BOBBA 8 (bis(2-methyl aziridinyl) 2-(2-hydroxypropanoxy) propylamino phosphine oxide); and other MAPO derivatives;
12. Methyl BAPO (bis(2-methyl aziridinyl) methylamino phosphine oxide) (CAS 85068-72-0);
13. N-methyl-p-nitroaniline (CAS 100-15-2);
14. 3-Nitraza-1,5-pentane diisocyanate (CAS 7406-61-9);
15. Organo-metallic coupling agents as follows:
    a. Neopentyl[diallyl]oxy, tri[dioctyl]phosphato-titanate (CAS 103850-22-2); also known as titanium IV, 2,2[bis 2-propenolato-methyl, butanolato, tris (dioctyl) phosphato] (CAS 110438-25-0); or LICA 12 (CAS 103850-22-2);
    b. Titanium IV, [(2-propenolato-1) methyl, n-propanolatomethyl] butanolato-1, tris[dioctyl] pyrophosphate or KR3538;
    c. Titanium IV, [(2-propenolato-1)methyl, n-propanolatomethyl] butanolato-1, tris(dioctyl) phosphate;
16. Polycyanodifluoroaminoethyleneoxide;

17. Bonding agents as follows:
    a. 1,1R,1S-trimesoyl-tris(2-ethylaziridine) (HX-868, BITA) (CAS 7722-73-8);
    b. Polyfunctional aziridine amides with isophthalic, trimesic, isocyanuric or trimethyladipic backbone also having a 2-methyl or 2-ethyl aziridine group;

    Note *Item ML.8.f.17.b. includes:*

    a. 1,1H-Isophthaloyl-bis(2-methylaziridine)(HX-752) (CAS 7652-64-4);

    b. 2,4,6-tris(2-ethyl-1-aziridinyl)-1,3,5-triazine (HX-874) (CAS 18924-91-9);

    c. 1,1'-trimethyladipoyl-bis(2-ethylaziridine) (HX-877)(CAS 71463-62-2).
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);
23. TEPB (Tris (ethoxyphenyl) bismuth) (CAS 90591-48-3);

g. 'Precursors' as follows:

N.B. *In ML8.g. the references are to specified 'Energetic Materials' manufactured from these substances.*

1. BCMO (3,3-bis(chloromethyl)oxetane) (CAS 78-71-7) (see also ML8.e.1. and e.2.);
2. Dinitroazetidine-t-butyl salt (CAS 125735-38-8) (see also ML8.a.28.);
3. Hexaazaisowurtzitane derivates including HBIW (hexabenzylhexaazaisowurtzitane) (CAS 124782-15-6) (see also ML8.a.4.) and TAIW (tetraacetyldibenzylhexaazaisowurtzitane) (CAS 182763-60-6) (see also ML8.a.4.);
4. Not used since 2013;
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.);
9. DADN (1,5-diacetyl-3,7-dinitro-1, 3, 5, 7-tetraaza-cyclooctane) (see also ML8.a.13.).

h. 'Reactive material' powders and shapes, as follows:

1. Powders of any of the following materials, with a particle size less than 250 μm in any direction and not specified elsewhere by ML8:
    a. Aluminium;
    b. Niobium;
    c. Boron;
    d. Zirconium;
    e. Magnesium;
    f. Titanium;
    g. Tantalum;
    h. Tungsten;
    i. Molybdenum; or
    j. Hafnium;
2. Shapes, not specified by ML3, ML4, ML12 or ML16, fabricated from powders specified by ML8.h.1.

Technical Notes

For the purposes of ML8.h.:

1. 'Reactive materials' are designed to produce an exothermic reaction only at high shear rates and for use as liners or casings in warheads.

2. 'Reactive material' powders are produced by, for example, a high energy ball milling process.

3. 'Reactive material' shapes are produced by, for example, selective laser sintering.

Note 1 *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 (CAS9056-38-6);

f. Potassium nitrate (CAS 7757-79-1);

g. Tetranitronaphthalene;

h. Trinitroanisol;

i. Trinitronaphthalene;

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); methylethyldiphenyl urea [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 entry 1C.11.d. on the EU Dual-Use List).

Note 2 *ML8. does not apply to ammonium perchlorate (ML8.d.2.), NTO (ML8.a.18.) or catocene (ML8.f.4.b.), and meeting all of the following:*

a. Specially shaped and formulated for civil-use gas generation devices;

b. Compounded or mixed, with non-active thermoset binders or plasticizers, and having a mass of less than 250 g;

c. Having a maximum of 80 % ammonium perchlorate (ML8.d.2.) in mass of active material;

d. Having less than or equal to 4 g of NTO (ML8.a.18.); and

e. Having less than or equal to 1 g of catocene (ML8.f.4.b.).

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;

Note *ML9.a.1. includes vehicles specially designed or modified for the delivery of divers.*

2. Surface vessels, not specified in ML9.a.1., having any of the following, fixed or integrated into the vessel:
   a. Automatic weapons - specified in ML1, or weapons specified in ML2, ML4, ML12 or ML19, or 'mountings' or hard points for weapons having a calibre of 12,7 mm or greater;

      Technical Note

      For the purposes of ML9.a.2.a, '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

      For the purposes of ML9.a.2.c.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;

      Technical Note

      For the purposes of ML9.a.2., '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.

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;
   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. 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;

      Technical Note

      For the purpose of ML9.b.3., 'non-magnetic' means the relative permeability is less than 2.
   4. 'Air Independent Propulsion' (AIP) systems specially designed for submarines;

      Note *ML9.b.4. does not apply to nuclear power.*

      Technical Note

      For the purposes of ML9.b.4., 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

      N.B. *See ML9.h. for nuclear power propulsion equipment.*
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 1 *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.*

Note 2 *ML9.f. does not apply to ordinary propulsive shaft and hydrodynamcontrol-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.

h. Nuclear power generating equipment or propulsion equipment, specially designed for vessels specified in ML9.a. and components therefor specially designed or 'modified' for military use.

Technical Note

For the purposes of ML9.h., '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.

Note *ML9.h. includes 'nuclear reactors'.*

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 'lighter-than-air vehicles', 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 refuelling equipment specially designed or modified for any of the following, and specially designed components therefor:

1. 'Aircraft' specified by ML10.a.; or
2. Unmanned 'aircraft' specified by ML10.c.;

f. Ground equipment specially designed for 'aircraft' specified by ML10.a. or aero-engines specified by ML10.d.;

Note 1 *ML10.f. includes pressure refuelling equipment and equipment designed to facilitate operations in confined areas, including equipment located on board a ship.*

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

1. *Towbars;*
2. *Protective mats and covers;*
3. *Ladders, steps and platforms;*
4. *Chocks, lashings and tie-down equipment.*

g. Aircrew life support equipment, aircrew safety equipment and other devices for emergency escape, not specified in ML10.a., designed for 'aircraft' specified by ML10.a.;

Note *ML10.g. does not control aircrew helmets that do not incorporate, or have mountings or fittings for, equipment specified in this Annex.*

N.B. *For helmets see also ML13.c.*

h. Parachutes, paragliders and related equipment, as follows, and specially designed components therefor:

1. Parachutes not specified elsewhere in the EU Common Military 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 civil aviation authorities of one or more EU Member States or Wassenaar Arrangement Participating States.

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 of one or more EU Member States or Wassenaar Arrangement Participating States 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' or 'lighter-than-air vehicles' that meet all of the following:*

a. Were first manufactured before 1946;

b. Do not incorporate items specified by the EU Common Military List, unless the items are required to meet safety or airworthiness standards of civil aviation authorities of one or more EU Member States or Wassenaar Arrangement Participating States; and

c. Do not incorporate weapons specified in the EU Common Military List, unless inoperable and incapable of being returned to operation.

Note 6 *ML10.d. does not apply to propulsion aero-engines that were first manufactured before 1946.*

ML11 **Electronic equipment, 'spacecraft' and components, not specified elsewhere in this Annex, as follows:**

a. Electronic equipment specially designed for military use and specially designed components therefor ;

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;

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 cryptographic functionality;

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. Jamming equipment designed or modified to hinder the reception, operation or effectiveness of positioning, navigation or timing services provided by 'satellite navigation systems', and specially designed components therefor;

c. 'Spacecraft' specially designed or modified for military use, and 'spacecraft' components specially designed for military use.

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 (e.g. high energy storage capacitors), thermal management, conditioning, switching or fuel-handling equipment; and electrical interfaces between power supply, gun and other turret electric drive functions;

N.B. See also 3.A.1.e.2. on the EU Dual-Use List for high energy storage capacitors.

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, components, and accessories, as follows:**

a. Metallic or non-metallic 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 plates, 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 and specially designed components and accessories therefor, as follows:

1. Helmets manufactured according to military standards or specifications, or comparable national standards;

2. Shells, liners, or comfort pads, specially designed for helmets specified in ML13.c.1.;

3. Add-on ballistic protection elements, specially designed for helmets specified in ML13.c.1.

N.B. *For other military helmet components or accessories, see the relevant e EU Common Military List entry.*

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 'equivalent standards'.

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 helmets that meet all of the following:*

(a) Were first manufactured before 1970; and

(b) Are neither designed or modified to accept, nor equipped with items specified by the EU Common Military List.

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.c. are those specially designed for military use.*

Note 5 *ML13.d.1. does not apply to protective eyewear.*

N.B. *For 'laser' protective eyewear, see ML17.o.*

N.B. 1 *See also entry 1.A.5 on the EU 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 EU 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.**

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.*

Note 3 *'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.*

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 *ML15. does not apply to 'first generation image intensifier tubes' or equipment specially designed to incorporate 'first generation image intensifier tubes'.*

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

N.B. *See also entries 6.A.2.a., 6.A.2.b. and 6.A.3.b on the EU 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. Diving and underwater swimming apparatus, specially designed or modified for military use, as follows:

1. Self-contained diving rebreathers, closed or semi-closed circuit;

2. Underwater swimming apparatus specially designed for use with the diving apparatus specified in ML17.a.1.;

N.B. *See also 8.A.2.q. on the EU Dual-Use List.*

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 'Electromagnetic Pulse' ('EMP') environment;

Technical Note

For the purpose of ML17.e.3., 'EMP' does not refer to unintentional interference caused by electromagnetic radiation from nearby equipment (e.g. machinery, appliances or electronics) or lightning.

f. 'Libraries' specially designed or modified for military use with systems, equipment or components, specified by the EU Common Military List;

g. Nuclear power generating equipment or propulsion equipment, not specified elsewhere, specially designed for military use and components therefor specially designed or 'modified' for military use;

Note *ML17.g. includes 'nuclear reactors'.*

h. Equipment and material, coated or treated for signature suppression, specially designed for military use, not specified elsewhere in the EU Common Military 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. ISO intermodal containers or demountable vehicle bodies (i.e. swap bodies), specially designed or 'modified' for military use;

m. Ferries, not specified elsewhere in this Annex, 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 or sensor protection) specially designed for military use;

p. 'Fuel cells', not specified elsewhere in the EU Common Military List, specially designed or 'modified' for military use.

Technical Notes

1. Not used since 2014.

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, environmental test facilities and components, as follows:**

a. Equipment specially designed or modified for the 'production' of items specified by the EU Common Military List, and specially designed components therefor;

b. Environmental test facilities specially designed for the certification, qualification or testing of products specified by the EU Common Military List, and specially designed equipment therefor, not specified elsewhere.

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:

a. 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 or 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.*

ML21 **'Software' as follows:**

a. 'Software' specially designed or modified for any of the following:

1. 'Development', 'production', operation or maintenance of equipment specified by the EU Common Military List;
2. 'Development' or 'production' of materials specified by the EU Common Military List; or
3. 'Development', 'production', operation or maintenance of 'software' specified by the EU Common Military List.

b. Specific 'software', other than that specified by ML21.a., as follows:

1. 'Software' specially designed for military use and specially designed for modelling, simulating or evaluating military weapon systems;
2. 'Software' specially designed for military use and specially designed for modelling or simulating military operational scenarios;
3. 'Software' for determining the effects of conventional, nuclear, chemical or biological weapons;

4. 'Software' specially designed for military use and specially designed for Command, Communications, Control and Intelligence (C^3I) or Command, Communications, Control, Computer and Intelligence (C^4I) applications;
5. 'Software' specially designed or modified for the conduct of military offensive cyber operations;

Note 1 *ML21.b.5. includes 'software' designed to destroy, damage, degrade or disrupt systems, equipment or 'software', specified in this Annex, cyber reconnaissance and cyber command and control 'software', therefor.*

Note 2 *ML21.b.5. does not apply to 'vulnerability disclosure' or to 'cyber incident response', limited to non-military defensive cybersecurity readiness or response.*

c. 'Software', not specified by ML21.a. or ML21.b., specially designed or modified to enable equipment not specified by the EU Common Military List to perform the military functions of equipment specified by the EU Common Military List.

N.B. *See systems, equipment or components specified in this Annex for general purpose 'digital computers' with installed 'software' specified by ML21.c.*

ML22 **'Technology' as follows:**

a. 'Technology', other than specified in ML22.b., which is 'required' for the 'development', 'production', operation, installation, maintenance (checking), repair, overhaul or refurbishing of items specified by the EU Common Military List;

b. 'Technology' as follows:

1. 'Technology' 'required' for the design of, the assembly of components into, and the operation, maintenance and repair of, complete production installations for items specified by the EU Common Military List, even if the components of such production installations are not specified;
2. 'Technology' 'required' for the 'development' and 'production' of small arms even if used to produce reproductions of antique small arms;
3. Not used since 2013

N.B. *See ML22.a. for 'technology' previously specified by ML22.b.3.*

4. Not used since 2013

N.B. *See ML22.a. for 'technology' previously specified by ML22.b.4.*

5. 'Technology' 'required' exclusively for the incorporation of 'biocatalysts', specified by ML7.i.1., into military carrier substances or military material.

Note 1 *'Technology' 'required' for the 'development', 'production', operation, installation, maintenance (checking), repair, overhaul or refurbishing of items specified by the EU Common Military List remains under control even when applicable to any item not specified by the EU Common Military List.*

Note 2 *ML22 does not apply to:*

a. 'Technology' that is the minimum necessary for the installation, operation, maintenance (checking) or repair, of those items which are not controlled or whose export has been authorised;

b. 'Technology' that is 'in the public domain', 'basic scientific research' or the minimum necessary information for patent applications;

c. 'Technology' for magnetic induction for continuous propulsion of civil transport devices.

DEFINITIONS OF TERMS USED IN THIS LIST

The following are definitions of the terms used in this List, in alphabetical order.

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

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

ML8 'Additives'

Substances used in explosive formulations to improve their properties.

ML1,8,10,14 'Aircraft'

A fixed wing, swivel wing, rotary wing (helicopter), tilt rotor or tilt-wing airborne vehicle.

ML11 'Automated Command and Control Systems'

Electronic systems, through which information essential to the effective operation of the grouping, major formation, tactical formation, unit, ship, subunit or weapons under command is entered, processed and transmitted. This is achieved by the use of computer and other specialised hardware designed to support the functions of a military command and control organisation. The main functions of an automated command and control system are: the efficient automated collection, accumulation, storage and processing of information; the display of the situation and the circumstances affecting the preparation and conduct of combat operations; operational and tactical calculations for the allocation of resources among force groupings or elements of the operational order of battle or battle deployment according to the mission or stage of the operation; the preparation of data for appreciation of the situation and decision-making at any point during operation or battle; computer simulation of operations.

ML22 '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.

ML7, 22 '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.

ML7 'Biological agents'

Pathogens or toxins, selected or modified (such as altering purity, shelf life, virulence, dissemination characteristics, or resistance to UV radiation) to produce casualties in humans or animals, degrade equipment or damage crops or the environment.

ML7 'Biopolymers'

Biological macromolecules as follows:

a. Enzymes for specific chemical or biochemical reactions;

b. 'Anti-idiotypic', 'monoclonal' or 'polyclonal' 'antibodies';

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.*

ML4, 10 'Civil aircraft'

Those 'aircraft' listed by designation in published airworthiness certification lists by civil aviation authorities of one or more EU Member States or Wassenaar Arrangement Participating States to fly commercial civil internal and external routes or for legitimate civil, private or business use.

ML21 'Cyber incident response'

The process of exchanging necessary information on a cybersecurity incident with individuals or organisations responsible for conducting or coordinating remediation to address the cybersecurity incident.

ML17 21, 22 'Development'

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.

ML21 'Digital computer'

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.

ML17 'End-effectors'

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.

ML8 'Energetic materials'

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

ML6, 13 'Equivalent standards'

Comparable national or international standards recognised by one or more EU Member States or Wassenaar Arrangement Participating States and applicable to the relevant entry.

ML8, 18 '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.

ML7	'Expression Vectors' Carriers (e.g. plasmid or virus) used to introduce genetic material into host cells.
ML13	'Fibrous or filamentary materials' 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.
ML15	'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.
ML17	'Fuel cell' An electrochemical device that converts chemical energy directly into Direct Current (DC) electricity by consuming fuel from an external source.
ML22	'In the public domain' 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'.*
ML9, 13, 17, 19	'Laser' An item that produces spatially and temporally coherent light through amplification by stimulated emission of radiation.
ML17	'Library' (parametric technical database) A collection of technical information, reference to which may enhance the performance of relevant systems, equipment or components.
ML10	"Lighter-than-air vehicles' Balloons and 'airships' that rely on hot air or on lighter-than-air gases such as helium or hydrogen for their lift. *Technical Note* *'Airship'* *A power-driven airborne vehicle that is kept buoyant by a body of gas (usually helium, formerly hydrogen) which is lighter than air.*
ML 9, 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.
ML8	'Precursors' Speciality chemicals used in the manufacture of explosives.
ML 21, 22	'Production' Means all production stages, such as: product engineering, manufacture, integration, assembly (mounting), inspection, testing, quality assurance.

ML8 'Propellants'

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

ML4, 8 'Pyrotechnic(s)'

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.

ML22 '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.

ML7 'Riot control agents'

Substances which, under the expected conditions of use for riot control purposes, produce rapidly in humans sensory irritation or disabling physical effects which disappear within a short time following termination of exposure. (Tear gases are a subset of 'riot control agents'.)

ML17 '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

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.

'User-accessible programmability' refers to the facility allowing a user to insert, modify or replace 'programs' by means other than:

a. A physical change in wiring or interconnections; or

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

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.*

ML11 'Satellite navigation system'

A system consisting of ground stations, a constellation of satellites, and receivers, that enables receiver locations to be calculated on the basis of signals received from the satellites. It includes Global Navigation Satellite Systems and Regional Navigation Satellite Systems.

ML4, 11, 21 'Software'

A collection of one or more 'programs' or 'microprograms' fixed in any tangible medium of expression.

Technical Note 1

'Program'

A sequence of instructions to carry out a process in, or convertible into, a form executable by an electronic computer.

Technical Note 2

'Microprogram'

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

ML11 'Spacecraft'

Active and passive satellites and space probes.

ML19 'Space-qualified'

Designed, manufactured, or qualified through successful testing, for operation at altitudes greater than 100 km above the surface of the Earth.

Note *A determination that a specific item is 'space- qualified' by virtue of testing does not mean that other items in the same production run or model series are 'space-qualified' if not individually tested.*

ML20 'Superconductive'

Refers to materials, (i.e. metals, alloys or compounds) which can lose all electrical resistance (i.e. which can attain infinite electrical conductivity and carry very large electrical currents without Joule heating).

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.

Note:

'Critical temperatures' (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.

ML22 'Technology'

Specific information necessary for the 'development', 'production' or 'use' of a product. The information takes the form of 'technical data' or 'technical assistance'. Specified 'technology' for the EU Common Military List is defined in ML22.

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'.*
3. *'Use': operation, installation (including on-site installation), maintenance (checking), repair, overhaul and refurbishing.*

ML10 'Unmanned aerial vehicle' ('UAV')

Any 'aircraft' capable of initiating flight and sustaining controlled flight and navigation without any human presence on board.

ML21 'Vulnerability disclosure'

The process of identifying, reporting or communicating a vulnerability to, or analysing a vulnerability with, individuals or organisations responsible for conducting or coordinating remediation for the purpose of resolving the vulnerability.