

SERVICES TEXTBOOK OF EXPLOSIVES - GLOSSARY OF TERMS

This Glossary of Terms covers the various terms and acronyms, etc. covered in the chapters of this Textbook. It also incorporates some of the terms used in the 1988 version of the Services Textbook of Explosives and from Allied Ordnance Publication 38 "Glossary of Terms and Definitions Concerning the Safety and Suitability for Service of Munitions, Explosives and Related Products" (AOP-38) which may be of use to the reader.

A

AAS3P	Allied Ammunition Safety & Suitability for Service Publication
Abel Heat Test	A test introduced by Sir Frederick Abel to assess the stability of guncotton by detecting oxides of nitrogen by starch-potassium iodide paper
ABOL	All Burnt On Launch - Normally referred to in connection with motors of Shoulder launched GW: rapid burning motor which expels all exhaust products before the missile leaves the launcher
Accelerated Test	A test in which the applied stress level is chosen to exceed that stated in the reference conditions in order to shorten the time required to observe the stress response of the item or magnify the response in a given time. To be valid, an accelerated test must not alter the basic modes and/or mechanisms of failures, or their relative prevalence
ACGIH	American Conference of Governmental Industrial Hygienists, an American advisory body which sets the standard for Threshold Limit Values
Action Time	The elapsed time from application of primer initiation energy to the moment of projectile base exit from the muzzle of the barrel
Activation Energy	The energy difference between the average energy of activated molecules (i.e. those which are able to react) and the average energy of normal molecules. In essence, it is the minimum amount of energy which must be supplied to a chemical system to initiate a chemical reaction
Actuator	A mechanism that furnishes the force required to displace a control surface or other control element
Acute Toxicity	Toxicological effect produced after a short exposure
Adiabatic Change	A change undergone by a system such that no heat enters or leaves the system. In the adiabatic expansion of a quantity of gas the temperature falls because the external work is done at the expense of the internal energy of the gas
Adiabatic Flame Temperature	The maximum thermodynamic standard state temperature ideally achievable during combustion under adiabatic conditions
ADN	Ammonium dinitramide - a potential replacement for ammonium perchlorate in composite propellants and more environmentally

	friendly compared with propellants based on AP
ADR	“Accord européen relatif au transport international des marchandises dangereuses par route” - regulates the carriage of dangerous goods, including explosives, by road
All-Arm Distance	After firing the munition, the minimum distance between the weapon and the launched munition where the fuze is armed
All-Fire Level	The value of a stimulus which, under specified conditions, is predicted to cause an explosive material or an explosive component to function, with a stated probability
All-Function Level	The minimum value of a stimulus which, under specified conditions, is predicted to cause a device or component to function, with a stated probability and confidence level
Amatol	Ammonium nitrate and TNT mixed in various proportions (e.g. 80/20) for use as a shell filling
Ames Test	A test, using micro-organisms, which is used as an indicator of possible mutagenicity
Ammonal	An explosive comprising a mixture of TNT, ammonium nitrate and aluminium
Ammunition	A device charged with explosive, propellant, pyrotechnic, initiating composition or nuclear, biological or chemical material for use in connection with offence, or defence including demolitions. Certain ammunition can be used for training, ceremonial or non-operational purposes
Ammunition Compatibility Grouping	A system of classifying bulk explosives and live ammunition into twelve groups, so that items which would, if accidentally initiated, increase the hazards by their interaction are not stored or transported together
AN	Ammonium Nitrate - a white crystalline solid with the chemical formula NH_4NO_3
Anaemia	A reduction in the normal concentration of haemoglobin or red cells in the blood
ANAL	Ammonium nitrate and aluminium powder
ANFO	Ammonium nitrate + fuel oil, a common, inexpensive blasting agent
Angina	Severe chest pain caused by lessening of blood supply to the heart muscles
ANNIE	ammonium nitrate nitrobenzene improvised explosive
ANS	Ammonium nitrate and sugar
Antioxidant	A substance which prevents or retards oxidation. For example, antioxidants are used in nitrate ester propellants to reduce the effect of the auto oxidation of the compositions
AOP-7	Allied Ordnance Publication 7 - Principals and methodology for the qualification of explosive materials for military use
AP	Ammonium Perchlorate – extensively used as an ingredient for composite propellants for rocket motors
Aplastic Anaemia	Anaemia as a result of damage to bone marrow
Approving Authority	For the Qualification of explosives, the approving authority is defined in STANAG 4170. The National Authority for the United Kingdom is the Defence Ordnance Safety Group

ARC	Accelerated Rate Calorimetry – used to measure the thermal and pressure properties of exothermic chemical reactions
Arkadite II	N-methyl-N',N'-diphenylurea – a stabiliser for nitrate ester propellants
Arm	To make a fuzing or firing system ready for functioning by removal of all the safety constraints thus permitting the munition to be fired on receipt of a specified firing stimulus and to function as intended
Armed	The state of the (sub)-system when all safety breaks and switches have been made ineffective with the exception of the single function which would initiate the intended operation of the system
Arrhenius Equation	An important equation in physical chemistry which expresses the way in which the rate constant of a chemical reaction is influenced by temperature
Arming Delay	A time delay between launch initiation and fuze arming by which time a safe separation distance should have been reached
Article (Explosive)	An article containing one or more explosive substances
ASA	A disruptive, flash sensitive, primary explosive composition containing lead azide, lead styphnate and aluminium in specific proportions
Assessment	The evaluation of the properties of an explosive, including the results of appropriate tests to determine its relationship, with particular regard to safety, to other explosives already in Service use
Attenuate	To reduce in force or value. The term is often used to describe the weakening of a shock wave by decreasing its amplitude or duration
Augmenting Cartridge	A small quantity of propellant in a container which may be added to the primary cartridge to make up propellant charges for mortar ammunition
Audit	An evaluation of a system, organisation, process, project or product. An audit is often carried out with a view to achieving an improvement in performance
Availability	The probability an item is in operable and committable at the start of a mission when the mission is called for an unknown (random) time

B

Bachmann Process	A method used for the manufacture of RDX using nitric acid and ammonium nitrate or nitric acid, ammonium nitrate, glacial acetic acid, and acetic anhydride. The process produces HMX as a by-product
Backblast	The rearward blast of (hot) propulsion gases when the weapon is fired, escape from the muzzle brake of recoil weapons and from the aft opening (venture) of recoilless weapons. The blast

	may contain fragments and particles swept up from the ground
Ballistic Coefficient	An index relating size, shape and weight of a projectile to its aerodynamic drag
Ballistic Modifier	Any additive incorporated in a propellant composition to alter its rate of burning
Ballistic Mortar	A device for measuring the power of an explosive
Ballistics	The science or art that deals with the motion, behaviour, appearance or modification of missiles or other vehicles acted upon by propellants, wind, gravity, temperature, or any other modifying substance, condition or force
Ballistite	A double base propellant in the form of flakes, used in mortars and small arms. It is composed of nitrocellulose and nitroglycerine, blended together with diphenylamine, which acts as a stabilizer
Ball Powder	A type of small arms propellant, usually single base, manufactured in the form of small spheres
Baratol	Barium nitrate and TNT mixed in various proportions for use in grenades and anti-tank mines, also in some wave shaping applications
Barium Styphanate	Barium 2,4,6-trinitroresorcinate – a relatively insensitive primary explosive which is difficult to ignite by electric spark. It is less sensitive to impact and friction than lead azide or lead styphnate
Base Bleed	Reduction of the aerodynamic drag of a shell by means of an auxiliary device in the shell consisting of propellant in a combustion chamber. The propellant gases flow out into the wake behind the shell, enhancing the pressure and thereby reducing drag
Base Charge	The increment of secondary high explosive (commonly tetryl, PETN or RDX) in the base of a composite detonator, which enhances the shock wave produced by the primary explosive.
BDNPA	Bis(2,2-dinitropropyl)acetal (BDNPA) $C_8H_{14}N_4O_{10}$ is an energetic plasticizer used in propellant and explosive applications
BDNPF	Bis-Dinitropropyl formal, $[CH_3.C(NO_2)_2.CH_2O]_2.CH_2$
BDNPA/F	Bis(2,2-dinitropropyl)acetal/formal $C_{7.5}H_{13}N_4O_{10}$ is used in LOVA gun propellants. It is typically used in a 50/50 mixture as a plasticiser
Biazzzi Process	Named after the Italian Mario Biazzzi – a continuous process for the manufacture of nitroglycerine
Biodiversity	The number and variety of living organisms on the planet
Bipropellant	A propellant composed of two components, a fuel and a liquid oxidiser. Generally neither substance is explosive
BKW	Brinkley-Kistiakowsky-Wilson, an empirical equation of state for the detonation products of condensed explosives that is widely used for practical calculations
Black Powder	Gunpowder comprising potassium nitrate, charcoal and sulphur. Usually 75/15/10
Blast	A supersonic wave produced in the surrounding atmosphere by

	an explosion. A blast wave comprises a shock front with an area of high pressure air behind it, followed by a rarefied zone
Blast Impulse (or Positive Impulse)	The time integral of the overpressure exerted by a blast wave
Blasting Agent	A commercial explosive mixture of fuel(s) and oxidant(s) containing no ingredient which is considered to be separately explosive. Examples are ANFO and some water based slurries. The distinction between blasting agents and explosives is economically important in the different safety regulations which apply
Blasting Gelatine	A commercial explosive comprising a very high proportion of nitroglycerine (about 92%) with sufficient nitrocellulose to render it gelatinous, and a little chalk. It has a high detonation velocity and is totally waterproof
Boltzmann Constant	Named after Ludwig Boltzmann, it is a physical constant relating the average kinetic energy of particles in a gas with the temperature of the gas
Bonding	The strength of the adhesion of an explosive filling to its receptacle
Booster (Explosive)	A high explosive element sufficiently sensitive so as to be actuated by small explosive elements in a fuze or primer and powerful enough to cause detonation of the main explosive filling
Booster (Propulsion)	An auxiliary or initial propulsion system which travels with a missile or aircraft and which may or may not separate from the parent craft when its impulse has been delivered. A booster system may contain or consist of one or more units
Bridge-wire	An electrical filament which can be used to ignite a pyrotechnic or primary explosive which is in contact with it, normally inside an igniter or detonator. Unless specified as an 'exploding bridge wire' it can be operated in a low tension circuit
Brisance	The shattering property shown by an explosive. The property is estimated by firing explosives in contact with metals or other solids and measuring the deformation or shattering. The effect is associated with the detonation pressure and the characteristics of the shock wave produced in the material in contact with the explosive
Brixal	Bridgwater explosive, aluminised. A variant of Debrix containing up to 30% of aluminium. Can be produced as a free flowing powder
Bruceton Staircase	A statistical technique used to determine the Figure of Insensitiveness (F of I) of energetic materials
Bubble Pulse	The repeated secondary shockwaves emanating from an underwater detonation of an explosive charge
Burning	The propagation of combustion by a surface process involving conduction, convection and radiation
BWX	Beeswax, used as a desensitiser in some HEs

C

CAB	Cellulose acetate butyrate – an inert polymeric binder
Calorimetric Value	The amount of heat evolved by the combustion of a propellant in a closed vessel in the absence of air or oxygen gas. By convention, the result is based on the assumption that the water formed during combustion is in the liquid state, which is not true in the case of a gun
CAN	Calcium Ammonium Nitrate - a mixture of AN and calcium carbonate that has a nitrogen content of 27%
Canister	A case containing substances designed to release or emit pyrotechnic smoke, harassing or casualty producing material. It may be a complete store in itself or may be a component of another store
Cap	A small metal container filled with a flame producing explosive composition
Carbamite	Diphenyl diethyl urea, known outside the UK as ethyl centralite. A common stabiliser/plasticiser/collant in gun propellant compositions
Carcinogen	A cancer producing substance
Cartridge	Definitions of cartridge are given as follows: (1) A cased quantity of propellant complete with its own means of ignition. The term is also used to describe a complete round of shell and cartridge when applied to small calibres, in the small arms range, of fixed or semi fixed ammunition. (2) A complete fixed round with propelling assemblage consisting of charge case, charge and primer. Also applicable to mortars and not restricted to small calibres
Case Cartridge	A container of brass, steel or other material to contain a propellant charge for use with automatic and semi-automatic ordnance, small arms and recoil-less weapons. The base is designed to take a primer or igniter
Case Bonding	The gas tight adhesion of a rocket propellant grain to the walls of the combustion chamber of the motor
CAS	Chemical Abstracts Service – ascribes reference numbers
Cavity	The portion of the projectile that accepts the fuze
CCC	(1) Cap conducting composition (2) A marking on British coloured smoke pyrotechnics, printed in the colour of the smoke produced. (3) Combustible charge container. Used in some large guns to contain the propellant charge, the container is completely consumed during firing and contributes to the ballistic performance
CDB	Cast double base (rocket propellant). British examples are propellants AY, BY, CY etc.
CE	Composition Exploding – also known as Tetryl (2,4,6 trinitrophenylmethylnitramine)
CERU	Cartridge Ejector Release Units used to provide a release and

Characterisation	separation of a missile from the aircraft The determination of attributes of a material or a substance to fulfil particular requirements
Charge	There are two definitions for this term: (1) The amount of propellant required for a fixed, semi fixed or separate loading projectile, round or shot. It may also refer to the quantity of explosive filling contained in a bomb, mine or the like. (2) In combat engineering, a quantity of explosive prepared for demolition purposes
Chamber Pressure	The pressure existent within the weapon chamber at any time as a result of the burning of the propellant charge
Chapman-Jouguet (C-J) Surface	A plane behind the initial shock front of a detonating explosive where material is receding from the wave front at the local sonic velocity. In a high order detonation the chemical reaction (and energy release) has effectively been completed. In a low order explosive the end of the reaction zone may be behind the C-J plane
CHEETAH	CHEETAH is a thermochemical computer code and is a physics- and chemistry-based computational tool that can reliably predict the performance of ideal and non-ideal high explosives and explosive formulations
CHIP	Chemical Hazard Labelling and Packaging
Chronic Toxicity	Toxicological effect produced as a result of long term exposure
Chuffing	The characteristic of some rockets to burn intermittently and with an irregular noise
CL-20	Hexanitrohexaazaisowurtzitane, also called HNIW - an explosive with detonation shock pressure greater than HMX
Closed Detonation	To place a munition in a closed chamber and to initiate it with an explosive charge. The evolved gases and solid residue can then be collected and treated in an environmentally safe manner
CLP	Classification, Labelling and Packaging Regulations - adopts the United Nations' Globally Harmonised System on the classification and labelling of chemicals (GHS) across all European Union countries, including the UK
Classification Of Hazardous Goods	A United Nations scheme for classifying goods into nine classes according to their hazardous nature. Explosives form Class 1
CLC	Charge Linear Cutting - A linear shaped cutting charge of high explosive encased in a metal tube which has a groove on one side. When detonated groove inwards against sheet metal it produces a cutting effect
Closed Vessel Test	A test in which the pressure time relationship, resulting from the combustion of a standard weight of propellant in a stout steel vessel of fixed volume, is used to indicate the ballistic properties of the propellant
CMCDB	Composite modified cast double base (rocket propellant).

	Ammonium Perchlorate and aluminium are added to CDB compositions via the casting powder. CMCDB may also contain RDX or HMX
CNS	Central Nervous System, comprises the brain and the spinal cord
COER	2.2.5 The Control of Explosives Regulations 1991 - regulates any person (including a body corporate) who acquires; has access to; possession of or control over any explosives
Combustion	An exothermic oxidation reaction producing flame, sparks or smoke. The oxidant may be part of the material as in a propellant, or oxygen from the atmosphere or other source
Comparison Explosive	An in-service explosive material with proven safety characteristics whose properties are used to assess the relative safety and suitability of a new explosive intended for use in a similar role
Compatibility	Compatibility of two or more items or components of equipment or material to exist or function in the same system or environment without interference
Compatibility Grouping	See Ammunition Compatibility Grouping
Complete Round	Ammunition which contains all the components necessary for it to function
Composition Exploding (CE)	See CE. The Service name for the explosive trinitrophenyl methyl nitramine. It is used in, for example, fuzes such as an Intermediary explosive. Also called Tetryl.
Composite Propellant	A solid propellant, usually for rockets, which comprises an inorganic oxidant (typically ammonium perchlorate) and a polymeric fuel/matrix. The wide diversity of candidate polymers and additives gives a range of physical properties and performance. They can be subdivided into three classes; 'plastic', 'rubbery' and 'pressed', the latter no longer being used widely now. Plastic propellants generally featured a polyisobutene (PIB) binder whereas composites use Polyurethane (PU), Polybutadiene (PB) or Polybutadiene acrylic acid acetonitrile (PBAN)
Composition A	A mixture of RDX 91% with beeswax 9% as desensitiser. (US term)
Composition B	A mixture of RDX with TNT, usually 60/40 (US term).
Composition C	A mixture of RDX with oil and/or polymeric material in proportions e.g. 88/12 to give a plastic explosive (US term)
Conducting Cap	An initiatory component (eg of a gun cartridge) in which the passage of an electric current through a small quantity of conducting composition heats it to its ignition temperature. The use of a bridge-wire is thus eliminated
Conducting Cap Composition	A initiating composition, containing graphite and initiating composition, which allows the flow of an electrical current between the pole pieces. As the current flows, sufficient heat is

	generated to function the composition
Confinement	The characteristics of the casing of a charge which restrict the expansion of the decomposition products when the explosive substance reacts
Consumable Case	A cartridge case, made of a suitable combination of ingredients, that will enable the case to be completely consumed during the firing event but which does not significantly contribute to the energy of the system
Continuous-rod warhead	The warhead casing features long pre-formed rods which are linked to produce an expanding hoop
Controlled Fragmentation	The munition casing or the explosive charge is modified to cut the metal into relatively uniform shapes and sizes
Cook-off	The premature explosion of an enclosed explosive by the conduction of heat through its container. Applicable to e.g. munitions exposed to fires, or to live cartridges left loaded in hot guns
Cordite	Double base propellant for small arms, guns or rockets, in the form of extruded cords or tubes. The use of the term cordite in British service was discouraged from 1950 but still persists. The correct designation of such compositions is simply "Propellant" followed by the identifying letters, e.g. "Propellant WM".
Cordtex	Proprietary name for one type of detonating fuze produced by NEC Ltd
COSHH	Control of Substances Hazardous to Health
Critical Characteristic	A characteristic (tolerance, surface finish, material, manufacture, assembly) of a product, material or process which may result in the failure of a critical item in the event of non-fulfilment of requirement
Critical Diameter	The diameter of an explosive charge below which it will not detonate
Cryolite	Potassium aluminium fluoride or sodium aluminium fluoride, both used to reduce flash in gun propellants
CS	The compound 2-chlorobenzalmalononitrile (also called o-chlorobenzylidene malononitrile) (chemical formula: $C_{10}H_5ClN_2$), a cyanocarbon, is the defining component of CS gas, which is used as a riot control agent
CTMTNA or R-salt	Cyclotrimethylenetrinitrosamine - similar in structure to cyclotrimethylenetrinitramine (RDX), the difference being the presence of nitroso groups rather than nitrate groups.
CTPB	Carboxy terminated polybutadiene
Cutting Charge	A charge which produces a cutting effect in line with its plane of symmetry
Cyanosis	Blue colouration of the mucous membranes and the skin caused by low oxygenation of the blood
Cyclonite	US name for RDX
Cyclotol	US name for RDX/TNT, usually 75/25

D

DADP	Diacetonediperoxide - a white powdery solids which is extremely sensitive to shock, friction, electrostatic spark and flame
Danger Area	A specified area above, below or within which there may exist potential danger for personnel and/or equipment
DATB	1,3-Diamino-2,4,6-trinitrobenzene, $(\text{NH}_2)_2.\text{C}_6\text{H}(\text{NO}_2)_3$, a high-melting secondary HE
DBP	Dibutyl phthalate – plasticiser historically used in propellants – now restricted under REACH
DBX-1	Copper(I) 5-nitrotetrazolate - an environmentally friendly (lead-free) primary explosive which is a drop-in replacement for lead azide and has a similar sensitivity profile and equivalent or better output when replacing LA in the same volume
DCDC	Development, Concepts and Doctrine Centre - based at Shrivenham
DDNP	Diazodinitrophenol; alternatively named 4,6 dinitrobenzene 2 diazo I oxide, a primary high explosive
Deactivation	To return an armed fuzing system to unarmed mode by the issue of a specific command or after a pre-set delay
Dead Pressing	A phenomenon whereby the sensitiveness of an energetic material is reduced at high pressing densities
Debrix	"Desensitised Bridgwater Explosive". A range of compositions in which RDX or HMX is desensitised by a small but efficiently admixed proportion of wax. Suggested for use in exploders, HEAT warheads and HESH projectiles
Deflagration	Subsonic combustion propagating through heat transfer; hot burning material heating the next layer of cold material and igniting it. When applied to articles: Ignition and burning of the confined energetic material leads to non-violent pressure release of a low strength case or venting through case closures (leading port/fuze walls, etc). The case might rupture but does not fragment; closure covers might be expelled, and unburned or burning energetic material might be thrown about and spread the fire. Pressure venting can propel an unsecured test item, causing an additional hazard. No blast or significant fragmentation damage to the surroundings; only heat and smoke damage from the burning energetic material
DDT	Deflagration to Detonation Transition - the transition to detonation from an initial burning reaction
DEFRA	The Department for Environment, Food and Rural Affairs. Defra are a government department responsible for environmental protection
DEGDN	Diethyleneglycol dinitrate, a propellant constituent. $(\text{O}_2\text{NOCH}_2\text{CH}_2)_2\text{O}$
Delay Element	An intermediate item in an explosive train to lengthen the function time of the train
Demilitarisation	The act of removing or otherwise nullifying the military potential

	of a munition. Demilitarisation is anecessary step for military items prior to their release into a non-military setting
Demolition	The destruction of structures, facilities or material by the use of fire, water, explosives mechanical or other means
Demolition Charge	An explosive charge designed to destroy material, structures or installations by means of explosive effects such as blast, fragmentation or cutting
Dermatitis	Inflammatory reaction of the skin to contact with toxic substance
Design Principles	The fundamental rules to be adhered to in the process of recognition and problem solving associated with the creation of a product
Design Safety State	A system state that provides the maximum degree of safety within the constraints of the administrative, operational or logistic phase
Detasheet	A plastic explosive in sheet form based on PETN and manufactured by DuPont of USA.
Detent	A catch, latch, stop pin, metal pin or similar feature supported or retained by a spring which prevents the movement of a functional fuze part, e.g. an interrupter or striker, until the restraint is removed due to the effect of the launch environment of the weapon
Detonating Fuze	Flexible tubing filled with powdered secondary high explosive, which will transmit a detonation wave over any required distance
Detonation	A type of combustion involving a supersonic exothermic front accelerating through a medium that eventually drives a shock front propagating directly in front of it
Detonation Pressure	The dynamic pressure in the shock front of a detonation wave. Its magnitude for a particular explosive can be calculated or can be determined experimentally using the Hopkinson machine. This parameter should not be confused with Pressure of Combustion
Detonator	An explosive device for starting detonation in a disruptive explosive train. It is small in size and may be designed for initiation by one of several methods, e.g. bridgewire, flashing stabbing, etc.
Detonics	The study of detonation and related phenomena
DFRMO	Defence Fire Risk management Organisation – MOD's single, integrated, regionally based fire risk management organisation; part of HQ Land Forces
Differential Thermal Analysis	A laboratory method for studying those physical and/or chemical changes which occur in a substance when its temperature is progressively raised and which result in the adsorption or emission of heat
DINA	Diethylnitramine dinitrate, a secondary high explosive. $(O_2NOCH_2CH_2)_2N.NO_2$, also used to replace NG in gun propellants

Dinitrogen Pentoxide	N_2O_5 – a nitrating agent used in the preparation of explosives
DIPAM	3,3` Diamino 2.2`,4,4`,6,6` hexanitrobiphenyl
Diphenylamine	$(C_6H_5)_2NH$ Diphenylamine is the most common stabilizer used in smokeless powder that prevents build-up of deteriorating matter
Disarm	To restore a fuze system to a non-armed condition from an armed condition, either reversibly to permit re-arming, or irreversibly and permanently (sterilization)
Disruptive Explosive Train	That type of explosive train which is designed to terminate in a detonation
Dissociation, Thermal	As applied to explosives, the decomposition of gas molecules at high temperature into other species, which may recombine at lower temperatures if conditions permit. Of particular relevance to the combustion products of propellants
DNAN	2,4-dinitroanisole - an explosive which is less sensitive to shock and heat than TNT and RDX
DNB	1,3-Dinitrobenzene, a weak secondary high explosive. $C_6H_4(NO_2)_2$
DNT	Dinitrotoluene (mixed isomers, usually) a coolant and moisture-repellent additive in some gun propellants. $CH_3.C_6H_3(NO_2)_2$
DOA	Diethyl adipate – a propellant plasticiser
DOS	diethyl sebacate - a propellant plasticiser
DOSG	Defence Ordnance Safety Group - the UK National Authority for the assessment of the safety and suitability for introduction into military service of energetic materials
DOSG ST1	Defence Ordnance Safety Group Science and Technology 1 – the section within DOSG responsible for advising on explosives safety
DOSR	Defence Ordnance, Munitions and Explosives Safety Regulator - responsible for regulating the majority of explosives and ordnance related activities in MOD
Double Base Propellant	A propellant based on nitrocellulose and nitroglycerine
DPA	Diphenylamine – a stabiliser for nitrate ester propellants
Driving Band	A band of metal or other material pressed round a projectile which, when engaged with the rifling of the barrel centres the projectile in the bore, imparts spin to the projectile and also prevents forward escape of the propellant gases
DSA	Defence Safety Authority - an independent organisation, empowered by charter from MOD's S of S to undertake the roles of regulator, accident investigation and Defence Authority for safety
DSC	Differential Scanning Calorimetry - a thermos-analytical technique in which the difference in the amount of heat required to increase the temperature of a sample and reference is measured as a function of temperature
DSHAR	2.2.3 Dangerous Substances in Harbour Area Regulations

	(DSHAR) 1987 - regulates all classes of Dangerous Goods including explosives (Class 1) for carriage, loading, unloading and storage in harbours and harbour areas
DTA	Differential Thermal Analysis - a thermos-analytic technique that is similar to differential scanning calorimetry. In DTA, the material under study and an inert reference are made to undergo identical thermal cycles, while recording any temperature difference between sample and reference.
Dud	Explosive munition which has not armed as intended or which has failed to explode after being armed
Dynamic Pressure	Pressure resulting from some medium in motion, such as air following the shock front of a blast wave
Dynamite	Dynamite can be either of the gelatine or non-gelatine type. The former is defined separately. The latter contains nitroglycerine (10-50%) an inorganic oxidant and woodmeal. The cohesion of the cartridge is due only to compaction and its waterproofing is by wax coating . If the oxidant is ammonium nitrate as distinct from the sodium salt, the composition is called an ammonia (or ammon) dynamite)

E

EA	Environment Agency - an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs
EA95	Environment Act 1995 - saw the establishing of the Environment Agency as the regulator for England and Wales and the Scottish Environmental Protection Agency for Scotland Arrangements for Northern Ireland followed later.
EBW	See Exploding Bridge Wire Detonator
EDB	Extruded double base propellant, usually referring to a type of rocket propellant. British examples are propellants PU, SU and VU
EDC	A series of high performance military explosives
Compositions	
EDNA	Ethylene dinitramine (Haleite), a secondary HE with some use in the USA. Alternative name ethane- 1, 2-dinitramine. $O_2N.NH.CH_2CH_2NH.NO_2$
EED	See Electro-Explosive Device
Effluent	Liquid waste from sewage treatment or industrial processes
EFM	Environmental Features Matrix – used to identify significant environmental impacts
EFP	Explosively formed projectile – A shallow dished metal plate in the warhead inverts to form a fast solid slug of metal travelling at high speed
EGDN	Ethylene glycol dinitrate – used as a replacement for NG in gun propellants
EH40	EH40/2005 “Workplace Exposure Limits”, available on-line via HSE website

EHDS	Explosives Hazard Data Sheet
EIA	Environmental Impact Assessment. Process required by UK planning legislation for certain projects detailing the significant environmental effects of a proposed development
Electric Detonator	A detonator initiated by electrical means
Electrochemical Reduction	Treatment of organic wastes by generation of highly oxidising species in an electrochemical cell and utilising these to oxidise the waste to carbon dioxide and water
Electro-Explosive Device	A one shot explosive or pyrotechnic device used as the initiating element in an explosive or mechanical train and which is activated solely by the application of electrical energy
Electromagnetic Radiation Environment	The intensity, frequency and time distribution of the RF radiation in the range 200 kHz to 40 GHz existing at a location
EMCDB	Elastomer modified cast double base propellants - a type of rocket propellant. The colloidal mixture used for double base propellants is modified by the introduction of an elastomer to confer good mechanical properties at low temperatures
Emissions	The release of a substance such as gas into the environment, for example the burning of coal releases Carbon Dioxide into the atmosphere, referred to as Carbon Dioxide emissions
EMS	Environmental Management System
Endothermic Compound	A compound of which the formation entails the absorption of heat from the surroundings. By convention, the heat (enthalpy) of formation of such a compound is positive. Single explosive compounds can be either endothermic or exothermic
Endothermic Reaction	A chemical reaction accompanied by the absorption of heat from the surroundings. The heat (enthalpy) change for such a reaction is, by convention, positive
Energetic Material	A material making a positive contribution to an explosive, propellant or pyrotechnic process
Enforcement Notice	Can be issued by the Environment Agency or a Local Authority with regard to Environmental issues. It gives notice that an organisation must act to avoid further penalty or closure.
Entropy	A condition of a chemical system which, under certain circumstances, is related to the degree of disorder within the system
Environmental Aspect	An Environmental Aspect is a feature or characteristic of an activity, product, or service that affects or can affect the environment
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services
Environmental Testing	Product testing under specified conditions of environment likely to affect performance
EOS	Equation Of State - a constitutive equation which provides a mathematical relationship between two or more state functions

	associated with the matter, such as its temperature, pressure, volume, or internal energy
EPA90	The Environmental Protection Act 1990
Equation of State	The equation which expresses the relationship between the temperature of a quantity of gas and the product of its pressure and volume. For the extreme conditions of temperature and pressure produced by high explosives and propellants, modifications of the ideal equation are necessary
ER14	Explosives Regulations 2014 - consolidated and therefore revoked a number of explosives regulations. It has brought together the requirements of health and safety related explosives legislation into a framework based around common topics such as authorisation, safety, security and placing on the market
Erosion	Removal of metal by gas action on the bore, including the possible contributory effects of chemical action by gases, corrosion or mechanical action by the driving band. When the effect is general it is Erosive wear, where the characteristic local effects are evident it is Erosive Scoring. The term is also used to describe the removal of metal by gas action on the projectile
ES	Exposed Site - any facility, service or civilian, exposed to and thus hazarded by the effects of an explosion or fire at a PES
ESD	Electro-static discharge
Ethyl Centralite	1,3-diethyl-1,3-diphenyl urea – a stabilisers for nitrate ester propellants. See also Carbamite
Ethridge Equation	A simplified version of the Friedlander equation, to describe the pressure time curve at a given location for the detonation of an explosive charge in air
EU	European Union
EU Directive	Directives are legally binding documents which specify desired outcomes or objectives and specific dates for achievement of those outcomes. They leave the means of achieving the objectives to national governments.
EU Framework Directive	A Framework Directive establishes a framework or template for subsequent legislation in an area
EU Regulation	Regulations are directly applicable laws in all EU member states
Excitation Time	The period for which current must be supplied to an electro explosive device to ensure functioning
Exothermic Compound	A compound of which the formation entails the loss of heat to the surroundings. By convention, the heat (enthalpy) of formation of such a compound is negative. Single explosive compounds can be either exothermic or endothermic
Exothermic Reaction	A chemical reaction accompanied by a loss of heat to the surroundings. The enthalpy change for such a reaction in, by convention, negative
Exploder	This term has two definitions: (1) When applied to a Booster or Gaine; A charge of secondary explosive designed to amplify the

	detonation wave produced by a fuze detonator or magazine, to ensure efficient detonation of the main charge in a shell, bomb, etc. The exploder may be a pressed pellet or a filled container (also known as a Booster or Gaine). (2) Otherwise a portable electric generator designed for use with electro explosive devices
Exploding Bridge Wire (EBW) Detonator	A detonator in which a secondary explosive filling is detonated by electrically exploding a fine wire embedded in it
Exploding Foil Initiator (EFI)	An electro-explosive device with a low resistance bridge which, when subject to a high energy short duration electrical pulse, converts the electrical energy into kinetic energy to project a high velocity flyer plate which, on impact, causes a detonation in a relatively insensitive explosive material which is not in direct contact with the bridge.
Explosion to Detonation Transition (XDT) Explosive	A delayed transition of an unstable violent reaction into detonation A chemical substance or mixture which can react to produce an explosion
Explosive Classification	A division of explosives according to the risks they present when initiated in storage or transport. The Hazard Divisions and Compatibility Groups are given in ESTC's paper 'Classification of Explosives for Storage and Transport' (ESTC/220/Leaflet No 2)
Explosive D	US name for ammonium picrate, used in the US as a secondary high explosive. This compound is also used as a coolant/burning rate moderant in plastic rocket propellants. $\text{NH}_4^+[\text{OC}_6\text{H}_2(\text{NO}_2)_3]^-$
Explosive Hazard Data Sheet	Supersedes Explosive Safety Certificate. A document which describes those properties of an explosive which are important for its safety during manufacture, handling, filling and disposal.
Explosive Ordnance	All munitions containing explosives, nuclear fission or fusion materials and biological and chemical agents. This includes bombs and warheads; guided and ballistic missiles; artillery, mortar, rocket and small arms ammunition; all mines, torpedoes and depth charges, demolition charges; pyrotechnics; clusters and dispensers; cartridges and propellant actuated devices; electro explosive devices; clandestine and improvised explosive devices and all similar or related items or components explosive in nature
Explosive Ordnance Disposal	The detection, identification, field evaluation, rendering safe, recovery and final disposal of unexploded explosive ordnance. It may also include the rendering safe and/or disposal of explosive ordnance which have become hazardous by damage or deterioration when the disposal of such explosive ordnance is beyond the capabilities of personnel normally assigned the responsibility for routine disposal
Explosive Power	The product of the heat of explosion and the volume of gas

Explosively-formed projectiles	produced in an explosive reaction
EPP	See EFP
ESTC	Explosives Precursors and Poisons - licence is required before these chemicals can be supplied to the public
Explosive Train	Explosives Storage and Transportation Committee - the UK Competent National Authority for the classification of military explosives. The Secretary ESTC is delegated as the Ministry of Defence Classification Authority
	The initiation train (transfer mechanism) beginning with the first explosive element (primer, detonator) and terminating in the main charge (munition functioning mechanism, high explosive, pyrotechnic compound)
Explosiveness	This describes the degree of violence shown by an energetic material when it responds to a prescribed stimulus relative to an accident situation. It is dependent on the nature of the energetic material, its mass, physical state, configuration and confinement
Extreme Service Conditions Pressure (ESCP)	The chamber pressure developed when firing the specified system under extreme service conditions (cannon systems)
E	
F	Propellant force constant – also known as the propellant impetus
Fail-Safe	A characteristic which prevents faults from becoming critical faults. A fail-safe design is one which ensures the system is put into a safe condition if a fault occurs. In a fuzing system it is a design feature which renders the munition incapable of arming and functioning upon malfunction of safety feature(s) or exposure to out of sequence arming stimuli or operation of components
Failure Mode Effects (and Criticality) Analysis (FMEA, FMECA)	An analytic procedure to evaluate the effects (probability and criticality) of failure modes
FAX	Fuel air explosive – liquids, slurries, gases or dust particles which exhibit explosive properties when mixed with air
F of I	Figure of Insensitiveness
FEFO	Bis (2-fluoro-2, 2-dinitroethyl formal), a secondary high explosive. Otherwise bis(2,2-dinitro-2-fluoro-ethyl) formal. $[(\text{NO}_2)_2\text{CFCH}_2\text{O}]_2\text{CH}_2$
FHN	Flash-less, non-hygroscopic (sic): a particular single base artillery gun propellant of US origin.

Film Bridge Initiator	An electro-explosive device where the power dissipated by the passage of current through a resistive vacuum deposited film or foil of very small dimensions is used to initiate by heating a primary explosive which is in intimate contact with the film or foil
Final (or Type) Qualification	Final qualification relates to the use of the explosive material in a specific application or munition. Final qualification is given when the explosive has been assessed as part of the design of the specific munition, and predicted to be safe and suitable for military operational or training use in that role
Firing Circuit	The complete system including the electro-explosive device (EED), power supply and associated electrical and electronic circuitry necessary for normal EED firing
Firing Energy	Energy available in a munition or a weapon system to cause its firing
Firing Interval	The time lapse between two successive firings during a sustained firing of cannons, mortars or automatic weapons
Firing Stimulus	A stimulus that will initiate the first explosive element in an explosive train
Firing System	The aggregate of devices in a munition and its associated weapon system (including cannon, launcher and munition launch platform) which generate and control the operating signal to cause the propelling charge or the propulsion system to function
Fixed Ammunition	Ammunition in which the cartridge case is permanently attached to the projectile until the round is fired
Flame Flash	Luminous phenomenon accompanying gas phase combustion The definitions for this term are: (1) A brief radiation pulse accompanying an explosion. (2) A short lived flame used to ignite safety fuze, a detonator or igniter
Flash Inhibitor	A substance added to a propellant composition to reduce muzzle flash
Flash Suppressor	Device attached to the muzzle of a weapon which reduces the amount of visible light or flash created by burning propellant gases
Flash Receptive Detonator	A type of fuze detonator which is initiated by a flash (short lived flame) from another component of the fuze
Force, Or Force Constant	The work capacity of an explosive, usually applied to gun propellants. It can be calculated for high explosives or propellants and in the case of the latter it can be determined experimentally by the use of the Closed Vessel
Form Function	The mathematical function describing how the surface area of a propellant grain of particular shape changes in the course of combustion
FOX-7	1,1-diamino-2,2-dinitroethene $C_2H_4N_4O_4$ - an insensitive high explosive
FOX-12	N-Guanylurea dinitramide (GUDN) - a low sensitivity explosive with good thermal stability and potential candidate for Insensitive Munitions

Fragmentation	The shattering effect of an explosive upon its container, e.g. fragmentation of a shell case by its explosive filling
Frank-Kamenetskii Theory	Named after a Russian scientist David A. Frank-Kamenetskii, the theory explains the thermal explosion of a homogeneous mixture of reactants, kept inside a closed vessel with constant temperature walls.
Friedlander Equation	An equation that describes the pressure-time curve at a given location resulting from the detonation of an explosive charge in air
Fuze	There are three definitions for this term: (1) Cord or tube for the transmission of detonation or flame. See Detonating Fuze and Safety Fuze respectively. (2) A compact, engineered assembly of explosive components, means of initiation and safety devices, to initiate the main charge of a munition. (3) An electric filament (bridge-wire) which is part of an electro explosive igniter
Fuze Assembly	A number of components or sub-assemblies or any combination thereof, joined together to perform a specific individual technical function. Examples: Antenna assemblies, mechanical assemblies, electronic assembly. Note the distinction between an assembly and a sub assembly is not always exact an assembly in one instance may be a sub assembly in another where it forms a portion of an assembly
Fuze Cavity (Pocket)	A recess in a charge for receiving a fuze
Fuze Safety System	The aggregate of devices included in the fuze to prevent its arming and functioning until a valid launch environment has been sensed and the arming delay has been achieved
Fuze Setter	A device for setting a unique and required function of the fuze
Fuzing System	A physical system designed to (a) sense a target or respond to one or more prescribed conditions, such as elapsed time, pressure or command; (b) initiate an explosive train in a munition; (c) provide as a primary role safety and arming in order to preclude munition arming before the desired position or time

G

Gain	In proximity fuzes, the component part which contains the explosive components together with certain safety devices
GAM	A primary explosive comprising a mixture of G elatin, L ead A zide and M olybdenum disulphide
GAP	Glycidyl azide polymer – an energetic binder
Gas Actuator	Device intended to perform one or several mechanical actions using the gases from the reaction of an explosive
Gas Constant	See Molar Gas Constant

Gas Generator	A munition or a subsystem of a munition that generates gases to be used for a purpose other than providing thrust for direct rocket motor propulsion of the host munition
Gastritis	Inflammation of the lining of the stomach
Gelatine Dynamite	Generic term for a commercial explosive containing 25-55% nitroglycerine, 1-5% nitrocellulose, woodmeal and one or more inorganic nitrates as oxidant. The gelatinous NG/NC matrix provides high density and detonation velocity, also good waterproofing. If the oxidant is sodium or potassium nitrate the composition is called a "straight gelatine", or gelignite. If ammonium nitrate is used instead of, or in addition to, other nitrates, the composition is a "special gelatine" (in NEC nomenclature), or ammon gelatine dynamite, or ammon gelignite. This type is somewhat less waterproof than the "straight" type
GHS	Globally Harmonised System of Classification and Labelling of Substances within the European Union
Global Warming	The average annual increase in temperature on earth caused by the activities of mankind
GPS	Gunpowder substitute
Grain	A discrete portion of a propellant composition, usually of a precise geometrical shape
Grenade	A self-contained fragmenting, blast, smoke or gas munition used at short ranges either thrown or projected
GUDN	See FOX-12
Guided Missile	A missile whose trajectory through the atmosphere can be controlled during flight
Guncotton	Nitrocellulose with a nitrogen content above 12.9%.
Gunpowder	A mixture comprising potassium nitrate, charcoal and sulphur. Usually 75/15/10.
Gun Propellant	A substance or mixture of substances which is required to burn in a controlled manner within a gun combustion chamber producing hot gases capable of propelling a projectile at high velocity. Combustible cases may be included as they contribute to the overall energy of the propellant
Gurney Equation	An equation to predict the velocity of fragments from warheads of various geometries

H

Haem	The part of the haemoglobin molecule which contains the oxygen binding iron atom
Haemoglobin	The oxygen binding pigment present in red blood cells containing iron in the 2+ valency state. See Methaemoglobin
Haemolytic Anaemia	Anaemia resulting from destruction of red blood cells
Hand Emplaced Munition (HEM)	A munition that is hand emplaced at, or hand-thrown to, the point of its intended function, and requires user action both to

	commit it to arm and to achieve safe separation
Hang Fire	An undesired delay in the functioning of a firing system
Hardening	The process by which a munition may be protected against potentially hazardous effects induced by the environment, by inducing particular features in the design
Hazard	A situation that in particular circumstances could lead to harm, where 'harm' is the loss to a human being (or human population) consequent on damage
Hazard Classification Code	A code derived from a combination of Hazard Class/Hazard Division and Compatibility Group
Hazard Assessment	The assessment, by means of various empirical tests and treatment of results, of the degree of hazard posed to personnel and property by the storage, handling, transportation and use of a particular explosive
Hazard Divisions	A system of classifying bulk explosives and live ammunition into six categories, based on the nature of the hazard(s) which they would pose to personnel and property if accidentally initiated; e.g. mass explosion, violent burning etc.
Hazard Probability	The aggregate probability of occurrence of the individual events that could create a specific hazard
Hazard Severity	The extent of the consequences which could be caused by a hazard
Hazardous Waste	Waste with the potential to adversely affect the environment or human health. All hazardous wastes are listed in the regulations and include, but are not restricted to, substances which are highly flammable, an irritant, toxic or carcinogenic e.g. batteries, oils, solvents and chemicals etc
HBX	A series of US explosives designed for underwater use
HCE	Hexachloroethane, on which a type of pyrotechnic screening smoke mixture is based
HE	High Explosive
Heat of Formation	The amount of heat absorbed from, or given up to, the surroundings, when one mole of a substance is formed from its elements at 298K and $1.01325 \times 10^5 \text{ Nm}^2$ (1 atmosphere) pressure
Heat Capacity	The amount of heat absorbed by a substance when its temperature is raised by 1K. The unit of substance may be one of mass, giving a 'specific heat capacity'. Alternatively, if the substance is an element or single compound the unit can be the mole, giving a 'molar heat capacity'. The molar heat capacities of gases, which are of special interest in explosives chemistry vary with temperature, but a mean value for a large temperature rise can be calculated. This is called 'mean molar heat capacity' and is a valuable aid in thermochemical calculations. The heat capacity of a gas can be measured either at constant pressure (C_p) or constant volume (C_v). The value of C_p is greater than the corresponding C_v because some of the

	heat supplied is used up as work in expanding the gas to maintain constant pressure. The difference between the corresponding values, for one mole of an ideal gas, is numerically equal to the molar gas constant R in SI units
Heat Capacity Ratio (γ)	The ratio of heat capacity at constant pressure to that at constant volume, $C_p:C_v$. For a diatomic gas its value is 1.4 and for a triatomic gas 1.33. In internal ballistics the value of γ is specially calculated because of the peculiar conditions obtaining, and is called 'gun γ '. It depends on the chemistry of the propellant and is less than the foregoing figures
Heat of Explosion	The liberation of heat under adiabatic conditions when an explosive is initiated either to burning or detonation
Heat of Formation	The heat released or absorbed during the formation of a pure substance from its elements at constant pressure
Hexamine	Hexamethylenetetramine or methenamine is a heterocyclic organic compound with the formula $(CH_2)_6N_4$ – a precursor in the manufacture of RDX
Hexogen	German name for RDX
Heinz Bodies	Small accumulations of abnormal haemoglobin seen, after staining with a dye, in red blood cells; typically caused by organic nitro or amino compound toxicity
HFC	Heat Flow Calorimetry
HIAP	High ignition temperature propellant
High Energy Gun Propellant	Triple base gun propellant with the addition of RDX or HMX.
High Explosive	An explosive which is capable of detonation under the normal conditions of use
High Order Detonation	Detonation at a velocity approaching the maximum stable velocity of detonation for the system. Usually applied to high order NG based compositions
HME	Home Made Explosive
HPLC	High performance liquid chromatography
HPOM	Hydrogen Peroxide Based Mixtures
HITP	High ignition temperature propellant
HITP/SEAP	High ignition temperature propellant, self-extinguishing at atmospheric pressure
HME	See Home Made Explosives
HMTD	Hexamethylenetriperoxidediamine - $C_6H_{12}N_2O_6$ - a powerful explosive, but it is not easy to handle. Shock, friction, heat, and reaction with common metals can cause it to detonate
HMX	HMX, $(C_4H_8N_8O_8)$ also called octogen, is a powerful and relatively insensitive nitroamine high explosive variously listed as High Melting Explosive, Her Majesty's Explosive, High-velocity Military Explosive, or High-Molecular-weight RDX
HNAB	Hexanitroazobenzene 2,2',4,4',6,6'-hexanitroazobenzene a secondary HE. $C_{12}H_4N_8O_{12}$
HND	Hexanitrodiphenylamine, a secondary HE, also known as hexyl. $(NO_2)_3C_6H_2.NH.C_6H_2(NO_2)_3$
HNIW	See CL-20 - a more powerful explosive than HMX

HNS	Hexanitrostilbene (1,3,5-Trinitro-2-[2-(2,4,6-trinitrophenyl)ethenyl]benzene) – generally used as an anti-cracking additive in TNT based fillings. It also is heat resistant with a melting point in the range 316-320 °C
Hollow Charge	A charge, usually cylindrical, having a cavity opposite the point of initiation to exploit the Munroe effect. The cavity may be lined with metal to enhance the effect
Hopkinson-Cranz Scaling Law	Also known as the cube root scaling law, this describes how the air blast from an explosive can be scaled by dimension
Hot Spot	A small, localised region in an explosive substance which is characterized by a temperature much higher than that of its surroundings. This is relevant to mechanisms of initiation
HSE	Health and Safety Executive
HTP	High test peroxide – a 80% - 90% solution of hydrogen peroxide in water, used as a liquid monopropellant
HTPB	Hydroxyterminated polybutadiene
Hugoniot	The Rankine– <u>Hugoniot</u> conditions, also referred to as Rankine–Hugoniot jump conditions or Rankine–Hugoniot relations, describe the relationship between the states on both sides of a shock wave in a one-dimensional flow in fluids or a one-dimensional deformation in solids
Hydrazene	Anhydrous hydrazine (N ₂ H ₄) is a colourless, mobile liquid generally used as a monopropellant in propulsion units for space probes. Hydrazene is normally utilised by decomposition on a spontaneous (cold start) catalyst
Hydrogen peroxide	Until the mid-1960s hydrogen peroxide (H ₂ O ₂) was the most widely used liquid monopropellant, as well as an oxidant in bipropellant systems. Subsequently Hydrazene found preference as a monopropellant
Hydrolysis	The decomposition of a compound by the action of water. This is of particular relevance to the chemical stability of explosives, and also to the formation of pyrotechnic smokes
Hypergolic	Term describing certain liquid bipropellant combinations which ignite spontaneously on mixing
I	
IED	Improvised Explosive Device – a bomb constructed and deployed in ways other than in conventional military action. It may be constructed of conventional military explosives, such as an artillery round, attached to a detonating mechanism. IEDs are commonly used as roadside bombs
Igniferous Explosive Train	That type of explosive train which functions throughout in a burning mode as distinct from a detonative one. Such trains are found in, e.g. gun cartridges, carrier projectiles and pyrotechnic devices
Igniter	A device for starting the burning of the next component in an

	explosive train
Igniting Component	A device which deflagrates but which does not detonate, producing either hot gas or hot particles, or a combination of both
Ignition	The onset of burning
Ignition Delay	Time lapse between the moment of administration of the firing signal or firing stimulus to the primer and the moment of irreversible function of the explosive train, or the moment a specified condition is reached, such as a specified gas pressure in a combustion chamber
Ignition System	The aggregate of devices involved in the control and generation of the operating signal to cause the rocket or missile to function
Ignition Train	In general munitions, a succession of pyrotechnic elements arranged to cause the ignition of a charge. In fuze systems, the deflagration train beginning with the initiator and terminating with the igniter charge
IM	Insensitive Munitions - those that reliably fulfil their performance, readiness, and operational requirements on demand, but are designed to minimize the violence of a reaction and subsequent collateral damage when subjected to unplanned heat, shock, fragment or bullet impact, electromagnetic pulse (EMP), or other unplanned stimuli.
IM Signature	The worst plausible responses of a munition to each of the following specified environments: fast heating, slow heating, bullet impact, sympathetic reaction and light fragment impact
IM Technology	Any structural or energetic material, concept or design which is an integral part of the munition itself, that can reduce the probability and violence of a munition response when subjected to an accidental or hostile stimulus
Impact Action Fuze	A fuze that is set in action by the striking of a projectile or a bomb against an object
Implosion	The definitions for this term are as follows: (1) The violent disruption or collapse of an evacuated vessel due to external pressure. (2) The effect of a hollow spherical charge of explosive, from which a concentrated shockwave impinges on any material, e.g. fissile, at the centre
Improvised Explosive Devices (IED)	Those devices placed or fabricated in an improvised manner incorporating destructive, lethal, noxious, pyrotechnic or incendiary chemicals, designed to destroy, disfigure, distract or harass. They may incorporate military stores, but are normally devised from non-military components
IME	An explosive mixture made, usually by terrorists, from common substances which are obtainable (legally or illegally) from shops, school laboratories, industrial premises, etc. (sometimes referred to as Home Made Explosives (HME))
IMS	Ion Mobility Spectrometers
IMX-101	A US explosive comprising DNAN, NQ and NTO
IMX-104	A US explosive comprising DNAN, NTO and RDX

In Line Explosive Train	An explosive train which has no physical interruption between the primary and secondary explosive elements
Incendiary Mix	A pyrotechnic composition which upon ignition rapidly converts to high temperature gases and hot particles
Incineration	The controlled burning of unwanted material to produce gases and solid residues containing little or no combustible material
Incremental Charge	An amount of propellant in a separate container, added to or taken from a propelling charge, to permit variation of the ballistic performance. (See also Augmenting Cartridge)
Independent Safety Feature	Each of several features is independent if it senses a different environmental force or condition from that sensed by the other safety features and if the integrity of the safety feature is not affected by the function or malfunction of one or more other safety features
Induced Environment	The conditions to which a material or component thereof may be exposed during its life cycle and which are directly or indirectly the result of human intervention
Inert	Not containing any explosive substance or other energetic material
Inertia Pellet	There are two definitions for the term Inertia Pellet: (1) In Fuzes, this is a mass, usually cylindrical in shape and of metal, which is used to sense the deceleration of the projectile. (2) In Fuzes, this is a free mass, usually cylindrical in shape and of metal which on impact or graze produces a sufficient force, normally transmitted through a striker, to initiate an explosive train
Ingestion	Entry into the body by eating or swallowing
Inhibitor	The definitions are: (1) An adherent layer of material applied to part of the surface of a propellant to prevent burning at that surface. (2) A substance employed to prevent or oppose chemical change in a system
Initiation	The action of a device used as the first element of an explosive train which, upon receipt of the proper impulse, causes the detonation or burning of an explosive item
Initiation System Initiator	System to initiate an explosive train or component in a munition The definitions for this term are: (1) A device for igniting or detonating explosives or pyrotechnics, commonly an igniter or detonator. (2) The term is also used as an abbreviation for the initiatory compositions, i.e. primary explosives, used in such devices. This usage introduces ambiguity and is best avoided.
Insensitiveness, Figure of (F of I)	A figure, determined by the Rotter Impact Test, which is a measure of the sensitiveness to impact of an explosive. It is a figure of insensitiveness because the results are calculated so that the higher the figure the more insensitive the explosive

Installed Munition	Any munition placed in a long-term fixture to the vehicle structure with or without anti-vibration mounts or isolators
Intermediary	An explosive of which the sensitiveness to initiation by impact or shock wave is intermediate between that of primary explosives and secondary explosives. The term is falling into disuse; such explosives are now classed as secondary explosives
Internal Energy	The total of all the forms of energy (translational, rotational and vibrational) in a chemical system. It is a function of temperature
Interrupter (Shutter)	A mechanical barrier in the explosive train which, when in the safe position will prevent the boost being initiated if the detonator inadvertently explodes. It is moved from the 'safe' position to the armed position by the effect of the launch environment of the weapon
Intraperitoneal Toxicity	Toxicological effects produced as a result of insertion of toxic substances directly into the abdominal cavity
Intravenous Toxicity	Toxicological effects produced as a result of injection of toxic substances directly into a vein
IPCC	Intergovernmental Panel on Climate Change – the United Nations associated body of scientists who evaluate the risk of global warming and climate change caused by the activities of mankind
IPN	Isopropyl nitrate, or more correctly propan-2-yl nitrate. A monopropellant for use in missile auxiliary power units
IRFNA	Inhibited red fuming nitric acid - red fuming nitric acid inhibited with a small percentage of hydrofluoric acid (HF) and used as a bi-propellant oxidizer
ISO 14001	International Standard Organisation (ISO) for an Environmental Management System. Sets out the actions to be taken by a company in running an Environmental Management System and allows for an independent third party to assess (through an audit) whether a company meets the ISO14001 specification.
ISO 14040	International Standard Organisation standard which describes the principles and framework for life cycle assessment
IPN	Isopropyl nitrate - 2-propyl nitrate (CH ₃) ₂ CHONO ₂ – used in starters for gas turbine engines
ITAR	International Traffic in Arms Regulations - a United States regulatory regime to restrict and control the export of defense and military related technologies to safeguard U.S. national security and further U.S. foreign policy objectives
ITOER	Identification and Traceability of Explosives Regulations 2010 - requires that explosives for civil uses are uniquely identified and can be traced from the production site through to their final use

J

Jet	In the context of the functioning of a shaped charge, this refers
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	to the dense material part, generally metallic, cylindrical, stretched fluid, solid or in particles, moving at high velocity, coming from the charge liner
JSP	Joint Services Publication
JSP 403	MOD Handbook of Defence Range Safety
JSP 418	MOD document setting out policies and procedures for the management of Environmental Protection in Defence
JSP 482	MOD explosives regulations
JSP 520	Safety and Environmental Management of Ordnance, Munitions and Explosives over the Equipment Acquisition Cycle
JSP 862	MOD maritime explosive regulations
JWL	Jones-Wilkins-Lee, an analytical equation of state used to describe the detonation products of high explosives

K

Kistiakowsky Wilson Rules	A set of empirical rules for calculating approximately the composition of the gaseous products of a high explosive
KDNAN	Potassium dinitroacetoneitrile. $K^+[O_2N=(CNO_2)CN]^-$
KDNBF	Potassium 4, 6 dinitrobenzofuroxan, a lead-free primary explosive used as a low toxicity replacement for lead azide
Kokinakis- Sperazza Model	A semi-empirical model to estimate the probability of incapacitation or medical severity of wounds by a penetrating fragment from a munition
Kyoto Protocol	United Nations treaty introduced in 1997 with the aim of reducing global warming by reducing emissions of greenhouse gases

L

L Mixture	An igniferous primary explosive composition, also known as RD 1651, comprising lead dinitroresorcinate, barium nitrate and tetrazene in the proportion 50/45/5
Lag Time	The period between first applying current to an electro explosive device and subsequent breaking of the circuit
Laser Initiation	The activation of an initiator by laser energy
LAT	Lead axotetrazole, $Pb(N_4.CN=NC.N_4).Pb(OH)_2$, a primary explosive
Launch	The irreversible discharging, firing, ejecting or releasing of a munition
LC ₅₀	Concentration of substance which, under specified conditions, is lethal, to 50 % of those exposed. (Typical units are $mg\ m^{-3}$ for a specified time)
LC _{t50}	Integrated atmospheric dosage (product of concentration and exposure time) which is lethal to 50 % of those exposed. (Typical units are $mg\ min\ m^{-3}$)

LD ₅₀	Dose of a substance which is lethal to 50 % of those exposed. (Typical units are mg, or mg per kg of body weight)
LCA	Life Cycle Assessment - a technique for assessing the environmental impact of product throughout the entire lifecycle from extraction of raw materials to disposal, often referred to as cradle to grave
LCC	Linear shaped cutting charge. A linear charge of high explosive encased in a metal tube which has a groove on one side. When detonated groove inwards against sheet metal it produces a cutting effect
LDNR	Lead salt of 2, 4-dinitroresorcinol or of 4,6-dinitroresorcinol. A primary explosive. The 2,4 type is known in the British service as "R" composition. $\text{Pb}[\text{O}_2\text{C}_6\text{H}_2(\text{NO}_2)_2]$
Lead	An intermediary secondary high explosive element or component designed to transmit a detonation reaction
Lead Azide	Lead salt of hydrazoic acid; a primary high explosive, PbN_6
Lead B-Resorcylate	A platonising ingredient in double base rocket propellants. Alternative name: lead 2,4 dihydroxybenzoate
Lead Block Test	See Explosive Power
Lead dinitroresorcinate	Lead 2,4-dinitroresorcinate – a primary explosive
Lead mononitroresorcinate	A primary explosive
Lead Styphnate	Lead salt of 2,4,6-trinitroresorcinol. A primary high explosive. $\text{Pb}(\text{O}_2\text{C}_6\text{H}(\text{NO}_2)_3) \cdot \text{H}_2\text{O}$ particularly sensitive to initiation by spark
Lead Thiocyanate	A primary high explosive. $\text{Pb}(\text{C}_6\text{H}_2\text{O}_{10}\text{N}_3\text{Pb})$
Lead Trinitrophenol	lead 2,4-dinitroresorcinate – a primary explosive
LEEFI	Low Energy Exploding foil initiator detonators - EFI initiators which can reliably, safely and precisely operate at reduced firing voltages
Lethal Range	The range at which a fragment from a warhead has slowed down sufficiently to become sub-lethal
Life Cycle	A time-base description of the events and environments from manufacture to final expenditures or removal from the operational inventory. It includes one or more operational profiles and disposal or demilitarization
List I and II	Lists of substances in the EC Dangerous Substances Directive (74/464/EC)
Liquid Propellant	A substance or mixture of substances which is required to react in a combustion chamber in a controlled manner in order to generate propulsive force. These may be mono-propellants, bi-propellants or hybrids composed of liquids and solids
Loading Safety	The property of the ammunition and its constituent parts that enables the ammunition to be loaded into a weapon with the required level of safety
Logistic Storage	The long-term storage of items in depots, usually under

	controlled relative humidity conditions. For munitions this usually implies unarmed and in its logistic package
Logistic transportation	The transport of items to and between, and from storage depots to and from maintenance workshops
Lot	A quantity of munitions, munition components or explosives, each of which is manufactured by one manufacturer under uniform conditions and which is expected to function in a uniform manner. The lot is designated and identified by assignment of a serial number
Low Explosive	An explosive which does not detonate under normal conditions of use. The term is rarely used now because the compositions which it covers fall largely into the category of propellants
Low Order Detonation	A detonation in which the charge is completely consumed but the velocity of detonation is well below its maximum value and the effect is therefore less violent. This phenomenon is commonly associated with nitroglycerine explosives. It must be carefully distinguished from partial detonation
Lower Conditioning Temperature (LCT)	The temperature to which test items are stabilised for cold tests. This temperature is based on the climatic region that the testing nation and the using nation predict to be the worst case cold environment that the test item will encounter during storage and transportation
Lower Firing Temperature (LFT)	The temperature to which test items are stabilised for cold test firing. This temperature is based on the climatic region that the testing nation and the using nation predict to be the worst case cold environment that the test item will encounter during operations
LOVA	<u>L</u> ow <u>V</u> ulnerability gun <u>A</u> mmunition
LOX	Liquid Oxygen
LTEL	Long Term Exposure Limit - the maximum exposure permitted over an 8-hour period
Lung Oedema	Accumulation of excessive fluid in the lungs which can lead to interference with respiration
Lyddite	An alternative name for Picric Acid

M

Mach Reflection	The interaction of a reflected portion of a shock wave with an incident (unreflected) portion. Constructive interference produces a strengthened wave called the Mach Stem. In the ideal case the Mach Stem is perpendicular to the reflecting surface
MACR	Major Accident Control Regulations - applicable to any establishment storing or otherwise handling large quantities of industrial chemicals of a hazardous nature such as explosives or petrochemicals
MAF	"Mixed amine fuel" a packageable liquid fuel for a rocket bi-propellant system

Magazine	There are three definitions for this term; (1) Any storehouse or compartment that is authorised for storage of explosives and that is maintained under 'clean conditions'. (2) A feed bin forming part of a gun. (3) The container for an intermediate charge between the initiator and the main charge
Magnadet	A high safety system of electrical initiations in which the detonator circuit is activated by magnetic induction only when a high frequency alternating current is applied to a separate circuit
Main Charge	The charge which is provided to accomplish the end result in a munition, i.e. bursting a casing to produce blast and fragmentation, splitting a canister to dispense sub missiles or producing other effects for which it may be designed
Maintainability	The ability of an item, under stated conditions of use, to be retained in or restored to a specific condition when maintenance is performed by personnel having specified skills levels under stated conditions and using prescribed procedures and resources
Mandatory Data	Test and analysis results concerning safety, suitability for service and performance of a munition or an explosives which shall be provided to determine its acceptability for military use
Mandatory Test	Test deemed essential to produce adequate data for assessing the safety and suitability for service of a munition or an explosive material being considered for military application
Mannitol Hexanitrate	A primary high explosive. $\text{CH}_2\text{NO}_3(\text{CHNO}_3)_4\text{CH}_2\text{NO}_3$
MARPOL	International Convention for the Prevention of Pollution from Ships - MARPOL is short for marine pollution
Mass Burning Rate	The rate at which a burning propellant is converted into heat and gas – measured in grams per second
Material	Any equipment, stores, packaging and supplies used by the military forces
Maximum Operating Pressure (MOP)	For cannon systems, the Extreme Service Condition Pressure (ESCP) plus three standard deviations in pressure estimated during the cannon design phase
MDC	Miniature detonating cord
Mechanite	A series of double base propellants used in engine starter cartridges
Melt-out	Removal of the energetic material from the munition envelope by applying heat to the filler causing it to melt and flow out
MEMS	Micro Electro Mechanical Systems whose applications include actuators, igniters, detonators and safety arming units
Mercury Fulminate	Mercury (II) salt of fulminic acid. $\text{Hg}(\text{ONC})_2$. A primary high explosive
Mesonisation	The modification of the burning rate/pressure curve of a double base rocket propellant to achieve a falling burning rate over a range of pressure (a mesa or hump in the curve)
Metabolite	A product resulting from the biochemical breakdown of a

	substance after entry into the body
Methaemoglobin	Abnormal haemoglobin which has had the haem iron oxidised to the 3+ valency state
Methemoglobinemia	A condition caused by elevated levels of methemoglobin in the blood. Methemoglobin is a form of the oxygen-carrying metalloprotein haemoglobin
Methyl Centralite	Diphenyl dimethyl urea, used in gun propellants as a stabiliser/plasticiser/coolant or as a surface moderant
MIDAS	<u>M</u> unition <u>I</u> tems <u>D</u> isposition <u>A</u> ction <u>S</u> ystem – a US database system to aid the safe and environmentally acceptable disposal of munitions
Mie-Grüneisen	The Mie-Grüneisen equation of state is a relation between the pressure and the volume of a solid at a given temperature
Minol	Amonium nitrate + TNT + aluminium. Minol 1 is 42/48/10 and Minol 2 is 40/40/20. Both were naval explosives
Minolex	Minol with the addition of RDX
MIP	Molecularly imprinted polymers
Misfire	The situation where, on application of the firing pulse, the motor or propellant does not ignite.
Missile	A weapon or object to which self-contained propulsive energy is applied during flight
Mixed Acids	Variable mixtures of mixed nitric and sulphuric acids, also known as nitrating mixtures
MMH	Monomethylhydrazine – a hydrazine derivative used for rocket propulsion
Molar (or Universal) Gas Constant (R).	A constant which appears in the equation of state for a perfect gas, viz. $PV = RT$. Its value is the same for all gases
Molten Salt Destruction	The conversion of the organic constituents of the waste into non-hazardous substances such as carbon dioxide, nitrogen and water. Any inorganic constituent of the waste is retained by the molten salt. The destruction of the energetic materials is accomplished by introducing it together with oxidant gases into a crucible containing a molten salt such as sodium carbonate or a suitable mixture of carbonates, chlorides or sulphates of sodium, potassium, lithium and calcium
Monopropellant	A single liquid that burns in the absence of air to produce hot gas for propulsion purposes. Such propellants do not provide sufficient impulse to propel modern aerial missiles but can be used in their gas generator devices, they are also used for the underwater propulsion of torpedoes
Montreal Protocol	International treaty introduced in 1987 with the aim of phasing out the use of substances such as CFCs which were known to be responsible for depleting the Ozone layer
Mortar	A weapon system with a short barrel in proportion to its bore, rifled or smooth, for firing shells at high angles
Mortar Munition	The complete munition comprising projectile and propellant

	system to be fired from a mortar. The projectile normally comprises fuze, body filled with HE or other filling, obturator and tail fin. The propellant system normally includes a primary cartridge and augmenting charge(s)
Mott Equation	An equation to predict the way in which the metal casing of a cylindrical explosive charge will break up into fragments
MSER	The Manufacture and Storage of Explosives Regulations 2005 - now superseded by Explosives Regulations 2014
MSIAC	Munitions Safety Information Analysis Centre (NATO)
MT Fuze	Mechanical Time fuze in which the timing function is performed by a mechanical clockwork
MTV	Magnesium Teflon Viton – a composition used in infra-red decoy flares
Munition	A term used to indicate a complete device, e.g. missile, shell etc, charged with explosives, propellants, pyrotechnics, or initiating composition. Munitions may be used in connection with defence, offence, training or non-operational purposes, including mines and demolition stores. When used in an OB paper the term must be defined because of its wide meaning
Munroe Effect	A local concentration of shock wave energy produced by shaping the explosive charge
Mutagenicity	The ability to cause inheritable genetic alterations in organisms
Muzzle Velocity	The velocity of a projectile with respect to the muzzle at the instant the projectile leaves the weapon

N

Napalm	This term is defined as: (1) Powdered aluminium soap or similar compound used to gelatinise oil or gasoline for use in napalm bombs or flame throwers. (2) The resultant gelatinised substance
National Parks	The national parks of England and Wales are areas of relatively undeveloped and scenic landscape that are designated under the National Parks and Access to the Countryside Act (2016).
Natural Fragmentation	The munition case breaks up to produce fragments of a range of shapes and sizes
NC	Nitrocellulose – and ingredient of gun and rocket propellants with a chemical formula $C_6H_7(NO_2)_3O_5$
NCT	A single base propellant based on nitrocellulose (T – tubular)
NDED	Norwegian Defence Environmental Database
2 NDPA	2- nitro diphenylamine – a stabiliser for nitrate ester propellants
NENA	Nitratoethylnitramines – energetic plasticisers available as butyl-NENA, methyl-NENA and ethyl-NENA
Neonite	Propellant with a nitrogen content of 12.5% - known as “Nobels Rifle Neonites” NRN
New Explosive	The term 'new explosive' encompasses: (1) Any modification to an existing specification which defines the composition of the explosive, its material constituents or the process by which the

	composition in prepared. (2) An explosive of a type not hitherto Qualified. (3) The application of an explosive in a role (e.g. main charge filling, booster, primary, rocket motor propellant, gun propellant, illuminant, smoke pyrotechnic, etc.) for which the explosive has not already been Qualified
New Munition	A munition which differs from munitions accepted for use by NATO forces in terms of (a) design (definition in accordance with its full data package, material specifications, drawings, etc.); (b) the user's manual and other user instructions; (c) production definition (product processing, tooling, quality assurance); (d) acceptance testing; € use in a specified role (weapon systems, interface with joint elements) or (f) its life cycle profile and the resulting environmental profile
NG	See Nitroglycerine
NHTPB	Nitrated hydroxyl terminated polybutadiene – an energetic binder
NM	Nitromethane, CH_3NO_2 - capable of detonation if shocked by a good booster charge
Nitramine	The nitramine molecule is essentially an amine group ($-\text{NH}_2$) bonded to a nitro group ($-\text{NO}_2$).
Nitrate Ester	A nitrate ester is the organic functional group with the formula RONO_2 where R stands for any organic residue.
Nitrocellulose	Nitric esters of cellulose having a nitrogen content depending upon conditions of preparation
Nitroglycerine	Glyceryl 1,2,3-trinitrate, alternatively named propane-1,2,3-triyl trinitrate. Used as a secondary high explosive in some desensitised form, or as a propellant ingredient. $\text{CH}_2(\text{ONO}_2).\text{CH}(\text{ONO}_2).\text{CH}_2(\text{ONO}_2)$.
Nitroglycol (EGDN)	Ethyleneglycol dinitrate, a low-freezing liquid secondary HE. $(\text{CH}_2.\text{ONO}_2)_2$ Alternative name: Ethane-1,2-diyl dinitrate. In this country it is used in admixture with nitroglycerine in commercial explosives. In some other countries it is now used as a straight replacement for nitroglycerine, to which it is slightly superior in respect of performance
Nitromethane	Nitro-methane (CH_3NO_2) was an early monopropellant, also used as a bi-propellant
NMR	Nuclear Magnetic Resonance (NMR) Spectroscopy
No-Fire Threshold	The value of an electrical parameter of an EED at which its defined probability of functioning is low
No-Function Threshold	The value of a stimulus which, under specified conditions, is predicted not to cause a device or a component to function, with a stated probability
Nonel	A non-disruptive detonating cord which produces flash but little shock effect. It is used in commercial blasting operations and in rocket motor ignition systems
Non Permitted Explosive	An explosive which is not among those 'permitted' by HM Government for use in underground coal seams. It can, however, be used for any other blasting work provided it is on the Home Office List of 'authorised' explosives

Non-Renewable Resource	A resource which cannot be replenished naturally at a rate comparable to which it is being consumed. For example coal and oil
New Explosive	The term 'New Explosive' encompasses the following; (1) An explosive material not previously qualified, (2) An explosive material for which the existing specification defining its composition, its material constituents or the process by which the composition is prepared has been modified. An explosive material resulting from a change in manufacturer or manufacturing location. (3) An explosive material used in a role for which the explosive has not already been qualified, (4) An explosive material used in a role for which it has not yet been qualified
NQ	Nitroguanidine - an organic compound with the formula $(\text{NH}_2)_2\text{CNNO}_2$ used as a constituent of gun propellants
NRN	Nobels Rifle Neonites – see also Neonites
NSO	NATO Standardization Office
NTO	3-nitro-1,2,4-triazol-5-one – an explosive which is less sensitive to shock and heat than TNT and RDX

O

Obturation	The sealing of the chamber of a gun to prevent the hot propellant gas escaping from the rear of the gun on firing
Obturator	This can be defined in three ways: (1) A small malleable cup employed in pressure recording to prevent seepage of gas. (2) A sealing device used in the breach of certain guns. (3) A sealing device on a projectile to prevent gases escaping
Octogen	German name for HMX
Octol	US name for HMX + TNT in proportion 75/25
ODS	Ozone Depleting Substances
Oedema	Accumulation of large quantities of fluid
OEL	Occupational Exposure Limit, maximum concentration levels of a toxic substance in air which, under certain conditions, is considered acceptable for the exposure of industrial workers. (OELs are set by the United Kingdom Health and Safety Executive)
OME	Ordnance, Munitions and Explosives
ONR	Two definitions – (1) UK – Office of Nuclear Regulation (2) – US – Office of naval Research
Open Burning	The burning of explosives and munitions in the external environment, without the control of resulting emissions
Open Detonation	The detonation of explosives and munitions in the external environment, without the control of resulting emissions
Open-pit Burning	The destruction of material by burning in a pit, often made of concrete, so that the material to be burned is not placed directly on the ground
Operational	The total set of all external natural and induced conditions to

Environment	which a materiel is exposed during its operational life
Operational Life	The time during which materiel may be expected to remain safe and serviceable when used under service or training conditions, when these are different from its storage conditions, but is within the envelope of its life cycle
Optional Test	Additional test not required by the standard test requirements. Optional tests are usually performed during development, for instance to determine the margins of safety and the reliability of the design
Oral Toxicity	Toxicological effects produced as a result of eating or swallowing toxic substances
Ordnance	Any munition or weapon that discharges a projectile
OSPAR	<u>Oslo/Paris</u> Convention for the Protection of the Marine Environment of the North-East Atlantic
Out-of-Line Explosive Train	An explosive train in which the elements containing primary explosives are held out of line or physically interrupted until the safe separation distance has been reached
Overpressure	The pressure resulting from the blast wave of an explosion. It is referred to as 'positive' when it exceeds atmospheric pressure and 'negative' when during the passage of the wave the resulting pressures are less than atmospheric pressure
Oxidation	The loss of electrons by an ion. This process is widely used to treat wastes, common oxidants being chlorine or hypochlorites, potassium permanganate and hydrogen peroxide
Oxygen Balance	For an explosive containing the usual elements carbon, hydrogen, nitrogen and oxygen, it is the percentage by weight of oxygen, positive or negative, remaining after combustion, assuming that all the carbon and hydrogen is converted into carbon dioxide and water. Effectively it is the oxygen content of the explosive in relation to the content of fuel elements
Ozone Layer	A naturally occurring layer of gas positioned 15-25 miles up in the earth's atmosphere which protects the planet from harmful ultra violet rays from the sun

P

Partial Detonation	Ignition and burning of the confined energetic materials leads to non-violent pressure release as a result of a low strength case or venting through case closures (leading port/fuze wells, etc.). The case might rupture but does not fragment; closure covers might be expelled, and unburned or burning energetic material might be thrown about and spread the fire. Pressure venting can propel an unsecured test item, causing an additional hazard. No blast or significant fragmentation damage to the surroundings; only heat and smoke damage from the burning energetic material
Partial Ignition	An ignition from which subsequent burning fails to propagate throughout the sample. It would be more properly referred to an partial burning

PB	Poly(buta-1,3-diene), a synthetic elastomer used as a fuel/matrix in some rubbery composite rocket propellants. $[-CH_2-CH-CH-CH_2-]_n$. See CTPB and HTPB
PBAN	Polybutadiene acrylonitrile, a copolymer of PB. Used as a fuel/maxtrix in some rubbery composite rocket propellants
PBX	Polymer Bonded Explosive
PD Fuze	Point detonating fuze – located in the noze of a projectile, designed to function as a result of impact
PDN	Propane-1,3-diyl dinitrate, otherwise trimethylene glycol dinitrate, a propellant ingredient with high explosive properties. - $CH_2ONO_2.CH_2.CH_2.ONO_2$
PE	(1) Plastic explosive, q.v. British service plastic explosives are of various compositions each denoted by a numerical suffix, e.g. PE4, PE7. (2) Penta erythritol, the parent compound of PETN
Pellet	An increment of explosive charge pressed in a tool or die to a predetermined size and density. It is assembled into ammunition in this form. The term is also sometimes used for an inertia mass in fuzes
Pentolite	An explosive comprising a mixture of PETN and TNT, usually 50/50
Percussion Cap	A cap containing a composition which produces a flash when struck. The first component of an igniferous train. Percussion caps are used in the Services for a variety of stores, including small arms cartridges, mortar bomb primary cartridges, some cannon and artillery primers, grenade fuzes, pyrotechnic stores and thermal batteries, also seat ejection and canopy jettison systems for aircraft
Percutaneous Toxicity	Toxicological effects produced as a result of penetration of substances through the skin
PERME	Propellants, Explosives and Rocket Motor Establishment
Permitted Explosive	An explosive which is specifically 'permitted' by HM Government for use in underground coal seams. Permitted explosives are characterised by a high ammonium nitrate content, low explosion temperature and low detonation velocities and are safe in flammable atmospheric conditions
PES	Potential Explosive Site - any stock of explosives, however or wherever stored (building, stack, vehicle, railway wagon, berth, transit shed etc), the explosion of which will affect an Exposed Site
PETN	Pentaerythritoltetranitrate – a high explosive used in exploder pellets and as an additive to other explosives. Chemically, it is a nitrate ester
PGDN	Propylene glycol dinitrate - a major constituent (76 %) of OTTO Fuel II used as a torpedo propellant

Phlegmatisation	The desensitisation of an explosive by mixing a soft or viscous substance with it, e.g. waxes, grease, oils, polymers. Such additives are called phlegmatisers
Photocatalytic Neutralisation	The use of a light emitting source to render an energetic material inactive or ineffective
Phytoextraction	Uptake and concentration of the contaminants from soil and water into plant biomass
Phytotransformation	Explosives are transformed as a result of the plant metabolism, leading to the formation of a less toxic product, degradation, or immobilization
Phytostimulation	Introduction of a plant that has got micro-organisms living in the root zone of the plant able to degrade the explosives.
PIB	Polyisobutene (or-butylene). $[-CH_2-C(CH_3)_2-]$. A viscous synthetic polymer used as a fuel/matrix in some plastic rocket propellants, also as a matrix in some plastic high explosive compositions
Picric Acid	2,4,6 trinitrophenol – also known as Lyddite
Picratol	US name for ammonium picrate + TNT 52/48
Plain Detonator	A demolition detonator designed to be initiated by means of safety fuze, as distinct from the electric type
Plastic Explosive	Explosive which is malleable at normal temperatures
Platonisation	A substance (certain lead or copper compounds) added to propellants to produce an alteration in the burning rate/pressure curve making the burning rate virtually independent of pressure within a given range
Plastic Propellant	A thermoplastic fuel/binder and an oxidant - ammonium perchlorate. The usual fuel/binder was polyisobutene (PIB): sometimes, with the addition of ethyl oleate as a plasticiser to improve the low temperature mechanical properties
PMMA	Polymethylmethacrylate - also known as acrylic or acrylic glass as well as by the trade names Plexiglas, Acrylite, Lucite, and Perspex, is a transparent thermoplastic
PN	(Porton Number followed by a numeral), a series of British service pyrotechnic compositions
pNMA	N-methyl-4-nitroaniline - a stabiliser for nitrate ester propellants
PNS	Peripheral Nervous System, that part of the nervous system which is not included in the CNS
POEMS	Ministry of Defence project Oriented Environmental Management System – used to identify the principal environmental impacts arising from the undertaking of activities using equipment throughout its life cycle
Polyisoprene	A synthetic polymer used as a matrix for plastic rocket propellants. Poly(2 methyl buta 1,3 diene)
Polymer Bonded Explosive (PBX)	A high explosive in which the solid ingredients e.g. the nitramines and/or ammonium perchlorate are embedded in a polymer matrix
Polymorphs	Forms of a substance chemically identical but with different crystal structures and X ray patterns
Poly-NIMMO	Poly-3-nitratomethyl-3-methyloxetane – an energetic binder

POMSTER	2.2.7 Placing on the Market and Supervision of Transfers of Explosive Regulations 1993 - mainly concerned with safety requirements for explosives and security controls on their transfer. They apply to explosives intended for use in the civil sector
POP	The POP plot, named after Alphonse Popolato, relates the distance-of-run to detonation versus initial shock pressure. It is a key characterization of shock initiation in a heterogeneous explosive
Potassium picrate	$C_6H_2KN_3O_7$; $C_6H_2(NO_2)_3OK$ - Potassium picrate is somewhat shock-sensitive. In contact with flame it deflagrates. If ignited in confined space, it will detonate.
Power	See Explosive Power
Pollution	The introduction of a substance to air, water or land that has the potential to cause harm to the environment. Oil, chemicals and litter are all examples of potential pollutants
Precautionary Principle	This means that there is a moral and sometimes legal obligation to take action if it is found that there could be a small risk that an activity could cause harm to the environment or to people.
Pre-formed Fragmentation	The munition case contains balls, cubes or rods to produce solid fragments with approximately the same characteristics
Premature Functioning	Complete or partial functioning of a munition payload after launch or emplacement at a moment or place prior to the intended fuze functioning before the intended point of operation of the fuze as foreseen by the time setting, proximity sensor function, pressure rise, etc.
Pressure of Combustion (or of Explosion)	The maximum static pressure produced when a given weight of high explosive or propellant is burned, without detonating, in a closed vessel of given volume. It should not be confused with detonation pressure which has a much higher value
Primary Charge	The intermediate charge used to augment the impulse from the primer to a magnitude sufficient to ignite the following element of the explosive train
Primary Explosive	Primary Explosives are sensitive formulations or compounds such as Lead Azide or Lead Styphnate which are used to initiate detonation or deflagration
Primary Fragments	Those fragments produced by a munition, whether the case or another component
Primer	The term Primer has the following three definitions: (1) In a gun cartridge it is the explosive device containing a cap and a charge of pyrotechnic or other flame producing material which ignites the propellant charge. (2) The term is sometimes used for the percussion cap of a small arms cartridge. This usage introduces an element of ambiguity when compared with (1) above, in which the cap is only part of the primer assembly. (3) The term is loosely used to describe any component of a disruptive explosive train which is interposed between the detonator and the main charge

Propellant	An explosive (in the broad sense) used to propel a projectile or missile, or to do other work by the expansion of high pressure gas produced by burning, e.g. for starting engines
Proximity Fuze	A fuze wherein initiation occurs by detecting the presence and/or the position of a target by means of a signal emitted by the fuze or by the target
PTFE	Polytetrafluoroethylene (C_2F_4) _n - a synthetic fluoropolymer of tetrafluoroethylene. The best known brand name of PTFE-based formulas is Teflon
PU	Polyurethane – used as a binder in composite propellant and other applications
Pulmonary	Relating to the lungs
PVA	Polyvinyl acetate is an aliphatic rubbery synthetic polymer with the formula $(C_4H_6O_2)_n$. It belongs to the polyvinyl esters family
PVC	Polyvinylchloride $(C_2H_3Cl)_n$ - produced by polymerization of the vinyl chloride monomer
Pyrotechnic	A substance or mixture of substances which when ignited undergoes an energetic chemical reaction at a controlled rate intended to produce on demand and in various combinations, specific time delays or quantities of heat, noise, smoke, light or IR radiation
Pyrotechnic Delay	A pyrotechnic device added to a firing system which transmits the ignition flame after a predetermined delay
Pyrotechnic train	An explosive train beginning with the igniter and terminating in a pyrotechnic or propulsive main charge
Pyromechanism	A mechanical device that is capable of releasing energy stored in a chemical composition and harnessing this energy to perform useful mechanical work or to create particular mechanical effects
Pyrophoric	liquids and solids that have the potential to spontaneously ignite in air at temperatures of 130 °F (54 °C) or below
Pyrotechnics	Materials capable of undergoing self-contained and self-sustained exothermic chemical reactions for the production of heat, light, gas, smoke and/or sound

Q

Q	Heat of explosion - the heat liberated under adiabatic conditions
QF (Gun)	Originally stood for Quick Firing but now describes a system of rear obturation in which sealing is achieved by a cartridge case, which expands against the chamber of the gun. Ignition of the propellant is by means of a primer in the base of the cartridge case
Qualified Explosive	An explosive is qualified when it has been assessed by the National Authority and adjudged to possess properties which

Quickness	make it safe and suitable for consideration for use in a particular role (e.g. as a main charge filling, a booster, propellant, gun propellant, illuminant, pyrotechnic, etc.) A measure of both the pressure generated in a confined space by a propellant, of given composition and grain shape, and the rapidity with which the pressure is produced. Effectively the product of force constant and vivacity
QRA	Quantitative Risk Assessment - can be used for many explosive risk applications. It is especially useful for site risk analysis when reliance on quantity distance (QD) tables is not feasible

R

RACK-A-ROCK	A former US blasting explosive consisting of nitrobenzene and potassium chlorate. The name is still used today for a similar mixture improvised by terrorists
RADHAZ	Radio and Radar radiation hazards –the risk of inadvertent ignition of electro-explosive devices and inflammables, injury to personnel or malfunction of safety critical electronic systems resulting from exposure to electromagnetic radiation environment in the frequency range emitted by radio and radar installations
Raman	Raman (named after Sir C. V. Raman), is a spectroscopic technique used to observe vibrational, rotational, and other low-frequency modes in a system. Raman spectroscopy is commonly used in chemistry to provide a structural fingerprint by which molecules can be identified
Ramjet	A jet propulsion engine containing neither compressor nor turbine which depends for its operation on the air compression accomplished by the forward motion of its engine
Rankine–Hugoniot	The Rankine–Hugoniot conditions, also referred to as Rankine–Hugoniot jump conditions or Rankine–Hugoniot relations, describe the relationship between the states on both sides of a shock wave in a one-dimensional flow in fluids or a one-dimensional deformation in solids
RARDE	Royal Armament Research Development Establishment
Rate of Burning	This term is defined as follows: (1) The rate of regression of the burning surface of an explosive, usually a propellant grain, under given conditions of pressure and grain temperature. Sometimes referred to as the 'linear rate of burning' in the geometrical sense but not the algebraic sense. (2) The rate of consumption of a burning explosive, usually a propellant or bipropellant combination, in terms of mass per unit time
Rate of Fire	The number of rounds fired per weapon per minute or per second
RATTAM	<u>Response to Attack of Ammunition</u> - The "RATTAM SCALE" quantifies the characteristics of magazines and ordnance e.g. in surface ships and tanks, when subjected to small arms or

	fragment attack
REACH	European Union regulation concerning the Registration, Evaluation, Authorisation and restriction of Chemicals that came into force on 1st June 2007
RD	Research Department - a series of materials, explosive or otherwise, which may be found in British service ammunition, each member of the series having a separator numerical suffix
RDX	Research Department Explosive - RDX is the organic compound with the formula $(O_2NNCH_2)_3$. Chemically, it is classified as a nitramine
Reaction Zone Thickness	The distance between the shock front and the Chapman Jouguet surface in a detonation wave
Recovery	The process of extracting serviceable and economically repairable components and material from excess or surplus munitions
Recycling	The re-use of materials recovered from a munition
Reduced Smoke Propellants	Reduced smoke propellants use nitramines (RDX and HMX) with hydroxyl-terminated polybutadiene or polyurethane as a binder. They have no aluminium and a low AP content
Renal	Relating to the kidneys
Resorcinol	1,3 dihydroxy benzene, the parent compound of several primary explosives
Render Safe	To bring an armed munition to a non-armed condition
Resource Depletion	An economic term meaning the exhaustion of a raw material or use of a resource faster than it can be replenished
Response	An observed reaction of a test specimen to an imparted stimulus, for example, fracture, detonation, deformation, penetration, arming, etc.
Respiratory Toxicity	Toxicological effects produced as a result of absorption of substances via the lunge and respiratory tract
Response Descriptors	Classification of reactions resulting from unwanted initiation of a munition, based on the effect on the environment of the munition. The types of reactions are: propulsion and type I,II,III, IV and V
Reuse	The alternative use of a munition or its components, for instance change from operational to training use
RF Hazard (RADHAZ)	The danger of the accidental initiation of an electro explosive device by radio frequency electromagnetic radiation
Risk	The combination of the frequency, or probability, and the consequence of a mishap
Risk Analysis	The systematic use of available information to identify hazards and to estimate the risk to individuals or populations, property or the environment
Risk Assessment	The overall process of risk analysis and risk evaluation
Risk Control	Process, the purpose of which is to determine the status of each individual risk throughout a programme. The principal activities involved in this process are the drafting of specifications and risk identification, assessment, reduction and acceptance

Risk Estimation	The process used to produce a measure of the level of being analysed. Risk estimation consists of the following: frequency analysis, consequence analysis and their integration
Risk Evaluation	The process by which judgements are made on the tolerability of the risk on the basis of risk analysis and taking into account factors such as socio-economic and environmental aspects
Risk Management	The systematic application of management policies, procedures and practices to the tasks of analysing, evaluating and controlling risks
Rocket Propellant	Substance or mixture of substances which is required to burn in a controlled manner within a rocket motor producing hot gases which are vented through a nozzle to propel the munition
Rotter Impact Test	An empirical test to determine the sensitiveness of a given explosive to mechanical impact, in this case a falling weight. An important part of hazard assessment. Results are calculated as a Figure of Insensitiveness (F of I)
Round	All the parts that make up the ammunition necessary in firing one shot
RP	Red phosphorus

S

SAA	Small Arms Ammunition
Sabot	Lightweight carrier in which a sub-calibre projectile is centred to permit firing the projectile in a larger calibre weapon. The carrier fills the bore of the weapon from which the projectile is fired; it is normally discarded a short distance from the muzzle. The large area of the sabot relative to the penetrator allows the propellant gases to impart greater energy to the round in the gun
Safe And Arming Device	A mechanism whose primary function is to prevent an unintended detonation and in turn allow the explosive train of the munition to function after the munition has reached the proper point in time or space
Safe Separation	The places or area where the risks to personnel are acceptable, with regard to the intentional or accidental function of a weapon or a munition, and the protection provided
Safe Separation Distance	A minimum distance between the delivery system or launcher and the armed munition beyond which the risks of functioning of the munition to personnel and the launch platform or delivery system are acceptable
Safety and Suitability for Service (S3)	A general term used to summarise the requirements for a munition to be acceptably free from hazards and to have inherent characteristics that meet specified requirements during its agreed life cycle. It does not include operational effectiveness
Safety Barrier	Material or procedure designed to interrupt or modify a feared potential event, in order to reduce the probability or gravity of the event

Safety Critical	Characterisation of a condition, event, function, operation, process or item of a system whose proper recognition, control, performance or tolerance is essential to system safety during any phase of its life cycle
Safety Critical Function	A function in which any failure will result in a potential unacceptable risk to the user, friendly forces, the system, other materiel, third parties or the environment
Safety Critical System	A system in which a failure will result in a potential unacceptable risk to the user, friendly forces, the system, other materiel, third parties or the environment
Safety Feature	An element or combination of elements which prevent unintentional arming and unintentional detonation
Safety Fuze (Bickford Fuze)	Flexible tube for the transmission of flame in an explosive train; commonly used to provide a delay of seconds or minutes in blasting or demolition operations. It comprises a gunpowder core in a flax or jute tube covered by bitumen or PVC
SAU	Safe and Arm Unit (or Safety and Arming Unit)
Scaled Blast Parameters	The blast effects of different explosions can be compared by scaling down the measurements of distances and pressure duration times. These are divided by the cube root of the charge weight, thus comparing parameters on the basis of unit weight of explosive
SCB	Semiconductor bridges – used in initiators with improved safety characteristics; The current pulse required to function SCBs is a unique signal preventing their accidental functioning.
SDS	Safety Data Sheet
SDT	Shock to detonation transition
Sealed Vessel	A strong steel vessel in which high explosives are ignited electrically to test their explosiveness
SEAP	“Self-extinguishing at ambient pressures” – a desired characteristic of caseless ammunition
SEC	Size Exclusion Chromatography
Secondary Explosive	An explosive which can be made to detonate when initiated by a detonation wave or other shock front but which does not normally detonate when heated or ignited
Secondary Fragments	Fragments coming from the material surrounding, but not part of, an explosive device
Secure Cargo Munition	Any munition which is firmly attached to the vehicle structure with or without anti-vibration mounts or isolators, but which will be removed or launched from the vehicle at some stage
Self Destruction	Automatic destruction of an explosive charge in a munition that did not or will not complete its mission as intended
Semi-Conductor Bridge (SCB) Initiator	An electro-explosive device containing a bridge which, when subjected to a pulse of electrical energy, produces a plasma discharge initiating an explosive with which it is in contact
Semtex	A series of Czechoslovakian explosives. Often refers to Semtex E, a plastic explosive based on PETN and RDX
Sensitisation	In the context of toxicology an enhanced effect, caused by previous exposure to a substance, which is produced on re

	exposure
Sensitise	To increase the sensitiveness or the sensitivity of an explosive
Sensitiveness	A measure of the minimum level of a prescribed stimulus, relevant to an accident situation, required to ignite or initiate an energetic material. Such stimuli include, among others, impact, friction, and electric spark
Sensitivity	A measure of a prescribed stimulus required to achieve reliable functioning of an energetic material in its designed mode.
SEPA	Scottish Environment Protection Agency - Scotland's environmental regulator
Septum	An item in an explosive train usually providing environmental sealing
Service Environment	The total set of all external natural and induced conditions to which an item or a materiel is expected to be exposed throughout its service life
Service Life	The time during which materiel, in specified storage conditions and when subsequently used in its specified operational and/or training conditions, may be expected to remain safe and serviceable
Service Life Cycle	A time-based description of the events and environments an item experiences from manufacture to final expenditures or removal from the operational inventory, to include one or more mission profiles, but not disposal or demilitarisation
Set-back	The inertial forces acting upon the contents of a projectile due to its being accelerated in a gun barrel
SFG	Sulphur-less Fine Grain gunpowder composition used as a primer
SGV	Soil Guidance Value - developed by DEFRA and the Environment Agency as indicators of potentially unacceptable toxicity risk
Shaped Charge	A charge shaped so as to concentrate its explosive force in a particular direction (see Hollow Charge)
Sheet Explosive	Plastic explosive provided in a sheet form
Shell	A hollow projectile filled with HE or other material, fired from a gun, cannon, howitzer or recoilless gun. Mortar fired projectiles are called shell (US) or bomb (UK)
Shell, High Explosive Anti-Tank (HEAT)	A shell used primarily for armour penetration, incorporating a shaped charge, which on detonation causes penetration of armour plate by means of a jet of metal and gas having a highly directional effect
Shell, High Explosive Squash Head (HESH)	A shell used primarily for attack of armour. It contains a high explosive filling and a base fuze which is operated by the shell hitting the target. The shell is designed to detonate when the HE is in contact with the target. The shock wave causes the rear face of the armour to scab (US term: High Explosive Plastic)
Shock Front	A discontinuous change in the pressure and other parameters of a medium. This change is propagated at supersonic speed
Shock to	Phenomenon of the transformation of a mechanical shock into a

Detonation Transition (SDT) Shock Wave	detonation A shock front together with its associated phenomena. It can be transmitted through all kinds of matter and can be generated by explosive or other means
Shock Tube	A flexible plastic tube of which the internal surface is covered by a thin layer of explosive and applied as a means of transmission in an explosive train
Shutter	A safety device in an explosive train for isolating the initiating explosive
Shuttered Fuze	A fuze in which a component, usually the detonator, is held out of line in a shutter from the initiating explosive train until the fuze senses the design environment allowing it to arm
Silver Azide	Silver salt of hydrazoic acid, a primary high explosive, AgN_3
Silver Fulminate	(CNO)Ag - the highly explosive silver salt of fulminic acid
Silvered Vessel	A special type of Dewar vessel for testing the stability of nitrate ester propellants when maintained at elevated temperatures for longer periods. May also be used to assess the compatibility of the propellants with other materials
Single Base Propellant	A class of propellants comprising nitrocellulose without nitroglycerine (or equivalent), plus small amounts of stabiliser, surface coating, etc
SLA	Service Lead Azide
Slapper Detonator	See Exploding Foil Initiator (EFI)
Slurry Cast Double Base Propellant	In the slurry casting process the solid ingredients, which may include a nitramine or ammonium perchlorate in addition to granular nitrocellulose are added to a liquid plasticiser
Slurry Explosive	A type of blasting explosive developed in recent decades, with advantages of cheapness and low accident risk. It consists largely of solid ammonium nitrate suspended in a gelled, saturated, aqueous solution of same, with a wide range of possible fuels and other ingredients.
SOLAS	Safety of Life at Sea - International Maritime Organisation (IMO) Convention that requires vessels and craft to carry distress pyrotechnics on-board
Solar Radiation	The infra-red, visible and ultraviolet radiation from the sun. Solar radiation beyond these spectra is not usually considered to be relevant to munitions
Specific Heat Capacity	See Heat Capacity
Specific Impulse	The time integral of the thrust produced in a rocket motor by unit mass of propellant (or of bipropellant combination). It can also be defined as the thrust per unit mass rate of burning of the propellant. The specific impulse is, ideally, a constant for a given propellant (or combination) and is an important performance parameter
Specific Surface	The ratio of the surface area of a solid object (e.g. a gun propellant grain) to its nett volume. It is measured in cm^{-1}

SPR	Source-pathway-receptor pollution linkages concept. It describes how a contaminant can enter the environment from a source and move through the environment by air, soil or water (pathway) to a receptor
Springall Roberts Rules	A set of empirical rules indicating the composition of the gases produced by high explosives detonating under heavy confinement
SPTA	Salisbury Plain Training Area
SQEP	Suitably Qualified and Experienced Personnel
Squib	A small electro explosive device for producing a rapid evolution of a gas to power a mechanical device or for igniting a pyrotechnic
SR	Superintendent Research Composition – a pyrotechnic composition designation used at RARDE Fort Halstead
SSSI	Site of Special Scientific Interest – a piece of land given statutory protection owing to its biological (habitats and species) and/or geological interest being of national importance. An Environmental Impact Assessment is more likely to be required for planning applications proposed within or near to an SSSI.
STANAG 4170	Standard NATO Agreement - Principals and methodology for the qualification of explosive materials for military use.
Stabiliser	A substance which prevents or reduces autocatalytic decomposition of explosives
Stand-off	The distance of a shaped explosive charge from a target at the instant of detonation. In general there is an optimum value at which best performance is achieved
Statutory Instruments	Statutory Instruments, also known as SIs, are a form of legislation which allows the provisions of an Act of Parliament to be subsequently brought into force or altered without Parliament having to pass a new Act. They are also referred to as secondary, delegated or subordinate legislation
STEL	Short Term Exposure Limit - the acceptable average exposure over a short period of time, usually 15 minutes
Stemming	There are two definitions: (1) An explosive filling which has been loaded in increments. (2) Inert material such as clay or sand used to close a loaded shot hole during rock blasting
Sterilisation	A process that renders a munition permanently incapable of being initiated or activated
Stimulus	The applied energy or power such as current, voltage, mechanical impact, friction or any other physical phenomenon such as (rate of) change of current or pressure which is capable of initiating directly or indirectly an explosive event
Stimulus Level	The value of a test variable imparted to an individual item or test unit
Stoichiometry	The relationship between the relative quantities of substances taking part in a reaction or forming a compound, typically a ratio of whole integers
Storage	The deposit of munition in a covered or uncovered enclosure, awaiting transportation to or from operational theatres or direct

	use. Normally the munition is stacked in its logistic package and ideally in a controlled environment
Storage Environment	The total set of all external natural and induced conditions to which a materiel is exposed during its storage life
Storage Life	The time for which an item of supply, including explosives, given specific storage conditions, may be expected to remain serviceable and safe
Stored Energy	The latent energy within a (sub)system which, when triggered, is released to perform a function. Examples include springs under load, batteries, charges capacitors, compressed gas devices and explosive actuators
Strand Burner	A device for measuring, experimentally, the rate of regression of a length of propellant, burning endwise at a fixed pressure
Subcutaneous Toxicity	Toxicological effects produced as a result of introduction of a substance directly underneath the skin
Surface Launched Munition (SLM)	Any munition containing explosives which is launched from the ground or sea surface
Surface Moderant	An additive applied to the surface of some gun propellants to reduce the burning rate in the early stage of combustion
SX	Sheet explosive, in British service nomenclature
Sympathetic Detonation	The detonation of an explosive substance or of an explosive device as the direct result of another detonation. The term is normally used in accident situations. Strictly speaking, the term should be used for initiation by shock wave only
Sympathetic Reaction	Explosive reaction of a munition by exploding another munition adjacent to it
Synergism	Co-operative action of two or more substances such that the total physiological effect is greater than would be expected for the sum of the individual effects acting independently
System Safety	The capability of a system to avoid causing personal injury or damage to property or the external environment

I

Tactical Storage	The storage of an item for a limited period of time under field conditions. It denotes storage in ammunition depots or readying sites located adjacent to bases, in naval vessels, and, on land, deployment areas, usually without any kind of controlled environment
Tactical Transportation	Transport of items in field conditions from depot storage to bases, naval supply vessels, deployment areas, etc. The concept includes short transport of items within and between these sites
TAGN	Triaminoguanidine nitrate, a constituent of some experimental US gun propellants
TAT	1,3,5,7-tetraacetyl-1,3,5,7-tetraazacyclooctane – a non-energetic intermediate in the production of HMX using Dinitrogen Pentoxide as the nitrating agent

TATB	Triaminotrinitrobenzene (2,4,6-triamino-1,3,5- trinitrobenzene) – an explosive which is extremely insensitive to accidental stimuli
TATP	Triacetonetriperoxide – a white powdery solids which is extremely sensitive to shock, friction, electrostatic spark and flame
TCD	Thermal conductivity detector
T&E	Test and Evaluation
TEGDN	Triethylene glycol dinitrate - an energetic plasticiser for explosives and propellants
Temperature Of Ignition	The temperature at which an explosive ignites under specified conditions. This is affected by Heating Rate and Mass
Temperature Coefficient	The variation per °C with respect to chamber pressure or muzzle velocity
Terahertz Radiation	Terahertz radiation also known as sub-millimetre radiation and T-waves lies in the far infra-red region from 0.1 to 10 THz. Most explosives and explosive related compounds have spectral fingerprints within this range, hence the technique's use in explosive detection
Test Configuration	A detailed description of the test item state during the test, for instance package mode or unpackaged, operating or not, environmental conditions, interfaces with associated equipment, fixation and orientation on test equipment, measurement points and eventual modifications for safety (e.g. replacement of explosives with inert material)
Test Directive	In Staff Requirements this is a documented set of requirements including a requirement to conduct tests and the objectives of the tests
Test Method	A document describing the requirements for the execution of a type of test and its objectives. It comprises modes of execution, sequences, parameters, configurations, equipment, data collection and treatment, and potentially criteria for acceptance with regard to the objectives of the test
Test Plan	A document describing the tests to be executed required to meet the objectives defined in the test directive. Included are: identification and quantities of the munition to be tested, reference to or description of the test methods, the test sequences, the values of the test parameters (severities), personnel and equipment needed, procedure for disposal of explosives remainders, data collection and treatment and the criteria to meet the requirements
Tetrazene	(1-5' tetrazolyl)-3-guanyltetrazene monohydrate. A primary high explosive used as a sensitising ingredient in primary compositions
Tetryl	2,4,6-Trinitro-phenylmethylnitramine – used as a booster explosive. Also known as Composition Exploding (CE)
TFA	Trading Fund Agency - an executive agency, government department or often simply a part of a department, that enables the department to handle its own revenues and expenses

	separately from overall government finances and more like a business, as opposed to having to obtain funding from the government's legislature and feeding income back into its treasury. The UK Hydrographic Office is a TFA within MOD
Tg	Glass Transition Temperature - the temperature at which a polymer turns from a ductile material to a hard, brittle material
TGA	Thermogravimetric analysis - a method of thermal analysis in which changes in physical and chemical properties of materials are measured as a function of increasing temperature (with constant heating rate), or as a function of time (with constant temperature and/or constant mass loss)
Thermal Explosion	Explosion resulting from a runaway exothermic reaction in an explosive charge in a region where heat is liberated more rapidly than it can be transferred away
Thermal Time Constant	In the context of electro-explosive devices, the time taken for the bridge-wire, the film or the conducting composition to reach 63% of the equilibrium temperature when a specified constant power is applied to the terminals of the device
Thermite	Fuel oxidant mixtures comprising metal/ metal oxide combinations
Time Fuze	A fuze designed to initiate a munition at a desired time after launch, release, drop, impact or emplacement
TLB	Top Level Budgetary area within the MOD
TLC	Thin Layer Chromatography
TLV	Threshold Limit Value
TMDI	(or TDI) Trimethyl hexamethylene di-isocyanate. Used in the production of some plastic-bonded explosives
TMETN	2-methyl-2-[(nitroxy) methyl] – propane – 1,3-diyl dinitrate ester, a propellant ingredient
TNB	2,4,6-Trinitrobenzene, $C_6H_3(NO_2)_3$, a secondary high explosive
TNC	Tetranitrocarbazole $C_{12}H_5N_5O_8$ - used in the Anti-riot Irritant CS Hand Grenade L13 as delay composition
TNT	Trinitrotoluene or more specifically 2,4,6-trinitrotoluene, is a chemical compound with the formula $C_6H_2(NO_2)_3CH_3$
TNT Equivalent	A measure of the energy released from the detonation of a nuclear weapon, or from the explosion of a given quantity of fissionable material, in terms of the amount of TNT (trinitrotoluene) which could release the same amount of energy when exploded
Torpex	Mixtures of RDX, TNT, and aluminium, used as fillings for aircraft bombs and underwater weapons: wax is also used in some of these compositions
Toxicity	Degree of poisonousness
Tracer	Pyrotechnic element enabling optical tracking of the trajectory of a projectile
Triple Base Propellant	A class of gun propellants comprising nitrocellulose, nitroglycerine and nitroguanidine (picrite), the latter ingredient providing a reduction of gun flash compared with other types of propellant

Tritonal US name for TNT/aluminium 80/20

U

Underwater Launched Munition (ULM)	Any munition that is ejected, propelled, released, placed or otherwise launched in an underwater environment
UDMH	Unsymmetrical dimethylhydrazine, a rocket bi-propellant. It has the advantage over hydrazine that it has a much lower freezing point; -57 °C as compared with +2 °C. A mixture of hydrazine and UDMH has been used as a liquid bi-propellant fuel
Urea Nitrate	$\text{CH}_5\text{N}_3\text{O}_4$ - Urea nitrate is a fertilizer-based high explosive that has been used in improvised explosive devices in Afghanistan, Pakistan, Iraq, and various other terrorist acts elsewhere in the world
UNDEX	An underwater explosion
Unsafe Area	Surroundings of a weapon system, the trajectory of launched munitions and the areas where the munition payload could function, wherein the risks for friendly personnel and materiel are unacceptable
Upper Conditioning Temperature (UCT)	The temperature to which test items are stabilised for hot tests. This temperature is based on the climatic region that the test nation and the using nation predict to be the worst case hot environment that the test item will encounter during storage and transportation
Upper Firing Temperature (UFT)	The temperature to which test items are stabilised for hot test firing. This temperature is based on the climatic region that the test nation and the using nation predict to be the worst case hot environment that the test item will encounter during operations
UXO	<u>Un-exploded Ordnance</u>

V

Vasoconstrictor	Substances that induce a narrowing of the blood supply vessels
Vasodilator	Substances that induce a widening of the blood supply vessels
Velocity of Detonation	This is the speed at which a detonation wave progresses through an explosive. When, in a given system, it attains such a value that it will continue without change, it is called the stable velocity of detonation for that system
VH2	'Von Hertz' mixture for percussion caps, consisting of lead styphnate, barium nitrate, antimony sulphide, calcium silicide and lead peroxide, sensitised with tetrazene. VH4 is somewhat similar but contains no calcium silicide or lead peroxide
Vibration	A state of oscillatory motion induced in a body or mechanical system by an input of mechanical energy. This input may in

	itself be oscillatory or in the form of a shock pulse or a succession of shock pulses
Vieille's Law	Defines the relationship between the rate of regression (r) in a burning propellant and the rocket motor chamber pressure (P _c). The relationship is expressed as $r = a P_c^n$
VITON	Viton is a brand of synthetic rubber and fluoropolymer elastomer used in Magnesium Teflon Viton (MTV) infra-red decoy flares
Vivacity	The way in which a gun propellant charge, of given composition and grain dimensions, behaves in respect of its mass burning rate during combustion under adiabatic conditions. Experimental determination is necessary and employs the closed vessel
VOCs	Volatile organic compounds - contaminants such as petroleum products (e.g. jet fuel, refinery wastes, diesel, some insulation materials, and paint)
VoD	Velocity of Detonation of an explosive charge

W

Waiver	In the context of qualification of a munition, acceptance by the appropriate accredited acceptance authority of a munition which does not meet all requirements for safety
Warhead	That part of a missile, torpedo, rocket or other munition which contains either the nuclear or thermonuclear system, high explosive system, chemical or biological agents or inert materials intended to inflict damage
Washout	The use of an agent such as hot water, solvent or cryogenic dry wash to remove energetic material from a munition without destruction of the case metal
Waste	Any substance or object that the holder discards, or intends, or is required to discard. This includes waste sent for recycling even if it is sold to the recycler
Water Jet Cutting	The use of a high pressure water jet to cut a variety of materials. If abrasive is entrained into the water jet, the method is called abrasive water jet cutting
WEL	Workplace Exposure Limit – under the COSHH regulations employers have a duty to ensure that their employees are not exposed to any concentration of substance in excess of the Workplace Exposure Limits for that substance
WM	“Waltham Abbey Modified” - a propellant with a nitrogen content of 12.9% to 13.1%
WOME	Weapons, Ordnance, Munitions and Explosives
Woolwich Process	A process for the manufacture of RDX by nitrating hexamine with nitric acid
WP	White phosphorus

X

XDT

See Explosion to Detonation Transition

XRF

X-ray Fluorescence spectroscopy – used in the detection of explosives

Y

Y

(Used in detonator nomenclature), tetryl

Z

Z

(1) Used as a suffix in propellant nomenclature,

(2) Used in detonator nomenclature, lead azide.

ZND

Zeldovich-von Neumann-Doering - a one-dimensional model for the process of detonation of an explosive