

2.2.1.4

Glossary of names

NOTE 1: The descriptions in the glossary are not intended to replace the test procedures, nor to determine the hazard classification of a substance or article of Class 1. Assignment to the correct division and a decision on whether Compatibility Group S is appropriate shall be based on testing of the product in accordance with the Manual of Tests and Criteria, Part I or by analogy with similar products which have already been tested and assigned in accordance with the procedures of the Manual of Tests and Criteria.

NOTE 2: The figures given after the names refer to the relevant UN numbers (Column 1 of Table A of Chapter 3.2). For the classification code, see 2.2.1.1.4.

AMMUNITION, ILLUMINATING, with or without burster, expelling charge or propelling charge: UN Nos. 0171, 0254, 0297

Ammunition designed to produce a single source of intense light for lighting up an area. The term includes illuminating cartridges, grenades and projectiles; and illuminating and target identification bombs.

NOTE: The following articles: CARTRIDGES, SIGNAL; SIGNAL DEVICES HAND; SIGNALS, DISTRESS; FLARES, AERIAL; FLARES, SURFACE are not included in this definition. They are listed separately.

AMMUNITION, INCENDIARY, liquid or gel, with burster, expelling charge or propelling charge: UN No. 0247

Ammunition containing liquid or gelatinous incendiary substance. Except when the incendiary substance is an explosive *per se*, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, INCENDIARY, WHITE PHOSPHORUS with burster, expelling charge or propelling charge: UN Nos. 0243, 0244

Ammunition containing white phosphorus as incendiary substance. It also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, INCENDIARY with or without burster, expelling charge or propelling charge: UN Nos. 0009, 0010, 0300

Ammunition containing incendiary composition. Except when the composition is an explosive *per se*, it also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

AMMUNITION, PRACTICE: UN Nos. 0362, 0488

Ammunition without a main bursting charge, containing a burster or expelling charge. Normally it also contains a fuze and a propelling charge.

NOTE: GRENADES, PRACTICE are not included in this definition. They are listed separately.

AMMUNITION, PROOF: UN No. 0363

Ammunition containing pyrotechnic substances, used to test the performance or strength of new ammunition, weapon components or assemblies.

AMMUNITION, SMOKE, WHITE PHOSPHORUS, with burster, expelling charge or propelling charge: UN Nos. 0245, 0246

Ammunition containing white phosphorus as a smoke-producing substance. It also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes grenades, smoke.

AMMUNITION, SMOKE with or without burster, expelling charge or propelling charge: UN Nos. 0015, 0016, 0303

Ammunition containing a smoke-producing substance such as chlorosulphonic acid mixture or titanium tetrachloride; or a smoke-producing pyrotechnic composition based on hexachloroethane or red phosphorus. Except when the substance is an explosive per se, the ammunition also contains one or more of the following: a propelling charge with primer and igniter charge; a fuze with burster or expelling charge. The term includes grenades, smoke.

NOTE: SIGNALS, SMOKE are not included in this definition. They are listed separately.

AMMUNITION, TEAR-PRODUCING, with burster, expelling charge or propelling charge: UN Nos. 0018, 0019, 0301

Ammunition containing a tear-producing substance. It also contains one or more of the following: a pyrotechnic substance; a propelling charge with primer and igniter charge; a fuze with burster or expelling charge.

ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES EEI): UN No. 0486

Articles containing only extremely insensitive substances which demonstrate a negligible probability of accidental initiation or propagation under normal conditions of transport, and which have passed Test Series 7.

ARTICLES, PYROPHORIC: UN No. 0380

Articles which contain a pyrophoric substance (capable of spontaneous ignition when exposed to air) and an explosive substance or component. The term excludes articles containing white phosphorus.

ARTICLES, PYROTECHNIC, for technical purposes: UN Nos. 0428, 0429, 0430, 0431, 0432

Articles which contain pyrotechnic substances and are used for technical purposes such as heat generation, gas generation, theatrical effects, etc.

NOTE: The following articles: all ammunition; CARTRIDGES, SIGNAL; CUTTERS, CABLE, EXPLOSIVE; FIREWORKS; FLARES, AERIAL; FLARES, SURFACE; RELEASE DEVICES, EXPLOSIVE; RIVETS, EXPLOSIVE; SIGNAL DEVICES, HAND; SIGNALS, DISTRESS; SIGNALS, RAILWAY TRACK, EXPLOSIVES; SIGNALS, SMOKE are not included in this definition. They are listed separately.

BLACK POWDER (GUNPOWDER), COMPRESSED or BLACK POWDER (GUNPOWDER), IN PELLETS: UN No. 0028

Substance consisting of a pelletized form of black powder.

BLACK POWDER (GUNPOWDER), granular or as meal: UN No. 0027

Substance consisting of an intimate mixture of charcoal or other carbon and either potassium nitrate or sodium nitrate, with or without sulphur.

BOMBS, WITH FLAMMABLE LIQUID, with bursting charge: UN Nos. 0399, 0400

Articles which are dropped from aircraft, consisting of a tank filled with inflammable liquid and bursting charge.

BOMBS, PHOTO-FLASH: UN No. 0038

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a charge of detonating explosive without means of initiation or with means of initiation containing two or more effective protective features.

BOMBS, PHOTO-FLASH: UN No. 0037

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a charge of detonating explosive with means of initiation not containing two or more effective protective features.

BOMBS, PHOTO-FLASH: UN Nos. 0039, 0299

Explosive articles which are dropped from aircraft to provide brief, intense illumination for photography. They contain a photo-flash composition.

BOMBS with bursting charge: UN Nos. 0034; 0035

Explosive articles which are dropped from aircraft, without means of initiation or with means of initiation containing two or more effective protective features.

BOMBS with bursting charge: UN Nos. 0033, 0291

Explosive articles which are dropped from aircraft, with means of initiation not containing two or more effective protective features.

BOOSTERS WITH DETONATOR: UN Nos. 0225, 0268

Articles consisting of a charge of detonating explosive with means of initiation. They are used to increase the initiating power of detonators or detonating cord.

BOOSTERS without detonator: UN Nos. 0042, 0283

Articles consisting of a charge of detonating explosive without means of initiation. They are used to increase the initiating power of detonators or detonating cord.

BURSTERS, explosive: UN No. 0043

Articles consisting of a small charge of explosive used to open projectiles or other ammunition in order to disperse their contents.

CARTRIDGES, FLASH: UN Nos. 0049, 0050

Articles consisting of a casing, a primer and flash powder, all assembled in one piece ready for firing.

CARTRIDGES FOR TOOLS, BLANK: UN No. 0014

Article, used in tools, consisting of a closed cartridge case with a centre or rim fire primer with or without a charge of smokeless or black powder but with no projectile.

CARTRIDGES FOR WEAPONS, BLANK: UN Nos. 0326, 0413, 0327, 0338, 0014

Ammunition consisting of a closed cartridge case with a centre or rim fire primer and a charge of smokeless or black powder but no projectile. It produces a loud noise and is used for training, saluting, propelling charge, starter pistols, etc. The term includes ammunition, blank.

CARTRIDGES FOR WEAPONS, INERT PROJECTILE: UN Nos. 0328, 0417, 0339, 0012

Ammunition consisting of a projectile without bursting charge but with a propelling charge with or without a primer. The articles may include a tracer, provided that the predominant hazard is that of the propelling charge.

CARTRIDGES FOR WEAPONS with bursting charge: UN Nos. 0006, 0321, 0412

Ammunition consisting of a projectile with a bursting charge without means of initiation or with means of initiation containing two or more effective protective features; and a propelling charge with or without a primer. The term includes fixed (assembled) ammunition, semi-fixed (partially assembled) ammunition and separate loading ammunition when the components are packed together.

CARTRIDGES FOR WEAPONS with bursting charge: UN Nos. 0005, 0007, 0348

Ammunition consisting of a projectile with a bursting charge with means of initiation not containing two or more effective protective features; and a propelling charge with or without a primer. The term includes fixed (assembled) ammunition, semi-fixed (partially assembled) ammunition and separate loading ammunition when the components are packed together.

CARTRIDGES, OIL WELL: UN Nos. 0277, 0278

Articles consisting of a thin casing of fibreboard, metal or other material containing only propellant powder which projects a hardened projectile to perforate an oil well casing.

NOTE: CHARGES, SHAPED are not included in this definition. They are listed separately.

CARTRIDGES, POWER DEVICE: UN Nos. 0275, 0276, 0323, 0381

Articles designed to accomplish mechanical actions. They consist of a casing with a charge of deflagrating explosive and a means of ignition. The gaseous products of the deflagration produce inflation, linear or rotary motion or activate diaphragms, valves or switches or project fastening devices or extinguishing agents.

CARTRIDGES, SIGNAL: UN Nos. 0054, 0312, 0405

Articles designed to fire coloured flares or other signals from signal pistols, etc.

CARTRIDGES, SMALL ARMS: UN Nos. 0417, 0339, 0012

Ammunition consisting of a cartridge case fitted with a centre or rim fire primer and containing both a propelling charge and solid projectile. They are designed to be fired in weapons of calibre not larger than 19.1 mm. Shot-gun cartridges of any calibre are included in this description.

NOTE: CARTRIDGES, SMALL ARMS, BLANK, are not included in this definition. They are listed separately. Some military small arms cartridges are not included in this definition. They are listed under CARTRIDGES FOR WEAPONS, INERT PROJECTILE.

CARTRIDGES, SMALL ARMS, BLANK: UN Nos. 0014, 0327, 0338

Ammunition consisting of a closed cartridge case with a centre or rim fire primer and a charge of smokeless or black powder. The cartridge cases contain no projectiles. The cartridges are designed to be fired from weapons with a calibre of at most 19.1 mm and serve to produce a loud noise and are used for training, saluting, propelling charge, starter pistols, etc.

CASES, CARTRIDGE, EMPTY, WITH PRIMER: UN Nos. 0379; 0055

Articles consisting of a cartridge case made from metal, plastics or other non-inflammable material, in which the only explosive component is the primer.

CASES, COMBUSTIBLE, EMPTY, WITHOUT PRIMER: UN Nos. 0447, 0446

Articles consisting of a cartridge case made partly or entirely from nitrocellulose.

CHARGES, BURSTING, PLASTICS BONDED: UN Nos. 0457, 0458, 0459, 0460

Articles consisting of a charge of detonating explosive, plastics bonded, manufactured in a specific form without a casing and without means of initiation. They are designed as components of ammunition such as warheads.

CHARGES, DEMOLITION: UN No. 0048

Articles containing a charge of a detonating explosive in a casing of fibreboard, plastics, metal or other material. The articles are without means of initiation or with means of initiation containing two or more effective protective features.

NOTE: The following articles: BOMBS; MINES; PROJECTILES are not included in this definition. They are listed separately.

CHARGES, DEPTH: UN No. 0056

Articles consisting of a charge of detonating explosive contained in a drum or projectile without means of initiation or with means of initiation containing two or more effective protective features. They are designed to detonate under water.

CHARGES, EXPLOSIVE, COMMERCIAL without detonator: UN Nos. 0442, 0443, 0444, 0445

Articles consisting of a charge of detonating explosive without means of initiation, used for explosive welding, jointing, forming and other metallurgical processes.

CHARGES, PROPELLING, FOR CANNON: UN Nos. 0242, 0279, 0414

Charges of propellant in any physical form for separate-loading ammunition for cannon.

CHARGES, PROPELLING: UN Nos. 0271, 0272, 0415, 0491

Articles consisting of a charge of a propellant charge in any physical form, with or without a casing, as a component of rocket motors or for reducing the drag of projectiles.

CHARGES, SHAPED, without detonator: UN Nos. 0059, 0439, 0440, 0441

Articles consisting of a casing containing a charge of detonating explosive with a cavity lined with rigid material, without means of initiation. They are designed to produce a powerful, penetrating jet effect.

CHARGES, SHAPED, FLEXIBLE, LINEAR: UN Nos. 0237, 0288

Articles consisting of a V-shaped core of a detonating explosive clad by a flexible sheath.

CHARGES, SUPPLEMENTARY, EXPLOSIVE: UN No. 0060

Articles consisting of a small removable booster placed in the cavity of a projectile between the fuze and the bursting charge.

COMPONENTS, EXPLOSIVE TRAIN, N.O.S.: UN Nos. 0382, 0383, 0384, 0461

Articles containing an explosive designed to transmit detonation or deflagration within an explosive train.

CONTRIVANCES, WATER-ACTIVATED with burster, expelling charge or propelling charge: UN Nos. 0248, 0249

Articles whose functioning depends upon physico-chemical reaction of their contents with water.

CORD, DETONATING, flexible: UN Nos. 0065, 0289

Article consisting of a core of detonating explosive enclosed in spun fabric and a plastics or other covering. The covering is not necessary if the spun fabric is sift-proof.

CORD (FUSE) DETONATING, metal clad: UN Nos. 0102, 0290

Article consisting of a core of detonating explosive clad by a soft metal tube with or without protective covering.

CORD (FUSE) DETONATING, MILD EFFECT, metal clad: UN No. 0104

Article consisting of a core of detonating explosive clad by a soft metal tube with or without a protective covering. The quantity of explosive substance is so small that only a mild effect is manifested outside the cord.

CORD, IGNITER: UN No. 0066

Article consisting of textile yarns covered with black powder or another fast burning pyrotechnic composition and of a flexible protective covering; or it consists of a core of black powder surrounded by a flexible woven fabric. It burns progressively along its length with an external flame and is used to transmit ignition from a device to a charge or primer.

CUTTERS, CABLE, EXPLOSIVE: UN No. 0070

Articles consisting of a knife-edged device which is driven by a small charge of deflagrating explosive into an anvil.

DETONATOR ASSEMBLIES, NON-ELECTRIC for blasting: UN Nos. 0360, 0361, 0500

Non-electric detonators assembled with and activated by such means as safety fuse, shock tube, flash tube or detonating cord. They may be of instantaneous design or incorporate delay elements. Detonating relays incorporating detonating cord are included.

DETONATORS, ELECTRIC for blasting: UN Nos. 0030, 0255, 0456

Articles specially designed for the initiation of blasting explosives. These detonators may be constructed to detonate instantaneously or may contain a delay element. Electric detonators are activated by an electric current.

DETONATORS FOR AMMUNITION: UN Nos. 0073, 0364, 0365, 0366

Articles consisting of a small metal or plastics tube containing explosives such as lead azide, PETN or combinations of explosives. They are designed to start a detonation train.

DETONATORS, NON-ELECTRIC for blasting: UN Nos. 0029, 0267, 0455

Articles specially designed for the initiation of blasting explosives. These detonators may be constructed to detonate instantaneously or may contain a delay element. Non-electric detonators are activated by such means as shock tube, flash tube, safety fuse, other igniferous device or flexible detonating cord. Detonating relays without detonating cord are included.

EXPLOSIVE, BLASTING, TYPE A: UN No. 0081

Substances consisting of liquid organic nitrates such as nitroglycerine or a mixture of such ingredients with one or more of the following: nitrocellulose; ammonium nitrate or other inorganic nitrates; aromatic nitro-derivatives, or combustible materials, such as wood-meal and aluminium powder. They may contain inert components such as kieselguhr, and additives such as colouring agents and stabilizers. Such explosives shall be in powdery, gelatinous or elastic form. The term includes dynamite; gelatine, blasting and gelatine dynamites.

EXPLOSIVE, BLASTING, TYPE B: UN Nos. 0082, 0331

Substances consisting of

- (a) a mixture of ammonium nitrate or other inorganic nitrates with an explosive such as trinitrotoluene, with or without other substances such as wood-meal and aluminium powder; or
- (b) a mixture of ammonium nitrate or other inorganic nitrates with other combustible substances which are not explosive ingredients. In both cases they may contain inert components such as kieselguhr, and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine, similar liquid organic nitrates or chlorates.

EXPLOSIVE, BLASTING, TYPE C: UN No. 0083

Substances consisting of a mixture of either potassium or sodium chlorate or potassium, sodium or ammonium perchlorate with organic nitro-derivatives or combustible materials such as wood-meal or aluminium powder or a hydrocarbon. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine or similar liquid organic nitrates.

EXPLOSIVE, BLASTING, TYPE D: UN No. 0084

Substances consisting of a mixture of organic nitrated compounds and combustible materials such as hydrocarbons and aluminium powder. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. Such explosives must not contain nitroglycerine, similar liquid organic nitrates, chlorates and ammonium nitrate. The term generally includes plastic explosives.

EXPLOSIVES, BLASTING, TYPE E: UN Nos. 0241, 0332

Substances consisting of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizers, some or all of which are in solution. The other constituents may include nitro-derivatives such as trinitrotoluene, hydrocarbons or aluminium powder. They may contain inert components such as kieselguhr and additives such as colouring agents and stabilizers. The term includes explosives, emulsion, explosives, slurry and explosives, watergel.

FIREWORKS: UN Nos. 0333, 0334, 0335, 0336, 0337

Pyrotechnic articles designed for entertainment.

FLARES, AERIAL: UN Nos. 0093, 0403, 0404, 0420, 0421

Articles containing pyrotechnic substances which are designed to be dropped from an aircraft to illuminate, identify, signal or warn.

FLARES, SURFACE: UN Nos. 0092, 0418, 0419

Articles containing pyrotechnic substances which are designed for use on the surface to illuminate, identify, signal or warn.

FLASH POWDER: UN Nos. 0094, 0305

Pyrotechnic substance which, when ignited, produces an intense light.

FRACTURING DEVICES, EXPLOSIVE without detonator, for oil wells: UN No. 0099

Articles consisting of a charge of detonating explosive contained in a casing without means of initiation. They are used to fracture the rock around a drill shaft to assist the flow of crude oil from the rock.

FUSE, IGNITER, tubular, metal clad: UN No. 0103

Article consisting of a metal tube with a core of deflagrating explosive.

FUSE, NON-DETONATING: UN No. 0101

Article consisting of cotton yarns impregnated with fine black powder (quickmatch). It burns with an external flame and is used in ignition trains for fireworks, etc.

FUSE, SAFETY: UN No. 0105

Article consisting of a core of fine grained black powder surrounded by a flexible woven fabric with one or more protective outer coverings. When ignited, it burns at a predetermined rate without any external explosive effect.

FUZES, DETONATING: UN Nos. 0106, 0107, 0257, 0367

Articles with explosive components designed to produce a detonation in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to initiate the detonation. They generally incorporate protective features.

FUZES, DETONATING with protective features: UN Nos. 0408, 0409, 0410

Articles with explosive components designed to produce a detonation in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to initiate the detonation. The detonating fuze must incorporate two or more effective protective features.

FUZES, IGNITING: UN Nos. 0316, 0317, 0368

Articles with primary explosive components designed to produce a deflagration in ammunition. They incorporate mechanical, electrical, chemical or hydrostatic components to start the deflagration. They generally incorporate protective features.

GRENADES, hand or rifle, with bursting charge: UN Nos. 0284, 0285

Articles which are designed to be thrown by hand or to be projected by a rifle. They are without means of initiation or with means of initiation containing two or more effective protective features.

GRENADES, hand or rifle, with bursting charge: UN Nos. 0292, 0293

Articles which are designed to be thrown by hand or to be projected by a rifle. They are with means of initiation not containing two or more effective protective features.

GRENADES, PRACTICE, hand or rifle: UN Nos. 0110, 0372, 0318, 0452

Articles without a main bursting charge which are designed to be thrown by hand or to be projected by a rifle. They contain the priming device and may contain a spotting charge.

HEXOTONAL: UN No. 0393

Substance consisting of an intimate mixture of cyclotrimethylene-trinitramine (RDX), trinitrotoluene (TNT) and aluminium.

HEXOLITE (HEXOTOL), dry or wetted with less than 15% water, by mass: UN No. 0118

Substance consisting of an intimate mixture of cyclotrimethylene-trinitramine (RDX) and trinitrotoluene (TNT). The term includes "Composition B".

IGNITERS: UN Nos. 0121, 0314, 0315, 0325, 0454

Articles containing one or more explosive substances designed to produce a deflagration in an explosive train. They may be actuated chemically, electrically or mechanically.

NOTE: *The following articles: CORD, IGNITER, FUSE, IGNITER; FUSE, NON-DETONATING; FUZES, IGNITING; LIGHTERS, FUSE; PRIMERS, CAP TYPE; PRIMERS, TUBULAR are not included in this definition. They are listed separately.*

JET PERFORATING GUNS, CHARGED, oil well, without detonator: UN Nos. 0124, 0494

Articles consisting of a steel tube or metallic strip, into which are inserted shaped charges connected by detonating cord, without means of initiation.

LIGHTERS, FUSE: UN No. 0131

Articles of various design actuated by friction, percussion or electricity and used to ignite a safety fuse.

MINES with bursting charge: UN Nos. 0137, 0138

Articles consisting normally of metal or composition receptacles filled with a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes "Bangalore torpedoes".

MINES with bursting charge: UN Nos. 0136, 0294

Articles consisting normally of metal or composition receptacles filled with a detonating explosive, with means of initiation not containing two or more effective protective features. They are designed to be operated by the passage of ships, vehicles or personnel. The term includes "Bangalore torpedoes".

OCTOLITE (OCTOL), dry or wetted with less than 15% water, by mass: UN No. 0266

Substance consisting of an intimate mixture of cyclotetramethylene-tetranitramine (HMX) and trinitrotoluene (TNT).

OCTONAL: UN No. 0496

Substance consisting of an intimate mixture of cyclotetramethylenetetranitramine (HMX), trinitrotoluene (TNT) and aluminium.

PENTOLITE, dry or wetted with less than 15% water, by mass: UN No. 0151

Substance consisting of an intimate mixture of pentaerythrite tetranitrate (PETN) and trinitrotoluene (TNT).

POWDER CAKE (POWDER PASTE), WETTED with not less than 17% alcohol, by mass; POWDER CAKE (POWDER PASTE), WETTED with not less than 25% water, by mass: UN Nos. 0433, 0159

Substance consisting of nitrocellulose impregnated with not more than 60% of nitroglycerine or other liquid organic nitrates or a mixture of these.

POWDER, SMOKELESS: UN Nos. 0160, 0161, 0509

Substance based on nitrocellulose used as propellant. The term includes propellants with a single base (nitrocellulose (NC) alone), those with a double base (such as NC and nitroglycerine/(NG)) and those with a triple base (such as NC/NG/nitroguanidine).

NOTE: Cast, pressed or bag-charges of smokeless powder are listed under CHARGES, PROPELLING or CHARGES, PROPELLING, FOR CANON.

PRIMERS, CAP TYPE: UN Nos. 0044, 0377, 0378

Articles consisting of a metal or plastics cap containing a small amount of primary explosive mixture that is readily ignited by impact. They serve as igniting elements in small arms cartridges and in percussion primers for propelling charges.

PRIMERS, TUBULAR: UN Nos. 0319, 0320, 0376

Articles consisting of a primer for ignition and an auxiliary charge of deflagrating explosive such as black powder used to ignite the propelling charge in a cartridge case for cannon, etc.

PROJECTILES, inert with tracer: UN Nos. 0345, 0424, 0425

Articles such as a shell or bullet, which are projected from a cannon or other gun, rifle or other small arm.

PROJECTILES with burster or expelling charge: UN Nos. 0346, 0347

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are without means of initiation or with means of initiation containing two or more effective protective features. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with burster or expelling charge: UN Nos. 0426, 0427

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are with means of initiation not containing two or more effective protective features. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with burster or expelling charge: UN Nos. 0434, 0435

Articles such as a shell or bullet, which are projected from a cannon or other gun, rifle or other small arm. They are used to scatter dyes for spotting or other inert materials.

PROJECTILES with bursting charge: UN Nos. 0168, 0169, 0344

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are without means of initiation or with means of initiation containing two or more effective protective features.

PROJECTILES with bursting charge: UN Nos. 0167, 0324

Articles such as a shell or bullet, which are projected from a cannon or other gun. They are with means of initiation not containing two or more effective protective features.

PROPELLANT, LIQUID: UN Nos. 0495, 0497

Substance consisting of a deflagrating liquid explosive, used for propulsion.

PROPELLANT, SOLID: UN Nos. 0498, 0499, 0501

Substance consisting of a deflagrating solid explosive, used for propulsion.

RELEASE DEVICES, EXPLOSIVE: UN No. 0173

Articles consisting of a small charge of explosive with means of initiation and rods or links. They sever the rods or links to release equipment quickly.

RIVETS, EXPLOSIVE: UN No. 0174

Articles consisting of a small charge of explosive inside a metallic rivet.

ROCKET MOTORS: UN Nos. 0186, 0280, 0281, 0510

Articles consisting of a charge of explosive, generally a solid propellant, contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKET MOTORS, LIQUID FUELLED: UN Nos. 0395, 0396

Articles consisting of a liquid fuel within a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKET MOTORS WITH HYPERGOLIC LIQUIDS with or without expelling charge: UN Nos. 0322, 0250

Articles consisting of a hypergolic fuel contained in a cylinder fitted with one or more nozzles. They are designed to propel a rocket or a guided missile.

ROCKETS, LINE THROWING: UN Nos. 0238, 0240, 0453

Articles consisting of a rocket motor which is designed to extend a line.

ROCKETS, LIQUID FUELLED with bursting charge: UN Nos. 0397, 0398

Articles consisting of a liquid fuel within a cylinder fitted with one or more nozzles and fitted with a warhead. The term includes guided missiles.

ROCKETS with bursting charge: UN Nos. 0181, 0182

Articles consisting of a rocket motor and a warhead without means of initiation or with means of initiation containing two or more effective protective features. The term includes guided missiles.

ROCKETS with bursting charge: UN Nos. 0180, 0295

Articles consisting of a rocket motor and a warhead with means of initiation not containing two or more effective protective features. The term includes guided missiles.

ROCKETS with expelling charge: UN Nos. 0436, 0437, 0438

Articles consisting of a rocket motor and a charge to expel the payload from a rocket head. The term includes guided missiles.

ROCKETS with inert head: UN Nos. 0183, 0502

Articles consisting of a rocket motor and an inert head. The term includes guided missiles.

SAFETY DEVICES, PYROTECHNIC: UN No. 0503

Articles which contain pyrotechnic substances or dangerous goods of other classes and are used in vehicles, vessels or aircraft to enhance safety to persons. Examples are: air bag inflators, air bag

modules, seat-belt pretensioners and pyromechanical devices. These pyromechanical devices are assembled components for tasks such as but not limited to separation, locking, or occupant restraint.

SAMPLES, EXPLOSIVE, other than initiating explosive UN No. 0190

New or existing explosive substances or articles, not yet assigned to a name in Table A of Chapter 3.2 and carried in conformity with the instructions of the competent authority and generally in small quantities, *inter alia*, for the purposes of testing, classification, research and development, or quality control, or as commercial samples.

NOTE: Explosive substances or articles already assigned to another name in Table A of Chapter 3.2 are not included in this definition.

SIGNAL DEVICES, HAND: UN Nos. 0191, 0373

Portable articles containing pyrotechnic substances which produce visual signals or warnings. The term includes small surface flares such as highway or railway flares and small distress flares.

SIGNALS, DISTRESS, ship: UN Nos. 0194, 0195, 0505, 0506

Articles containing pyrotechnic substances designed to produce signals by means of sound, flame or smoke or any combination thereof.

SIGNALS, RAILWAY TRACK, EXPLOSIVE: UN Nos. 0192, 0193, 0492, 0493

Articles containing a pyrotechnic substance which explodes with a loud report when the article is crushed. They are designed to be placed on a rail.

SIGNALS, SMOKE: UN Nos. 0196, 0197, 0313, 0487, 0507

Articles containing pyrotechnic substances which emit smoke. In addition they may contain devices for emitting audible signals.

SOUNDING DEVICES, EXPLOSIVE: UN Nos. 0374, 0375

Articles consisting of a charge of detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are dropped from ships and function when they reach a predetermined depth or the sea bed.

SOUNDING DEVICES, EXPLOSIVE: UN Nos. 0204, 0296

Articles consisting of a charge of detonating explosive with means of initiation not containing two or more effective protective features. They are dropped from ships and function when they reach a predetermined depth or the sea bed.

SUBSTANCES, EXPLOSIVE, VERY INSENSITIVE (Substances, EVI), N.O.S.: UN No. 0482

Substances presenting a mass explosion hazard but which are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport, and which have passed Test Series 5.

TORPEDOES, LIQUID FUELLED with inert head: UN No. 0450

Articles consisting of a liquid explosive system to propel the torpedo through the water, with an inert head.

TORPEDOES, LIQUID FUELLED with or without bursting charge: UN No. 0449

Articles consisting of either a liquid explosive system to propel the torpedo through the water, with or without a warhead; or a liquid non-explosive system to propel the torpedo through the water, with a warhead.

TORPEDOES with bursting charge: UN No. 0451

Articles consisting of a non-explosive system to propel the torpedo through the water, and a warhead without means of initiation or with means of initiation containing two or more effective protective features.

TORPEDOES with bursting charge: UN No. 0329

Articles consisting of an explosive system to propel the torpedo through the water, and a warhead without means of initiation or with means of initiation containing two or more effective protective features.

TORPEDOES with bursting charge: UN No. 0330

Articles consisting of an explosive or non-explosive system to propel the torpedo through the water, and a warhead with means of initiation not containing two or more effective protective features.

TRACERS FOR AMMUNITION: UN Nos. 0212, 0306

Sealed articles containing pyrotechnic substances, designed to reveal the trajectory of a projectile.

TRITONAL: UN No. 0390

Substance consisting of trinitrotoluene (TNT) mixed with aluminium.

WARHEADS, ROCKET with burster or expelling charge: UN No. 0370

Articles consisting of an inert payload and a small charge of detonating or deflagrating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a rocket motor to scatter inert material. The term includes warheads for guided missiles.

WARHEADS, ROCKET with burster or expelling charge: UN No. 0371

Articles consisting of an inert payload and a small charge of detonating or deflagrating explosive, with means of initiation not containing two or more effective protective features. They are designed to be fitted to a rocket motor to scatter inert material. The term includes warheads for guided missiles.

WARHEADS, ROCKET with bursting charge: UN Nos. 0286, 0287

Articles consisting of a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a rocket. The term includes warheads for guided missiles.

WARHEADS, ROCKET with bursting charge: UN No. 0369

Articles consisting of a detonating explosive, with means of initiation not containing two or more effective protective features. They are designed to be fitted to a rocket. The term includes warheads for guided missiles.

WARHEADS, TORPEDO with bursting charge: UN No. 0221

Articles consisting of a detonating explosive, without means of initiation or with means of initiation containing two or more effective protective features. They are designed to be fitted to a torpedo.

2.2.2 Class 2 Gases**2.2.2.1 Criteria**

2.2.2.1.1 The heading of Class 2 covers pure gases, mixtures of gases, mixtures of one or more gases with one or more other substances and articles containing such substances.

A gas is a substance which:

- (a) at 50 °C has a vapour pressure greater than 300 kPa (3 bar); or
- (b) is completely gaseous at 20 °C at the standard pressure of 101.3 kPa.

NOTE 1: UN No. 1052 HYDROGEN FLUORIDE, ANHYDROUS is nevertheless classified in Class 8.

NOTE 2: A pure gas may contain other components deriving from its production process or added to preserve the stability of the product, provided that the level of these components does not change its classification or its conditions of carriage, such as filling ratio, filling pressure, test pressure.

NOTE 3: N.O.S. entries in 2.2.2.3 may cover pure gases as well as mixtures.

2.2.2.1.2 The substances and articles of Class 2 are subdivided as follows:

1. *Compressed gas*: a gas which when packaged under pressure for carriage is entirely gaseous at -50 °C; this category includes all gases with a critical temperature less than or equal to -50 °C;
2. *Liquefied gas*: a gas which when packaged under pressure for carriage is partially liquid at temperatures above -50 °C. A distinction is made between:

High pressure liquefied gas: a gas with a critical temperature above -50 °C and equal to or below +65 °C; and

Low pressure liquefied gas: a gas with a critical temperature above +65 °C;

3. *Refrigerated liquefied gas*: a gas which when packaged for carriage is made partially liquid because of its low temperature;
4. *Dissolved gas*: a gas which when packaged under pressure for carriage is dissolved in a liquid phase solvent;
5. Aerosol dispensers and receptacles, small, containing gas (gas cartridges);
6. Other articles containing gas under pressure;
7. Non-pressurized gases subject to special requirements (gas samples);
8. Chemicals under pressure: liquids, pastes or powders, pressurized with a propellant that meets the definition of a compressed or liquefied gas and mixtures thereof.
9. *Adsorbed gas*: a gas which when packaged for carriage is adsorbed onto a solid porous material resulting in an internal receptacle pressure of less than 101.3 kPa at 20 °C and less than 300 kPa at 50 °C.

2.2.2.1.3 Substances and articles (except aerosols and chemicals under pressure) of Class 2 are assigned to one of the following groups according to their hazardous properties, as follows:

- A asphyxiant;
- O oxidizing;
- F flammable;
- T toxic;
- TF toxic, flammable;

TC toxic, corrosive;
TO toxic, oxidizing;
TFC toxic, flammable, corrosive;
TOC toxic, oxidizing, corrosive.

For gases and gas mixtures presenting hazardous properties associated with more than one group according to the criteria, the groups designated by letter T take precedence over all other groups. The groups designated by letter F take precedence over the groups designated by letters A or O.

NOTE 1: In the UN Model Regulations, the IMDG Code and the ICAO Technical Instructions, gases are assigned to one of the following three divisions, based on the primary hazard:

Division 2.1: flammable gases (corresponding to the groups designated by the capital letter F);

Division 2.2: non-flammable, non-toxic gases (corresponding to the groups designated by the capital letters A or O);

Division 2.3: toxic gases (corresponding to the groups designated by the capital letter T i.e. T, TF, TC, TO, TFC and TOC).

NOTE 2: Receptacles, small containing gas (UN No. 2037) shall be assigned to the groups A to TOC according to the hazard of the contents. For aerosols (UN No. 1950), see 2.2.2.1.6. For chemicals under pressure (UN Nos. 3500 to 3505), see 2.2.2.1.7.

NOTE 3: Corrosive gases are considered to be toxic, and are therefore assigned to the group TC, TFC or TOC.

2.2.2.1.4 If a mixture of Class 2 mentioned by name in Table A of Chapter 3.2 meets different criteria as mentioned in 2.2.2.1.2 and 2.2.2.1.5, this mixture shall be classified according to the criteria and assigned to an appropriate N.O.S. entry.

2.2.2.1.5 Substances and articles (except aerosols and chemicals under pressure) of Class 2 which are not mentioned by name in Table A of Chapter 3.2 shall be classified under a collective entry listed in 2.2.2.3 in accordance with 2.2.2.1.2 and 2.2.2.1.3. The following criteria shall apply:

Asphyxiant gases

Gases which are non-oxidizing, non-flammable and non-toxic and which dilute or replace oxygen normally in the atmosphere.

Flammable gases

Gases which at 20 °C and a standard pressure of 101.3 kPa:

- (a) are ignitable when in a mixture of 13% or less by volume with air; or
- (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit.

Flammability shall be determined by tests or by calculation, in accordance with methods adopted by ISO (see ISO 10156:2010).

Where insufficient data are available to use these methods, tests by a comparable method recognized by the competent authority of the country of origin may be used.

If the country of origin is not a Contracting Party to ADR these methods shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.

Oxidizing gases

Gases, which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. These are pure gases or gas mixtures with an oxidizing power greater than 23.5% as determined by a method specified in ISO 10156:2010.

Toxic gases

NOTE: *Gases meeting the criteria for toxicity in part or completely owing to their corrosivity are to be classified as toxic. See also the criteria under the heading "Corrosive gases" for a possible subsidiary corrosivity hazard.*

Gases which:

- (a) are known to be so toxic or corrosive to humans as to pose a hazard to health; or
- (b) are presumed to be toxic or corrosive to humans because they have a LC₅₀ value for acute toxicity equal to or less than 5 000 ml/m³ (ppm) when tested in accordance with 2.2.61.1.

In the case of gas mixtures (including vapours of substances from other classes) the following formula may be used:

$$LC_{50} \text{ Toxic (mixture)} = \frac{1}{\sum_{i=1}^n \frac{f_i}{T_i}}$$

where f_i = mole fraction of the i^{th} component substance of the mixture;

T_i = toxicity index of the i^{th} component substance of the mixture.

The T_i equals the LC₅₀ value as found in packing instruction P200 of 4.1.4.1.

When no LC₅₀ value is listed in packing instruction P200 of 4.1.4.1, a LC₅₀ value available in scientific literature shall be used.

When the LC₅₀ value is unknown, the toxicity index is determined by using the lowest LC₅₀ value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

Corrosive gases

Gases or gas mixtures meeting the criteria for toxicity completely owing to their corrosivity are to be classified as toxic with a subsidiary corrosivity hazard.

A gas mixture that is considered to be toxic due to the combined effects of corrosivity and toxicity has a subsidiary hazard of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membranes or when the LC₅₀ value of the corrosive components of the mixture is equal to or less than 5 000 ml/m³ (ppm) when the LC₅₀ is calculated by the formula:

$$LC_{50} \text{ Corrosive (mixture)} = \frac{1}{\sum_{i=1}^n \frac{f_{ci}}{T_{ci}}}$$

where f_{ci} = mole fraction of the i^{th} corrosive component substance of the mixture;

T_{ci} = toxicity index of the i^{th} corrosive component substance of the mixture.

The T_{ci} equals the LC₅₀ value as found in packing instruction P200 of 4.1.4.1.

When no LC₅₀ value is listed in packing instruction P200 of 4.1.4.1, a LC₅₀ value available in scientific literature shall be used.

When the LC₅₀ value is unknown the toxicity index is determined by using the lowest LC₅₀ value of substances of similar physiological and chemical effects, or through testing if this is the only practical possibility.

2.2.2.1.6 *Aerosols*

Aerosols (UN No. 1950) are assigned to one of the following groups according to their hazardous properties, as follows:

A	asphyxiant;
O	oxidizing;
F	flammable;
T	toxic;
C	corrosive;
CO	corrosive, oxidizing;
FC	flammable, corrosive;
TF	toxic, flammable;
TC	toxic, corrosive;
TO	toxic, oxidizing;
TFC	toxic, flammable, corrosive;
TOC	toxic, oxidizing, corrosive.

The classification depends on the nature of the contents of the aerosol dispenser.

NOTE: *Gases, which meet the definition of toxic gases according to 2.2.2.1.5 and gases identified as "Considered as pyrophoric" by table note c of Table 2 of packing instruction P200 in 4.1.4.1, shall not be used as a propellant in an aerosol dispenser. Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity shall not be accepted for carriage (see also 2.2.2.2.2).*

The following criteria shall apply:

- (a) Assignment to group A shall apply when the contents do not meet the criteria for any other group according to sub-paragraphs (b) to (f) below;
- (b) Assignment to group O shall apply when the aerosol contains an oxidizing gas according to 2.2.2.1.5;
- (c) Assignment to group F shall apply if the contents include 85% by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more.

It shall not apply if the contents contain 1% by mass or less flammable components and the heat of combustion is less than 20 kJ/g.

Otherwise the aerosol shall be tested for flammability in accordance with the tests described in the *Manual of Tests and Criteria*, Part III, section 31. Extremely flammable and flammable aerosols shall be assigned to group F;

NOTE: *Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of sub-section 31.1.3 of Part III of the Manual of Tests and Criteria. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion shall be determined by one of the following methods ASTM D 240, ISO/CDIS 13943:1999 (E/F) 86.1 to 86.3 or NFPA 30B.*

- (d) Assignment to group T shall apply when the contents, other than the propellant of aerosol dispensers to be ejected, are classified as Class 6.1, packing groups II or III;
- (e) Assignment to group C shall apply when the contents, other than the propellant of aerosol dispensers to be ejected, meet the criteria for Class 8, packing groups II or III;
- (f) When the criteria for more than one group amongst groups O, F, T, and C are met, assignment to groups CO, FC, TF, TC TO, TFC or TOC shall apply, as relevant.

2.2.2.1.7 *Chemicals under pressure*

Chemicals under pressure (UN Nos. 3500 to 3505) are assigned to one of the following groups according to their hazardous properties, as follows:

- A asphyxiant;
- F flammable;
- T toxic;
- C corrosive;
- FC flammable, corrosive;
- TF toxic, flammable.

The classification depends on the hazard characteristics of the components in the different states:

The propellant;

The liquid; or

The solid.

NOTE 1: *Gases, which meet the definition of toxic gases or of oxidizing gases according to 2.2.2.1.5 or gases identified as "Considered as pyrophoric" by table note c of Table 2 of packing instruction P200 in 4.1.4.1, shall not be used as a propellant in chemicals under pressure.*

NOTE 2: *Chemicals under pressure with contents meeting the criteria for packing group I for toxicity or corrosivity or with contents meeting both the criteria for packing group II or III for toxicity and for packing group II or III for corrosivity shall not be accepted for carriage under these UN numbers.*

NOTE 3: *Chemicals under pressure with components meeting the properties of Class 1; liquid desensitized explosives of Class 3; self-reactive substances and solid desensitized explosives of Class 4.1; Class 4.2; Class 4.3; Class 5.1; Class 5.2; Class 6.2; or Class 7, shall not be used for carriage under these UN numbers.*

NOTE 4: *A chemical under pressure in an aerosol dispenser shall be carried under UN No. 1950.*

The following criteria shall apply:

- (a) Assignment to group A shall apply when the contents do not meet the criteria for any other group according to sub-paragraphs (b) to (e) below;

(b) Assignment to group F shall apply if one of the components, which can be a pure substance or a mixture, needs to be classified as flammable. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

- (i) A flammable liquid is a liquid having a flashpoint of not more than 93 °C;
- (ii) A flammable solid is a solid which meets the criteria in 2.2.41.1;
- (iii) A flammable gas is a gas which meets the criteria in 2.2.2.1.5;

(c) Assignment to group T shall apply when the contents, other than the propellant, are classified as dangerous goods of Class 6.1, packing groups II or III;

(d) Assignment to group C shall apply when the contents, other than the propellant, are classified as dangerous goods of Class 8, packing groups II or III;

(e) When the criteria for two groups amongst groups F, T, and C are met, assignment to groups FC or TF shall apply, as relevant.

2.2.2.2

Gases not accepted for carriage

2.2.2.2.1

Chemically unstable gases of Class 2 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage or unless carried in accordance with special packing provision (r) of packing instruction P200 (10) of 4.1.4.1, as applicable. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.2.2.2

The following substances and mixtures shall not be accepted for carriage:

- UN No. 2186 HYDROGEN CHLORIDE, REFRIGERATED LIQUID;
- UN No. 2421 NITROGEN TRIOXIDE;
- UN No. 2455 METHYL NITRITE;
- Refrigerated liquefied gases which cannot be assigned to classification codes 3A, 3O or 3F;
- Dissolved gases which cannot be classified under UN Nos. 1001, 2073 or 3318;
- Aerosols where gases which are toxic according to 2.2.2.1.5 or pyrophoric according to packing instruction P200 in 4.1.4.1 are used as propellants;
- Aerosols with contents meeting the criteria for packing group I for toxicity or corrosivity (see 2.2.61 and 2.2.8);
- Receptacles, small, containing gases which are very toxic (LC₅₀ lower than 200 ppm) or pyrophoric according to packing instruction P200 in 4.1.4.1.

2.2.2.3 *List of collective entries*

Compressed gases		
Classification code	UN No.	Name of the substance or article
1A	1956	COMPRESSED GAS, N.O.S.
1O	3156	COMPRESSED GAS, OXIDIZING, N.O.S.
1F	1964	HYDROCARBON GAS MIXTURE, COMPRESSED, N.O.S.
	1954	COMPRESSED GAS, FLAMMABLE, N.O.S.
1T	1955	COMPRESSED GAS, TOXIC, N.O.S.
1TF	1953	COMPRESSED GAS, TOXIC, FLAMMABLE, N.O.S.
1TC	3304	COMPRESSED GAS, TOXIC, CORROSIVE, N.O.S.
1TO	3303	COMPRESSED GAS, TOXIC, OXIDIZING, N.O.S.
1TFC	3305	COMPRESSED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
1TOC	3306	COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.

Liquefied gases		
Classification code	UN No.	Name of the substance or article
2A	1058	LIQUEFIED GASES, non-flammable, charged with nitrogen, carbon dioxide or air
	1078	REFRIGERANT GAS, N.O.S. such as mixtures of gases, indicated by the letter R..., which as: Mixture F1, have a vapour pressure at 70 °C not exceeding 1.3 MPa (13 bar) and a density at 50 °C not lower than that of dichlorofluoromethane (1.30 kg/l); Mixture F2, have a vapour pressure at 70 °C not exceeding 1.9 MPa (19 bar) and a density at 50 °C not lower than that of dichlorodifluoromethane (1.21 kg/l); Mixture F3, have a vapour pressure at 70 °C not exceeding 3 MPa (30 bar) and a density at 50 °C not lower than that of chlorodifluoromethane (1.09 kg/l). <i>NOTE: Trichlorofluoromethane (Refrigerant R 11), 1,1,2-trichloro-1,2,2-trifluoroethane (Refrigerant R 113), 1,1,1-trichloro-2,2,2-trifluoroethane (Refrigerant R 113a), 1-chloro-1,2,2-trifluoroethane (Refrigerant R 133) and 1-chloro-1,1,2-trifluoroethane (Refrigerant R 133b) are not substances of Class 2. They may, however, enter into the composition of mixtures F1 to F3.</i>
	1968	INSECTICIDE GAS, N.O.S.
	3163	LIQUEFIED GAS, N.O.S.
2O	3157	LIQUEFIED GAS, OXIDIZING, N.O.S.
2F	1010	BUTADIENES AND HYDROCARBON MIXTURE, STABILIZED, having a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l. <i>NOTE: Butadienes, stabilized are also classified under UN No. 1010, see Table A of Chapter 3.2.</i>
	1060	METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED such as mixtures of methylacetylene and propadiene with hydrocarbons, which as: Mixture P1, contain not more than 63% methylacetylene and propadiene by volume and not more than 24% propane and propylene by volume, the percentage of C ₄ - saturated hydrocarbons being not less than 14% by volume; and as Mixture P2, contain not more than 48% methylacetylene and propadiene by volume and not more than 50% propane and propylene by volume, the percentage of C ₄ - saturated hydrocarbons being not less than 5% by volume, as well as mixtures of propadiene with 1 to 4% methylacetylene.

Liquefied gases (cont'd)		
Classification code	UN No.	Name of the substance or article
2F <i>(cont'd)</i>	1965	<p>HYDROCARBON GAS MIXTURE, LIQUEFIED, N.O.S such as mixtures, which as:</p> <p>Mixture A, have a vapour pressure at 70 °C not exceeding 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l;</p> <p>Mixture A01, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a relative density at 50 °C not lower than 0.516 kg/l;</p> <p>Mixture A02, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a relative density at 50 °C not lower than 0.505 kg/l;</p> <p>Mixture A0, have a vapour pressure at 70 °C not exceeding 1.6 MPa (16 bar) and a density at 50 °C not lower than 0.495 kg/l;</p> <p>Mixture A1, have a vapour pressure at 70 °C not exceeding 2.1 MPa (21 bar) and a density at 50 °C not lower than 0.485 kg/l;</p> <p>Mixture B1 have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a relative density at 50 °C not lower than 0.474 kg/l;</p> <p>Mixture B2 have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a relative density at 50 °C not lower than 0.463 kg/l;</p> <p>Mixture B, have a vapour pressure at 70 °C not exceeding 2.6 MPa (26 bar) and a density at 50 °C not lower than 0.450 kg/l;</p> <p>Mixture C, have a vapour pressure at 70 °C not exceeding 3.1 MPa (31 bar) and a relative density at 50 °C not lower than 0.440 kg/l;</p> <p><i>NOTE 1: In the case of the foregoing mixtures, the use of the following names customary in the trade is permitted for describing these substances: for mixtures A, A01, A02 and A0: BUTANE; for mixture C: PROPANE.</i></p> <p><i>NOTE 2: UN No. 1075 PETROLEUM GASES, LIQUEFIED may be used as an alternative entry for UN No. 1965 HYDROCARBON GAS MIXTURE LIQUEFIED, N.O.S. for carriage prior to or following maritime or air carriage.</i></p>
	3354	INSECTICIDE GAS, FLAMMABLE, N.O.S.
	3161	LIQUEFIED GAS, FLAMMABLE, N.O.S.
2T	1967	INSECTICIDE GAS, TOXIC, N.O.S.
	3162	LIQUEFIED GAS, TOXIC, N.O.S.
2TF	3355	INSECTICIDE GAS, TOXIC, FLAMMABLE, N.O.S.
	3160	LIQUEFIED GAS, TOXIC, FLAMMABLE, N.O.S.
2TC	3308	LIQUEFIED GAS, TOXIC, CORROSIVE, N.O.S.
2TO	3307	LIQUEFIED GAS, TOXIC, OXIDIZING, N.O.S.
2TFC	3309	LIQUEFIED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
2TOC	3310	LIQUEFIED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.

Refrigerated liquefied gases		
Classification code	UN No.	Name of the substance or article
3A	3158	GAS, REFRIGERATED LIQUID, N.O.S.
3O	3311	GAS, REFRIGERATED LIQUID, OXIDIZING, N.O.S.
3F	3312	GAS, REFRIGERATED LIQUID, FLAMMABLE, N.O.S.

Dissolved gases		
Classification code	UN No.	Name of the substance or article
4		Only substances listed in Table A of Chapter 3.2 are to be accepted for carriage.

Aerosols and receptacles, small, containing gas		
Classification code	UN No.	Name of the substance or article
5	1950	AEROSOLS
	2037	RECEPTACLES, SMALL CONTAINING GAS (GAS CARTRIDGES) without a release device, non-refillable

Other articles containing gas under pressure		
Classification code	UN No.	Name of the substance or article
6A	2857	REFRIGERATING MACHINES containing non-flammable, non-toxic gases or ammonia solutions (UN 2672)
	3164	ARTICLES, PRESSURIZED, PNEUMATIC (containing non-flammable gas) or
	3164	ARTICLES, PRESSURIZED, HYDRAULIC (containing non-flammable gas)
	3538	ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.
6F	3150	DEVICES, SMALL, HYDROCARBON GAS POWERED or
	3150	HYDROCARBON GAS REFILLS FOR SMALL DEVICES, with release device
	3478	FUEL CELL CARTRIDGES, containing liquefied flammable gas or
	3478	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing liquefied flammable gas or
	3478	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing liquefied flammable gas
	3479	FUEL CELL CARTRIDGES, containing hydrogen in metal hydride or
	3479	FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT, containing hydrogen in metal hydride or
	3479	FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT, containing hydrogen in metal hydride
	3529	ENGINE, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or
	3529	ENGINE, FUEL CELL, FLAMMABLE GAS POWERED or
	3529	MACHINERY, INTERNAL COMBUSTION, FLAMMABLE GAS POWERED or
	3529	MACHINERY, FUEL CELL, FLAMMABLE GAS POWERED
	3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.
6T	3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.

Gas samples		
Classification code	UN No.	Name of the substance or article
7F	3167	GAS SAMPLE, NON-PRESSURIZED, FLAMMABLE, N.O.S., not refrigerated liquid
7T	3169	GAS SAMPLE, NON-PRESSURIZED, TOXIC, N.O.S., not refrigerated liquid
7TF	3168	GAS SAMPLE, NON-PRESSURIZED, TOXIC, FLAMMABLE, N.O.S., not refrigerated liquid

Chemicals under pressure		
Classification code	UN No.	Name of the substance or article
8A	3500	CHEMICAL UNDER PRESSURE, N.O.S.
8F	3501	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.
8T	3502	CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.
8C	3503	CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.
8TF	3504	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.
8FC	3505	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.

Adsorbed gases		
Classification code	UN No.	Name of the substance or article
9A	3511	ADSORBED GAS, N.O.S.
9O	3513	ADSORBED GAS, OXIDIZING, N.O.S.
9F	3510	ADSORBED GAS, FLAMMABLE, N.O.S.
9T	3512	ADSORBED GAS, TOXIC, N.O.S.
9TF	3514	ADSORBED GAS, TOXIC, FLAMMABLE, N.O.S.
9TC	3516	ADSORBED GAS, TOXIC, CORROSIVE, N.O.S.
9TO	3515	ADSORBED GAS, TOXIC, OXIDIZING, N.O.S.
9TFC	3517	ADSORBED GAS, TOXIC, FLAMMABLE, CORROSIVE, N.O.S.
9TOC	3518	ADSORBED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S.

2.2.3 Class 3 Flammable liquids**2.2.3.1 Criteria**

2.2.3.1.1 The heading of Class 3 covers substances and articles containing substances of this Class which:

- are liquids according to subparagraph (a) of the definition for "liquid" in 1.2.1;
- have at 50 °C a vapour pressure of not more than 300 kPa (3 bar) and are not completely gaseous at 20 °C and at standard pressure of 101.3 kPa; and
- have a flash-point of not more than 60 °C (see 2.3.3.1 for the relevant test).

The heading of Class 3 also covers liquid substances and molten solid substances with a flash-point of more than 60°C and which are carried or handed over for carriage whilst heated at temperatures equal to or higher than their flash-point. These substances are assigned to UN No. 3256.

The heading of Class 3 also covers liquid desensitized explosives. Liquid desensitized explosives are explosive substances which are dissolved or suspended in water or other liquid substances, to form an homogeneous liquid mixture to suppress their explosive properties. Such entries in Table A of Chapter 3.2 are UN Nos. 1204, 2059, 3064, 3343, 3357 and 3379.

NOTE 1: Substances having a flash-point above 35 °C, which do not sustain combustion according to the criteria of sub-section 32.2.5 of Part III of the Manual of Tests and Criteria, are not substances of Class 3; if, however, these substances are handed over for carriage and carried whilst heated at temperatures equal to or higher than their flash-point, they are substances of Class 3.

NOTE 2: By derogation from paragraph 2.2.3.1.1 above, diesel fuel, gasoil, heating oil (light) including synthetically manufactured products having a flash-point above 60 °C and not more than 100 °C shall be deemed substances of Class 3, UN No. 1202.

NOTE 3: Flammable liquids which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9, and toxic substances having a flash-point of 23 °C or above are substances of Class 6.1 (see 2.2.61.1). Liquids which are highly toxic by inhalation are indicated as "toxic by inhalation" in their proper shipping name in Column (2) or by special provision 354 in Column (6) of Table A of Chapter 3.2.

NOTE 4: Flammable liquid substances and preparations used as pesticides, which are highly toxic, toxic or slightly toxic and have a flash-point of 23 °C or above are substances of Class 6.1 (see 2.2.61.1).

2.2.3.1.2 The substances and articles of Class 3 are subdivided as follows:

F Flammable liquids, without subsidiary hazard and articles containing such substances:

- F1 Flammable liquids having a flash-point of or below 60 °C;
- F2 Flammable liquids having a flash-point above 60 °C which are carried or handed over for carriage at or above their flash-point (elevated temperature substances);
- F3 Articles containing flammable liquids;

FT Flammable liquids, toxic:

- FT1 Flammable liquids, toxic;

- FT2 Pesticides;

FC Flammable liquids, corrosive;

FTC Flammable liquids, toxic, corrosive;

D Liquid desensitized explosives.

2.2.3.1.3

Substances and articles classified in Class 3 are listed in Table A of Chapter 3.2. Substances not mentioned by name in Table A of Chapter 3.2 shall be assigned to the relevant entry of 2.2.3.3 and the relevant packing group in accordance with the provisions of this section. Flammable liquids shall be assigned to one of the following packing groups according to the degree of danger they present for carriage:

Packing group	Flash point (closed cup)	Initial boiling point
I	--	$\leq 35^{\circ}\text{C}$
II ^a	$< 23^{\circ}\text{C}$	$> 35^{\circ}\text{C}$
III ^a	$\geq 23^{\circ}\text{C} \leq 60^{\circ}\text{C}$	$> 35^{\circ}\text{C}$

^a See also 2.2.3.1.4.

For a liquid with (a) subsidiary hazard(s), the packing group determined in accordance with the table above and the packing group based on the severity of the subsidiary hazard(s) shall be considered; the classification and packing group shall then be determined in accordance with the table of precedence of hazards in 2.1.3.10.

2.2.3.1.4

Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash-point of less than 23°C may be assigned to packing group III in conformity with the procedures prescribed in the Manual of Tests and Criteria, Part III, sub-section 32.3, provided that:

(a) the viscosity² and flash-point are in accordance with the following table:

Kinematic viscosity (extrapolated) ν (at near-zero shear rate) mm^2/s at 23°C	Flow-time t in seconds	Jet diameter (mm)	Flash-point, closed-cup ($^{\circ}\text{C}$)
$20 < \nu \leq 80$	$20 < t \leq 60$	4	above 17
$80 < \nu \leq 135$	$60 < t \leq 100$	4	above 10
$135 < \nu \leq 220$	$20 < t \leq 32$	6	above 5
$220 < \nu \leq 300$	$32 < t \leq 44$	6	above -1
$300 < \nu \leq 700$	$44 < t \leq 100$	6	above -5
$700 < \nu$	$100 < t$	6	no limit

(b) Less than 3% of the clear solvent layer separates in the solvent separation test;
 (c) The mixture or any separated solvent does not meet the criteria for Class 6.1 or Class 8;
 (d) The substances are packed in receptacles of not more than 450 litre capacity.

NOTE: These provisions also apply to mixtures containing no more than 20% nitrocellulose with a nitrogen content not exceeding 12.6% by dry mass. Mixtures containing more than 20% but not more than 55% nitrocellulose with a nitrogen content not exceeding 12.6% by dry mass are substances assigned to UN No. 2059.

Mixtures having a flash-point below 23°C and containing:

- more than 55% nitrocellulose, whatever their nitrogen content; or
- not more than 55% nitrocellulose with a nitrogen content above 12.6% by dry mass,

are substances of Class 1 (UN Nos. 0340 or 0342) or of Class 4.1 (UN Nos. 2555, 2556 or 2557).

² *Viscosity determination:* Where the substance concerned is non-Newtonian, or where a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer shall be used to determine the dynamic viscosity coefficient of the substance, at 23°C , at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.

2.2.3.1.5 *Viscous liquids*

2.2.3.1.5.1 Except as provided for in 2.2.3.1.5.2, viscous liquids which:

- have a flash-point of 23 °C or above and less than or equal to 60 °C;
- are not toxic, corrosive or environmentally hazardous;
- contain not more than 20% nitrocellulose provided the nitrocellulose contains not more than 12.6% nitrogen by dry mass; and
- are packed in receptacles of not more than 450 litre capacity;

are not subject to ADR, if:

- (a) in the solvent separation test (see *Manual of Tests and Criteria*, Part III, sub-section 32.5.1), the height of the separated layer of solvent is less than 3% of the total height; and
- (b) the flowtime in the viscosity test (see *Manual of Tests and Criteria*, Part III, sub-section 32.4.3), with a jet diameter of 6 mm is equal to or greater than:
 - (i) 60 seconds; or
 - (ii) 40 seconds if the viscous liquid contains not more than 60% of Class 3 substances.

2.2.3.1.5.2 Viscous liquids which are also environmentally hazardous, but meet all other criteria in 2.2.3.1.5.1, are not subject to any other provisions of ADR when they are carried in single or combination packagings containing a net quantity per single or inner packaging of 5 litres or less, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.

2.2.3.1.6 If substances of Class 3, as a result of admixtures, come into categories of hazard different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes) see also 2.1.3.

2.2.3.1.7 On the basis of the test procedures in accordance with 2.3.3.1 and 2.3.4, and the criteria set out in 2.2.3.1.1, it may also be determined whether the nature of a solution or a mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this Class (see also 2.1.3).

2.2.3.2 *Substances not accepted for carriage*

2.2.3.2.1 Substances of Class 3 which are liable to form peroxides easily (as happens with ethers or with certain heterocyclic oxygenated substances) shall not be accepted for carriage if their peroxide content, calculated as hydrogen peroxide (H₂O₂), exceeds 0.3%. The peroxide content shall be determined as indicated in 2.3.3.3.

2.2.3.2.2 Chemically unstable substances of Class 3 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.3.2.3 Liquid desensitized explosives other than those listed in Table A of Chapter 3.2 shall not be accepted for carriage as substances of Class 3.

2.2.3.3

List of collective entries

Flammable liquids and articles containing such substances Without subsidiary hazard F	1133 ADHESIVES containing flammable liquid 1136 COAL TAR DISTILLATES, FLAMMABLE 1139 COATING SOLUTION (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining) 1169 EXTRACTS, AROMATIC, LIQUID 1197 EXTRACTS, FLAVOURING, LIQUID 1210 PRINTING INK, flammable or 1210 PRINTING INK RELATED MATERIAL (including printing ink thinning or reducing compound), flammable 1263 PAINT (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or 1263 PAINT RELATED MATERIAL (including paint thinning or reducing compound) 1266 PERFUMERY PRODUCTS with flammable solvents 1293 TINCTURES, MEDICINAL 1306 WOOD PRESERVATIVES, LIQUID 1866 RESIN SOLUTION, flammable 1999 TARS, LIQUID, including road oils, and cutback bitumens 3065 ALCOHOLIC BEVERAGES 1224 KETONES, LIQUID, N.O.S. 1268 PETROLEUM DISTILLATES, N.O.S. or 1268 PETROLEUM PRODUCTS, N.O.S. 1987 ALCOHOLS, N.O.S. 1989 ALDEHYDES, N.O.S. 2319 TERPENE HYDROCARBONS, N.O.S. 3271 ETHERS, N.O.S. 3272 ESTERS, N.O.S. 3295 HYDROCARBONS, LIQUID, N.O.S. 3336 MERCAPTANS, LIQUID, FLAMMABLE, N.O.S. or 3336 MERCAPTANS MIXTURE, LIQUID, FLAMMABLE, N.O.S. 1993 FLAMMABLE LIQUID, N.O.S.
F1	3256 ELEVATED TEMPERATURE LIQUID, FLAMMABLE, N.O.S., with flash-point above 60 °C, at or above its flash-point
F2 elevated temperature	3269 POLYESTER RESIN KIT, liquid base material 3473 FUEL CELL CARTRIDGES or 3473 FUEL CELL CARTRIDGES CONTAINED IN EQUIPMENT or 3473 FUEL CELL CARTRIDGES PACKED WITH EQUIPMENT 3528 ENGINE, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or 3528 ENGINE, FUEL CELL, FLAMMABLE LIQUID POWERED or 3528 MACHINERY, INTERNAL COMBUSTION, FLAMMABLE LIQUID POWERED or 3528 MACHINERY, FUEL CELL, FLAMMABLE LIQUID POWERED 3540 ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.
F3 articles	

(cont'd on next page)

2.2.3.3

List of collective entries (cont'd)

		1228 MERCAPTANS, LIQUID, FLAMMABLE, TOXIC, N.O.S. or 1228 MERCAPTAN MIXTURE, LIQUID, FLAMMABLE, TOXIC, N.O.S. 1986 ALCOHOLS, FLAMMABLE, TOXIC, N.O.S. 1988 ALDEHYDES, FLAMMABLE, TOXIC, N.O.S. 2478 ISOCYANATES, FLAMMABLE, TOXIC, N.O.S. or 2478 ISOCYANATE SOLUTION, FLAMMABLE, TOXIC, N.O.S. 3248 MEDICINE, LIQUID, FLAMMABLE, TOXIC, N.O.S. 3273 NITRILES, FLAMMABLE, TOXIC, N.O.S. 1992 FLAMMABLE LIQUID, TOXIC, N.O.S.
Toxic	FT	2758 CARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2760 ARSENIC PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2762 ORGANOCHLORINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2764 TRIAZINE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2772 THIOCARBAMATE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2776 COPPER BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2778 MERCURY BASED PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2780 SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2782 BIPYRIDILIUM PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2784 ORGANOPHOSPHORUS PESTICIDE, LIQUID, FLAMMABLE, TOXIC 2787 ORGANOTIN PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3024 COUMARIN DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3346 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3350 PYRETHROID PESTICIDE, LIQUID, FLAMMABLE, TOXIC 3021 PESTICIDE, LIQUID, FLAMMABLE, TOXIC, N.O.S. <i>NOTE: The classification of a pesticide under an entry shall be effected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary hazards it may exhibit.</i>
Corrosive	FC	3469 PAINT, FLAMMABLE, CORROSIVE (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base) or 3469 PAINT RELATED MATERIAL, FLAMMABLE, CORROSIVE (including paint thinning or reducing compound) 2733 AMINES, FLAMMABLE, CORROSIVE, N.O.S. or 2733 POLYAMINES, FLAMMABLE, CORROSIVE, N.O.S. 2985 CHLOROSILANES, FLAMMABLE, CORROSIVE, N.O.S. 3274 ALCOHOLATES SOLUTION, N.O.S., in alcohol 2924 FLAMMABLE LIQUID, CORROSIVE, N.O.S.
Toxic, corrosive	FTC	3286 FLAMMABLE LIQUID, TOXIC, CORROSIVE, N.O.S.
Liquid desensitised explosive	D	3343 NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, FLAMMABLE, N.O.S. with not more than 30% nitroglycerin by mass 3357 NITROGLYCERIN MIXTURE, DESENSITIZED, LIQUID, N.O.S. with not more than 30% nitroglycerin by mass 3379 DESENSITIZED EXPLOSIVE, LIQUID, N.O.S.

2.2.41 Class 4.1 Flammable solids, self-reactive substances, polymerizing substances and solid desensitized explosives**2.2.41.1 *Criteria***

2.2.41.1.1 The heading of Class 4.1 covers flammable substances and articles, desensitized explosives which are solids according to subparagraph (a) of the definition "solid" in 1.2.1, self-reactive liquids or solids and polymerizing substances..

The following are assigned to Class 4.1:

- readily flammable solid substances and articles (see paragraphs 2.2.41.1.3 to 2.2.41.1.8);
- self-reactive solids or liquids (see paragraphs 2.2.41.1.9 to 2.2.41.1.17);
- solid desensitized explosives (see 2.2.41.1.18);
- substances related to self-reactive substances (see 2.2.41.1.19);
- polymerizing substances (see 2.2.41.1.20 and 2.2.41.1.21).

2.2.41.1.2 The substances and articles of Class 4.1 are subdivided as follows:

F Flammable solids, without subsidiary hazard:

F1 Organic;

F2 Organic, molten;

F3 Inorganic;

F4 Articles;

FO Flammable solids, oxidizing;

FT Flammable solids, toxic:

FT1 Organic, toxic;

FT2 Inorganic, toxic;

FC Flammable solids, corrosive:

FC1 Organic, corrosive;

FC2 Inorganic, corrosive;

D Solid desensitized explosives without subsidiary hazard;

DT Solid desensitized explosives, toxic;

SR Self-reactive substances:

SR1 Not requiring temperature control;

SR2 Requiring temperature control.

PM Polymerizing substances

PM1 Not requiring temperature control;

PM2 Requiring temperature control.

Flammable solids*Definition and properties*

2.2.41.1.3

Flammable solids are readily combustible solids and solids which may cause fire through friction.

Readily combustible solids are powdered, granular, or pasty substances which are dangerous if they can be easily ignited by brief contact with an ignition source, such as a burning match, and if the flame spreads rapidly. The danger may come not only from the fire but also from toxic combustion products. Metal powders are especially dangerous because of the difficulty of extinguishing a fire since normal extinguishing agents such as carbon dioxide or water can increase the hazard.

Classification

2.2.41.1.4

Substances and articles classified as flammable solids of Class 4.1 are listed in Table A of Chapter 3.2. The assignment of organic substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of sub-section 2.2.41.3 in accordance with the provisions of Chapter 2.1 can be based on experience or on the results of the test procedures in accordance with Part III, sub-section 33.2.1 of the Manual of Tests and Criteria. The assignment of inorganic substances not mentioned by name shall be based on the results of the test procedures in accordance with Part III, sub-section 33.2.1 of the Manual of Tests and Criteria; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.41.1.5

When substances not mentioned by name are assigned to one of the entries listed in 2.2.41.3 on the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, sub-section 33.2.1, the following criteria apply:

- (a) With the exception of metal powders or powders of metal alloys, powdery, granular or pasty substances shall be classified as readily flammable substances of Class 4.1 if they can be easily ignited by brief contact with an ignition source (e.g. a burning match), or if, in the event of ignition, the flame spreads rapidly, the burning time is less than 45 seconds for a measured distance of 100 mm or the rate of burning is greater than 2.2 mm/s;
- (b) Metal powders or powders of metal alloys shall be assigned to Class 4.1 if they can be ignited by a flame and the reaction spreads over the whole length of the sample in 10 minutes or less.

Solids which may cause fire through friction shall be classified in Class 4.1 by analogy with existing entries (e.g. matches) or in accordance with any appropriate special provision.

2.2.41.1.6

On the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.2.1 and the criteria set out in 2.2.41.1.4 and 2.2.41.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

2.2.41.1.7

If substances of Class 4.1, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

Assignment of packing groups

2.2.41.1.8

Flammable solids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 33.2.1, in accordance with the following criteria:

- (a) Readily flammable solids which, when tested, have a burning time of less than 45 seconds over a measured distance of 100 mm shall be assigned to:

Packing group II: if the flame passes the wetted zone;

Packing group III: if the wetted zone stops the flame for at least four minutes;

- (b) Metal powders or powders of metal alloys shall be assigned to:

Packing group II: if, when tested, the reaction spreads over the whole length of the sample in five minutes or less;

Packing group III: if, when tested, the reaction spreads over the whole length of the sample in more than five minutes.

For solids which may cause fire through friction, the packing group shall be assigned by analogy with existing entries or in accordance with any special provision.

Self-reactive substances

Definitions

2.2.41.1.9

For the purposes of ADR, *self-reactive substances* are thermally unstable substances liable to undergo a strongly exothermic decomposition even without participation of oxygen (air). Substances are not considered to be self-reactive substances of Class 4.1, if:

- (a) they are explosives according to the criteria of Class 1;
- (b) they are oxidizing substances according to the classification procedure for Class 5.1 (see 2.2.51.1) except that mixtures of oxidizing substances which contain 5% or more of combustible organic substances shall be subjected to the classification procedure defined in Note 2;
- (c) they are organic peroxides according to the criteria of Class 5.2 (see 2.2.52.1);
- (d) their heat of decomposition is less than 300 J/g; or
- (e) their self-accelerating decomposition temperature (SADT) (see Note 3 below) is greater than 75 °C for a 50 kg package.

NOTE 1: The heat of decomposition can be determined using any internationally recognised method e.g. differential scanning calorimetry and adiabatic calorimetry.

NOTE 2: Mixtures of oxidizing substances meeting the criteria of Class 5.1 which contain 5% or more of combustible organic substances, which do not meet the criteria mentioned in (a), (c), (d) or (e) above, shall be subjected to the self-reactive substance classification procedure.

A mixture showing the properties of a self-reactive substance, type B to F, shall be classified as a self-reactive substance of Class 4.1.

A mixture showing the properties of a self-reactive substance, type G, according to the principle given in section 20.4.3 (g) of Part II of the Manual of Tests and Criteria shall be considered for classification as a substance of Class 5.1 (see 2.2.51.1).

NOTE 3: The self-accelerating decomposition temperature (SADT) is the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used during carriage. Requirements for the determination of the SADT are given in the Manual of Tests and Criteria, Part II, Chapter 20 and section 28.4.

NOTE 4: Any substance which shows the properties of a self-reactive substance shall be classified as such, even if this substance gives a positive test result according to 2.2.42.1.5 for inclusion in Class 4.2.

Properties

2.2.41.1.10

The decomposition of self-reactive substances can be initiated by heat, contact with catalytic impurities (e.g. acids, heavy-metal compounds, bases), friction or impact. The rate of decomposition increases with temperature and varies with the substance. Decomposition, particularly if no ignition occurs, may result in the evolution of toxic gases or vapours. For certain self-reactive substances, the temperature shall be controlled. Some self-reactive substances may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Certain self-reactive substances burn vigorously. Self-reactive substances are, for example, some compounds of the types listed below:

aliphatic azo compounds (-C-N=N-C-);
organic azides (-C-N₃);
diazonium salts (-CN₂⁺ Z⁻);
N-nitroso compounds (-N-N=O); and
aromatic sulphonydrazides (-SO₂-NH-NH₂).

This list is not exhaustive and substances with other reactive groups and some mixtures of substances may have similar properties.

Classification

2.2.41.1.11

Self-reactive substances are classified into seven types according to the degree of danger they present. The types of self-reactive substances range from type A, which is not accepted for carriage in the packaging in which it is tested, to type G, which is not subject to the provisions for self-reactive substances of Class 4.1. The classification of types B to F is directly related to the maximum quantity allowed in one packaging. The principles to be applied for classification as well as the applicable classification procedures, test methods and criteria and an example of a suitable test report are given in Part II of the Manual of Tests and Criteria.

2.2.41.1.12

Self-reactive substances which have already been classified and are already permitted for carriage in packagings are listed in 2.2.41.4, those already permitted for carriage in IBCs are listed in 4.1.4.2, packing instruction IBC520 and those already permitted for carriage in tanks according to Chapter 4.2 are listed in 4.2.5.2, portable tank instruction T23. Each permitted substance listed is assigned to a generic entry of Table A of Chapter 3.2 (UN Nos. 3221 to 3240), and appropriate subsidiary hazards and remarks providing relevant transport information are given.

The collective entries specify:

- self-reactive substances types B to F, see 2.2.41.1.11 above;
- physical state (liquid/solid); and
- temperature control (when required), see 2.2.41.1.17 below.

The classification of the self-reactive substances listed in 2.2.41.4 is based on the technically pure substance (except where a concentration of less than 100% is specified).

2.2.41.1.13

Classification of self-reactive substances not listed in 2.2.41.4, 4.1.4.2, packing instruction IBC520 or 4.2.5.2, portable tank instruction T23 and assignment to a collective entry shall be made by the competent authority of the country of origin on the basis of a test report. The statement of approval shall contain the classification and the relevant conditions of carriage. If the country of origin is not a Contracting Party to ADR, the classification and the conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.

2.2.41.1.14

Activators, such as zinc compounds, may be added to some self-reactive substances to change their reactivity. Depending on both the type and the concentration of the activator, this may result in a decrease in thermal stability and a change in explosive properties. If either of these properties is altered, the new formulation shall be assessed in accordance with the classification procedure.

2.2.41.1.15

Samples of self-reactive substances or formulations of self-reactive substances not listed in 2.2.41.4, for which a complete set of test results is not available and which are to be carried for further testing or evaluation, shall be assigned to one of the appropriate entries for self-reactive substances type C provided the following conditions are met:

- the available data indicate that the sample would be no more dangerous than self-reactive substances type B;
- the sample is packaged in accordance with packing method OP2 and the quantity per transport unit is limited to 10 kg;
- the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

Desensitization

2.2.41.1.16 In order to ensure safety during carriage, self-reactive substances are in many cases desensitized by use of a diluent. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. If a diluent is used, the self-reactive substance shall be tested with the diluent present in the concentration and form used in carriage. Diluents which may allow a self-reactive substance to concentrate to a dangerous extent in the event of leakage from a packaging shall not be used. Any diluent shall be compatible with the self-reactive substance. In this regard, compatible diluents are those solids or liquids which have no detrimental influence on the thermal stability and hazard type of the self-reactive substance. Liquid diluents in formulations requiring temperature control (see 2.2.41.1.14) shall have a boiling point of at least 60 °C and a flash-point not less than 5 °C. The boiling point of the liquid shall be at least 50 °C higher than the control temperature of the self-reactive substance.

Temperature control requirements

2.2.41.1.17 Self-reactive substances with an SADT not greater than 55 °C shall be subject to temperature control during carriage. See 7.1.7.

Solid desensitized explosives

2.2.41.1.18 Solid desensitized explosives are substances which are wetted with water or alcohols or are diluted with other substances to suppress their explosive properties. Such entries in Table A of Chapter 3.2 are: UN Nos. 1310, 1320, 1321, 1322, 1336, 1337, 1344, 1347, 1348, 1349, 1354, 1355, 1356, 1357, 1517, 1571, 2555, 2556, 2557, 2852, 2907, 3317, 3319, 3344, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3376, 3380 and 3474.

Substances related to self-reactive substances

2.2.41.1.19 Substances that:

- (a) have been provisionally accepted into Class 1 according to Test Series 1 and 2 but exempted from Class 1 by Test Series 6;
- (b) are not self-reactive substances of Class 4.1; and
- (c) are not substances of Classes 5.1 or 5.2;

are also assigned to Class 4.1. UN Nos. 2956, 3241, 3242 and 3251 are such entries.

*Polymerizing substances**Definitions and properties*

2.2.41.1.20 Polymerizing substances are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in carriage. Such substances are considered to be polymerizing substances of Class 4.1 when:

- (a) their self-accelerating polymerization temperature (SAPT) is 75 °C or less under the conditions (with or without chemical stabilization as offered for carriage) and in the packaging, IBC or tank in which the substance or mixture is to be carried;
- (b) they exhibit a heat of reaction of more than 300 J/g; and
- (c) they do not meet any other criteria for inclusion in classes 1 to 8.

A mixture meeting the criteria of a polymerizing substance shall be classified as a polymerizing substance of Class 4.1.

Temperature control requirements

2.2.41.1.21 Polymerizing substances are subject to temperature control in carriage if their self-accelerating polymerization temperature (SAPT) is:

- (a) when offered for carriage in a packaging or IBC, 50 °C or less in the packaging or IBC in which the substance is to be carried; or

(b) When offered for carriage in a tank, 45 °C or less in the tank in which the substance is to be carried.

See 7.1.7.

NOTE: *Substances meeting the criteria of polymerizing substances and also for inclusion in Classes 1 to 8 are subject to the requirements of special provision 386 of Chapter 3.3.*

2.2.41.2 Substances not accepted for carriage

2.2.41.2.1 The chemically unstable substances of Class 4.1 shall not be accepted for carriage unless the necessary steps have been taken to prevent their dangerous decomposition or polymerization during carriage. To this end, it shall in particular be ensured that receptacles and tanks do not contain any substance liable to promote these reactions.

2.2.41.2.2 Flammable solids, oxidizing, assigned to UN No. 3097 shall not be accepted for carriage unless they meet the requirements for Class 1 (see also 2.1.3.7).

2.2.41.2.3 The following substances shall not be accepted for carriage:

- Self-reactive substances of type A (see Manual of Tests and Criteria, Part II, paragraph 20.4.2 (a));
- Phosphorus sulphides which are not free from yellow and white phosphorus;
- Solid sensitized explosives other than those listed in Table A of Chapter 3.2;
- Inorganic flammable substances in the molten form other than UN No. 2448 SULPHUR, MOLTEN.

2.2.41.3 List of collective entries

Flammable solids	without subsidiary hazard	organic	F1	3175 SOLIDS CONTAINING FLAMMABLE LIQUID, N.O.S.
				1353 FIBRES IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S. or
				1353 FABRICS IMPREGNATED WITH WEAKLY NITRATED NITROCELLULOSE, N.O.S.
				1325 FLAMMABLE SOLID, ORGANIC, N.O.S.
	organic molten		F2	3176 FLAMMABLE SOLID, ORGANIC, MOLTEN, N.O.S.
				3089 METAL POWDER, FLAMMABLE, N.O.S. ^a ^b
				3181 METAL SALTS OF ORGANIC COMPOUNDS, FLAMMABLE, N.O.S.
	inorganic		F3	3182 METAL HYDRIDES, FLAMMABLE, N.O.S. ^c
				3178 FLAMMABLE SOLID, INORGANIC, N.O.S.
	articles		F4	3527 POLYESTER RESIN KIT, solid base material
				3541 ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.
F	oxidizing		FO	3097 FLAMMABLE SOLID, OXIDIZING, N.O.S. (not allowed, see para. 2.2.41.2.2)
				2926 FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.
	toxic	organic	FT1	3179 FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.
				2925 FLAMMABLE SOLID, TOXIC, INORGANIC, N.O.S.
	corrosive	organic	FC1	3180 FLAMMABLE SOLID, CORROSIVE, INORGANIC, N.O.S.
				2926 FLAMMABLE SOLID, TOXIC, ORGANIC, N.O.S.
Solid desensitized explosives	without subsidiary hazard		D	3319 NITROGLYCERIN MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 2% but not more than 10% nitroglycerin by mass
				3344 PENTAERYTHRITRE TETRANITRATE (PENTAERYTHRITOL TETRANITRATE, PETN) MIXTURE, DESENSITIZED, SOLID, N.O.S. with more than 10% but not more than 20% PETN by mass
				3380 DESENSITIZED EXPLOSIVE, SOLID, N.O.S.
	toxic		DT	Only substances listed in Table A of Chapter 3.2 are to be accepted for carriage as substances of Class 4.1
				3221 SELF-REACTIVE LIQUID TYPE A 3222 SELF-REACTIVE SOLID TYPE A 3223 SELF-REACTIVE LIQUID TYPE B 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F 3231 SELF-REACTIVE LIQUID TYPE G 3232 SELF-REACTIVE SOLID TYPE G
Self-reactive substances	SR	Not requiring temperature control	SR1	3221 SELF-REACTIVE LIQUID TYPE A 3222 SELF-REACTIVE SOLID TYPE A 3223 SELF-REACTIVE LIQUID TYPE B 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F 3231 SELF-REACTIVE LIQUID TYPE G 3232 SELF-REACTIVE SOLID TYPE G
				3221 SELF-REACTIVE LIQUID TYPE A 3222 SELF-REACTIVE SOLID TYPE A 3223 SELF-REACTIVE LIQUID TYPE B 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F 3231 SELF-REACTIVE LIQUID TYPE G 3232 SELF-REACTIVE SOLID TYPE G
				3221 SELF-REACTIVE LIQUID TYPE A 3222 SELF-REACTIVE SOLID TYPE A 3223 SELF-REACTIVE LIQUID TYPE B 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F 3231 SELF-REACTIVE LIQUID TYPE G 3232 SELF-REACTIVE SOLID TYPE G
				3221 SELF-REACTIVE LIQUID TYPE A 3222 SELF-REACTIVE SOLID TYPE A 3223 SELF-REACTIVE LIQUID TYPE B 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F 3231 SELF-REACTIVE LIQUID TYPE G 3232 SELF-REACTIVE SOLID TYPE G
				3221 SELF-REACTIVE LIQUID TYPE A 3222 SELF-REACTIVE SOLID TYPE A 3223 SELF-REACTIVE LIQUID TYPE B 3224 SELF-REACTIVE SOLID TYPE C 3225 SELF-REACTIVE LIQUID TYPE C 3226 SELF-REACTIVE SOLID TYPE D 3227 SELF-REACTIVE LIQUID TYPE E 3228 SELF-REACTIVE SOLID TYPE E 3229 SELF-REACTIVE LIQUID TYPE F 3230 SELF-REACTIVE SOLID TYPE F 3231 SELF-REACTIVE LIQUID TYPE G 3232 SELF-REACTIVE SOLID TYPE G
Requiring temperature control	SR2		SR2	3231 SELF-REACTIVE LIQUID TYPE B, TEMPERATURE CONTROLLED 3232 SELF-REACTIVE SOLID TYPE B, TEMPERATURE CONTROLLED 3233 SELF-REACTIVE LIQUID TYPE C, TEMPERATURE CONTROLLED 3234 SELF-REACTIVE SOLID TYPE C, TEMPERATURE CONTROLLED 3235 SELF-REACTIVE LIQUID TYPE D, TEMPERATURE CONTROLLED 3236 SELF-REACTIVE SOLID TYPE D, TEMPERATURE CONTROLLED 3237 SELF-REACTIVE LIQUID TYPE E, TEMPERATURE CONTROLLED 3238 SELF-REACTIVE SOLID TYPE E, TEMPERATURE CONTROLLED 3239 SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED 3240 SELF-REACTIVE SOLID TYPE F, TEMPERATURE CONTROLLED

(cont'd on next page)

^a Metals and metal alloys in powdered or other flammable form, liable to spontaneous combustion, are substances of Class 4.2.

^b Metals and metal alloys in powdered or other flammable form, which in contact with water, emit flammable gases, are substances of Class 4.3.

^c Metals hydrides which, in contact with water, emit flammable gases, are substances of Class 4.3. Aluminium borohydride or aluminium borohydride in devices are substances of Class 4.2, UN No. 2870.

Not accepted for carriage,
see 2.2.41.2.3

Not subject to the provisions applicable
to Class 4.1, see 2.2.41.1.11

2.2.41.3 *List of collective entries (cont'd)*

Polymerizing substances PM	not requiring temperature control	PM1	3531 POLYMERIZING SUBSTANCE, SOLID, STABILIZED, N.O.S. 3532 POLYMERIZING SUBSTANCE, LIQUID, STABILIZED, N.O.S.
	requiring temperature control	PM2	3533 POLYMERIZING SUBSTANCE, SOLID, TEMPERATURE CONTROLLED, N.O.S. 3534 POLYMERIZING SUBSTANCE, LIQUID, TEMPERATURE CONTROLLED, N.O.S.

2.2.41.4 *List of currently assigned self-reactive substances in packagings*

In the column "Packing Method" codes "OP1" to "OP8" refer to packing methods in 4.1.4.1, packing instruction P520 (see also 4.1.7.1). Self-reactive substances to be carried shall fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see 4.1.4.2, packing instruction IBC520 and, for those permitted in tanks according to Chapter 4.2, see 4.2.5.2.6, portable tank instruction T23. The formulations listed in packing instruction IBC520 of 4.1.4.2 and in portable tank instruction T23 of 4.2.5.2.6 may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.

NOTE: The classification given in this table is based on the technically pure substance (except where a concentration of less than 100% is specified). For other concentrations, the substance may be classified differently following the procedures given in Part II of the Manual of Tests and Criteria and in 2.2.41.1.17.

SELF-REACTIVE SUBSTANCE	Concen-tration (%)	Packing method	Control tempera-ture (°C)	Emergency tempera-ture (°C)	UN generic entry	Remarks
ACETONE-PYROGALLOL COPOLYMER 2-DIAZO-1-NAPHTHOL-5-SULPHONATE	100	OP8			3228	
AZODICARBONAMIDE FORMULATION TYPE B, TEMPERATURE CONTROLLED	< 100	OP5			3232	(1) (2)
AZODICARBONAMIDE FORMULATION TYPE C	< 100	OP6			3224	(3)
AZODICARBONAMIDE FORMULATION TYPE C, TEMPERATURE CONTROLLED	< 100	OP6			3234	(4)
AZODICARBONAMIDE FORMULATION TYPE D	< 100	OP7			3226	(5)
AZODICARBONAMIDE FORMULATION TYPE D, TEMPERATURE CONTROLLED	< 100	OP7			3236	(6)
2,2' -AZODI(2,4-DIMETHYL- 4-METHOXY- VALERONITRILE)	100	OP7	-5	+5	3236	
2,2' -AZODI(2,4-DIMETHYL- VALERONITRILE)	100	OP7	+10	+15	3236	
2,2' -AZODI(ETHYL- 2-METHYL-PROPIONATE)	100	OP7	+20	+25	3235	
1,1-AZODI(HEXAHYDROBENZONITRILE)	100	OP7			3226	
2,2' -AZODI(ISOBUTYRONITRILE)	100	OP6	+40	+45	3234	
2,2' -AZODI(ISOBUTYRONITRILE) as a water based paste	≤ 50%	OP6			3224	
2,2' -AZODI(2-METHYLBUTYRONITRILE)	100	OP7	+35	+40	3236	
BENZENE-1,3-DISULPHONYL HYDRAZIDE, as a paste	52	OP7			3226	
BENZENE SULPHONYL HYDRAZIDE	100	OP7			3226	
4-(BENZYL(ETHYL)AMINO)-3-ETHOXY- BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7			3226	
4-(BENZYL(METHYL)AMINO)-3-ETHOXY- BENZENEDIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
3-CHLORO-4-DIETHYLAMINOBENZENE- DIAZONIUM ZINC CHLORIDE	100	OP7			3226	

SELF-REACTIVE SUBSTANCE	Concen- tration (%)	Packing method	Control tempera- ture (°C)	Emergency tempera- ture (°C)	UN generic entry	Remarks
2-DIAZO-1-NAPHTHOL-4-SULPHONYL CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL-5-SULPHONYL CHLORIDE	100	OP5			3222	(2)
2-DIAZO-1-NAPHTHOL SULPHONIC ACID ESTER MIXTURE, TYPE D	< 100	OP7			3226	(9)
2,5-DIBUTOXY-4-(4-MORPHOLINYL)- BENZENEDIAZONIUM, TETRACHLOROZINCATE (2:1)	100	OP8			3228	
2,5-DIETHOXY-4-MORPHOLINO- BENZENEDIAZONIUM ZINC CHLORIDE	67-100	OP7	+35	+40	3236	
2,5-DIETHOXY-4-MORPHOLINO- BENZENEDIAZONIUM ZINC CHLORIDE	66	OP7	+40	+45	3236	
2,5-DIETHOXY-4-MORPHOLINO- BENZENEDIAZONIUM TETRAFLUOROBORATE	100	OP7	+30	+35	3236	
2,5-DIETHOXY-4-(4-MORPHOLINYL)- BENZENEDIAZONIUM SULPHATE	100	OP7			3226	
2,5-DIETHOXY-4-(PHENYLSULPHONYL)- BENZENEDIAZONIUM ZINC CHLORIDE	67	OP7	+40	+45	3236	
DIETHYLENEGLYCOL BIS (ALLYL CARBONATE) + DI- ISOPROPYL-PEROXYDICARBONATE	≥ 88+≤ 12	OP8	-10	0	3237	
2,5-DIMETHOXY-4-(4-METHYL- PHENYLSULPHONYL)BENZENE- DIAZONIUM ZINC CHLORIDE	79	OP7	+40	+45	3236	
4-(DIMETHYLAMINO)-BENZENE-DIAZONIUM TRICHLOROZINCATE (-1)	100	OP8			3228	
4-DIMETHYLAMINO-6-(2-DIMETHYL- AMINOETHOXY) TOLUENE- 2-DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
N,N'-DINITROSO-N,N'- DIMETHYL TEREPHTHALAMIDE, as a paste	72	OP6			3224	
N,N'-DINITROSPENTAMETHYLENE- TETRAMINE	82	OP6			3224	(7)
DIPHENYLOXIDE-4,4'-DISULPHONYL HYDRAZIDE	100	OP7			3226	
4-DIPROPYLAMINOBENZENE- DIAZONIUM ZINC CHLORIDE	100	OP7			3226	
2-(N,N-ETHOXYCARBONYL- PHENYLAMINO)-3-METHOXY-4- (N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	63-92	OP7	+ 40	+ 45	3236	
2-(N,N-ETHOXYCARBONYL- PHENYLAMINO)-3-METHOXY-4- (N-METHYL-N-CYCLOHEXYLAMINO) BENZENEDIAZONIUM ZINC CHLORIDE	62	OP7	+ 35	+ 40	3236	
N-FORMYL-2-(NITROMETHYLENE) -1,3-PERHYDROTHIAZINE	100	OP7	+45	+50	3236	
2-(2-HYDROXYETHOXY)-1- (PYRROLIDIN-1-YL)BENZENE-4- DIAZONIUM ZINC CHLORIDE	100	OP7	+ 45	+ 50	3236	
3-(2-HYDROXYETHOXY)-4- (PYRROLIDIN-1-YL) BENZENE DIAZONIUM ZINC CHLORIDE	100	OP7	+40	+45	3236	
2-(N,N-METHYLAMINOETHYLCARBONYL)- 4-(3,4-DIMETHYLPHENYLSULPHONYL) BENZENEDIAZONIUM HYDROGEN SULPHATE	96	OP7	+45	+50	3236	
4-METHYLBENZENESULPHONYLHYDRAZIDE	100	OP7			3226	

SELF-REACTIVE SUBSTANCE	Concen-tration (%)	Packing method	Control tempera-ture (°C)	Emergency tempera-ture (°C)	UN generic entry	Remarks
3-METHYL-4-(PYRROLIDIN-1-YL) BENZENEDIAZONIUM TETRAFLUOROBORATE	95	OP6	+45	+50	3234	
4-NITROSOPHENOL	100	OP7	+35	+40	3236	
PHOSPHOROTHIOIC ACID, O-[(CYANOPHENYL METHYLENE) AZANYL] O,O-DIETHYL ESTER (Z isomer)	82-91	OP8			3227	(10)
SELF-REACTIVE LIQUID, SAMPLE		OP2			3223	(8)
SELF-REACTIVE LIQUID, SAMPLE, TEMPERATURE CONTROLLED		OP2			3233	(8)
SELF-REACTIVE SOLID, SAMPLE		OP2			3224	(8)
SELF-REACTIVE SOLID, SAMPLE, TEMPERATURE CONTROLLED		OP2			3234	(8)
SODIUM 2-DIAZO-1-NAPHTHOL- 4-SULPHONATE	100	OP7			3226	
SODIUM 2-DIAZO-1-NAPHTHOL- 5-SULPHONATE	100	OP7			3226	
TETRAMINE PALLADIUM (II) NITRATE	100	OP6	+30	+35	3234	

Remarks

- (1) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (b) of the Manual of Tests and Criteria. The control and emergency temperatures shall be determined by the procedure given in 7.1.7.3.1 to 7.1.7.3.6.
- (2) "EXPLOSIVE" subsidiary hazard label required (Model No. 1, see 5.2.2.2.2).
- (3) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (c) of the Manual of Tests and Criteria.
- (4) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (c) of the Manual of Tests and Criteria. The control and emergency temperatures shall be determined by the procedure given in 7.1.7.3.1 to 7.1.7.3.6.
- (5) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (d) of the Manual of Tests and Criteria.
- (6) Azodicarbonamide formulations which fulfil the criteria of paragraph 20.4.2 (d) of the Manual of Tests and Criteria. The control and emergency temperatures shall be determined by the procedure given in 7.1.7.3.1 to 7.1.7.3.6.
- (7) With a compatible diluent having a boiling point of not less than 150 °C.
- (8) See 2.2.41.1.15.
- (9) This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1-naphthol-5-sulphonic acid which fulfil the criteria of paragraph 20.4.2 (d) of the Manual of Test and Criteria.
- (10) This entry applies to the technical mixture in n-butanol within the specified concentration limits of the (Z) isomer.

2.2.42 Class 4.2 Substances liable to spontaneous combustion**2.2.42.1 Criteria**

2.2.42.1.1 The heading of Class 4.2 covers:

- *Pyrophoric substances* which are substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite on contact with air within five minutes. These are the Class 4.2 substances the most liable to spontaneous combustion; and
- *Self-heating substances and articles* which are substances and articles, including mixtures and solutions, which, on contact with air, without energy supply, are liable to self-heating. These substances will ignite only in large amounts (kilograms) and after long periods of time (hours or days).

2.2.42.1.2 The substances and articles of Class 4.2 are subdivided as follows:

S Substances liable to spontaneous combustion, without subsidiary hazard:

- S1 Organic, liquid;
- S2 Organic, solid;
- S3 Inorganic, liquid;
- S4 Inorganic, solid;
- S5 Organometallic;
- S6 Articles

SW Substances liable to spontaneous combustion, which, in contact with water, emit flammable gases;

SO Substances liable to spontaneous combustion, oxidizing;

ST Substances liable to spontaneous combustion, toxic:

- ST1 Organic, toxic, liquid;
- ST2 Organic, toxic, solid;
- ST3 Inorganic, toxic, liquid;
- ST4 Inorganic, toxic, solid;

SC Substances liable to spontaneous combustion, corrosive:

- SC1 Organic, corrosive, liquid;
- SC2 Organic, corrosive, solid;
- SC3 Inorganic, corrosive, liquid;
- SC4 Inorganic, corrosive, solid.

Properties

2.2.42.1.3 Self-heating of a substance is a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion.

Classification

2.2.42.1.4 Substances and articles classified in Class 4.2 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant specific N.O.S. entry of 2.2.42.3 in accordance with the provisions of Chapter 2.1 can be based on experience or the results of the test procedures in accordance with the Manual of Tests and Criteria, Part III, Section 33.3. Assignment to general N.O.S. entries of Class 4.2 shall be based on the results of the test procedures in accordance with the Manual of Tests and Criteria, Part III, section 33.3; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.42.1.5

When substances or articles not mentioned by name are assigned to one of the entries listed in 2.2.42.3 on the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, section 33.3, the following criteria shall apply:

- (a) Solids liable to spontaneous combustion (pyrophoric) shall be assigned to Class 4.2 when they ignite on falling from a height of 1 m or within five minutes;
- (b) Liquids liable to spontaneous combustion (pyrophoric) shall be assigned to Class 4.2 when:
 - (i) on being poured on an inert carrier, they ignite within five minutes, or
 - (ii) in the event of a negative result of the test according to (i), when poured on a dry, indented filter paper (Whatman No. 3 filter), they ignite or carbonize it within five minutes;
- (c) Substances in which, in a 10 cm sample cube, at 140 °C test temperature, spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours shall be assigned to Class 4.2. This criterion is based on the temperature of the spontaneous combustion of charcoal, which is at 50 °C for a sample cube of 27 m³. Substances with a temperature of spontaneous combustion higher than 50 °C for a volume of 27 m³ are not to be assigned to Class 4.2.

NOTE 1: Substances carried in packages with a volume of not more than 3 m³ are exempted from Class 4.2 if, tested with a 10 cm sample cube at 120 °C, no spontaneous combustion nor a rise in temperature to over 180 °C is observed within 24 hours.

NOTE 2: Substances carried in packages with a volume of not more than 450 litres are exempted from Class 4.2 if, tested with a 10 cm sample cube at 100 °C, no spontaneous combustion nor a rise in temperature to over 160 °C is observed within 24 hours.

NOTE 3: Since organometallic substances can be classified in Class 4.2 or 4.3 with additional subsidiary hazards, depending on their properties, a specific classification flow chart for these substances is given in 2.3.5.

2.2.42.1.6

If substances of Class 4.2, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

2.2.42.1.7

On the basis of the test procedure in the Manual of Tests and Criteria, Part III, section 33.3 and the criteria set out in 2.2.42.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

Assignment of packing groups

2.2.42.1.8

Substances and articles classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 33.3, in accordance with the following criteria:

- (a) Substances liable to spontaneous combustion (pyrophoric) shall be assigned to packing group I;
- (b) Self-heating substances and articles in which, in a 2.5 cm sample cube, at 140 °C test temperature, spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours, shall be assigned to packing group II;

Substances with a temperature of spontaneous combustion higher than 50 °C for a volume of 450 litres are not to be assigned to packing group II;

(c) Slightly self-heating substances in which, in a 2.5 cm sample cube, the phenomena referred to under (b) are not observed, in the given conditions, but in which in a 10 cm sample cube at 140 °C test temperature spontaneous combustion or a rise in temperature to over 200 °C is observed within 24 hours, shall be assigned to packing group III.

2.2.42.2 *Substances not accepted for carriage*

The following substances shall not be accepted for carriage:

- UN No. 3255 tert-BUTYL HYPOCHLORITE; and
- Self-heating solids, oxidizing, assigned to UN No. 3127 unless they meet the requirements for Class 1 (see 2.1.3.7).

2.2.42.3 List of collective entries

Without subsidiary hazard	S	Substances liable to spontaneous combustion	liquid S1	2845 PYROPHORIC LIQUID, ORGANIC, N.O.S. 3183 SELF-HEATING LIQUID, ORGANIC, N.O.S.
			organic	1373 FIBRES or FABRICS, ANIMAL or 1373 VEGETABLE or SYNTHETIC, N.O.S. with oil 2006 PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S. 3313 ORGANIC PIGMENTS, SELF HEATING 2846 PYROPHORIC SOLID, ORGANIC, N.O.S. 3088 SELF-HEATING SOLID, ORGANIC, N.O.S.
		solid S2	solid S2	1373 FIBRES or FABRICS, ANIMAL or 1373 VEGETABLE or SYNTHETIC, N.O.S. with oil 2006 PLASTICS, NITROCELLULOSE-BASED, SELF-HEATING, N.O.S. 3313 ORGANIC PIGMENTS, SELF HEATING 2846 PYROPHORIC SOLID, ORGANIC, N.O.S. 3088 SELF-HEATING SOLID, ORGANIC, N.O.S.
			liquid S3	3194 PYROPHORIC LIQUID, INORGANIC, N.O.S. 3186 SELF-HEATING LIQUID, INORGANIC, N.O.S.
		inorganic	solid S4	1383 PYROPHORIC METAL, N.O.S. or 1383 PYROPHORIC ALLOY, N.O.S. 1378 METAL CATALYST, WETTED with a visible excess of liquid 2881 METAL CATALYST, DRY 3189 ^a METAL POWDER, SELF-HEATING, N.O.S. 3205 ALKALINE EARTH METAL ALCOHOLATES, N.O.S. 3200 PYROPHORIC SOLID, INORGANIC, N.O.S. 3190 SELF-HEATING SOLID, INORGANIC, N.O.S.
			organometallic S5	3392 ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC 3391 ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC 3400 ORGANOMETALLIC SUBSTANCE, SOLID, SELF-HEATING
		articles S6		3542 ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.
		Water-reactive	SW	3394 ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE 3393 ORGANOMETALLIC SUBSTANCE, SOLID, PYROPHORIC, WATER-REACTIVE
		Oxidizing	SO	3127 SELF-HEATING SOLID, OXIDIZING, N.O.S. (not allowed, see 2.2.42.2)
		Toxic	liquid ST1	3184 SELF-HEATING LIQUID, TOXIC, ORGANIC, N.O.S.
			solid ST2	3128 SELF-HEATING SOLID, TOXIC, ORGANIC, N.O.S.
			liquid ST3	3187 SELF-HEATING LIQUID, TOXIC, INORGANIC, N.O.S.
			solid ST4	3191 SELF-HEATING SOLID, TOXIC, INORGANIC, N.O.S.
		Corrosive	liquid SC1	3185 SELF-HEATING LIQUID, CORROSIVE, ORGANIC, N.O.S.
			solid SC2	3126 SELF-HEATING SOLID, CORROSIVE, ORGANIC, N.O.S.
			liquid SC3	3188 SELF-HEATING LIQUID, CORROSIVE, INORGANIC, N.O.S.
			solid SC4	3206 ALKALI METAL ALCOHOLATES, SELF-HEATING, CORROSIVE, N.O.S. 3192 SELF-HEATING SOLID, CORROSIVE, INORGANIC, N.O.S.

^a Dust and powder of metals, non toxic in a non-spontaneous combustible form which nevertheless, in contact with water, emit flammable gases, are substances of Class 4.3.

2.2.43 Class 4.3 Substances which, in contact with water, emit flammable gases**2.2.43.1 Criteria**

2.2.43.1.1 The heading of Class 4.3 covers substances which react with water to emit flammable gases liable to form explosive mixtures with air, and articles containing such substances.

2.2.43.1.2 Substances and articles of Class 4.3 are subdivided as follows:

W Substances which, in contact with water, emit flammable gases, without subsidiary hazard, and articles containing such substances:

W1 Liquid;

W2 Solid;

W3 Articles;

WF1 Substances which, in contact with water, emit flammable gases, liquid, flammable;

WF2 Substances which, in contact with water, emit flammable gases, solid, flammable;

WS Substances which, in contact with water, emit flammable gases, solid, self-heating;

WO Substances which, in contact with water, emit flammable gases, oxidizing, solid;

WT Substances which, in contact with water, emit flammable gases, toxic:

WT1 Liquid;

WT2 Solid;

WC Substances which, in contact with water, emit flammable gases, corrosive:

WC1 Liquid;

WC2 Solid;

WFC Substances which, in contact with water, emit flammable gases, flammable, corrosive.

Properties

2.2.43.1.3 Certain substances in contact with water may emit flammable gases that can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example naked lights, sparking handtools or unprotected lamps. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 2.2.43.1.4 below is used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. This test method shall not be applied to pyrophoric substances.

Classification

2.2.43.1.4 Substances and articles classified in Class 4.3 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.43.3 in accordance with the provisions of Chapter 2.1 shall be based on the results of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.4; experience shall also be taken into account when it leads to a more stringent assignment.

2.2.43.1.5 When substances not mentioned by name are assigned to one of the entries listed in 2.2.43.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, Section 33.4, the following criteria shall apply:

A substance shall be assigned to Class 4.3 if:

- (a) spontaneous ignition of the gas emitted takes place in any step of the test procedure; or
- (b) there is an evolution of flammable gas at a rate greater than 1 litre per kilogram of the substance to be tested per hour.

NOTE: Since organometallic substances can be classified in Class 4.2 or 4.3 with additional subsidiary hazards, depending on their properties, a specific classification flow chart for these substances is given in 2.3.5.

2.2.43.1.6 If substances of Class 4.3, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes) see also 2.1.3.

2.2.43.1.7 On the basis of the test procedures in accordance with the Manual of Tests and Criteria, Part III, Section 33.4, and the criteria set out in paragraph 2.2.43.1.5, it may also be determined whether the nature of a substance mentioned by name is such that the substance is not subject to the provisions for this Class.

Assignment of packing groups

2.2.43.1.8 Substances and articles classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 33.4, in accordance with the following criteria:

- (a) Packing group I shall be assigned to any substance which reacts vigorously with water at ambient temperature and generally demonstrates a tendency for the gas produced to ignite spontaneously, or one which reacts readily with water at ambient temperatures such that the rate of evolution of flammable gas is equal to or greater than 10 litres per kilogram of substance over any one minute period;
- (b) Packing group II shall be assigned to any substance which reacts readily with water at ambient temperature such that the maximum rate of evolution of flammable gas is equal to or greater than 20 litres per kilogram of substance per hour, and which does not meet the criteria of packing group I;
- (c) Packing group III shall be assigned to any substance which reacts slowly with water at ambient temperature such that the maximum rate of evolution of flammable gas is greater than 1 litre per kilogram of substance per hour, and which does not meet the criteria of packing groups I or II.

2.2.43.2 Substances not accepted for carriage

Water-reactive solids, oxidizing, assigned to UN No. 3133 shall not be accepted for carriage unless they meet the requirements for Class 1 (see also 2.1.3.7).

2.2.43.3 List of collective entries

Substances which, in contact with water, emit flammable gases	liquid	W1	1389 ALKALI METAL AMALGAM, LIQUID 1391 ALKALI METAL DISPERSION or 1391 ALKALINE EARTH METAL DISPERSION 1392 ALKALINE EARTH METAL AMALGAM, LIQUID 1420 POTASSIUM METAL ALLOYS, LIQUID 1421 ALKALI METAL ALLOY, LIQUID, N.O.S. 1422 POTASSIUM SODIUM ALLOYS, LIQUID 3398 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE 3148 WATER-REACTIVE LIQUID, N.O.S.
Without subsidiary hazard W	solid	W2 ^a	1390 ALKALI METAL AMIDES 3401 ALKALI METAL AMALGAM, SOLID 3402 ALKALINE EARTH METAL AMALGAM, SOLID 3170 ALUMINIUM SMELTING BY-PRODUCTS or 3170 ALUMINIUM REMELTING BY-PRODUCTS 3403 POTASSIUM METAL ALLOYS, SOLID 3404 POTASSIUM SODIUM ALLOYS, SOLID 1393 ALKALINE EARTH METAL ALLOY, N.O.S. 1409 METAL HYDRIDES, WATER-REACTIVE, N.O.S. 3208 METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. 3395 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE 2813 WATER-REACTIVE SOLID, N.O.S.
	articles	W3	3292 BATTERIES, CONTAINING SODIUM or 3292 CELLS, CONTAINING SODIUM 3543 ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S
Liquid, flammable		WF1	3482 ALKALI METAL DISPERSION, FLAMMABLE or 3482 ALKALINE EARTH METAL DISPERSION, FLAMMABLE 3399 ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE
Solid, flammable		WF2	3396 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, FLAMMABLE 3132 WATER-REACTIVE SOLID, FLAMMABLE, N.O.S.
Solid, self-heating		WS ^b	3397 ORGANOMETALLIC SUBSTANCE, SOLID, WATER-REACTIVE, SELF-HEATING 3209 METALLIC SUBSTANCE, WATER-REACTIVE, SELF-HEATING, N.O.S. 3135 WATER-REACTIVE SOLID, SELF-HEATING, N.O.S.
Solid, oxidizing		WO	3133 WATER-REACTIVE SOLID, OXIDIZING, N.O.S. (not allowed, see 2.2.43.2)
Toxic	liquid	WT1	3130 WATER-REACTIVE LIQUID, TOXIC, N.O.S.
WT	solid	WT2	3134 WATER-REACTIVE SOLID, TOXIC, N.O.S.
Corrosive	liquid	WC1	3129 WATER-REACTIVE LIQUID, CORROSIVE, N.O.S.
WC	solid	WC2	3131 WATER-REACTIVE SOLID, CORROSIVE, N.O.S.
Flammable, corrosive		WFC ^c	2988 CHLOROSILANES, WATER-REACTIVE, FLAMMABLE, CORROSIVE, N.O.S. (No other collective entry with this classification code available, if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazard in 2.1.3.10.)

^a Metals and metal alloys which, in contact with water, do not emit flammable gases and are not pyrophoric or self-heating, but which are readily flammable, are substances of Class 4.1. Alkaline-earth metals and alkaline-earth metal alloys in pyrophoric form are substances of Class 4.2. Dust and powders of metals in pyrophoric form are substances of Class 4.2. Metals and metal alloys in pyrophoric form are substances of Class 4.2. Compounds of phosphorus with heavy metals such as iron, copper, etc. are not subject to the provisions of ADR.

^b Metals and metal alloys in pyrophoric form are substances of Class 4.2.

^c Chlorosilanes, having a flash-point of less than 23 °C and which, in contact with water, do not emit flammable gases, are substances of Class 3. Chlorosilanes, having a flash-point equal to or greater than 23 °C and which, in contact with water, do not emit flammable gases, are substances of Class 8.

2.2.51 Class 5.1 Oxidizing substances**2.2.51.1 Criteria**

2.2.51.1.1 The heading of Class 5.1 covers substances which, while in themselves not necessarily combustible, may, generally by yielding oxygen, cause or contribute to the combustion of other material, and articles containing such substances.

2.2.51.1.2 The substances of Class 5.1 and articles containing such substances are subdivided as follows:

O Oxidizing substances without subsidiary hazard or articles containing such substances:

O1 Liquid;

O2 Solid;

O3 Articles;

OF Oxidizing substances, solid, flammable;

OS Oxidizing substances, solid, self-heating;

OW Oxidizing substances, solid which, in contact with water, emit flammable gases;

OT Oxidizing substances, toxic:

OT1 Liquid;

OT2 Solid;

OC Oxidizing substances, corrosive:

OC1 Liquid;

OC2 Solid;

OTC Oxidizing substances, toxic, corrosive.

2.2.51.1.3 Substances and articles classified in Class 5.1 are listed in Table A of Chapter 3.2. The assignment of substances and articles not mentioned by name in Table A of Chapter 3.2 to the relevant entry of 2.2.51.3 in accordance with the provisions of Chapter 2.1 can be based on the tests, methods and criteria in paragraphs 2.2.51.1.6-2.2.51.1.10 below and the Manual of Tests and Criteria, Part III, Section 34.4 or, for solid ammonium nitrate based fertilizers, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth and fourteenth indents. In the event of divergence between test results and known experience, judgement based on known experience shall take precedence over test results.

2.2.51.1.4 If substances of Class 5.1, as a result of admixtures, come into different categories of hazard from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes), see also Section 2.1.3.

2.2.51.1.5 On the basis of the test procedures in the Manual of Tests and Criteria, Part III, Section 34.4 and the criteria set out in 2.2.51.1.6 to 2.2.51.1.9 it may also be determined whether the nature of a substance mentioned by name in Table A of Chapter 3.2 is such that the substance is not subject to the provisions for this class.

Oxidizing solids***Classification*****2.2.51.1.6**

When oxidizing solid substances not mentioned by name in Table A of Chapter 3.2 are assigned to one of the entries listed in 2.2.51.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or alternatively, sub section 34.4.3 (test O.3), the following criteria shall apply:

- (a) In the test O.1, a solid substance shall be assigned to Class 5.1 if, in the 4:1 or the 1:1 sample-to-cellulose ratio (by mass) tested, it ignites or burns or exhibits mean burning times equal to or less than that of a 3:7 mixture (by mass) of potassium bromate and cellulose; or
- (b) In the test O.3, a solid substance shall be assigned to Class 5.1 if, in the 4:1 or the 1:1 sample-to-cellulose ratio (by mass) tested, it exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose.

2.2.51.1.7

By exception, solid ammonium nitrate based fertilizers shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.

Assignment of packing groups**2.2.51.1.8**

Oxidizing solids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, sub-section 34.4.1 (test O.1) or sub-section 34.4.3 (test O.3), in accordance with the following criteria:

- (a) Test O.1:
 - (i) Packing group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time less than the mean burning time of a 3:2 mixture, by mass, of potassium bromate and cellulose;
 - (ii) Packing group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 2:3 mixture (by mass) of potassium bromate and cellulose and the criteria for packing group I are not met;
 - (iii) Packing group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning time equal to or less than the mean burning time of a 3:7 mixture (by mass) of potassium bromate and cellulose and the criteria for packing groups I and II are not met;
- (b) Test O.3:
 - (i) Packing group I: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate greater than the mean burning rate of a 3:1 mixture (by mass) of calcium peroxide and cellulose;
 - (ii) Packing group II: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:1 mixture (by mass) of calcium peroxide and cellulose, and the criteria for packing group I are not met;
 - (iii) Packing group III: any substance which, in the 4:1 or 1:1 sample-to-cellulose ratio (by mass) tested, exhibits a mean burning rate equal to or greater than the mean burning rate of a 1:2 mixture (by mass) of calcium peroxide and cellulose, and the criteria for packing groups I and II are not met.

Oxidizing liquids***Classification*****2.2.51.1.9**

When oxidizing liquid substances not mentioned by name in Table A of Chapter 3.2 are assigned to one of the entries listed in sub-section 2.2.51.3 on the basis of the test procedure in accordance with the Manual of Tests and Criteria, Part III, sub-section 34.4.2, the following criteria shall apply:

A liquid substance shall be assigned to Class 5.1 if, in the 1:1 mixture, by mass, of substance and cellulose tested, it exhibits a pressure rise of 2070 kPa gauge or more and a mean pressure rise time equal to or less than the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose.

Assignment of packing groups

2.2.51.1.10 Oxidizing liquids classified under the various entries in Table A of Chapter 3.2 shall be assigned to packing groups I, II or III on the basis of test procedures of the Manual of Tests and Criteria, Part III, section 34.4.2, in accordance with the following criteria:

- (a) Packing group I: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, spontaneously ignites; or the mean pressure rise time of a 1:1 mixture, by mass, of substance and cellulose is less than that of a 1:1 mixture, by mass, of 50% perchloric acid and cellulose;
- (b) Packing group II: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 40% aqueous sodium chlorate solution and cellulose; and the criteria for packing group I are not met;
- (c) Packing group III: any substance which, in the 1:1 mixture, by mass, of substance and cellulose tested, exhibits a mean pressure rise time less than or equal to the mean pressure rise time of a 1:1 mixture, by mass, of 65% aqueous nitric acid and cellulose; and the criteria for packing groups I and II are not met.

2.2.51.2 Substances not accepted for carriage

2.2.51.2.1 The chemically unstable substances of Class 5.1 shall not be accepted for carriage unless the necessary steps have been taken to prevent their dangerous decomposition or polymerization during carriage. To this end it shall in particular be ensured that receptacles and tanks do not contain any material liable to promote these reactions.

2.2.51.2.2 The following substances and mixtures shall not be accepted for carriage:

- oxidizing solids, self-heating, assigned to UN No. 3100, oxidizing solids, water-reactive, assigned to UN No. 3121 and oxidizing solids, flammable, assigned to UN No. 3137, unless they meet the requirements for Class 1 (see also 2.1.3.7);
- hydrogen peroxide, not stabilized or hydrogen peroxide, aqueous solutions, not stabilized containing more than 60% hydrogen peroxide;
- tetrinitromethane not free from combustible impurities;
- perchloric acid solutions containing more than 72% (mass) acid, or mixtures of perchloric acid with any liquid other than water;
- chloric acid solution containing more than 10% chloric acid or mixtures of chloric acid with any liquid other than water;
- halogenated fluor compounds other than UN Nos. 1745 BROMINE PENTAFLUORIDE; 1746 BROMINE TRIFLUORIDE and 2495 IODINE PENTAFLUORIDE of Class 5.1 as well as UN Nos. 1749 CHLORINE TRIFLUORIDE and 2548 CHLORINE PENTAFLUORIDE of Class 2;
- ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt;
- ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt;
- mixtures of a hypochlorite with an ammonium salt;
- ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt;
- ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt;

- ammonium nitrate containing more than 0.2% combustible substances (including any organic substance calculated as carbon) unless it is a constituent of a substance or article of Class 1;
- ammonium nitrate based fertilizers with compositions that lead to exit boxes 4, 6, 8, 15, 31, or 33 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1;
- ammonium nitrate based fertilizers with compositions that lead to exit boxes 20, 23 or 39 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1 or, provided that the suitability for carriage has been demonstrated and that this has been approved by the competent authority, in Class 5.1 other than UN No. 2067;

NOTE: *The term “competent authority” means the competent authority of the country of origin. If the country of origin is not a Contracting Party to ADR, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.*

- ammonium nitrite and its aqueous solutions and mixtures of an inorganic nitrite with an ammonium salt;
- mixtures of potassium nitrate, sodium nitrite and an ammonium salt.

2.2.51.3 *List of collective entries*

Oxidizing substances and articles containing such substances	liquid	O1	3210 CHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3211 PERCHLORATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3213 BROMATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3214 PERMANGANATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3216 PERSULPHATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3218 NITRATES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3219 NITRITES, INORGANIC, AQUEOUS SOLUTION, N.O.S. 3139 OXIDIZING LIQUID, N.O.S.
	solid	O2	1450 BROMATES, INORGANIC, N.O.S. 1461 CHLORATES, INORGANIC, N.O.S. 1462 CHLORITES, INORGANIC, N.O.S. 1477 NITRATES, INORGANIC, N.O.S. 1481 PERCHLORATES, INORGANIC, N.O.S. 1482 PERMANGANATES, INORGANIC, N.O.S. 1483 PEROXIDES, INORGANIC, N.O.S 2627 NITRITES, INORGANIC, N.O.S. 3212 HYPOCHLORITES, INORGANIC, N.O.S. 3215 PERSULPHATES, INORGANIC, N.O.S. 1479 OXIDIZING SOLID, N.O.S.
Without subsidiary hazard	articles	O3	3356 OXYGEN GENERATOR, CHEMICAL 3544 ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.
		OF	3137 OXIDIZING SOLID, FLAMMABLE, N.O.S. (not allowed, see 2.2.51.2)
		OS	3100 OXIDIZING SOLID, SELF-HEATING, N.O.S. (not allowed, see 2.2.51.2)
Solid, water reactive		OW	3121 OXIDIZING SOLID, WATER REACTIVE, N.O.S. (not allowed, see 2.2.51.2)
Toxic	liquid	OT1	3099 OXIDIZING LIQUID, TOXIC, N.O.S.
	solid	OT2	3087 OXIDIZING SOLID, TOXIC, N.O.S.
Corrosive	liquid	OC1	3098 OXIDIZING LIQUID, CORROSIVE, N.O.S.
	solid	OC2	3085 OXIDIZING SOLID, CORROSIVE, N.O.S.
Toxic, corrosive		OTC	(No collective entry with this classification code available; if need be, classification under a collective entry with a classification code to be determined according to the table of precedence of hazard in 2.1.3.10.)

2.2.52 **Class 5.2 Organic peroxides**2.2.52.1 **Criteria**

2.2.52.1.1 The heading of Class 5.2 covers organic peroxides and formulations of organic peroxides.

2.2.52.1.2 The substances of Class 5.2 are subdivided as follows:

- P1 Organic peroxides, not requiring temperature control;
- P2 Organic peroxides, requiring temperature control.

Definition

2.2.52.1.3 *Organic peroxides* are organic substances which contain the bivalent -O-O- structure and may be considered derivatives of hydrogen peroxide, where one or both of the hydrogen atoms have been replaced by organic radicals.

Properties

2.2.52.1.4 Organic peroxides are liable to exothermic decomposition at normal or elevated temperatures. The decomposition can be initiated by heat, contact with impurities (e.g. acids, heavy-metal compounds, amines), friction or impact. The rate of decomposition increases with temperature and varies with the organic peroxide formulation. Decomposition may result in the evolution of harmful, or flammable, gases or vapours. For certain organic peroxides the temperature shall be controlled during carriage. Some organic peroxides may decompose explosively, particularly if confined. This characteristic may be modified by the addition of diluents or by the use of appropriate packagings. Many organic peroxides burn vigorously. Contact of organic peroxides with the eyes is to be avoided. Some organic peroxides will cause serious injury to the cornea, even after brief contact, or will be corrosive to the skin.

NOTE: *Test methods for determining the flammability of organic peroxides are set out in the Manual of Tests and Criteria, Part III, sub-section 32.4. Because organic peroxides may react vigorously when heated, it is recommended to determine their flash-point using small sample sizes such as described in ISO 3679:1983.*

Classification

2.2.52.1.5 Any organic peroxide shall be considered for classification in Class 5.2 unless the organic peroxide formulation contains:

- (a) Not more than 1.0% available oxygen from the organic peroxides when containing not more than 1.0% hydrogen peroxide;
- (b) Not more than 0.5% available oxygen from the organic peroxides when containing more than 1.0% but not more than 7.0% hydrogen peroxide.

NOTE: *The available oxygen content (%) of an organic peroxide formulation is given by the formula*

$$16 \times \sum (n_i \times c_i / m_i)$$

where:

n_i = *number of peroxygen groups per molecule of organic peroxide i;*
 c_i = *concentration (mass %) of organic peroxide i; and*
 m_i = *molecular mass of organic peroxide i.*

2.2.52.1.6 Organic peroxides are classified into seven types according to the degree of danger they present. The types of organic peroxide range from type A, which is not accepted for carriage in the packaging in which it is tested, to type G, which is not subject to the provisions of Class 5.2. The classification of types B to F is directly related to the maximum quantity allowed in one package. The principles to be applied to the classification of substances not listed in 2.2.52.4 are set out in the Manual of Tests and Criteria, Part II.

2.2.52.1.7 Organic peroxides which have already been classified and are already permitted for carriage in packagings are listed in 2.2.52.4, those already permitted for carriage in IBCs are listed in 4.1.4.2, packing instruction IBC520 and those already permitted for carriage in tanks in accordance with Chapters 4.2 and 4.3 are listed in 4.2.5.2, portable tank instruction T23. Each permitted substance listed is assigned to a generic entry of Table A of Chapter 3.2 (UN Nos. 3101 to 3120) and appropriate subsidiary hazards and remarks providing relevant transport information are given.

These generic entries specify:

- the type (B to F) of organic peroxide (see 2.2.52.1.6 above);
- physical state (liquid/solid); and
- temperature control (when required), see 2.2.52.1.15 and 2.2.52.1.16.

Mixtures of these formulations may be classified as the same type of organic peroxide as that of the most dangerous component and be carried under the conditions of carriage given for this type. However, as two stable components can form a thermally less stable mixture, the self-accelerating decomposition temperature (SADT) of the mixture shall be determined and, if necessary, the control and emergency temperatures derived from the SADT in accordance with 7.1.7.3.6.

2.2.52.1.8 Classification of organic peroxides not listed in 2.2.52.4, 4.1.4.2 packing instruction IBC520 or 4.2.5.2, portable tank instruction T23, and assignment to a collective entry shall be made by the competent authority of the country of origin. The statement of approval shall contain the classification and the relevant conditions of carriage. If the country of origin is not a Contracting Party to ADR, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.

2.2.52.1.9 Samples of organic peroxides or formulations of organic peroxides not listed in 2.2.52.4, for which a complete set of test results is not available and which are to be carried for further testing or evaluation, shall be assigned to one of the appropriate entries for organic peroxides type C provided the following conditions are met:

- the available data indicate that the sample would be no more dangerous than organic peroxides type B;
- the sample is packaged in accordance with packing method OP2 and the quantity per transport unit is limited to 10 kg;
- the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.

Desensitization of organic peroxides

2.2.52.1.10 In order to ensure safety during carriage, organic peroxides are in many cases desensitized by organic liquids or solids, inorganic solids or water. Where a percentage of a substance is stipulated, this refers to the percentage by mass, rounded to the nearest whole number. In general, desensitization shall be such that, in case of spillage, the organic peroxide will not concentrate to a dangerous extent.

2.2.52.1.11 Unless otherwise stated for the individual organic peroxide formulation, the following definition(s) shall apply to diluents used for desensitization:

- diluents type A are organic liquids which are compatible with the organic peroxide and which have a boiling point of not less than 150 °C. Type A diluents may be used for desensitizing all organic peroxides;
- diluents type B are organic liquids which are compatible with the organic peroxide and which have a boiling point of less than 150 °C but not less than 60 °C and a flash-point of not less than 5 °C.

Type B diluents may be used for desensitization of all organic peroxides provided that the boiling point of the liquid is at least 60 °C higher than the SADT in a 50 kg package.

2.2.52.1.12 Diluents, other than type A or type B, may be added to organic peroxide formulations as listed in 2.2.52.4 provided that they are compatible. However, replacement of all or part of a type A or type B diluent by another diluent with differing properties requires that the organic peroxide formulation be re-assessed in accordance with the normal acceptance procedure for Class 5.2.

2.2.52.1.13 Water may only be used for the desensitization of organic peroxides which are listed in 2.2.52.4 or in the competent authority decision according to 2.2.52.1.8 as being "with water" or "as a stable dispersion in water". Samples of organic peroxides or formulations of organic peroxides not listed in 2.2.52.4 may also be desensitized with water provided the requirements of 2.2.52.1.9 are met.

2.2.52.1.14 Organic and inorganic solids may be used for desensitization of organic peroxides provided that they are compatible. Compatible liquids and solids are those which have no detrimental influence on the thermal stability and hazard type of the organic peroxide formulation.

Temperature control requirements

2.2.52.1.15 The following organic peroxides shall be subject to temperature control during carriage:

- organic peroxides types B and C with an SADT ≤ 50 °C;
- organic peroxides type D showing a medium effect when heated under confinement with an SADT ≤ 50 °C or showing a low or no effect when heated under confinement with an SADT ≤ 45 °C; and
- organic peroxides types E and F with an SADT ≤ 45 °C.

NOTE: Provisions for the determination of the effects of heating under confinement are given in the Manual of Tests and Criteria, Part II, Section 20 and test series E in Section 25.

See 7.1.7.

2.2.52.1.16 Where applicable, control and emergency temperatures are listed in 2.2.52.4. The actual temperature during carriage may be lower than the control temperature but shall be selected so as to avoid dangerous separation of phases.

2.2.52.2 Substances not accepted for carriage

Organic peroxides, type A, shall not be accepted for carriage under the provisions of Class 5.2 (see Manual of Tests and Criteria, Part II, paragraph 20.4.3 (a)).

2.2.52.3 List of collective entries

Organic peroxides <u>Not requiring temperature control</u> P1	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">3101</td><td>ORGANIC PEROXIDE TYPE A, LIQUID</td><td rowspan="10" style="vertical-align: middle; text-align: right; font-size: small;">} Not accepted for carriage, see 2.2.52.2</td></tr> <tr> <td>3102</td><td>ORGANIC PEROXIDE TYPE A, SOLID</td></tr> <tr> <td>3103</td><td>ORGANIC PEROXIDE TYPE B, LIQUID</td></tr> <tr> <td>3104</td><td>ORGANIC PEROXIDE TYPE B, SOLID</td></tr> <tr> <td>3105</td><td>ORGANIC PEROXIDE TYPE C, LIQUID</td></tr> <tr> <td>3106</td><td>ORGANIC PEROXIDE TYPE C, SOLID</td></tr> <tr> <td>3107</td><td>ORGANIC PEROXIDE TYPE D, LIQUID</td></tr> <tr> <td>3108</td><td>ORGANIC PEROXIDE TYPE D, SOLID</td></tr> <tr> <td>3109</td><td>ORGANIC PEROXIDE TYPE E, LIQUID</td></tr> <tr> <td>3110</td><td>ORGANIC PEROXIDE TYPE E, SOLID</td></tr> <tr> <td>3545</td><td>ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.</td><td rowspan="2" style="vertical-align: middle; text-align: right; font-size: small;">} Not subject to the provisions applicable to Class 5.2, see 2.2.52.1.6</td></tr> <tr> <td></td><td>ORGANIC PEROXIDE TYPE F, LIQUID</td></tr> <tr> <td></td><td>ORGANIC PEROXIDE TYPE F, SOLID</td><td></td></tr> </table>	3101	ORGANIC PEROXIDE TYPE A, LIQUID	} Not accepted for carriage, see 2.2.52.2	3102	ORGANIC PEROXIDE TYPE A, SOLID	3103	ORGANIC PEROXIDE TYPE B, LIQUID	3104	ORGANIC PEROXIDE TYPE B, SOLID	3105	ORGANIC PEROXIDE TYPE C, LIQUID	3106	ORGANIC PEROXIDE TYPE C, SOLID	3107	ORGANIC PEROXIDE TYPE D, LIQUID	3108	ORGANIC PEROXIDE TYPE D, SOLID	3109	ORGANIC PEROXIDE TYPE E, LIQUID	3110	ORGANIC PEROXIDE TYPE E, SOLID	3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	} Not subject to the provisions applicable to Class 5.2, see 2.2.52.1.6		ORGANIC PEROXIDE TYPE F, LIQUID		ORGANIC PEROXIDE TYPE F, SOLID	
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<u>Requiring temperature control</u> P2	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">3111</td><td>ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3112</td><td>ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3113</td><td>ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3114</td><td>ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3115</td><td>ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3116</td><td>ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3117</td><td>ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3118</td><td>ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3119</td><td>ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3120</td><td>ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED</td></tr> <tr> <td>3545</td><td>ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.</td></tr> </table>	3111	ORGANIC PEROXIDE TYPE B, LIQUID, TEMPERATURE CONTROLLED	3112	ORGANIC PEROXIDE TYPE B, SOLID, TEMPERATURE CONTROLLED	3113	ORGANIC PEROXIDE TYPE C, LIQUID, TEMPERATURE CONTROLLED	3114	ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED	3115	ORGANIC PEROXIDE TYPE D, LIQUID, TEMPERATURE CONTROLLED	3116	ORGANIC PEROXIDE TYPE D, SOLID, TEMPERATURE CONTROLLED	3117	ORGANIC PEROXIDE TYPE E, LIQUID, TEMPERATURE CONTROLLED	3118	ORGANIC PEROXIDE TYPE E, SOLID, TEMPERATURE CONTROLLED	3119	ORGANIC PEROXIDE TYPE F, LIQUID, TEMPERATURE CONTROLLED	3120	ORGANIC PEROXIDE TYPE F, SOLID, TEMPERATURE CONTROLLED	3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.							
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2.2.52.4***List of currently assigned organic peroxides in packagings***

In the column "Packing Method", codes "OP1" to "OP8" refer to packing methods in 4.1.4.1, packing instruction P520 (see also 4.1.7.1). Organic peroxides to be carried shall fulfil the classification and the control and emergency temperatures (derived from the SADT) as listed. For substances permitted in IBCs, see 4.1.4.2, packing instruction IBC520 and, for those permitted in tanks according to Chapters 4.2 and 4.3, see 4.2.5.2.6, portable tank instruction T23. The formulations listed in packing instruction IBC520 of 4.1.4.2 and in portable tank instruction T23 of 4.2.5.2.6 may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
ACETYL ACETONE PEROXIDE	≤ 42	≥ 48		≥ 8	OP7				3105	2)
"	≤ 32 as a paste			OP7					3106	20)
ACETYL CYCLOHEXANESULPHONYL PEROXIDE	≤ 82			≥ 12	OP4	-10	0	0	3112	3)
"	≤ 32	≥ 68		OP7	-10	0	0	0	3115	
tert-AMYL HYDROPEROXIDE	≤ 88	≥ 6		≥ 6	OP8				3107	
tert-AMYL PEROXYACETATE	≤ 62	≥ 38			OP7				3105	
tert-AMYL PEROXYBENZOATE	≤ 100				OP5				3103	
tert-AMYL PEROXY-2-ETHYLHEXANOATE	≤ 100				OP7	+20	+25		3115	
tert-AMYL PEROXY-2-ETHYLHEXYL CARBONATE	≤ 100				OP7				3105	
tert-AMYL PEROXY ISOPROPYL CARBONATE	≤ 77	≥ 23			OP5				3103	
tert-AMYL PEROXYNEODECANOATE	≤ 77	≥ 23			OP7	0	+10	+10	3115	
"	≤ 47	≥ 53			OP8	0	+10	+10	3119	
tert-AMYL PEROXYPIVALATE	≤ 77		≥ 23		OP5	+10	+15	+15	3113	
tert-AMYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	≤ 100				OP7				3105	
tert-BUTYL CUMYL PEROXIDE	> 42 - 100				OP8				3109	
"	≤ 52			≥ 48	OP8				3108	
n-BUTYL-4,4-Di-(tert-BUTYLPEROXY)VALERATE	> 52 - 100				OP5				3103	
"	≤ 52			≥ 48	OP8				3108	
tert-BUTYL HYDROPEROXIDE	>79 - 90				≥ 10	OP5			3103	13)
"	≤ 80	≥ 20			OP7				3105	4) 13)
"	≤ 79				> 14	OP8			3107	13) 23)
"	≤ 72				≥ 28	OP8			3109	13)
tert-BUTYL HYDROPEROXIDE + Di-tert-BUTYLPEROXIDE	< 82 + > 9			≥ 7	OP5				3103	13)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
tert-BUTYL MONOPEROXYMALEATE	> 52 - 100				OP5				3102	3)
"	≤ 52	≥ 48			OP6				3103	
"	≤ 52			≥ 48	OP8				3108	
"	≤ 52 as a paste				OP8				3108	
tert-BUTYL PEROXYACETATE	> 52 - 77	≥ 23			OP5				3101	3)
"	> 32 - 52	≥ 48			OP6				3103	
"	≤ 32			≥ 68	OP8				3109	
tert-BUTYL PEROXYBENZOATE	> 77 - 100				OP5				3103	
"	> 52 - 77	≥ 23			OP7				3105	
"	≤ 52			≥ 48	OP7				3106	
tert-BUTYL PEROXYBUTYL FUMARATE	≤ 52	≥ 48			OP7				3105	
tert-BUTYL PEROXYCROTONATE	≤ 77	≥ 23			OP7				3105	
tert-BUTYL PEROXYDIETHYLACETATE	≤ 100				OP5	+20	+25		3113	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE	> 52 - 100				OP6	+20	+25		3113	
"	> 32 - 52			≥ 48	OP8	+30	+35		3117	
"	≤ 52			≥ 48	OP8	+20	+25		3118	
"	≤ 32			≥ 68	OP8	+40	+45		3119	
tert-BUTYL PEROXY-2-ETHYLHEXANOATE + 2,2-Di-tert-BUTYL PEROXYBUTANE	≤ 12 +≤ 14	≥ 14		≥ 60	OP7				3106	
"	≤ 31 +≤ 36			≥ 33			+40		3115	
tert-BUTYL PEROXY-2-ETHYLHEXYLCARBONATE	≤ 100				OP7	+35			3105	
tert-BUTYL PEROXYISOBUTYRATE	> 52 - 77			≥ 23	OP5	+15	+20		3111	3)
"	≤ 52			≥ 48	OP7	+15	+20		3115	
tert-BUTYL PEROXY ISOPROPYL CARBONATE	≤ 77	≥ 23			OP5				3103	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
1-(2-tert-BUTYLPEROXY ISOPROPYL)-3-ISOPROPENYLBENZENE	≤ 77	≥ 23			OP7				3105	
"	≤ 42			≥ 58	OP8				3108	
tert-BUTYL PEROXY-2-METHYLBENZOATE	≤ 100				OP5				3103	
tert-BUTYL PEROXYNEODECANOATE	> 77 - 100				OP7	-5	+5		3115	
"	≤ 77			≥ 23	OP7	0	+10		3115	
"	≤ 52 as a stable dispersion in water				OP8	0	+10		3119	
"	≤ 42 as a stable dispersion in water (frozen)				OP8	0	+10		3118	
"	≤ 32	≥ 68			OP8	0	+10		3119	
tert-BUTYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23			OP7	0	+10		3115	
"	≤ 42 as a stable dispersion in water				OP8	0	+10		3117	
tert-BUTYL PEROXYPIVULATE	> 67 - 77	≥ 23			OP5	0	+10		3113	
"	> 27 - 67	≥ 33			OP7	0	+10		3115	
"	≤ 27	≥ 73			OP8	+30	+35		3119	
tert-BUTYL PEROXY STEARYLCARBONATE	≤ 100				OP7				3106	
tert-BUTYL PEROXY 3,5,5-TRIMETHYLLHEXANOATE	> 37 - 100				OP7				3105	
"	≤ 42			≥ 58	OP7				3106	
"	≤ 37	≥ 63			OP8				3109	
3-CHLOROPEROXYBENZOIC ACID	> 57 - 86			≥ 14	OP1				3102	3)
"	≤ 57			≥ 3	OP7				3106	
"	≤ 77			≥ 6	OP7				3106	
CUMYL HYDROPEROXIDE	> 90 - 98	≤ 10			OP8				3107	13)
"	≤ 90	≥ 10			OP8				3109	13) 18)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
CUMYL PEROXYNEODECANOATE	≤ 87	≥ 13			OP7	- 10	0	0	3115	
"	≤ 77		≥ 23		OP7	- 10	0	0	3115	
"	≤ 52 as a stable dispersion in water				OP8	- 10	0	0	3119	
CUMYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23			OP7	- 10	0	0	3115	
CUMYL PEROXPIVALATE	≤ 77		≥ 23		OP7	- 5	+ 5	+ 5	3115	
CYCLOHEXANONE PEROXIDE(S)	≤ 91			≥ 9	OP6				3104	(13)
"	≤ 72	≥ 28			OP7				3105	5)
"	≤ 72 as a paste				OP7				3106	5) (20)
"	≤ 32			≥ 68					Exempt	29)
([3R,3S,6S,8S,9R,10R,12S,12aS,12aR***] - DECAHYDRO-10-METHOXY-3,6,9-TRIMETHYL-3,12-EPOXY-12H-PYRANO[4,3-j]-1,2-BENZODIOXEPIN)	≤ 100				OP7				3106	
DIACETONE ALCOHOL PEROXIDES	≤ 57		≥ 26	≥ 8	OP7	+ 40	+ 45	+ 45	3115	6)
DIACETYL PEROXIDE	≤ 27		≥ 73		OP7	+ 20	+ 25	+ 25	3115	7) (13)
Di-tert-AMYL PEROXIDE	≤ 100				OP8				3107	
2,2-Di-(tert-AMYLPEROXY)BUTANE	≤ 57	≥ 43			OP7				3105	
1,1-Di-(tert-AMYLPEROXY)CYCLOHEXANE	≤ 82	≥ 18			OP6				3103	
DIBENZOYL PEROXIDE	> 52 - 100			≤ 48	OP2				3102	3)
"	> 77 - 94				OP4				3102	3)
"	≤ 77				≥ 23	OP6			3104	
"	≤ 62			≥ 28	≥ 10	OP7			3106	
"	> 52 - 62 as a paste				OP7				3106	(20)
"	> 35 - 52			≥ 48	OP7				3106	
"	> 36 - 42	≥ 18			OP8				3107	
"	≤ 56.5 as a paste				OP8				3108	
"	≤ 52 as a paste				OP8				3108	20)
"	≤ 42 as a stable dispersion in water				OP8				3109	
"	≤ 35			≥ 65					Exempt	29)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
DI-(4-tert-BUTYL CYCLOHEXYL) PEROXYDICARBONATE	≤ 100				OP6	+30	+35	+35	3114	
"	≤ 42 as a stable dispersion in water				OP8	+30	+35	+35	3119	
"	≤ 42 (as a paste)				OP7	+35	+40	+40	3116	
DI-tert-BUTYL PEROXIDE	> 52 - 100				OP8				3107	
"	≤ 52	≥ 48			OP8				3109	25)
DI-tert-BUTYL PEROXYAZELATE	≤ 52	≥ 48			OP7				3105	
2,2-DI-(tert-BUTYL PEROXY)BUTANE	≤ 52	≥ 48			OP6				3103	
1,6-DI-(tert-BUTYL PEROXYCARBONYLOXY)HEXANE	≤ 72	≥ 28			OP5				3103	
1,1-DI-(tert-BUTYL PEROXY) CYCLOHEXANE	> 80 - 100				OP5				3101	3)
"	≤ 72	≥ 28			OP5				3103	30)
"	> 52 - 80	≥ 20			OP5				3103	
"	> 42 - 52	≥ 48			OP7				3105	
"	≤ 42	≥ 13	≥ 45		OP7				3106	
"	≤ 42	≥ 58			OP8				3109	
"	≤ 27	≥ 25			OP8				3107	21)
"	≤ 13	≥ 13	≥ 74		OP8				3109	
1,1-DI-(tert-BUTYL PEROXY) CYCLOHEXANE + ter-BUTYL PEROXY-2-ETHYLHEXANOATE	≤ 43 + ≤ 16	≥ 41			OP 7				3105	
DI-n-BUTYL PEROXYDICARBONATE	> 27 - 52	≥ 48			OP7	-15	-5	-5	3115	
"	≤ 27	≥ 73			OP8	-10	0	0	3117	
"	≤ 42 as a stable dispersion in water (frozen)				OP8	-15	-5	-5	3118	
DI-sec-BUTYL PEROXYDICARBONATE	> 52 - 100				OP4	-20	-10	-10	3113	
"	≤ 52	≥ 48			OP7	-15	-5	-5	3115	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
DI-(tert-BUTYLPEROXYISOPROPYL)BENZENE(S)	> 42 - 100			≤ 57	OP7				3106	
"	≤ 42			≥ 58					Exempt	29)
DI-(tert-BUTYLPEROXY)PHthalATE	> 42 - 52	≥ 48			OP7				3105	
"	≤ 52 as a paste				OP7				3106	20)
"	≤ 42	≥ 58			OP8				3107	
2,2-DI-(tert-BUTYLPEROXY)PROPANE	≤ 52	≥ 48			OP7				3105	
"	≤ 42	≥ 13		≥ 45	OP7				3106	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYLCYCLOHEXANE	> 90 - 100				OP5				3101	3)
"	≤ 90			≥ 10	OP5				3103	30)
"	> 57 - 90	≥ 10			OP5				3103	
"	≤ 77			≥ 23	OP5				3103	
"	≤ 57			≥ 43	OP8				3110	
"	≤ 57	≥ 43			OP8				3107	
"	≤ 32	≥ 26	≥ 42		OP8				3107	
DICETYL PEROXYDICARBONATE	≤ 100				OP8	+30	+35	3120		
"	≤ 42 as a stable dispersion in water				OP8	+30	+35	3119		
DI4-CHLOROBENZOYL PEROXIDE	≤ 77			≥ 23	OP5				3102	3)
"	≤ 52 as a paste				OP7				3106	20)
"	≤ 32			≥ 68				Exempt	29)	
DICUMYL PEROXIDE	> 52 - 100				OP8				3110	12)
"	≤ 52			≥ 48				Exempt	29)	
DICYCLOHEXYL PEROXYDICARBONATE	> 91 - 100				OP3	+10	+15	3112	3)	
"	≤ 91				OP5	+10	+15	3114		
"	≤ 42 as a stable dispersion in water				OP8	+15	+20	3119		

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
DIDEcanoYL PEROXIDE	≤100				OP6	+30	+35		3114	
2,2-DI(4,4-DI(tert-BUTYL PEROXY) CYCLOHEXYL) PROPANE	≤42			≥58	OP7				3106	
"	≤22			≥78	OP8				3107	
DI(2,4-DICHLOROBENZOYL PEROXIDE	≤77				OP5				3102	3)
"	≤52 as a paste				OP8	+20	+25		3118	
"	≤52 as a paste with silicon oil				OP7				3106	
DI-(2-ETHOXYETHYL) PEROXYDICARBONATE	≤52			≥48	OP7	-10	0		3115	
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE	>77 – 100				OP5	-20	-10		3113	
"	≤77			≥23	OP7	-15	-5		3115	
"	≤62 as a stable dispersion in water				OP8	-15	-5		3119	
"	≤52 as a stable dispersion in water (frozen)				OP8	-15	-5		3120	
2,2-DIHYDROPEROXYPROPANE	≤27			≥73	OP5				3102	3)
DI-(1-HYDROXYCYCLOHEXYL) PEROXIDE	≤100				OP7				3106	
DISOBUTYRYL PEROXIDE	>32 – 52			≥48	OP5	-20	-10		3111	3)
"	≤32			≥68	OP7	-20	-10		3115	
"	≤42 (as a stable dispersion in water)				OP8	-20	-10		3119	
DIISOPROPYLBENZENE DIHYDROPEROXIDE	≤82	≥5		≥5	OP7				3106	24)
DIISOPROPYL PEROXYDICARBONATE	>52-100				OP2	-15	-5		3112	3)
"	≤52			≥48	OP7	-20	-10		3115	
"	≤32			≥68	OP7	-15	-5		3115	
DILAUROYL PEROXIDE	≤100				OP7				3106	
"	≤42 as a stable dispersion in water				OP8				3109	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
DI-(3-METHOXYBUTYL) PEROXYDICARBONATE	≤ 52		≥ 48		OP7	-5	+5		3115	
DI-(2-METHYLBENZOYL) PEROXIDE	≤ 87			≥ 13	OP5	+30	+35		3112	3)
DI-(3-METHYLBENZOYL) PEROXIDE + BENZOYL (3-METHYLBENZOYL) PEROXIDE + DIBENZOYL PEROXIDE	≤ 20 + ≤ 18 + ≤ 4		≥ 58		OP7	+35	+40		3115	
DI-(4-METHYLBENZOYL) PEROXIDE □		≤ 52 as a paste with silicon oil			OP7				3106	
	"	≥ 82			OP5				3102	3)
	"	≤ 82			OP5				3104	
2,5-DIMETHYL-2,5-DI-(BENZOYLPEROXY)HEXANE	> 90 - 100				OP5				3103	
"	> 52 - 90	≥ 10			OP7				3105	
"	"	≤ 77		≥ 23	OP8				3108	
"	"	≤ 52	≥ 48		OP8				3109	
"	"	≤ 47 as a paste			OP8				3108	
2,5-DIMETHYL-2,5-DI-(tert-BUTYLPEROXY)HEXYNE-3	> 86-100				OP5				3101	3)
"	"	>52-86	≥ 14		OP5				3 03	(26)
"	"	≤ 52		≥ 48	OP7				3 06	
2,5-DIMETHYL-2,5-DI-(2-ETHYLHEXANOYLPEROXY)HEXANE □	≤ 100				OP5	+20	+25		3113	
2,5-DIMETHYL-2,5-DI-(3,5,5-TRIMETHYLHEXANOYLPEROXY)HEXANE	≤ 82			≥ 18	OP6				3104	
1,1-DIMETHYL-3-HYDROXYBUTYL PEROXYNEOHEPTANOATE	≤ 77	≥ 23			OP7				3105	
DIMYRISTYL PEROXYDICARBONATE	≤ 100				OP8	0	+10		3117	
"	"	≤ 42 as a stable dispersion in water			OP8	+20	+25		3116	
						+20	+25		3119	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Water	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
DI-(2-NEODECANOYL)PEROXYISOPROPYL BENZENE	≤ 52	≥ 48			OP7	-10	0	0	3115	
DI-n-NONANOYL PEROXIDE	≤ 100				OP7	0	+10		3116	
DI-n-OCTANOYL PEROXIDE	≤ 100				OP5	+10	+15		3114	
DI-(2-PHENOXOXYETHYL)PEROXYDICARBONATE	>85-100				OP5				3102	3)
"	≤ 85				≥ 15	OP7			3106	
DIPROPIONYL PEROXIDE	≤ 27		≥ 73		OP8	+15	+20		3117	
DI-n-PROPYL PEROXYDICARBONATE	≤ 100		≤ 100		OP3	-25	-15		3113	
"	≤ 77		≥ 23		OP5	-20	-10		3113	
DISUCCINIC ACID PEROXIDE	> 72-100				OP4				3102	3) 17)
"	≤ 72				≥ 28	OP7	+10	+15	3116	
DI-(3,5,5-TRIMETHYLHEXANOYL) PEROXIDE	> 52-82	≥ 18			OP7	0	+10		3115	
"		≤ 52 as a stable dispersion in water			OP8	+10	+15		3119	
"	> 38-52	≥ 48			OP8	+10	+15		3119	
"	≤ 38	≥ 62			OP8	+20	+25		3119	
ETHYL 3,3-DI-(tert-AMYL)PEROXYBUTYRATE	≤ 67	≥ 33			OP7				3105	
ETHYL 3,3-DI-(tert-BUTYL)PEROXYBUTYRATE	> 77 - 100				OP5				3103	
"	≤ 77	≥ 23			OP7				3105	
"	≤ 52		≥ 48		OP7				3106	
1-(2-ETHYLHEXANOYL)PEROXY-1,3-DIMETHYLBUTYL PEROXYPIVALATE	≤ 52	≥ 45	≥ 10		OP7	-20	-10		3115	
tert-HEXYL PEROXYNEODECANOATE	≤ 71	≥ 29			OP7	0	+10		3115	
tert-HEXYL PEROXYPIVALATE	≤ 72		≥ 28		OP7	+10	+15		3115	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	≤ 77	≥ 23			OP 7	- 5	+ 5		3115	
"	≤ 52	≥ 48			OP 8	- 5	+ 5		3117	

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
"	≤ 52 as a stable dispersion in water				OP 8	- 5	+ 5	-10	3119	
ISOPROPYL sec-BUTYL PEROXYDICARBONATE +Di-sec-BUTYL PEROXYDICARBONATE +Di-ISOPROPYL PEROXYDICARBONATE	≤ 32 + ≤ 15 - 18 ≤ 12 - 15	≥ 38			OP7	-20			3115	
"	≤ 52 + ≤ 28 + ≤ 22				OP5	-20	-10		3111	3)
ISOPROPYL CUMYL HYDROPEROXIDE	≤ 72	≥ 28			OP8				3109	13)
p-MENTHYL HYDROPEROXIDE	> 72 - 100				OP7				3105	13)
"	≤ 72	≥ 28			OP8				3109	27)
METHYL CYCLOHEXANONE PEROXIDE(S)	≤ 67		≥ 33		OP7	+35	+40		3115	
METHYL ETHYL KETONE PEROXIDE(S)	see remark 8)	≥ 48			OP5				3101	318) 13)
"	see remark 9)	≥ 55			OP7				3105	9)
"	see remark 10)	≥ 60			OP8				3107	10)
METHYL ISOBUTYL KETONE PEROXIDE(S)	≤ 62	≥ 19			OP7				3105	22)
METHYL ISOPROPYL KETONE PEROXIDE(S)	see remark 31)	≥ 70			OP8				3109	31)
ORGANIC PEROXIDE, LIQUID, SAMPLE					OP2				3103	11)
ORGANIC PEROXIDE, LIQUID, SAMPLE, TEMPERATURE CONTROLLED					OP2				3113	11)
ORGANIC PEROXIDE, SOLID, SAMPLE					OP2				3104	11)
ORGANIC PEROXIDE, SOLID, SAMPLE, TEMPERATURE CONTROLLED					OP2				3114	11)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	≤ 100				OP8				3107	
PEROXYACETIC ACID, TYPE D, stabilized	≤ 43				OP7				3105	13) 14) 19)
PEROXYACETIC ACID, TYPE E, stabilized	≤ 43				OP8				3107	13) 15) 19)
PEROXYACETIC ACID, TYPE F, stabilized	≤ 43				OP8				3109	13) 16) 19)
PEROXYLAURIC ACID	≤ 100				OP8	+35	+40		3118	
1-PHENYLETHYL HYDROPEROXIDE	≤ 38			≥ 62	OP8				3109	
PINANYL HYDROPEROXIDE	> 56 - 100				OP7				3105	13)

ORGANIC PEROXIDE	Concentration (%)	Diluent type A (%)	Diluent type B (%) (%) ¹⁾	Inert solid (%)	Wafer	Packing Method	Control temperature (°C)	Emergency temperature (°C)	Number (Generic entry)	Subsidiary hazards and remarks
"	≤ 56	≥ 44			OP8				3109	
POLYETHER POLY-tert-BUTYL PEROXY-CARBONATE	≤ 52		≥ 48		OP8				3107	
1,1,3,3-TRI(METHYL)BUTYL HYDROPEROXIDE	≤ 100				OP7				3105	
1,1,3,3-TRI(METHYL)BUTYL PEROXY-2-ETHYLHEXANOATE	≤ 100				OP7	+15		+20	3115	
1,1,3,3-TETRAMETHYLBUTYL PEROXYNEODECANOATE	≤ 72		≥ 28		OP7	-5		+5	3115	
<hr/>										
"	≤ 52 as a stable dispersion in water				OP8		-5	+5	3119	
1,1,3,3-TETRAMETHYLBUTYL PEROXYPIVALATE	≤ 77	≥ 23			OP7	0		+10	3115	
3,6,9-TRIETHYL-3,6,9-TRIMETHYL-1,4,7-TRIPEROXONANE	≤ 17	≥ 18		≥ 65	OP8				3110	
3,6,9-TRIETHYL-3,6,9-TRIMETHYL-1,4,7-TRIPEROXONANE	≤ 42	≥ 58			OP7				3105	(28)

Remarks (refer to the last column of the Table in 2.2.52.4):

- 1) Diluent type B may always be replaced by diluent type A. The boiling point of diluent type B shall be at least 60°C higher than the SADT of the organic peroxide.
- 2) Available oxygen ≤ 4.7%.
- 3) "EXPLOSIVE" subsidiary hazard label required (Model No.1, see 5.2.2.2.2).
- 4) Diluent may be replaced by di-tert-butyl peroxide.
- 5) Available oxygen ≤ 9%.
- 6) With ≤ 9% hydrogen peroxide; available oxygen ≤ 10%.
- 7) Only non-metallic packagings allowed.
- 8) Available oxygen > 10% and ≤ 10.7%, with or without water.
- 9) Available oxygen ≤ 10%, with or without water.
- 10) Available oxygen ≤ 8.2%, with or without water.
- 11) See 2.2.52.1.9.
- 12) Up to 2000 kg per receptacle assigned to ORGANIC PEROXIDE TYPE F on the basis of large scale trials.
- 13) "CORROSIVE" subsidiary hazard label required (Model No.8, see 5.2.2.2.2).
- 14) Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (d).
- 15) Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (e).
- 16) Peroxyacetic acid formulations which fulfil the criteria of the Manual of Tests and Criteria, paragraph 20.4.3 (f).
- 17) Addition of water to this organic peroxide will decrease its thermal stability.
- 18) No "CORROSIVE" subsidiary hazard label (Model No.8, see 5.2.2.2.2) required for concentrations below 80%.
- 19) Mixtures with hydrogen peroxide, water and acid(s).
- 20) With diluent type A, with or without water.
- 21) With ≥ 25% diluent type A by mass, and in addition ethylbenzene.
- 22) With ≥ 19%, diluent type A by mass, and in addition methyl isobutyl ketone.
- 23) With < 6% di-tert-butyl peroxide.
- 24) With ≤ 8% 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.
- 25) Diluent type B with boiling point > 110 °C.
- 26) With < 0.5% hydroperoxides content.
- 27) For concentrations more than 56%, "CORROSIVE" subsidiary hazard label required (Model No.8, see 5.2.2.2.2).
- 28) Available active oxygen ≤ 7.6% in diluent type A having a 95% boil-off point in the range of 200 - 260 °C.
- 29) Not subject to the requirements of ADR for Class 5.2.
- 30) Diluent type B with boiling point > 130 °C.
- 31) Active oxygen ≤ 6.7%.

2.2.61 Class 6.1 Toxic substances**2.2.61.1 Criteria**

2.2.61.1.1 The heading of Class 6.1 covers substances of which it is known by experience or regarding which it is presumed from experiments on animals that in relatively small quantities they are able by a single action or by action of short duration to cause damage to human health, or death, by inhalation, by cutaneous absorption or by ingestion.

NOTE: *Genetically modified microorganisms and organisms shall be assigned to this Class if they meet the conditions for this Class.*

2.2.61.1.2 Substances of Class 6.1 are subdivided as follows:

T Toxic substances without subsidiary hazard:

- T1 Organic, liquid;
- T2 Organic, solid;
- T3 Organometallic substances;
- T4 Inorganic, liquid;
- T5 Inorganic, solid;
- T6 Liquid, used as pesticides;
- T7 Solid, used as pesticides;
- T8 Samples;
- T9 Other toxic substances;
- T10 Articles;

TF Toxic substances, flammable:

- TF1 Liquid;
- TF2 Liquid, used as pesticides;
- TF3 Solid;

TS Toxic substances, self-heating, solid;

TW Toxic substances, which, in contact with water, emit flammable gases:

- TW1 Liquid;
- TW2 Solid;

TO Toxic substances, oxidizing:

- TO1 Liquid;
- TO2 Solid;

TC Toxic substances, corrosive:

- TC1 Organic, liquid;
- TC2 Organic, solid;
- TC3 Inorganic, liquid;
- TC4 Inorganic, solid;

TFC Toxic substances, flammable, corrosive;

TFW Toxic substances, flammable, which, in contact with water, emit flammable gases.

Definitions

2.2.61.1.3 For the purposes of ADR:

LD₅₀ (median lethal dose) for acute oral toxicity is the statistically derived single dose of a substance that can be expected to cause death within 14 days in 50 per cent of young adult albino rats when administered by the oral route. The LD₅₀ value is expressed in terms of mass of test substance per mass of test animal (mg/kg);

LD₅₀ for acute dermal toxicity is that dose of the substance which, administered by continuous contact for 24 hours with the bare skin of albino rabbits, is most likely to cause death within 14 days in one half of the animals tested. The number of animals tested shall be sufficient to give a statistically significant result and be in conformity with good pharmacological practice. The result is expressed in milligrams per kg body mass;

LC₅₀ for acute toxicity on inhalation is that concentration of vapour, mist or dust which, administered by continuous inhalation to both male and female young adult albino rats for one hour, is most likely to cause death within 14 days in one half of the animals tested. A solid substance shall be tested if at least 10% (by mass) of its total mass is likely to be dust in a respirable range, e.g. the aerodynamic diameter of that particle-fraction is 10 µm or less. A liquid substance shall be tested if a mist is likely to be generated in a leakage of the transport containment. Both for solid and liquid substances more than 90% (by mass) of a specimen prepared for inhalation toxicity shall be in the respirable range as defined above. The result is expressed in milligrams per litre of air for dusts and mists or in millilitres per cubic metre of air (parts per million) for vapours.

Classification and assignment of packing groups

2.2.61.1.4 Substances of Class 6.1 shall be classified in three packing groups according to the degree of danger they present for carriage, as follows:

Packing group I: highly toxic substances

Packing group II: toxic substances

Packing group III: slightly toxic substances.

2.2.61.1.5 Substances, mixtures, solutions and articles classified in Class 6.1 are listed in Table A of Chapter 3.2. The assignment of substances, mixtures and solutions not mentioned by name in Table A of Chapter 3.2 to the relevant entry of sub-section 2.2.61.3 and to the relevant packing group in accordance with the provisions of Chapter 2.1, shall be made according to the following criteria in 2.2.61.1.6 to 2.2.61.1.11.

2.2.61.1.6 To assess the degree of toxicity, account shall be taken of human experience of instances of accidental poisoning, as well as special properties possessed by any individual substances: liquid state, high volatility, any special likelihood of cutaneous absorption, and special biological effects.

2.2.61.1.7 In the absence of observations on humans, the degree of toxicity shall be assessed using the available data from animal experiments in accordance with the table below:

	Packing group	Oral toxicity LD ₅₀ (mg/kg)	Dermal toxicity LD ₅₀ (mg/kg)	Inhalation toxicity by dusts and mists LC ₅₀ (mg/l)
Highly toxic	I	≤ 5	≤ 50	≤ 0.2
Toxic	II	> 5 and ≤ 50	> 50 and ≤ 200	> 0.2 and ≤ 2
Slightly toxic	III ^a	> 50 and ≤ 300	> 200 and ≤ 1 000	> 2 and ≤ 4

^a Tear gas substances shall be included in packing group II even if data concerning their toxicity correspond to packing group III criteria.

2.2.61.1.7.1 Where a substance exhibits different degrees of toxicity for two or more kinds of exposure, it shall be classified under the highest such degree of toxicity.

2.2.61.1.7.2 Substances meeting the criteria of Class 8 and with an inhalation toxicity of dusts and mists (LC_{50}) leading to packing group I shall only be accepted for an allocation to Class 6.1 if the toxicity through oral ingestion or dermal contact is at least in the range of packing groups I or II. Otherwise an assignment to Class 8 shall be made if appropriate (see 2.2.8.1.4.5).

2.2.61.1.7.3 The criteria for inhalation toxicity of dusts and mists are based on LC_{50} data relating to 1-hour exposure, and where such information is available it shall be used. However, where only LC_{50} data relating to 4-hour exposure are available, such figures can be multiplied by four and the product substituted in the above criteria, i.e. LC_{50} value multiplied by four (4 hour) is considered the equivalent of LC_{50} (1 hour).

Inhalation toxicity of vapours

2.2.61.1.8 Liquids giving off toxic vapours shall be classified into the following groups where "V" is the saturated vapour concentration (in ml/m^3 of air) (volatility) at $20^\circ C$ and standard atmospheric pressure:

	Packing group	
Highly toxic	I	Where $V \geq 10$ LC_{50} and $LC_{50} \leq 1\,000 ml/m^3$
Toxic	II	Where $V \geq LC_{50}$ and $LC_{50} \leq 3\,000 ml/m^3$ and the criteria for packing group I are not met
Slightly toxic	III ^a	Where $V \geq 1/5 LC_{50}$ and $LC_{50} \leq 5\,000 ml/m^3$ and the criteria for packing groups I and II are not met

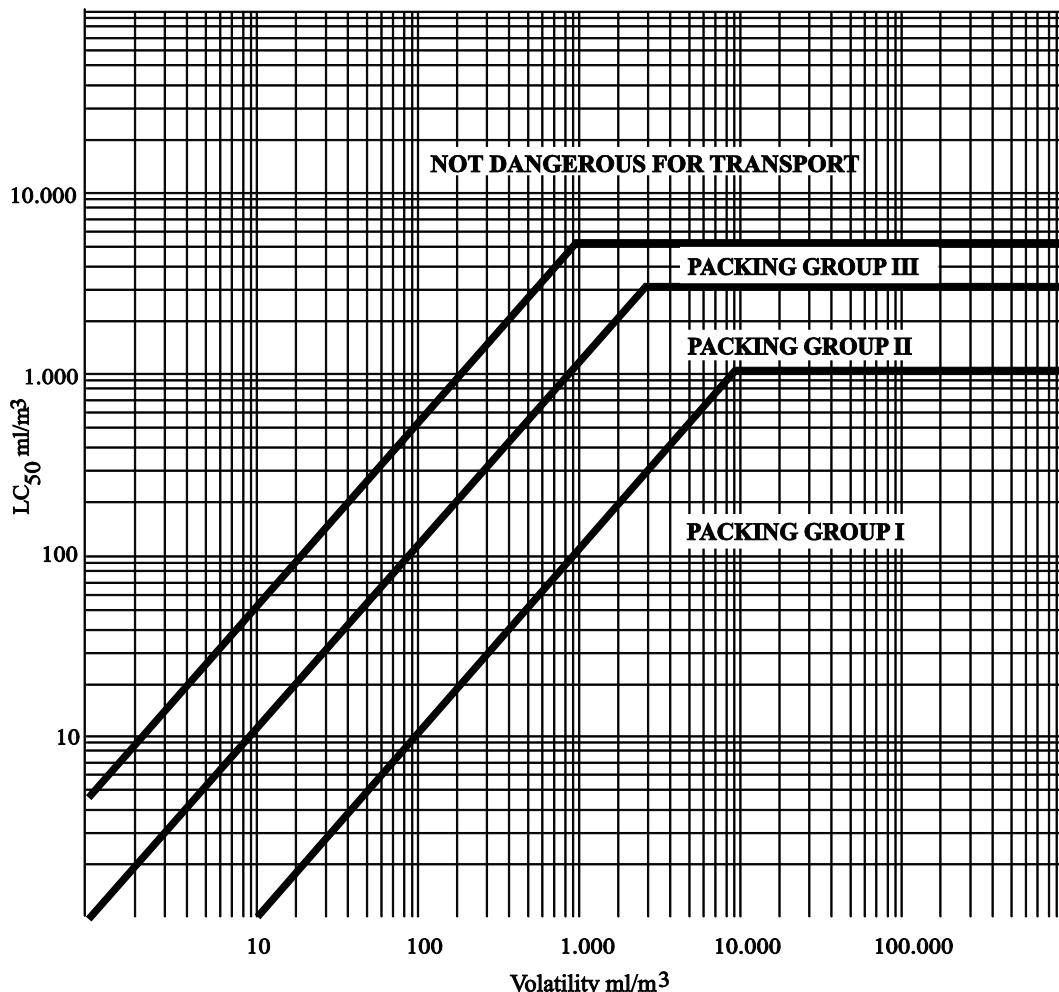
^a *Tear gas substances shall be included in packing group II even if data concerning their toxicity correspond to packing group III criteria.*

These criteria for inhalation toxicity of vapours are based on LC_{50} data relating to 1-hour exposure, and where such information is available, it shall be used.

However, where only LC_{50} data relating to 4-hour exposure to the vapours are available, such figures can be multiplied by two and the product substituted in the above criteria, i.e. LC_{50} (4 hour) $\times 2$ is considered the equivalent of LC_{50} (1 hour).

In this figure, the criteria are expressed in graphical form, as an aid to easy classification. However, due to approximations inherent in the use of graphs, substances falling on or near group borderlines shall be checked using numerical criteria.

GROUP BORDERLINES INHALATION TOXICITY OF VAPOURS

*Mixtures of liquids*

2.2.61.1.9 Mixtures of liquids which are toxic on inhalation shall be assigned to packing groups according to the following criteria:

2.2.61.1.9.1 If LC_{50} is known for each of the toxic substances constituting the mixture, the packing group may be determined as follows:

(a) calculation of the LC_{50} of the mixture:

$$LC_{50} (\text{mixture}) = \frac{1}{\sum_{i=1}^1 \frac{f_i}{LC_{50i}}}$$

where f_i = molar fraction of constituent i of the mixture;

LC_{50i} = average lethal concentration of constituent i in ml/m^3 .

(b) calculation of volatility of each mixture constituent:

$$V_i = P_i \times \frac{10^6}{101.3} (ml/m^3)$$

where P_i = partial pressure of constituent i in kPa at 20 °C and at standard atmospheric pressure.

(c) calculation of the ratio of volatility to LC_{50} :

$$R = \sum_{i=1}^n \frac{V_i}{LC_{50i}}$$

(d) the values calculated for LC_{50} (mixture) and R are then used to determine the packing group of the mixture:

Packing group I	$R \geq 10$ and LC_{50} (mixture) $\leq 1\ 000 \text{ ml/m}^3$;
Packing group II	$R \geq 1$ and LC_{50} (mixture) $\leq 3\ 000 \text{ ml/m}^3$, if the mixture does not meet the criteria for packing group I;
Packing group III	$R \geq 1/5$ and LC_{50} (mixture) $\leq 5\ 000 \text{ ml/m}^3$, if the mixture does not meet the criteria of packing groups I or II.

2.2.61.1.9.2 In the absence of LC_{50} data on the toxic constituent substances, the mixture may be assigned to a group based on the following simplified threshold toxicity tests. When these threshold tests are used, the most restrictive group shall be determined and used for carrying the mixture.

2.2.61.1.9.3 A mixture is assigned to packing group I only if it meets both of the following criteria:

(a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of $1\ 000 \text{ ml/m}^3$ vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than $1\ 000 \text{ ml/m}^3$;

(b) A sample of vapour in equilibrium with the liquid mixture is diluted with 9 equal volumes of air to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than 10 times the mixture LC_{50} .

2.2.61.1.9.4 A mixture is assigned to packing group II only if it meets both of the following criteria, and does not meet the criteria for packing group I:

(a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of $3\ 000 \text{ ml/m}^3$ vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than $3\ 000 \text{ ml/m}^3$;

(b) A sample of the vapour in equilibrium with the liquid mixture is used to form a test atmosphere. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have a volatility equal to or greater than the mixture LC_{50} .

2.2.61.1.9.5 A mixture is assigned to packing group III only if it meets both of the following criteria, and does not meet the criteria for packing groups I or II:

(a) A sample of the liquid mixture is vaporized and diluted with air to create a test atmosphere of $5\ 000 \text{ ml/m}^3$ vaporized mixture in air. Ten albino rats (5 male and 5 female) are exposed to the test atmosphere for 1 hour and observed for 14 days. If five or more of the animals die within the 14-day observation period, the mixture is presumed to have an LC_{50} equal to or less than $5\ 000 \text{ ml/m}^3$;

(b) The vapour concentration (volatility) of the liquid mixture is measured and if the vapour concentration is equal to or greater than $1\ 000 \text{ ml/m}^3$, the mixture is presumed to have a volatility equal to or greater than $1/5$ the mixture LC_{50} .

Methods for determining oral and dermal toxicity of mixtures

2.2.61.1.10 When classifying and assigning the appropriate packing group to mixtures in Class 6.1 in accordance with the oral and dermal toxicity criteria (see 2.2.61.1.3), it is necessary to determine the acute LD₅₀ of the mixture.

2.2.61.1.10.1 If a mixture contains only one active substance, and the LD₅₀ of that constituent is known, in the absence of reliable acute oral and dermal toxicity data on the actual mixture to be carried, the oral or dermal LD₅₀ may be obtained by the following method:

$$\text{LD}_{50} \text{ value of preparation} = \frac{\text{LD}_{50} \text{ value of active substance} \times 100}{\text{percentage of active substance by mass}}$$

2.2.61.1.10.2 If a mixture contains more than one active constituent, there are three possible approaches that may be used to determine the oral or dermal LD₅₀ of the mixture. The preferred method is to obtain reliable acute oral and dermal toxicity data on the actual mixture to be carried. If reliable, accurate data are not available, then either of the following methods may be performed:

- (a) Classify the formulation according to the most hazardous constituent of the mixture as if that constituent were present in the same concentration as the total concentration of all active constituents; or
- (b) Apply the formula:

$$\frac{C_A}{T_A} + \frac{C_B}{T_B} + \dots + \frac{C_Z}{T_Z} = \frac{100}{T_M}$$

where:

C = the percentage concentration of constituent A, B, ..., Z in the mixture;

T = the oral LD₅₀ values of constituent A, B, ... Z;

T_M = the oral LD₅₀ value of the mixture.

NOTE: This formula can also be used for dermal toxicities provided that this information is available on the same species for all constituents. The use of this formula does not take into account any potentiation or protective phenomena.

Classification of pesticides

2.2.61.1.11 All active pesticide substances and their preparations for which the LC₅₀ and/or LD₅₀ values are known and which are classified in Class 6.1 shall be classified under appropriate packing groups in accordance with the criteria given in 2.2.61.1.6 to 2.2.61.1.9. Substances and preparations which are characterized by subsidiary hazards shall be classified according to the precedence of hazard Table in 2.1.3.10 with the assignment of appropriate packing groups.

2.2.61.1.11.1 If the oral or dermal LD₅₀ value for a pesticide preparation is not known, but the LD₅₀ value of its active substance(s) is known, the LD₅₀ value for the preparation may be obtained by applying the procedures in 2.2.61.1.10.

NOTE: LD₅₀ toxicity data for a number of common pesticides may be obtained from the most current edition of the document "The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification" available from the International Programme on Chemical Safety, World Health Organisation (WHO), 1211 Geneva 27, Switzerland. While that document may be used as a source of LD₅₀ data for pesticides, its classification system shall not be used for purposes of transport classification of, or assignment of packing groups to, pesticides, which shall be in accordance with the requirements of ADR.

2.2.61.1.11.2 The proper shipping name used in the carriage of the pesticide shall be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary hazards it may exhibit (see 3.1.2).

2.2.61.1.12 If substances of Class 6.1, as a result of admixtures, come into categories of hazard different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong on the basis of their actual degree of danger.

NOTE: For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.

2.2.61.1.13 On the basis of the criteria of 2.2.61.1.6 to 2.2.61.1.11, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the requirements for this Class.

2.2.61.1.14 Substances, solutions and mixtures, with the exception of substances and preparations used as pesticides, which are not classified as acute toxic category 1, 2 or 3 according to Regulation (EC) No 1272/2008³, may be considered as substances not belonging to class 6.1.

2.2.61.2 Substances not accepted for carriage

2.2.61.2.1 Chemically unstable substances of Class 6.1 shall not be accepted for carriage unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of carriage. For the precautions necessary to prevent polymerization, see special provision 386 of Chapter 3.3. To this end particular care shall be taken to ensure that receptacles and tanks do not contain any substances liable to promote these reactions.

2.2.61.2.2 The following substances and mixtures shall not be accepted for carriage:

- Hydrogen cyanide, anhydrous or in solution, which do not meet the descriptions of UN Nos. 1051, 1613, 1614 and 3294;
- metal carbonyls, having a flash-point below 23 °C, other than UN Nos. 1259 NICKEL CARBONYL and 1994 IRON PENTACARBONYL;
- 2,3,7,8-TETRACHLORODIBENZO-P-DIOXINE (TCDD) in concentrations considered highly toxic in accordance with the criteria in 2.2.61.1.7;
- UN No. 2249 DICHLORODIMETHYL ETHER, SYMMETRICAL;
- Preparations of phosphides without additives inhibiting the emission of toxic flammable gases.

³ Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directive 67/548/EEC and 1999/45/EC; and amending Regulation (EC) No 1907/2006, published in the Official Journal of the European Union, L 353, 31 December 2008, p 1-1355.

2.2.61.3 *List of collective entries*Toxic substances without subsidiary hazard(s)

Organic	liquid ^a	1583 CHLOROPICRIN MIXTURE, N.O.S. 1602 DYE, LIQUID, TOXIC, N.O.S., or 1602 DYE INTERMEDIATE, LIQUID, TOXIC, N.O.S. 1693 TEAR GAS SUBSTANCE, LIQUID, N.O.S. 1851 MEDICINE, LIQUID, TOXIC, N.O.S. 2206 ISOCYANATES, TOXIC, N.O.S. or 2206 ISOCYANATE SOLUTION, TOXIC, N.O.S. 3140 ALKALOIDS, LIQUID, N.O.S. or 3140 ALKALOID SALTS, LIQUID, N.O.S. 3142 DISINFECTANT, LIQUID, TOXIC, N.O.S. 3144 NICOTINE COMPOUND, LIQUID, N.O.S. or 3144 NICOTINE PREPARATION, LIQUID, N.O.S. 3172 TOXINS, EXTRACTED FROM LIVING SOURCES, LIQUID, N.O.S. 3276 NITRILES, LIQUID, TOXIC, N.O.S. 3278 ORGANOPHOSPHORUS COMPOUND, LIQUID, TOXIC, N.O.S. 3381 TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀ 3382 TOXIC BY INHALATION LIQUID, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀ 2810 TOXIC LIQUID, ORGANIC, N.O.S.
		1544 ALKALOIDS, SOLID, N.O.S. or 1544 ALKALOID SALTS, SOLID, N.O.S. 1601 DISINFECTANT, SOLID, TOXIC, N.O.S. 1655 NICOTINE COMPOUND, SOLID, N.O.S., or 1655 NICOTINE PREPARATION, SOLID, N.O.S. 3448 TEAR GAS SUBSTANCE, SOLID, N.O.S. 3143 DYE, SOLID, TOXIC, N.O.S. or 3143 DYE INTERMEDIATE, SOLID, TOXIC, N.O.S. 3462 TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. 3249 MEDICINE, SOLID, TOXIC, N.O.S. 3464 ORGANOPHOSPHORUS COMPOUND, SOLID, TOXIC, N.O.S. 3439 NITRILES, SOLID, TOXIC, N.O.S. 2811 TOXIC SOLID, ORGANIC, N.O.S.
Organometallic ^{c, d}	solid ^{a, b}	2026 PHENYLMERCURIC COMPOUND, N.O.S. 2788 ORGANOTIN COMPOUND, LIQUID, N.O.S. 3146 ORGANOTIN COMPOUND, SOLID, N.O.S. 3280 ORGANOARSENIC COMPOUND, LIQUID, N.O.S. 3465 ORGANOARSENIC COMPOUND, SOLID, N.O.S. 3281 METAL CARBONYLS, LIQUID, N.O.S. 3466 METAL CARBONYLS, SOLID, N.O.S. 3282 ORGANOMETALLIC COMPOUND, LIQUID, TOXIC, N.O.S. 3467 ORGANOMETALLIC COMPOUND, SOLID, TOXIC, N.O.S.
^a Substances and preparations containing alkaloids or nicotine used as pesticides shall be classified under UN No. 2588 PESTICIDES, SOLID, TOXIC, N.O.S., UN No. 2902 PESTICIDES, LIQUID, TOXIC, N.O.S. or UN No. 2903 PESTICIDES, LIQUID, TOXIC, FLAMMABLE, N.O.S.		

(cont'd on next page)

^a Substances and preparations containing alkaloids or nicotine used as pesticides shall be classified under UN No. 2588 PESTICIDES, SOLID, TOXIC, N.O.S., UN No. 2902 PESTICIDES, LIQUID, TOXIC, N.O.S. or UN No. 2903 PESTICIDES, LIQUID, TOXIC, FLAMMABLE, N.O.S.

^b Active substances and triturations or mixtures of substances intended for laboratories and experiments and for the manufacture of pharmaceutical products with other substances shall be classified according to their toxicity (see 2.2.61.1.7 to 2.2.61.1.11).

^c Self-heating substances, slightly toxic and spontaneously combustible organometallic compounds, are substances of Class 4.2.

^d Water-reactive substances, slightly toxic, and water-reactive organometallic compounds, are substances of Class 4.3.

2.2.61.3 *List of collective entries (cont'd)***Toxic substances without subsidiary hazard(s) (cont'd)**

Inorganic Pesticides	<p>liquid^e T4</p> <p>1556 ARSENIC COMPOUND, LIQUID, N.O.S., inorganic including: Arsenates, n.o.s., Arsenites, n.o.s.; and Arsenic sulphides, n.o.s. 1935 CYANIDE SOLUTION, N.O.S. 2024 MERCURY COMPOUND, LIQUID, N.O.S. 3141 ANTIMONY COMPOUND, INORGANIC, LIQUID, N.O.S. 3440 SELENIUM COMPOUND, LIQUID, N.O.S. 3381 TOXIC BY INHALATION LIQUID, N.O.S. with an LC₅₀ lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC₅₀ 3382 TOXIC BY INHALATION LIQUID, N.O.S. with an LC₅₀ lower than or equal to 1000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC₅₀ 3287 TOXIC LIQUID, INORGANIC, N.O.S.</p> <p>solids^{f, g} T5</p> <p>1549 ANTIMONY COMPOUND, INORGANIC, SOLID, N.O.S. 1557 ARSENIC COMPOUND, SOLID, N.O.S., including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides, n.o.s. 1564 BARIUM COMPOUND, N.O.S. 1566 BERYLLIUM COMPOUND, N.O.S. 1588 CYANIDES, INORGANIC, SOLID, N.O.S. 1707 THALLIUM COMPOUND, N.O.S. 2025 MERCURY COMPOUND, SOLID, N.O.S. 2291 LEAD COMPOUND, SOLUBLE, N.O.S. 2570 CADMIUM COMPOUND 2630 SELENATES or 2630 SELENITES 2856 FLUOROSILICATES, N.O.S. 3283 SELENIUM COMPOUND, SOLID, N.O.S. 3284 TELLURIUM COMPOUND, N.O.S. 3285 VANADIUM COMPOUND, N.O.S. 3288 TOXIC SOLID, INORGANIC, N.O.S.</p> <p>liquid^h T6</p> <p>2992 CARBAMATE PESTICIDE, LIQUID, TOXIC 2994 ARSENICAL PESTICIDE, LIQUID, TOXIC 2996 ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC 2998 TRIAZINE PESTICIDE, LIQUID, TOXIC 3006 THIOCARBAMATE PESTICIDE, LIQUID, TOXIC 3010 COPPER BASED PESTICIDE, LIQUID, TOXIC 3012 MERCURY BASED PESTICIDE, LIQUID, TOXIC 3014 SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC 3016 BIPYRIDILIUM PESTICIDE, LIQUID, TOXIC 3018 ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC 3020 ORGANOTIN PESTICIDE, LIQUID, TOXIC 3026 COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC 3348 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC 3352 PYRETHROID PESTICIDE, LIQUID, TOXIC 2902 PESTICIDE, LIQUID, TOXIC, N.O.S.</p>
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^e Mercury fulminate, wetted with not less than 20% water, or mixture of alcohol and water by mass is a substance of Class 1, UN No. 0135.

^f Ferricyanides, ferrocyanides, alkaline thiocyanates and ammonium thiocyanates are not subject to the provisions of ADR.

^g Lead salts and lead pigments which, when mixed in a ratio of 1:1,000 with 0.07M hydrochloric acid and stirred for one hour at a temperature of 23 °C ± 2 °C, exhibit a solubility of 5% or less, are not subject to the provisions of ADR.

^h Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of ADR.

2.2.61.3 *List of collective entries (cont'd)*Toxic substances without subsidiary hazard(s) (cont'd)

Pesticides (cont'd)

Solid^h	T7	2757 CARBAMATE PESTICIDE, SOLID, TOXIC
		2759 ARSENICAL PESTICIDE, SOLID, TOXIC
		2761 ORGANOCHLORINE PESTICIDE, SOLID, TOXIC
		2763 TRIAZINE PESTICIDE, SOLID, TOXIC
		2771 THIOCARBAMATE PESTICIDE, SOLID, TOXIC
		2775 COPPER BASED PESTICIDE, SOLID, TOXIC
		2777 MERCURY BASED PESTICIDE, SOLID, TOXIC
		2779 SUBSTITUTED NITROPHENOL PESTICIDE, SOLID, TOXIC
		2781 BIPYRIDIUM PESTICIDE, SOLID, TOXIC
		2783 ORGANOPHOSPHORUS PESTICIDE, SOLID, TOXIC
		2786 ORGANOTIN PESTICIDE, SOLID, TOXIC
		3027 COUMARIN DERIVATIVE PESTICIDE, SOLID, TOXIC
		3048 ALUMINIUM PHOSPHIDE PESTICIDE
		3345 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, SOLID, TOXIC
		3349 PYRETHRROID PESTICIDE, SOLID, TOXIC
		2588 PESTICIDE, SOLID, TOXIC, N.O.S.

Samples	T8	3315 CHEMICAL SAMPLE, TOXIC
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Other toxic substancesⁱ	T9	3243 SOLIDS CONTAINING TOXIC LIQUID, N.O.S.
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Articles	T10	3546 ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.
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Toxic substances with subsidiary hazard(s)

Liquid^{j, k}	TF1	3071 MERCAPTANS, LIQUID, TOXIC, FLAMMABLE, N.O.S. or
		3071 MERCAPTAN MIXTURE, LIQUID, TOXIC, FLAMMABLE, N.O.S.
		3080 ISOCYANATES, TOXIC, FLAMMABLE, N.O.S. or
		3080 ISOCYANATE SOLUTION, TOXIC, FLAMMABLE, N.O.S.
		3275 NITRILES, TOXIC, FLAMMABLE, N.O.S.
		3279 ORGANOPHOSPHORUS COMPOUND, TOXIC, FLAMMABLE, N.O.S.
		3383 TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
		3384 TOXIC BY INHALATION LIQUID, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
		2929 TOXIC LIQUID, FLAMMABLE, ORGANIC, N.O.S.

Flammable**TF**

(cont'd on next page)

^h Articles impregnated with this pesticide, such as fibreboard plates, paper strips, cotton-wool balls, sheets of plastics material, in hermetically closed wrappings, are not subject to the provisions of ADR.

ⁱ Mixtures of solids which are not subject to the provisions of ADR and of toxic liquids may be carried under UN No. 3243 without first applying the classification criteria of Class 6.1, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging, container or transport unit is closed. Each packaging shall correspond to a design type that has passed a leakproofness test at the packing group II level. This entry shall not be used for solids containing a packing group I liquid.

^j Highly toxic and toxic flammable liquids having a flash-point below 23 °C are substances of Class 3 except those which are highly toxic by inhalation, as defined in 2.2.61.1.4 to 2.2.61.1.9. Liquids which are highly toxic by inhalation are indicated as "toxic by inhalation" in their proper shipping name in Column (2) or by special provision 354 in Column (6) of Table A of Chapter 3.2.

^k Flammable liquids, slightly toxic, with the exception of substances and preparations used as pesticides, having a flash-point between 23 °C and 60 °C inclusive, are substances of Class 3.

2.2.61.3 *List of collective entries (cont'd)**Toxic substances with subsidiary hazard(s) (cont'd)*

Flammable TF (cont'd)			
			2991 CARBAMATE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2993 ARSENICAL PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2995 ORGANOCHLORINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2997 TRIAZINE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3005 THiocarbamate PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3009 COPPER BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3011 MERCURY BASED PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3013 SUBSTITUTED NITROPHENOL PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3015 BIPYRIDIUM PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3017 ORGANOPHOSPHORUS PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3019 ORGANOTIN PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3025 COUMARIN DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3347 PHENOXYACETIC ACID DERIVATIVE PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			3351 PYRETHROID PESTICIDE, LIQUID, TOXIC, FLAMMABLE
			2903 PESTICIDE, LIQUID, TOXIC, FLAMMABLE, N.O.S.
		pesticides, liquid TF2	
			1700 TEAR GAS CANDLES
			2930 TOXIC SOLID, FLAMMABLE, ORGANIC, N.O.S.
			3535 TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.
		solid TF3	
Solid, self-heating ^c TS			3124 TOXIC SOLID, SELF-HEATING, N.O.S.
		liquid TW1	3385 TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3386 TOXIC BY INHALATION LIQUID, WATER-REACTIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			3123 TOXIC LIQUID, WATER-REACTIVE, N.O.S.
Water-reactive ^d TW		solid ⁿ TW2	3125 TOXIC SOLID, WATER-REACTIVE, N.O.S.
		liquid TO1	3387 TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3388 TOXIC BY INHALATION LIQUID, OXIDIZING, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			3122 TOXIC LIQUID, OXIDIZING, N.O.S.
Oxidizing ^l TO		solid TO2	3086 TOXIC SOLID, OXIDIZING, N.O.S.
		liquid TC1	3277 CHLOROFORMATES, TOXIC, CORROSIVE, N.O.S.
			3361 CHLOROSILANES, TOXIC, CORROSIVE, N.O.S.
			3389 TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
			3390 TOXIC BY INHALATION LIQUID, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
			2927 TOXIC LIQUID, CORROSIVE, ORGANIC, N.O.S.
Corro- sive ^m TC		solid TC2	2928 TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S.

(cont'd on next page)

^c Self-heating substances, slightly toxic and spontaneously combustible organometallic compounds, are substances of Class 4.2.

^d Water-reactive substances, slightly toxic, and water-reactive organometallic compounds, are substances of Class 4.3.

^l Oxidizing substances, slightly toxic, are substances of Class 5.1.

^m Substances slightly toxic and slightly corrosive, are substances of Class 8.

ⁿ Metal phosphides assigned to UN Nos. 1360, 1397, 1432, 1714, 2011 and 2013 are substances of Class 4.3.

2.2.61.3 *List of collective entries (cont'd)**Toxic substances with subsidiary hazard(s) (cont'd)*

Corrosive ^m		
TC (cont'd)		
	liquid	TC3
inorga- nic		
	solid	TC4
		3290 TOXIC SOLID, CORROSIVE, INORGANIC, N.O.S.
Flammable, corrosive		
TFC		
		2742 CHLOROFORMATES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
		3362 CHLOROSILANES, TOXIC, CORROSIVE, FLAMMABLE, N.O.S.
		3488 TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
		3489 TOXIC BY INHALATION LIQUID, FLAMMABLE, CORROSIVE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀
Flammable, water-reactive		
TFW		
		3490 TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 200 ml/m ³ and saturated vapour concentration greater than or equal to 500 LC ₅₀
		3491 TOXIC BY INHALATION LIQUID, WATER-REACTIVE, FLAMMABLE, N.O.S. with an LC ₅₀ lower than or equal to 1000 ml/m ³ and saturated vapour concentration greater than or equal to 10 LC ₅₀

^m Substances slightly toxic and slightly corrosive, are substances of Class 8.

2.2.62 Class 6.2 Infectious substances**2.2.62.1 Criteria**

2.2.62.1.1 The heading of Class 6.2 covers infectious substances. For the purposes of ADR, infectious substances are substances which are known or are reasonably expected to contain pathogens. Pathogens are defined as microorganisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

NOTE 1: *Genetically modified microorganisms and organisms, biological products, diagnostic specimens and intentionally infected live animals shall be assigned to this Class if they meet the conditions for this Class.*

The carriage of unintentionally or naturally infected live animals is subject only to the relevant rules and regulations of the respective countries of origin, transit and destination.

NOTE 2: *Toxins from plant, animal or bacterial sources which do not contain any infectious substances or organisms or which are not contained in them are substances of Class 6.1, UN Nos. 3172 or 3462.*

2.2.62.1.2 Substances of Class 6.2 are subdivided as follows:

- I1 Infectious substances affecting humans;
- I2 Infectious substances affecting animals only;
- I3 Clinical waste;
- I4 Biological substances.

Definitions

2.2.62.1.3 For the purposes of ADR,

"Biological products" are those products derived from living organisms which are manufactured and distributed in accordance with the requirements of appropriate national authorities, which may have special licensing requirements, and are used either for prevention, treatment, or diagnosis of disease in humans or animals, or for development, experimental or investigational purposes related thereto. They include, but are not limited to, finished or unfinished products such as vaccines;

"Cultures" are the result of a process by which pathogens are intentionally propagated. This definition does not include human or animal patient specimens as defined in this paragraph;

"Medical or clinical wastes" are wastes derived from the medical treatment of animals or humans or from bio-research;

"Patient specimens" are those collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being carried for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.

Classification

2.2.62.1.4 Infectious substances shall be classified in Class 6.2 and assigned to UN Nos. 2814, 2900, 3291 or 3373, as appropriate.

Infectious substances are divided into the following categories:

2.2.62.1.4.1

Category A: An infectious substance which is carried in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Indicative examples of substances that meet these criteria are given in the table in this paragraph.

NOTE: *An exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.*

- (a) Infectious substances meeting these criteria which cause disease in humans or both in humans and animals shall be assigned to UN No. 2814. Infectious substances which cause disease only in animals shall be assigned to UN No. 2900;
- (b) Assignment to UN No. 2814 or UN No. 2900 shall be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal.

NOTE 1: *The proper shipping name for UN No. 2814 is "INFECTIOUS SUBSTANCE, AFFECTING HUMANS". The proper shipping name for UN No. 2900 is "INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only".*

NOTE 2: *The following table is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria shall be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it shall be included in Category A.*

NOTE 3: *In the following table, the microorganisms written in italics are bacteria, mycoplasmas, rickettsia or fungi.*

INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.2.62.1.4.1)	
UN Number and name	Microorganism
UN No. 2814 Infectious substances affecting humans	<i>Bacillus anthracis</i> (cultures only) <i>Brucella abortus</i> (cultures only) <i>Brucella melitensis</i> (cultures only) <i>Brucella suis</i> (cultures only) <i>Burkholderia mallei</i> - <i>Pseudomonas mallei</i> – Glanders (cultures only) <i>Burkholderia pseudomallei</i> – <i>Pseudomonas pseudomallei</i> (cultures only) <i>Chlamydia psittaci</i> - avian strains (cultures only) <i>Clostridium botulinum</i> (cultures only) <i>Coccidioides immitis</i> (cultures only) <i>Coxiella burnetii</i> (cultures only) Crimean-Congo haemorrhagic fever virus Dengue virus (cultures only) Eastern equine encephalitis virus (cultures only) <i>Escherichia coli</i> , verotoxigenic (cultures only) ^a Ebola virus Flexal virus <i>Francisella tularensis</i> (cultures only) Guanarito virus Hantaan virus Hantavirus causing haemorrhagic fever with renal syndrome Hendra virus Hepatitis B virus (cultures only) Herpes B virus (cultures only) Human immunodeficiency virus (cultures only) Highly pathogenic avian influenza virus (cultures only) Japanese Encephalitis virus (cultures only) Junin virus Kyasanur Forest disease virus Lassa virus Machupo virus Marburg virus Monkeypox virus <i>Mycobacterium tuberculosis</i> (cultures only) ^a Nipah virus Omsk haemorrhagic fever virus Poliovirus (cultures only) Rabies virus (cultures only) <i>Rickettsia prowazekii</i> (cultures only) <i>Rickettsia rickettsii</i> (cultures only) Rift Valley fever virus (cultures only) Russian spring-summer encephalitis virus (cultures only) Sabia virus <i>Shigella dysenteriae</i> type 1 (cultures only) ^a Tick-borne encephalitis virus (cultures only) Variola virus Venezuelan equine encephalitis virus (cultures only) West Nile virus (cultures only) Yellow fever virus (cultures only) <i>Yersinia pestis</i> (cultures only)

^a Nevertheless, when the cultures are intended for diagnostic or clinical purposes, they may be classified as infectious substances of Category B.

INDICATIVE EXAMPLES OF INFECTIOUS SUBSTANCES INCLUDED IN CATEGORY A IN ANY FORM UNLESS OTHERWISE INDICATED (2.2.62.1.4.1)	
UN Number and name	Microorganism
UN No. 2900 Infectious substances affecting animals only	African swine fever virus (cultures only) Avian paramyxovirus Type 1 - Velogenic Newcastle disease virus (cultures only) Classical swine fever virus (cultures only) Foot and mouth disease virus (cultures only) Lumpy skin disease virus (cultures only) <i>Mycoplasma mycoides</i> - Contagious bovine pleuropneumonia (cultures only) Peste des petits ruminants virus (cultures only) Rinderpest virus (cultures only) Sheep-pox virus (cultures only) Goatpox virus (cultures only) Swine vesicular disease virus (cultures only) Vesicular stomatitis virus (cultures only)

2.2.62.1.4.2 Category B: An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B shall be assigned to UN No. 3373.

NOTE: The proper shipping name of UN No. 3373 is "BIOLOGICAL SUBSTANCE, CATEGORY B".

2.2.62.1.5 *Exemptions*

2.2.62.1.5.1 Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals are not subject to the provisions of ADR unless they meet the criteria for inclusion in another class.

2.2.62.1.5.2 Substances containing microorganisms which are non-pathogenic to humans or animals are not subject to ADR unless they meet the criteria for inclusion in another class.

2.2.62.1.5.3 Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk are not subject to ADR unless they meet the criteria for inclusion in another class.

NOTE: Medical equipment which has been drained of free liquid is deemed to meet the requirements of this paragraph and is not subject to the provisions of ADR.

2.2.62.1.5.4 Substances where the concentration of pathogens is at a level naturally encountered (including foodstuff and water samples) and which are not considered to pose a significant risk of infection are not subject to ADR unless they meet the criteria for inclusion in another class.

2.2.62.1.5.5 Dried blood spots, collected by applying a drop of blood onto absorbent material, are not subject to ADR.

2.2.62.1.5.6 Faecal occult blood screening samples are not subject to ADR.

2.2.62.1.5.7 Blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation as well as samples drawn in connection with such purposes are not subject to ADR.

2.2.62.1.5.8 Human or animal specimens for which there is minimal likelihood that pathogens are present are not subject to ADR if the specimen is carried in a packaging which will prevent any leakage and which is marked with the words "Exempt human specimen" or "Exempt animal specimen", as appropriate.

The packaging is deemed to comply with the above requirements if it meets the following conditions:

(a) The packaging consists of three components:

- (i) a leak-proof primary receptacle(s);
- (ii) a leak-proof secondary packaging; and

- (iii) an outer packaging of adequate strength for its capacity, mass and intended use, and with at least one surface having minimum dimensions of 100 mm × 100 mm;
- (b) For liquids, absorbent material in sufficient quantity to absorb the entire contents is placed between the primary receptacle(s) and the secondary packaging so that, during carriage, any release or leak of a liquid substance will not reach the outer packaging and will not compromise the integrity of the cushioning material;
- (c) When multiple fragile primary receptacles are placed in a single secondary packaging, they are either individually wrapped or separated to prevent contact between them.

NOTE 1: An element of professional judgment is required to determine if a substance is exempt under this paragraph. That judgment should be based on the known medical history, symptoms and individual circumstances of the source, human or animal, and endemic local conditions. Examples of specimens which may be carried under this paragraph include the blood or urine tests to monitor cholesterol levels, blood glucose levels, hormone levels, or prostate specific antibodies (PSA); those required to monitor organ function such as heart, liver or kidney function for humans or animals with non-infectious diseases, or for therapeutic drug monitoring; those conducted for insurance or employment purposes and are intended to determine the presence of drugs or alcohol; pregnancy test; biopsies to detect cancer; and antibody detection in humans or animals in the absence of any concern for infection (e.g. evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.).

NOTE 2: For air transport, packagings for specimens exempted under this paragraph shall meet the conditions in (a) to (c).

2.2.62.1.5.9 Except for:

- (a) Medical waste (UN No. 3291);
- (b) Medical devices or equipment contaminated with or containing infectious substances in Category A (UN No. 2814 or UN No. 2900); and
- (c) Medical devices or equipment contaminated with or containing other dangerous goods that meet the definition of another class,

medical devices or equipment potentially contaminated with or containing infectious substances which are being carried for disinfection, cleaning, sterilization, repair, or equipment evaluation are not subject to provisions of ADR other than those of this paragraph if packed in packagings designed and constructed in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. Packagings shall be designed to meet the construction requirements listed in 6.1.4 or 6.6.4.

These packagings shall meet the general packing requirements of 4.1.1.1 and 4.1.1.2 and be capable of retaining the medical devices and equipment when dropped from a height of 1.2 m.

The packagings shall be marked "USED MEDICAL DEVICE" or "USED MEDICAL EQUIPMENT". When using overpacks, these shall be marked in the same way, except when the inscription remains visible.

2.2.62.1.6 to 2.2.62.1.8 (Reserved)

2.2.62.1.9 *Biological products*

For the purposes of ADR, biological products are divided into the following groups:

- (a) those which are manufactured and packaged in accordance with the requirements of appropriate national authorities and carried for the purposes of final packaging or distribution, and use for personal health care by medical professionals or individuals. Substances in this group are not subject to the provisions of ADR;
- (b) those which do not fall under paragraph (a) and are known or reasonably believed to contain infectious substances and which meet the criteria for inclusion in Category A or Category B. Substances in this group shall be assigned to UN Nos. 2814, 2900 or 3373, as appropriate.

NOTE: Some licensed biological products may present a biohazard only in certain parts of the world. In that case, competent authorities may require these biological products to be in compliance with local requirements for infectious substances or may impose other restrictions.

2.2.62.1.10 *Genetically modified microorganisms and organisms*

Genetically modified microorganisms not meeting the definition of infectious substance shall be classified according to section 2.2.9.

2.2.62.1.11 *Medical or clinical wastes*

2.2.62.1.11.1 Medical or clinical wastes containing Category A infectious substances shall be assigned to UN No. 2814 or UN No. 2900 as appropriate. Medical or clinical wastes containing infectious substances in Category B shall be assigned to UN No. 3291.

NOTE: Medical or clinical wastes assigned to number 18 01 03 (Wastes from human or animal health care and/or related research – wastes from natal care, diagnosis, treatment or prevention of disease in humans – wastes whose collection and disposal is subject to special requirements in order to prevent infection) or 18 02 02 (Wastes from human or animal health care and/or related research – wastes from research, diagnosis, treatment or prevention of disease involving animals – wastes whose collection and disposal is subject to special requirements in order to prevent infection) according to the list of wastes annexed to the Commission Decision 2000/532/EC⁴ as amended, shall be classified according to the provisions set out in this paragraph, based on the medical or veterinary diagnosis concerning the patient or the animal.

2.2.62.1.11.2 Medical or clinical wastes which are reasonably believed to have a low probability of containing infectious substances shall be assigned to UN No. 3291. For the assignment, international, regional or national waste catalogues may be taken into account.

NOTE 1: The proper shipping name for UN No. 3291 is "CLINICAL WASTE, UNSPECIFIED, N.O.S." or "(BIO) MEDICAL WASTE, N.O.S.". or "REGULATED MEDICAL WASTE, N.O.S.".

NOTE 2: Notwithstanding the classification criteria set out above, medical or clinical wastes assigned to number 18 01 04 (Wastes from human or animal health care and/or related research – wastes from natal care, diagnosis, treatment or prevention of disease in humans – wastes whose collection and disposal is not subject to special requirements in order to prevent infection) or 18 02 03 (Wastes from human or animal health care and/or related research – wastes from research, diagnosis, treatment or prevention of disease involving animals – wastes whose collection and disposal is not subject to special requirements in order to prevent infection) according to the list of wastes annexed to the Commission Decision 2000/532/EC⁵ as amended, are not subject to the provisions of ADR.

2.2.62.1.11.3 Decontaminated medical or clinical wastes which previously contained infectious substances are not subject to the provisions of ADR unless they meet the criteria for inclusion in another class.

2.2.62.1.11.4 Medical or clinical wastes assigned to UN No. 3291 are assigned to packing group II.

2.2.62.1.12 *Infected animals*

2.2.62.1.12.1 Unless an infectious substance cannot be consigned by any other means, live animals shall not be used to consign such a substance. A live animal which has been intentionally infected and is known or suspected to contain an infectious substance shall only be carried under terms and conditions approved by the competent authority.

NOTE: The approval of the competent authorities shall be issued on the basis of the relevant rules for the carriage of live animals, taking into consideration dangerous goods aspects. The authorities

⁴ Commission Decision 2000/532/EC of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste (replaced by the Directive 2006/12/EC of the European Parliament and of the Council (Official Journal of the European Union No. L 114 of 27 April 2006, page 9)) and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste (Official Journal of the European Communities No. L 226 of 6 September 2000, page 3).

that are competent to lay down these conditions and rules for approval shall be regulated at national level.

If there is no approval by a competent authority of a Contracting Party to ADR, the competent authority of a Contracting Party to ADR may recognize an approval issued by the competent authority of a country that is not a Contracting Party to ADR.

Rules for the carriage of livestock are, for example, contained in Council Regulation (EC) No 1/2005 of 22 December 2004 on the protection of animals during transport (Official Journal of the European Union No L 3 of 5 January 2005) as amended.

2.2.62.1.12.2 *(Deleted)*

2.2.62.2 *Substances not accepted for carriage*

Live vertebrate or invertebrate animals shall not be used to carry an infectious agent unless the agent cannot be carried by other means or unless this carriage has been approved by the competent authority (see 2.2.62.1.12.1).

2.2.62.3 *List of collective entries*

Effects on humans	I1	2814 INFECTIOUS SUBSTANCE, AFFECTING HUMANS
Effects on animals only	I2	2900 INFECTIOUS SUBSTANCE, AFFECTING ANIMALS only
Clinical waste	I3	3291 CLINICAL WASTE, UNSPECIFIED, N.O.S. or 3291 (BIO) MEDICAL WASTE, N.O.S. or 3291 REGULATED MEDICAL WASTE, N.O.S.
Biological substances	I4	3373 BIOLOGICAL SUBSTANCE, CATEGORY B

2.2.7 Class 7 Radioactive material**2.2.7.1 Definitions**

2.2.7.1.1 *Radioactive material* means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 2.2.7.2.2.1 to 2.2.7.2.2.6.

2.2.7.1.2 Contamination

Contamination means the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm² for all other alpha emitters.

Non-fixed contamination means contamination that can be removed from a surface during routine conditions of carriage.

Fixed contamination means contamination other than non-fixed contamination.

2.2.7.1.3 Definitions of specific terms **A_1 and A_2**

A_1 means the activity value of special form radioactive material which is listed in the Table in 2.2.7.2.2.1 or derived in 2.2.7.2.2.2 and is used to determine the activity limits for the requirements of ADR.

A_2 means the activity value of radioactive material, other than special form radioactive material, which is listed in the Table in 2.2.7.2.2.1 or derived in 2.2.7.2.2.2 and is used to determine the activity limits for the requirements of ADR.

Fissile nuclides means uranium-233, uranium-235, plutonium-239 and plutonium-241. *Fissile material* means a material containing any of the fissile nuclides. Excluded from the definition of fissile material are the following:

- (a) Natural uranium or depleted uranium which is unirradiated;
- (b) Natural uranium or depleted uranium which has been irradiated in thermal reactors only;
- (c) Material with fissile nuclides less than a total of 0.25 g;
- (d) Any combination of (a), (b) and/or (c).

These exclusions are only valid if there is no other material with fissile nuclides in the package or in the consignment if shipped unpackaged.

Low dispersible radioactive material means either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form.

Low specific activity (LSA) material means radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

Low toxicity alpha emitters are: natural uranium; depleted uranium; natural thorium; uranium-235 or uranium-238; thorium-232; thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Special form radioactive material means either:

- (a) An indispersible solid radioactive material; or
- (b) A sealed capsule containing radioactive material.

Specific activity of a radionuclide means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.

Surface contaminated object (SCO) means a solid object which is not itself radioactive but which has radioactive material distributed on its surface.

Unirradiated thorium means thorium containing not more than 10^{-7} g of uranium-233 per gram of thorium-232.

Unirradiated uranium means uranium containing not more than 2×10^3 Bq of plutonium per gram of uranium-235, not more than 9×10^6 Bq of fission products per gram of uranium-235 and not more than 5×10^{-3} g of uranium-236 per gram of uranium-235.

Uranium - natural, depleted, enriched means the following:

Natural uranium means uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass).

Depleted uranium means uranium containing a lesser mass percentage of uranium-235 than in natural uranium.

Enriched uranium means uranium containing a greater mass percentage of uranium-235 than 0.72%.

In all cases, a very small mass percentage of uranium-234 is present.

2.2.7.2 *Classification*

2.2.7.2.1 *General provisions*

Radioactive material shall be assigned to one of the UN numbers specified in Table 2.2.7.2.1.1, in accordance with 2.2.7.2.4 and 2.2.7.2.5, taking into account the material characteristics determined in 2.2.7.2.3.