

2008. Notes cont'd.

1. a. 2. Metal fuels in particle sizes of less than 60 µm whether spherical, atomized, spheroidal, flaked or ground, manufactured from material consisting of 99% or more of any of the following: zirconium, magnesium and alloys of these; beryllium; fine iron powder with average particle size of 3 µm or less produced by reduction of iron oxide with hydrogen; boron or boron carbide fuels of 85% purity or higher and average particle size of 60 µm or less;

N.B.:
The military explosives and fuels containing the metals or alloys listed in a.1. and a.2. above are embargoed whether or not the metals or alloys are encapsulated in aluminium, magnesium, zirconium or beryllium.

 3. Perchlorates, chlorates and chromates composited with powdered metal or other high energy fuel components;
 4. Nitroguanidine (NQ);
 5. Compounds composed of fluorine and any of the following: other halogens, oxygen, nitrogen;
 6. Carboranes; decaborane; pentaborane and derivatives;
 7. Cyclotetramethylenetetranitramine (HMX); octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine; 1,3,5,7-tetranitro-1,3,5,7-tetraza-cyclooctane; (octogen, octogene);
 8. Hexanitrostilbene (HNS);
 9. Diaminotrinitrobenzene (DATB);
 10. Triaminotrinitrobenzene (TATB);
 11. Triaminoguanidinenitrate (TAGN);
 12. Titanium subhydride of stoichiometry TiH 0.65-1.68;
 13. Dinitroglucoluril (DNGU, DINGU); tetranitroglucoluril (TNGU, SORGUYL);
 14. Tetranitrobenzotriazolobenzotriazole (TACOT);
 15. Diaminohexanitrobiphenyl (DIPAM);
 16. Picrylaminedinitropyridine (PYX);
 17. 3-nitro-1,2,4-triazol-5-one (NTO or ONTA);
 18. Hydrazine in concentrations of 70% or more; hydrazine nitrate; hydrazine perchlorates; unsymmetrical dimethyl hydrazine; monomethyl hydrazine; symmetrical dimethyl hydrazine;
 19. Ammonium perchlorate;
 20. Cyclotrimethylenetrinitramine (RDX); cyclonite; T4; hexahydro-1,3,5-trinitro-1,3,5-triazine; 1,3,5-trinitro-1,3,5-triaza-cyclohexane (hexogen, hexogene);
 21. Hydroxylammonium nitrate (HAN); hydroxylammonium perchlorate (HAP);
 22. 2-(5-cyanotetrazolato) penta ammine-cobalt (III) perchlorate (or CP);
 23. cis-bis (5-nitrotetrazolato) penta amine-cobalt (III) perchlorate (or BNCP)
 24. 7-Amino-4,6-dinitrobenzofurazane-1-oxide (ADNBF); amino dinitrobenzo-furoxan;
 25. 5,7-diamino-4,6-dinitrobenzofurazane-1-oxide, (CL-14) or diamino dinitrobenzofurozan);
 26. 2,4,6-trinitro-2,4,6-triaza-cyclo-hexanone (K-6 or Keto-RDX);
 27. 2,4,6,8-tetranitro-2,4,6,8-tetraaza-bicyclo (3,3,0)-octanone-3 (tetranitrosemiglycouril, K-55 or keto-bicyclic HMX);
 28. 1,1,3-trinitroazetidine (TNAZ);
 29. 1,4,5,8-tetranitro-1,4,5,8-tetraazadecalin (TNAD);
 30. Hexanitrohexaazaisowurtzitane (CL-20) or HNIW; **and** chlathrates of CL-20);
 31. Polynitrocubanes with more than four nitro groups;
 32. Ammonium dinitramide (ADN or SR 12);

b. Meet the following performance parameters:

 1. Any explosive with a detonation velocity exceeding 8,700 m/s or a detonation pressure exceeding 340 kilobars;
 2. Other organic high explosives not listed in this Note yielding detonation pressures of 250 kilobars or more that will remain stable at temperatures of 523 K (250°C) or higher for periods of 5 minutes or longer;
 3. Any other UN Class 1.1 solid propellant not listed in this Note with a theoretical specific impulse (under standard conditions) of more than 250 seconds for non-metallised, or more than 270 seconds for aluminised compositions;
 4. Any UN Class 1.3 solid propellant with a theoretical specific impulse of more than 230 seconds for non-halogenised, 250 seconds for non-metallised and 266 seconds for metallised compositions;
 5. Any other gun propellants not listed in this Note having a force constant of more than 1,200 kJ/kg;
 6. Any other explosive, propellant or pyrotechnic not listed in this Note that can sustain a steady-state burning rate of more than 38 mm per second under standard conditions of 68.9 bar pressure and 294 K (21°C); **or**
 7. Elastomer modified cast double based propellants (EMCDB) with extensibility at maximum stress of more than 5% at 233 K (-40°C).
2. "Additives" include the following:
 - a. Glycidylazide Polymer (GAP) and its derivatives;
 - b. Polycyanodifluoroaminoethyleneoxide (PCDE);
 - c. Butanetrioltrinitrate (BTTN);
 - d. Bis-2-fluoro-2,2-dinitroethylformal (FEFO);
 - e. Butadienenitrileoxide (BNO);
 - f. Catocene, N-butyl-ferrocene and other ferrocene derivatives;
 - g. Bis(2,2-dinitropropyl) formal and acetal;
 - h. 3-nitro-1,5-pentane diisocyanate;
 - i. Energetic monomers, plasticisers and polymers containing nitro, azido, nitrate, nitraza or difluoroamino groups;
 - j. 1,2,3-Tris[1,2-bis(difluoroamino)ethoxy] propane; Tris vinoxyl propane adduct (TVOPA);
 - k. Bisazidomethylloxetane and its polymers;
 - l. Nitratomethylmethylloxetane or poly (3-Nitratomethyl, 3-methyl oxetane); (Poly-NIMMO) (NMMO);
 - m. azidomethylmethylloxetane (AMMO) and its polymers;
 - n. Polynitroorthocarbonates;
 - o. Tetraethylenepentamineacrylonitrile (TEPAN); cyanoethylated polyamine and its salts;
 - p. Tetraethylenepentamineacrylonitrileglycidol (TEPANOL); cyanoethylated polyamine adducted with glycidol and its salts;
 - q. Polyfunctional aziridine amides: with isophthalic, trimesic (BITA); butyleneimine trimesamide isocyanuric; or trimethyladipic backbone structures and 2-methyl or 2-ethyl substitutions on the aziridine ring;
 - r. Basic copper salicylate; lead salicylate;
 - s. Lead beta resorcyate;
 - t. Lead stannate, lead maleate, lead citrate;
 - u. Tris-1-(2-methyl)aziridinyl phosphine oxide (MAPO); bis(2-methyl aziridinyl) 2-(2-hydroxypropanoxy) propylamino phosphine oxide (BOBBA 8); **and** other MAPO derivatives;
 - v. bis(2-methyl aziridinyl) methylamino phosphine oxide (Methyl BAPO);
 - w. Organo-metallic coupling agents, specifically:
 1. Neopentyl [diallyl] oxy, tri [diocyl] phosphato titanate ; also known as titanium IV, 2,2[bis 2-propenolato-methyl, butanolate or tris [diocyl] phosphato-O], or LICA 12;
 2. Titanium IV, [(2-propenolato-1) methyl, N-propanolatomethyl] butanolato-1, also known as tris[diocyl]pyrophosphato or KR3538;
 3. Titanium IV, [(2-propenolato-1)methyl, N-propanolatomethyl] butanolato-1, also known as tris(diocyl)phosphato or KR3512;
 - x. FPF-1 poly-2,2,3,3,4,4-hexafluoropentane-1,5-diol formal;
 - y. FPF-3poly-2,4,4,5,5,6,6-heptafluoro-2-tri-fluoromethyl-3-oxaheptane-1,7-diol formal;
 - z. Polyglycidyl nitrate or poly (Nitratomethyl oxirane); (Poly-GLYN) (PGN);
 - aa. Hydroxyl terminated polybutadiene (HTPB) with a hydroxyl functionality of less than 2.16, a hydroxyl value of less than 0.77 meq/g, and a viscosity at 30°C of less than 47 poise;
 - bb. Lead-copper chelates of beta-resorcyate or salicylates;
 - cc. Triphenyl bismuth (TPB);
 - dd. Bis-2-hydroxyethylglycolamide (BHEGA);
 - ee. Superfine iron oxide (Fe₂O₃, hematite) with a specific surface area more than 250 m²/g and an average particle size of 0.003 µm or less;
 - ff. N-Methyl-p-Nitroaniline.
 3. Aircraft fuels embargoed by sub-item d. are finished products not their constituents.
 4. Sub-item d. includes military materials containing thickeners for hydrocarbon fuels specially formulated for use in flamethrowers or incendiary munitions, such as metal stearates or palmates (also known as octol) and M1, M2, M3 thickeners.