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3. AASTP-2 (Edition 1) contains only factual information. Changes to these are not subject to the ratification procedures; they will be promulgated on receipt from the nations concerned.

A. GRØNHEIM
Major General, NOAF
Chairman, MAS

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PREFACE

1. *Purpose*

To assemble in one document the essential instructions required for national and international transport of military ammunition and explosives in all modes of transport.

2. *Content*

This manual comprises 6 parts, the first giving the general principles applicable to all modes of transport and each subsequent part detailing requirements for specific modes of transport, i.e. road, rail, air, sea and inland waterways.

3. *Authority*

This Manual was drawn up by the Transportation Sub-Group of the "Group of Experts on the Safety Aspects of Transportation and Storage of Military Ammunition and Explosives (AC/258)".

4. *Basis of the Manual*

The Manual is based on[1] and supersedes:

- AC/258-D/288 dated August 1979
  (Road Transport) + corrigendum No. 7
- AC/258-D/289 dated September 1979
  (Ships and Harbours) second edition
- AC/258-D/290 dated October 1979
  (Air Transport) second edition + corrigendum No. 5
- AC/258-D/291 dated April 1983
  (Rail Transport) + corrigendum No. 4
- AC/258-D/366 dated May 1987
  (Inland Waterways Transport) second revision + corrigendum No. 2
- AC/258-D/400 dated Feb 1989

  (Container Transport)

5. *Updating*

The "CNAD Ammunition Safety Group (AC/326)", as custodian of this Manual, will publish corrigenda from time to time through its Sub-Group 4 on Transport Logistics.

[1] including documents D/408 D/412 (rev)
D/410 D/415 (rev)

6. *Disclaimer*

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting form the use of this document".

7. *Inquiries*

Any questions or requirements for further information should be addressed to:

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MANUAL OF NATO SAFETY PRINCIPLES FOR THE TRANSPORT OF MILITARY AMMUNITION AND EXPLOSIVES

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PART I

GENERAL

CHAPTER 1 - PURPOSE AND SCOPE OF THE MANUAL

1.1.0.1 The object of this Manual is to establish safety principles and procedures to be used by NATO forces in host countries during the transport of conventional military ammunition and explosives by all modes of transport.
These principles which apply to the movement of ammunition in peacetime should also be taken in consideration in times of tension and war whenever practicable and are also intended to form the basis of national regulations.
These principles may also prove useful outside the NATO area where two or more member nations are acting together, bearing in mind such nations would expect to operate under the local rules (if any) of a (non-NATO) host nation.

1.1.0.2. These recommendations focus upon the transport of MILITARY ammunition. Military ammunition is robustly designed for rough handling under wartime conditions and for storage for long periods of time. Continuous condition checks are performed by trained quality assurance personnel to assure that no degradation occurs.
The packaging further supports that design and the result is a product which is extremely safe to handle and transport within the civilian community.

1.1.0.3. Some countries may not have regulations for the transport of military ammunition and explosives in all modes of transport and may use these regulations alone. Other countries may have more stringent regulations to be observed by visiting forces. The more stringent requirements of member countries are given in the relevant Annexes.
The principles are not intended to inhibit a visiting force from applying its own more stringent regulations.

1.1.0.4. In different modes of transport carriage of military ammunition and explosives will be done by civilian or military means. Detailed information for these circumstances are given in Parts II - VI.

1.1.0.5. This Manual is not intended to be a substitute either for international codes, recommendations or regulations, or for national regulations, but should be used in conjunction with them.
A number of Standardization Agreements and International Codes on the transport of ammunition and explosives are already in existence. Those referred to in this Manual are:

- ADNR — Accord européen relatif au transport international des marchandises dangereuses par le Rhin;
- ADR — Accord européen relatif au transport international des marchandises dangereuses par route;
- CSC — Convention for Safe Containers;
- ICAO — International Civil Aviation Organization;
- IMDG-Code — International Maritime Dangerous Goods-Code;
- IMO — International Maritime Organization;

-	RID	Réglement concernant le transport international ferroviaire des marchandises dangereuses;
-	SOLAS	The convention for the Safety Of Life At Sea;
-	UIC-leaflets	Union Internationale des Chemins de fer;
-	UN "Orange Book"	Recommendations on the Transportation of Dangerous Goods;
-	STANAG 2023	Marking of Military Cargo for International Movement by all International Means of Transport;
-	AMovP 3, Chap 3	Road Movement Bid and Credit;
-	AMovP 3, Chap 4	Surface Transport Request and Reply to Surface Transport Request;
-	AMovP 3, Chap 5	Forecast Movements Requirements –Rail, Road and Inland Waterways;
-	AMovP 3, Chap 6	Movements and transport documents used for movements by ship;
-	STANAG 2316	Marking of ammunition and its packaging of a caliber below 20mm;
-	STANAG 2322	Minimum Markings for the Identification of Ammunition (and its packaging);
-	STANAG 2828	Military Pallets, Packages and Containers;
-	STANAG 2926	Procedures for the Use and handling of Freight Containers for Military Supplies;
-	STANAG 3854	Policies and Procedures governing the Air Transportation of Dangerous Cargo;
-	STANAG 4123	Methods to Determine and Classify the Hazards of Ammunition.

1.1.0.6 Users of this Manual are invited to inform the Secretary of the AC/326 Group when an accident or incident occurs which may require a review of the principles in this manual or when their national regulations have been modified.

CHAPTER 2 - DEFINITIONS

Definitions of Terms

In this Manual, the following definitions apply:

1.2.0.1 *Ammunition*

a) A device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological or chemical material for use in connection with defence or offence, including demolitions. Certain ammunition can be used for training, ceremonial or non-operational purposes.

b) In this Manual the term is restricted to conventional ammunition and the conventional explosive components of nuclear ammunition or ammunition containing toxic chemical agents. This Manual does not deal with nuclear or toxic hazards or their classification, but does include ammunition with depleted uranium (DU) projectiles for armour penetration.

NOTE: The term "ammunition" in it's restricted meaning is used throughout this Manual in the same sense as "explosive article" is used by UN and IMO in the "Orange Book" and "IMDG Code" respectively to mean an article containing one or more explosive substance(s).

1.2.0.2 *Authorized Representative*

A qualified person who is responsible to an appropriate authority, to ensure that the technical requirements of a specified task are fully complied with. This definition includes the tasks of responsible personnel involved in the conveyance of ammunition as well as those solely responsible for the (un)loading, verification, receipt and dispatch of ammunition or any other specific duty.

1.2.0.3 *Assembly Place*

A building or place where it is customary for people to assemble (e.g. a church, school, sports stadium).

1.2.0.4 *Classification Code*

The alphanumeric symbol which denotes the complete hazard classification for a particular type of ammunition. The code comprises two digits, indicating the hazard division, followed by a letter corresponding to the compatibility group.

1.2.0.5 *Compatibility Groups*

Ammunition and explosives are considered to be compatible if they can be stored or transported together without significantly increasing either the probability of an accident, or, for a given quantity, the magnitude of the effects of such an accident.

1.2.0.6 *Debris*

Any portion of the natural ground or of a structure (rocks, structural materials, fittings, equipment, barricade materials etc.) which is propelled from the site of an explosion.

1.2.0.7 *Deflagrating Explosive*

A deflagrating explosive is a secondary explosive which reacts by deflagration rather than detonation when used in its normal manner.

1.2.0.8 *Deflagration*

A chemical reaction proceeding at subsonic velocity along the surface of, and/or through an explosive, producing hot gases at high pressures. A deflagration under confinement increases the pressure, the rate of reaction and the temperature which may cause transition into a detonation.

1.2.0.9 *Detonating Explosive*

A detonating explosive is an explosive which reacts by detonation rather than deflagration when used in its normal manner.

NOTE: The main detonating explosives are high explosives such as TNT, RDX, PETN, etc.

1.2.0.10 *Detonation*

A violent and complete chemical reaction proceeding at supersonic velocity within an explosive, generating gases at extremely high pressure and temperature. The sudden and enormous pressure of hot gases violently disrupts the surroundings and a shock wave is propagated at supersonic velocity.

1.2.0.11 *Electro-Explosive Device*

A one-shot explosive or pyrotechnic device initiated by the application of electrical energy.

1.2.0.12 *Explosion*

The mechanical and thermal effect of the chemical reaction of an explosive during a detonation or a deflagration under confinement. The term "Explosion" may also be used as the inclusive term for "Detonation" and "Deflagration under confinement".

1.2.0.13 *Explosive*

A substance manufactured with a view to producing a practical effect by explosion or pyrotechnic effect. An explosive atmosphere of gas, vapour or dust is not considered to be an explosive.

NOTE: The term "explosive" is used throughout this Manual in the same sense as "explosive substance" is used by UN and IMO in the Orange Book and IMDG Code respectively to mean in its broadest sense all explosive and pyrotechnic substances. The term may be made more restrictive by qualifying it with such terms as primary.

1.2.0.14 *Explosives Area*

An area used for the handling, processing, storing and loading and unloading of ammunition and explosives.

1.2.0.15 *Exposed Site*

A magazine, cell, stack, truck or trailer loaded with ammunition, explosives workshop, inhabited building, assembly place or public traffic route, which is exposed to the effects of an explosion (or fire) at the Potential Explosion Site under consideration.

1.2.0.16 *Exterior Quantity-Distance*

The minimum permissible distance between a Potential Explosion Site and an Exposed Site outside the explosives area.

1.2.0.17 *Fragment*

Any metal portion of the ammunition or its package which is propelled from the site of an explosion.

1.2.0.18 *Freight Container*

An article of transport equipment:

- of a permanent character and accordingly strong enough to be suitable for repeated use;
- specially designed to facilitate the transport of goods by one or more modes of transport, without intermediate reloading;
- fitted with devices permitting its securing and/or ready handling, particularly its transfer from one mode of transport to another;
- so designed as to be easy to fill and empty
- having an internal volume of 1 m^3 (35.3 ft^3) or more.

The term "Freight Container" includes neither vehicles nor conventional packing.

1.2.0.19 *Hazard Classification or Classification*

The assignment of a type of ammunition to the correct hazard division, according to tests or other assessment, and the appropriate compatibility group. Thus there are two components in the complete classification.

1.2.0.20 *Hazard Division*

The hazard division indicates the type of hazard to be expected in the event of an accident: blast (Division 1.1), projection effects (Division 1.2), fire and radiant heat (Division 1.3), no significant hazard (Division 1.4), very insensitive substances with a mass explosion hazard (Division 1.5) and extremely insensitive articles which do not have a mass explosion hazard (Division 1.6).

1.2.0.21 *High Velocity Projections*

Debris or fragments at high velocity as the result of an explosion and with sufficient remaining energy to propagate an explosion to another stack.

1.2.0.22 *Holding Yard*

A designated area within a military installation where trucks or railcars loaded with explosives are held for interim periods prior to storage or shipment.

1.2.0.23 *Host Country*

The territory of the country in which the transport takes place.

1.2.0.24 *Ignition*

The initial heating of a deflagrating explosive or pyrotechnic composition, by a flame or other heat source, up to its point of inflammation, Means of ignition may include: propellant primers, igniters, squibs, fuse lighters.

1.2.0.25 *Inhabited Building*

A building or structure occupied in whole or in part by people.

1.2.0.26 *Initiation*

The transmission of a violent chemical reaction at supersonic velocity from one explosive into an adjacent explosive to cause its detonation. Means of initiation may include: fuses, primers, detonators, blasting caps.

1.2.0.27 *Interior Quantity-Distance*

The minimum permissible distance between a Potential Explosion Site and an Exposed Site inside the explosives area.

1.2.0.28 *Labelling*

The display on the outside of each package of government department monograms, authenticity labels, sealing labels, explosives classification and the UN-type hazard label for explosives. These details may be printed on linen, paper stick-on labels, or stencilled or painted where appropriate.

1.2.0.29 *Lobbed Ammunition*

Unexploded ammunition projected from an exploding stack. It may explode on impact.

1.2.0.30 *Mass Explosion*

An explosion which affects virtually the entire quantity of explosives under consideration practically instantaneously. The term usually relates to detonation but also applies to deflagration when the practical effects are similar, for example the mass deflagration of propellants under very strong confinement so as to produce a bursting effect and a serious hazard from debris.

1.2.0.31 *Mass Fire*

A rapid deflagration of the entire quantity of explosives under consideration in circumstances that avoid a bursting effect and a serious hazard from debris. A typical mass fire occurs in a few seconds at most and produces extensive flame, intense radiant heat and minor projection effects.

1.2.0.32 *Moderate Fire*

A fire comparable with that involving an ordinary commercial warehouse which burns comparatively slowly and with a moderate flame radius. Some items may be thrown out of such a fire for a short distance.

1.2.0.33 *Net Explosives Mass (NEM)*

For the purpose of transport the net explosives mass is regarded to be the total net mass in kg of explosives substances, or, in the case of explosive articles, the total mass of explosive substances contained in all the articles.

Note: This definition differs from the definition NEQ, used for storage purposes.

1.2.0.34 *Net Explosives Quantity*

The Net Explosives Quantity (NEQ) is the total explosives contents of ammunition unless it has been determined that the effective quantity is significantly different from the actual quantity.
It does not include such substances as white phosphorus, war gases or smoke and incendiary compositions unless these substances contribute significantly to the dominant hazard of the hazard division concerned.

1.2.0.35 *Overpacks*

An enclosure used by a single consignor to contain one or more packages, consolidated into a single unit easier to handle and stow during carriage. Examples of overpacks are:

1. A loading tray such as a pallet, on which several packages are placed or stacked and secured by a plastic strip, shrink or stretch wrapping or other appropriate means, or
2. An outer protective packaging such as a box or crate.

1.2.0.36 *Primary Explosive*

An explosive which is extremely sensitive to stimuli such as heat, friction and/or shock and requires special care in handling. Generally primary explosives are synonymous with initiating explosives.

1.2.0.37 *Potential Explosion Site*

The cavern, chamber, building, cell or stack, which contains or is intended to contain the ammunition and/or explosives under consideration.

1.2.0.38 *Projections*

Debris and fragments (see above).

1.2.0.39 *Pyrotechnic Substance*

A pyrotechnic substance is a substance designed to produce an effect of heat, light, sound, gas or smoke or a combination of these as result of non-detonative, self-sustaining, exothermic, chemical reactions.

1.2.0.40 *Salvage Packaging*

Packaging suitable to contain damaged, defective or leaking dangerous goods packages

1.2.0.41 *Secondary Explosives*

An explosive which is relatively insensitive to stimuli such as heat, friction and/or shock. Secondary detonating explosives are also known as high explosives. Secondary deflagrating explosives are normally known as propellants

1.2.0.42 *Serious Structural Damage*

Damage which renders buildings uninhabitable. For example: serious weakening or displacement of foundation, supporting walls, interiour supports, side walls, floors or ceiling structures, breaking numerous rafters or other important supporting members of roofs or floors. Damage which is readily repairable is not considered serious structural damage.

1.2.0.43 *Shipping package*

For the purpose of this manual, the term "shipping package" also comprises unpackaged items, provided they are approved for conveyance as such.

1.2.0.44 *Stuffing*

The placing of the cargo and cargo bracing materials (dunnage) or other methods of restraint, if required, into the container.

1.2.0.45 *Unit Load*

A load designed to be carried, stored and handled as a separate unit and able to withstand the conditions associated with the appropriate modes of transport and comprising a number of packages or articles which are either:

1. placed or stacked on and secured by strapping, shrink-wrapping or other suitable means to a load board such as a pallet,

2. placed in a protective outer packaging such as a pallet box,

3. permanently secured together in a sling.

A single large package such as a tank-container, intermediate bulk container or freight container is specifically excluded.

1.2.0.46 *Unstuffing*

The removal of cargo and cargo bracing materials (dunnage) or other methods of restraint from the container.

1.2.0.47 *Visiting Force*

The force responsible for the transport of ammunition and explosives in a host country.

1.2.0.48 *With a Propelling Charge*

The propelling charge is assembled to the projectile or packed with the projectile in the same package or palletised with the projectile on the same pallet.

1.2.0.49 *With its (own) Means of Initiation*

The ammunition has its normal initiating device assembled to it or packed with it and this device is considered to present a significant risk during storage and transport.

1.2.0.50 *Without its (own) Means of Initiation*

In general the ammunition is packed without its (own) means of initiation. The ammunition may be packed together with its (own) means of initiation provided the device is packaged so as to eliminate the initiation of the ammunition in the event of an accidental functioning of the initiating device. The term may even apply where the means of initiation is assembled to the ammunition if the protective features (i.e. two or more independent safety features) of the device prevent the initiation of the ammunition in case of an accidental functioning of the device during handling, storage and transport.

CHAPTER 3 - SAFETY REQUIREMENTS

Section I - General safety requirements

1.3.1.1 Ammunition transport should be limited to absolute necessity. It should be planned, prepared, and carried out with care.
The training should include safe handling and emergency response procedures, and take the following form:

- General awareness training, to make personnel familiar with the general requirements for the transport of ammunition and explosives.

- Function-specific training, to make personnel aware of the detailed duties and responsibilities associated with their specific function in the carriage of ammunition and explosives.

- Safety training, to make personnel aware of the hazards and dangers presented by ammunition and explosives, commensurate with the degree of risk of injury or exposure arising from an incident involving their transport, loading or unloading.

1.3.1.2 Mode, route, and time of ammunition transport should be selected so as to keep risk to an acceptable level.
Transport by inland waterways should be preferred to railroad transport which, in turn, should be preferred to road transport.
The following factors should be taken into account:

- operational requirements,
- public safety,
- security,
- efficiency,
- the condition of the ammunition,
- the time available, and
- environmental protection.

Those participating in the transport of ammunition should take every precaution to prevent accidents and damage to the ammunition or keep the effects of such accidents or damage to an absolute minimum.

1.3.1.3 *Supervision during transport*

a) No loading and unloading activities should take place without a qualified or authorised representative. If special safety requirements are necessary, he will accompany the load during the whole operation.

b) Ammunition and explosives are to be handled carefully during loading and unloading. Packages are not to be thrown or allowed to be dropped.

c) No person under the influence of alcohol or drugs is to be allowed to take part in any stage of a transport operation.

1.3.1.4 *Securing the load*

Ammunition and explosives are to be loaded and secured so as to prevent significant movement under normal transport conditions. No highly flammable materials may be used for stowage. For additional regulations regarding the securing of loads, refer to the relevant part of the manual.

1.3.1.5 *Protection against weather*

Ammunition should be protected against adverse weather conditions. Tarpaulins used to cover ammunition should be made of impermeable material not readily flammable.
Care should be taken during loading and unloading of ammunition and explosives to prevent packages from becoming wet, since, in some cases, the hazard might be aggravated by wetting of the contents.

1.3.1.6 *Defective Packages*

Any leaky, broken or otherwise defective packages, containing ammunition and explosives including those which have been affected by moisture, should not be accepted for transport.
Before the transport of defective packages of ammunition and explosives can be continued, an ammunition expert must certify that they are safe for transport.

1.3.1.7 It is forbidden to work on ammunition or packages containing ammunition and explosives (e.g. opening of such packages) or to pack or repack ammunition and explosives in a means of transport loaded with ammunition.

1.3.1.8 It is permitted to work on a means of transport loaded with ammunition and explosives only if this is necessary to enable the continuation of the transport, and if it does not represent a hazard.

1.3.1.9 *Fire Precautions*

Smoking and the use of naked lights is forbidden within a radius of 25 m from where ammunition and explosives are loaded or unloaded.

1.3.1.10 *Precautions against Lightning*

Loading and/or unloading must be suspended during thunderstorms. Ammunition and explosives on an in-transit storage point must be covered with tarpaulins and hanging wires or ropes must be secured at least 3 m from the base of a stack of ammunition and explosives.

1.3.1.11 *Screening of EEDs*

Electro-explosive devices (EED) or ammunition containing electro-explosive devices may only be transported when effectively screened against electromagnetic radiation hazards.

1.3.1.12 *Special Safety Requirements*

Special safety requirements are necessary for the transport of certain ammunition types presenting supplementary risks (for example: Compatibility Group L, etc.).
These special safety requirements are additional to those prescribed by the present Manual.

1.3.1.13 *Electrical Installations*

Electrical cables should not pass through a compartment containing a magazine or being used for the stowage of ammunition and explosives. If this is unavoidable, ammunition and explosives should be sited in a safe position relative to the cable. Cables should be enclosed in heavy gauge steel conduit or protected by electrically continuous metal sheathing and steel wire armour. Alternatively, they may be of the mineral insulated metallic sheathed type.

1.3.1.14 *Artificial Lighting*

No artificial light except electric lights, electric lamps or floodlights of an approved type should be used when handling ammunition and explosives.

1.3.1.15. *Dangerous Goods Advisory System*

a) In the interest of identifying and correcting hazards involved in ammunition transport, a system of dangerous goods advice for commanding officers is recommended – for all modes of transport. Its purpose is to seek, by all appropriate means and by all appropriate action, to facilitate the transportation activities in accordance with existing rules and regulations (eg: published in this manual) and in the safest possible way. The system is to provide commanding officers with expertise, assessment of the transport process, recommendations for improvements, accident analysis, and assurance that individuals are properly trained. It supplements responsible persons with an overwatch function.

b) The appointment of certified Dangerous Goods Safety Advisers (DGSAs) would match the decision of the European Union, under Council Directive 96/35/EC of 3 June 1996, to adopt a system of this kind for the transport of dangerous goods (by road, rail and inland waterway only) and to specify their qualifications and duties. Nations show in the national annexes (Annex II-B) whether or not they have appointed DGSAs.

1.3.1.16. *Military Multimodal Dangerous Goods Form*

The Military Multimodal Dangerous Goods Form shown at ANNEX 1-B, APPENDIX 1, EXAMPLE NO 1 is the same that appears in the IMDG Code, RID, and ADR, with the single addition of the word '**Military**' in the heading. It is available for transport by all modes – road, rail, sea, inland waterway, and military aircraft - but ***not*** for transport by civil aircraft, where the form prescribed by IATA Dangerous Goods Regulations should be used instead.

Section II - Protection for emergency services and the public at the scene of a transportation accident.

1.3.2.1 *General*

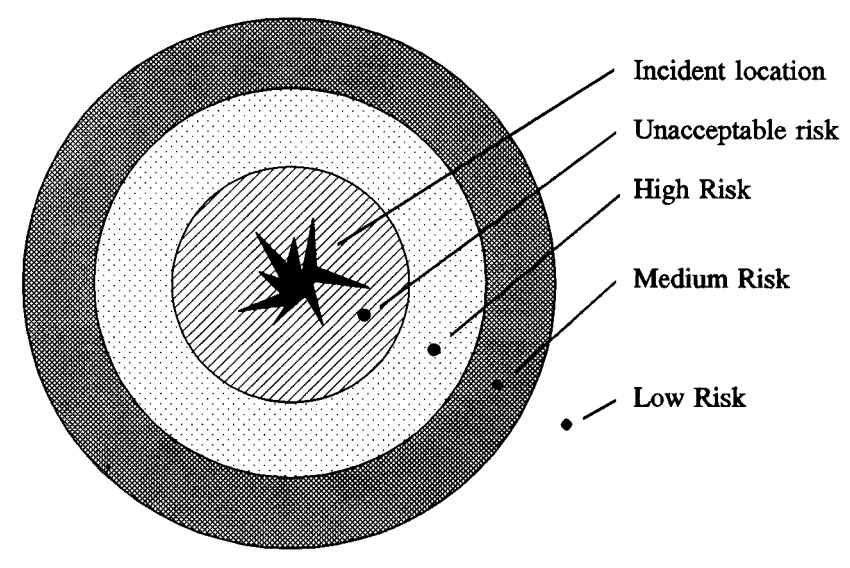
Military explosive articles and substances are designed for safety during long term storage periods and for rough transportation under wartime conditions. Therefore, the general characteristics of and packaging requirements for military materiel provide inherently safe goods for peacetime transport.
Accidental functioning is virtually impossible under normal transport conditions or in an accident sequence. However, with the exception of division 1.6 articles, a fire increases the probability of an explosion.
This section is to be considered as background advisory information for emergency planning in advance. Detailed calculation using the formulae in this section will very rarely be appropriate at the scene of an accident.
16 tons NEM was taken as the worst case assumption on which the withdrawal distances mentioned in the Explosives Hazard Warning Sheets for road and inland water transport are based.

1.3.2.2 *Emergency response*.

Considering the robustness of the materiel and the packaging, emergency response to the situation must be scaled to the actual degree of danger. There is no need for a full emergency response over a flat tire or minor traffic accident. Although there should be concern where munition packaging has been damaged, these cases also have little need for a full emergency response. However, when a fire is present or is reasonably expected, all effort should be made to execute aggressive fire suppression and removal of non involved personnel from the area. The tasks should be performed in accordance with the EXPLOSIVES HAZARD WARNING SHEET for the load.

1.3.2.3 *Hazard radii*.

Three guideline radii have been developed to assist the advanced planning of emergency distances by assessing risk to personnel. Four zones of differing risk are defined: from catastrophic to reasonably safe exposure. The distances are based upon explosive quantity distance associations evolved within AASTP-1.
Once it is reasonably certain that cargo containing Hazard Division 1.1, 1.2, 1.3 or 1.5 substances or articles is or will become involved in fire, the fire should in no circumstances be fought and crews should withdraw to the advised safe distance.



1.3.2.4 *High Risk Radius*.

This is the minimum distance allowed for personnel in direct emergency intervention. Some injury is possible at this distance due to blast overpressure and possibly fatal injuries can occur due to fragments and debris. Very substantial cover is required to protect from blast, fragments and debris, including building materiels.

The High Risk Radius is derived from the AASTP-1 as follows:

- Division 1.1 and 1.5: **9.6 $M^{1/3}$** where M is the Net Explosive Mass in kilograms. This distance is the same as twice the D9 distance.

- Division 1.2: **135 metres**, a fixed distance representing relative safety with light cover during the initial stages of progressive explosions but will require heavy cover with increasing explosion frequency and for protection against lobbed ammunition.

- Division 1.3: **3.2 $M^{1/3}$**, with a minimum of 60 metres. This distance is the same as the D2 distance, and when coupled with some physical barrier, will protect individuals from radiant heat.

1.3.2.5 *Medium Risk Radius*.

This is the boundary of the next highest risk area where personnel involved in the operation may be located. This area may, at the discretion of the on-scene commander, include personnel who cannot be evacuated back to the Low Risk Radius. Personnel in the open at this radius can be expected to be injured, possibly seriously, by fragments and debris. Personnel should be under significant cover and away from glass windows and light constructions which may possibly collapse. The danger to any one individual decreases with distance back from this radius and with the degree of overhead and frontal protection.

The Medium Risk Radius is derived from the AASTP-1 as follows:

- Division 1.1 and 1.5: **22.2 $M^{1/3}$**, (is the same as the D13 distance) representing the distance at which building damage is tolerable. If not less than 400 metres, it represents tolerable risk of debris to individuals inside dwellings in a built up area.

- Division 1.2: **68 M0.18**, (is the same as the D2 distance) representing the distance at which personnel in vehicles with limited exposure have a tolerable risk. The minimum is 270 metres.

- Division 1.3: **3.2 $M^{1/3}$**, (is the same as the D2 distance) with a minimum of 60 metres. This is the same as the High Risk Radius since the hazard is radiant heat.

1.3.2.6 *Low Risk Radius*

This is the minimum distance away from the scene for personnel not involved in mitigating the incident, including civilians and emergency services. It is a relatively but not absolutely risk free distance and should therefore be expanded whenever possible. Cover, except large glass surfaces, should assure protection.

The Low Risk Radius is derived from AASTP-1 as follows:

- Division 1.1 and 1.5: **44.4 $M^{1/3}$**, (is the same as two times the D13 distance. This distance provides mitigation of overpressure and damaging effects on structures, except possibly large glass surfaces, and provides relatively low risk of injury from hazardous debris.

- Division 1.2: **1000 metres**. This distance is not based upon AASTP-1 but is carried over as the existing evacuation standard.

- Division 1.3: **6.4 $M^{1/3}$**, (is the same as the D4 distance). The inhabited building distance, with a minimum of 60 metres, provides protection against flame and heat propagation.

CHAPTER 4 - CLASSIFICATION OF AMMUNITION AND EXPLOSIVES

1.4.0.1 *General*

a) Ammunition and explosives must be classified in accordance with STANAG 4123.

b) Ammunition and explosives are grouped into six Hazard Divisions: 1,1, 1.2, 1.3, 1.4, 1.5 and 1.6.

c) Ammunition and explosives are also grouped into thirteen compatibility Groups: A to H, J, K, L, N and S.

Group I is omitted to avoid confusion between the letter "I" and the Roman numeral "I". Group S is given a distinctive letter since it corresponds to a unique possibility for mixing in transport and storage.

d) The combination of hazard division and compatibility group gives the Classification Code (Table 1).

e) National Authorities for classification are given in Annex I-A.

1.4.0.2 *Definitions of the Hazard Division*

a) Hazard Division 1.1

1) This division comprises ammunition and explosives which have a mass explosion hazard.

2) The major hazard of this division are blast, high velocity projections and other projections of relatively low velocity.

3) The explosion results in severe structural damage, the severity and range being determined by the amount of high explosives involved. There may be a risk from heavy debris propelled from the structure in which the explosion occurs or from the crater.

b) Hazard Division 1.2

1) This division comprises ammunition and explosives which have a projection hazard but not a mass explosion hazard.

2) The explosion results in items burning and exploding progressively, a few at a time. Furthermore, fragments, firebrands and unexploded items may be projected in considerable numbers; some of these may explode on impact and cause fire or explosions. Blast effects are limited to the immediate vicinity.

c) Hazard Division 1.3

1) This division comprises ammunition and explosives which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

2) This division includes some items which burn with great violence and intense heat emitting considerable thermal radiation (mass fire hazard) and others which burn sporadically. Items in this division may explode but do not usually form dangerous fragments. Firebrands and burning containers may be projected.

d) Hazard Division 1.4

1) This division comprises ammunition and explosives which present no significant hazard.

2) This division includes items which are primarily a moderate fire hazard. They do not contribute excessively to a fire. The effects are largely confined to the package. No fragments of appreciable size or range are to be expected. An external fire does not cause the simultaneous explosion of the total contents of a package of such items.

3) These items are so packed or designed that any explosive effect during storage and transport is confined within the package except when an external fire has degraded this packaging.

e) Hazard Division 1.5: Very insensitive substances which have a mass explosion hazard

1) This division comprises substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

2) The probability of transition from burning to detonation is greater when large quantities are carried in a ship.

f) Hazard Division 1.6: Extremely insensitive articles which do not have a mass explosive hazard

1) This division comprises articles which contain only extremely insensitive detonating substances and which demonstrate a negligible probability of accidental initiation or propagation.

2) The risk from articles of Division 1.6 is limited to the explosion of a single article.

1.4.0.3 *Definitions of the Compatibility Groups*

Group A: Primary explosive substance.

Group B: Article containing primary explosive substance and not containing two or more effective protective features.

Group C: Propellant explosive substance or other deflagrating explosive substance or article containing such explosive substance.

Group D: Secondary detonating explosive substance or black powder or article containing secondary detonating explosive substance, in each case without means of initiation and without a propelling charge, or article containing a primary explosive substance and containing two or more independent effective protective features.

Group E: Article containing a secondary detonating explosive substance, without means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids).

Group F: Article containing secondary detonating explosive substance, with its own means of initiation, with a propelling charge (other than one containing a flammable liquid or gel or hypergolic liquids) or without a propelling charge.

Group G: Pyrotechnic substance, or ammunition containing a pyrotechnic substance, or article containing both an explosive substance and an illuminating, incendiary, tear- or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphides, a pyrophoric substance, a flammable liquid or gel, or hypergolic liquids).

Group H: Article containing both an explosive substance and white phosphorus.

Group J: Article containing both an explosive substance and a flammable liquid or gel.

Group K: Article containing both an explosive substance and a toxic chemical agent.

Group L: Explosive substance or article containing an explosive substance and presenting a special risk (e.g. due to water activation or presence of hypergolic liquids, phos-phides or a pyrophoric substance) and needing isolation of each type.

Group N: Articles which contain only extremely insensitive detonating substances.

Group S: Substances or articles so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response efforts in the immediate vicinity of the package.

1.4.0.4 *Subsidiary Hazards*

Certain ammunition and explosives carry toxic and/or corrosive hazards associated with dangerous goods of Class 6 and 8. There this is the case the use of subsidiary hazard labels and placards is indicated in other parts of AASTP-2

1.4.0.5 *Supplementary Hazards*

Where ammunition and explosives contain supplementary hazards which are not evident from the hazard classification, compatibility group or subsidiary hazard label, these must also be indicated in the transport documentation. The hazard and emergency measures associated with them must be described separately or advice be immediately accessible. The use of Supplementary Hazard Warning Sheets meets the requirement for roads (para 2.4.2.6) and inland waterways (para 6.4.0.9) and is recommended also for other modes of transport.

Explosive articles should be considered having a supplementary risk, when/if (unless tested to be otherwise):

1. The main charge of the article contains substances reacting hazardously in the atmosphere, in sufficient quantity to present a significant non-explosive hazard.
2. The contents of the article react hazardously, but not explosively, in an accident situation (fire).
3. An explosive hazard is present which is not evident form the hazard division, compatibility group, or subsidiary hazard by which the article is labelled.

For pragmatic reasons, articles under UN Proper Shipping Name “Fireworks” are beyond consideration

TABLE 1 Combination of Hazard Divisions and Compatibility Groups

Compatibility Group Hazard division	A	B	C	D	E	F	G	H	J	K	L	N	S	A-S Σ
1.1	1.1 A	1.1 B	1.1 C	1.1 D	1.1 E	1.1 F	1.1 G		1.1 J		1.1 L			9
1.2		1.2 B	1.2 C	1.2 D	1.2 E	1.2 F	1.2 G	1.2 H	1.2 J	1.2 K	1.2 L			10
1.3			1.3 C			1.3 F	1.3 G	1.3 H	1.3 J	1.3 K	1.3 L			7
1.4		1.4 B	1.4 C	1.4 D	1.4 E	1.4 F	1.4 G						1.4 S	7
1.5				1.5 D										1
1.6												1.6 N		1
1.1 - 1.6 Σ	1	3	4	4	3	4	4	2	3	2	3	1	1	35

CHAPTER 5 - LIMITATIONS ON TRANSPORT

1.5.0.1 *Principles*

Ammunition and explosives must not be loaded together with other goods which may increase the danger (e.g. flammable, oxidising, corrosive and combustible materials). The cargo space should be clean, dry and well ventilated. Adjacent cargo spaces not containing ammunition may only be loaded with non flammable goods.

1.5.0.2 *Transport of Compatibility Groups*

The transport of ammunition containing both an explosive and a toxic chemical agent (CG K) is prohibited in all modes of transport except for sea transport. The transport of the articles must be left to the discretion of the nation's national authorities as it is subject to waivers to be granted nationally, and to international special agreements. Nations will give appropriate information in their national annexes.

1.5.0.3 *Mixed Loads - Compatibility Groups*

Ideally ammunition and explosives belonging to the same compatibility group should be loaded together, however, when this is not possible to achieve, loading is permissible in accordance with Table I-2.

TABLE I-2 Mixing of compatibility groups

Compatibility group	A	B	C	D	E	F	G	H	J	K	L	N	S
A	1												
B		X		2	2	2							X
C			X	X	X		X					3	X
D		2	X	X	X		X					3	X
E		2	X	X	X		X					3	X
F		2				X							X
G			X	X	X		X						X
H								X					X
J									X				X
K										X			
L											4		
N			3	3	3							5	6
S		X	X	X	X	X	X	X	X			6	X

(See legend at next page)

X = mixed loading authorised.

1 = Not normally allowed to be transported by road, rail, air and inland waterways.

2 = Quantities as required to meet all foreseen operational requirements, hazard division 1.1 compatibility group B fuzes may be transported with other items of ammunition in compatibility groups D, E or F of which the fuzes are components. When so loaded, the compatibility group is to be that of the assembled item.

3 = Articles of compatibility group N should not in general be loaded with articles of other compatibility groups except S. However if such articles are loaded with articles of compatibility groups C, D and E, the articles of compatibility group N should be considered as having the characteristics of compatibility group D and the compatibility groups mixing rules apply accordingly.

4 = Ammunition and explosives of Compatibility Group L should not be loaded together with ammunition and explosives of other Compatibility Groups. Furthermore ammunition and explosives of Compatibility Group L should only be loaded with the same type of ammunition and explosives within Compatibility Group L.

6 = A mixed set of ammunition 1.6N and 1.4S may be considered as having the characteristics of compatibility group N.

5 = It is allowed to mix 1.6N ammunition. The compatibility group of the mixed set remains N if the ammunition belongs to the same family or if it has been demonstrated that, in case of a detonation of one munition, there is no instant transmission to the munitions of another family. If this is not the case the whole set of ammunition should be considered as having the characteristics of compatibility group D and the compatibility groups mixing rules apply accordingly.

1.5.0.4 *Mixed loads - Hazard Divisions*

It is permissible to load ammunition and explosives of different hazard divisions into the same vehicle, providing the conditions of paragraph 1.5.0.2. are met. The mixed load as a whole shall be treated as if it belonged to the most dangerous hazard division in the order 1.1, 1.5, 1.2, 1.3, 1.6 and 1.4. However, the net mass of explosives of compatibility group S shall not count towards the limitation of quantities carried.
Where substances of HD 1.5 are carried in one transport unit with substances and articles of HD 1.2, the entire load shall be treated for carriage as if it belonged to HD 1.1.

1.5.0.5. *Prohibition of Mixed Loading in a Container*

a) The prohibition of mixed loading of goods laid down in paragraph 1.5.0.2. shall apply within each container.

b) The provisions of paragraph 1.5.0.2. shall apply as between the dangerous goods in a container and the other dangerous goods loaded on the same vehicle, whether or not the latter goods are enclosed in one or more containers.

1.5.0.6 *Prohibition of Mixed Loading with other Dangerous Goods*

Packagings bearing a label for ammunition and explosives (Class 1) shall not be loaded together in one vehicle or container with packages bearing a label assigned for goods of Class 2 to 9.

CHAPTER 6 - PACKAGING, MARKING AND LABELLING STANDARDS

1.6.0.1 *Packaging*

It is impracticable to prescribe specifications for the packaging of ammunition and explosives. Any type of packaging should, therefore, be accepted, provided it is of a type approved by a competent authority for use in the country of the visiting force and which meets the general requirements given below:

1. Be of such strength, construction and character that it does not break open or become defective during the conveyance.

2. Be made and closed so that spillage of ammunition and explosive is not possible.

3. Be constructed of such material which is neither affected by its content nor will form

   dangerous combinations with it.

   This includes fastenings and internal fitments.

4. Use suitable inner fitments or packing to maintain adequately the safety and serviceability of the ammunition and explosives.

1.6.0.2 *Marking*

a. The markings on the packaging must be in accordance with STANAGs 2023, 2316 and 2322. For transport purposes the following markings of each package must have as a minimum requirement:

   - UN-packaging mark and/or certification details
   - UN-serial number
   - UN-proper shipping name and, in the case of a N.O.S. (Not Otherwise Specified) entry, the mutually agreed technical name (NATO name)
   - hazard classification code

b. An overpack shall carry the identification number of the goods, preceded by the letters “UN” unless the identification numbers of all dangerous goods contained in the overpack are visible;

c. When salvage packagings are used they shall bear the identification number preceded by the letters “UN” of the damaged packages they contain, as well as the word “SALVAGE”.

1.6.0.3 *Labelling*

a. Unless otherwise provided in this manual all packagings may bear a label identifying the primary hazard of the content. Additional labels may be required by international codes, regulations and recommendations as given in paragraph 1.1.0.5.

Labels must be able to withstand open weather exposure without a substantial reduction in effectiveness.
They must be so placed on the packagings that they do not cover or obscure any part of or attachment to the packaging or any other label or marking.

b. An overpack shall carry the labels of all packages contained in the overpack, unless the labels representing all the dangerous goods contained in the overpacks are visible.

c. When salvage packaging are used they shall bear all the danger labels of the damaged packages they contain.

1.6.0.4 *Vehicle Marking*

Vehicle marking is covered in Part II paras 2.2.0.8 and 2.2.0.9.

1.6.0.5 *Acceptance of Intermodal Carriage*

When the transport is by road prior to or following maritime or air carriage, it is acceptable to follow the regulations of ICAO or the IMDG Code.

CHAPTER 7 - FREIGHT CONTAINERS[1]

Section I - Introduction

1.7.1.1 *Introduction*

The use of freight containers is becoming more common in all modes of transport. An advantage of transport by freight container is that loads can be transferred from one transport mode to another without intermediate reloading thus preventing damage to the load. The purpose of this chapter is to recommend safety principles to be observed during the transport of ammunition and explosives in freight containers. Special attention is drawn to the limits of quantities (by vehicles type) at para 2.3.0.1.
More detailed information is given in the subsequent parts of the manual.

[1] Refer also to Chapter 3 of Part II (Road Transport - Loading, Unloading and Handling). Paragraph 2.3.0.10. explains

Section II - General safety requirements

1.7.2.1 During stuffing/unstuffing and handling of stuffed containers the number of persons should be kept to a minimum, consistent with safe and efficient operation.

1.7.2.2 During stuffing/unstuffing and handling of stuffed containers an Authorized Representative has to be present. His duties are summarised in Annex I-B.

1.7.2.3 The container must be inspected before use (see Section IV).

1.7.2.4 The container must have a roof or a fire-retardant tarpaulin and be weatherproof. It must be secured against unauthorised access and sealed.

1.7.2.5 Stuffing of the container must be in accordance with Section V.

1.7.2.6 Handling of stuffed containers must be in accordance with Annex I-C.

Section III - Types of containers permitted

1.7.3.1 Only containers with a current approval plate of the "Convention for Safe Containers (CSC)" should be used (see also Section IV).

Section IV - Inspection of containers before use

1.7.4.1 The Authorized Representative must check if a current CSC approval plate is attached to the container.

1.7.4.2 Before transport of ammunition and explosives the empty container is to be given a thorough examination by the Authorized Representative to ensure that it is clean and dry internally and is free from significant structural defects. Such defects include the following;

1. Major defects in its structural components, for example top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts and corner fittings (major defects are dents or bends in the structural members greater than 19 mm in depth and regardless of length, or cracks or breaks in structural members).

2. More than one splice, or any improper splices (for example lapped splices), in any top or bottom end rail or door header, or two splices in any top or bottom side rail, or any splice in a door sill.

3. Door hinges and door fittings that are seized, twisted, broken, missing or otherwise inoperative.

4. Gaskets, seals or sheeting that do not seal against the ingress of water.

5. Floor insecurely attached to the container, leaky floor, wall or roof.

6. Any distortion of the overall configuration great enough to prevent proper alignment of handling equipment, or to prevent mounting and securing on rail or road vehicle, or to prevent insertion into ships' cells.

7. Unserviceable or damaged twist lock recesses.

8. If a tarpaulin is used with an open top container it must be inspected to ensure its serviceability and that it is large enough to cover the container with a minimum overlap of 20 cm on each side. Ensure that the tarpaulin is fire-retardant and weatherproof before use.

9. Significant deterioration in any component of the container regardless of the material of construction, such as corroded metal in side walls, or disintegrated fibreglass (normal wear, including rust, slight dents and scratches and other damage not affecting the serviceability or the weatherproof integrity of the container, is acceptable).

1.7.4.3 Containers with any of the defects listed in paragraph 1.7.4.2. above must not be used for the transport of military ammunition and explosives.

Section V - Stuffing of the container[1]

1.7.5.1 The safety of the stuffing operation is the responsibility of everyone involved. The Authorized Representative is responsible for ensuring that all safety regulations are applied.

1.7.5.2 All packages and dunnage should be dry and stuffing should take place either in dry weather or under weather protection.

1.7.5.3 The container must be on a firm base during stuffing

1.7.5.4 The handling equipment used must be suitable for its task and the type of ammunition handled and it must have a current inspection certificate.

1.7.5.5 Ammunition must be stuffed and restrained in the container in such a manner that there is no significant movement of the load when subjected to accelerations.

1.7.5.6 Restraint parameters for securing of cargo, based on the IMDG Code (Supplement – Packing Cargo Transport Units). are recommended as follows:

Mode of Transport	Forwards	Backwards	Sideways
ROAD	1.0g	0.5g	0.5g
RAILWAY Wagons carrying RID Label 15 for shunting Combined transport	 4.0g 1.0g	 4.0g 1.0	 0.5g 0.5g
SEA Unrestricted (Worldwide)	0.4g	0.4g	0.8g

1.7.5.7 After stuffing a container with loose packages of ammunition the face of the stack facing the door is to be secured in such a way that opening of the door is not hindered in any way.

1.7.5.8 After stuffing, the doors, viewing ports or other openings are to be closed, secured against unauthorised access and sealed.

1.7.5.9 A Military Multimodal Dangerous Goods Form (an example of which is at APPENDIX 1 to ANNEX I-B) should to be provided, and the CONTAINER/VEHICLE PACKING CERTIFICATE signed by the Authorised Representative. See also 2.4.1.3 1.

[1] Refer also to Chapter 3 of Part II (Road Transport - Loading, Unloading and Handling). Paragraph 2.3.0.10. explains.

Section VI - Principles for stuffing military ammunition and explosives in containers[2]

1.7.6.1 *A stuffing plan is to be prepared*

1.7.6.2 Ideally the container should be filled completely so that no movement is possible and no restraint system necessary. This can be achieved very rarely because of tonnage limitations. Therefore a suitable restraint system must be chosen from the following:

1. Dunnage
2. Bracing
3. Lashing and strapping provided adequate strength is available through container rings.

1.7.6.3 Make the centre of gravity as central and low as possible.

1.7.6.4 Any gaps in stow should be along the centre lines.

1.7.6.5 Distribute the load evenly where practical to ensure that

1. no concentrations in excess of container design limits occur; use load spreaders

   if necessary,

2. no weight imbalances causing overloading of axles when loaded on a vehicle,
3. a balanced lift with no tilting is achieved; this can be done by loading not more than 60 % of the load in less than half the length of the container.

1.7.6.6 Unitise the load when possible by banding horizontally and vertically.

[2] Refer also to Chapter 3 of Part II (Road Transport - Loading, Unloading and Handling). Paragraph 2.3.0.10. explains.

Section VII - Additional recommendations for container transport in different transportation modes

1.7.7.1 *Road Transport*

a) Only diesel-engined motor vehicles must be used for transport of containers loaded with ammunition and explosives.

b) The container must be securely attached by means of appropriate locking devices, secured in the engaged position to a motor vehicle or to a semi-trailer towed by such a vehicle.

c) Before conveyance begins the driver has to check that the doors, viewing ports or other openings of the container are closed, secured against unauthorised access and sealed.

1.7.7.2 *Rail Transport*

The transport of ammunition and explosives in containers is permitted subject to the same regulations as when in covered wagons. Large capacity containers loaded with ammunition which are carried by rail in intermodal transport must also conform to the applicable conventions as far as their construction, loading and marking is concerned.

1.7.7.3 *Inland Water Transport*

Vessels carrying ammunition and explosives in containers must not carry other dangerous goods. Containers must have a current CSC approval plate. Holds which do not contain ammunition and explosives may only be loaded with non-flammable goods.

1.7.7.4 *Sea Transport*

Containers must have a current CSC approval plate. Ships carrying containers loaded with ammunition and explosives must follow the segregation rules in the IMDG Code, Sections 15 and 17 and the regulations in Part V of this manual.

1.7.7.5 *Air Transport*

- to be completed -

NATIONAL POINTS OF CONTACT FOR CLASSIFICATION

National points of contact for classification

1 BELGIUM

a. Military ammunition and explosives:

Div Log Sp - Staf Eval - SIPEG
Fort Kolonel IMF BROSIUS
2070 ZWIJNDRECHT
Tel: 0032/3/253 7248
Fax: 0032/3/253 7269

b. Civil ammunition and explosives:

MINISTERIE VAN ECONOMISCHE ZAKEN
Koning ALBERT II-Iaan Nr 16
1000 BRUSSEL
Tel: 0032/2/20 64 111 or 0032/2/20 64 906

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2 CANADA

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3 DENMARK

a. Military ammunition and explosives.

ARMY
Hærens Materielkommando
Arsenalvej 55
9800 Hjørring
Tel: ++45 98901322
Fax: ++45 98900623
NAVY
Søværnets Materielkommando
Holmen
1433 København K
Tel: ++45 32663266
Fax: ++45 32663299
AIR FORCE
Flyvematerielkommandoen
Postboks 130
3500 Værløse
Tel: ++45 44682255
Fax: ++45 44662533

b. Civil ammunition and explosives

Justitsministeriet
Civilkontoret
Slotholmsgade 10
1216 København K
Tel: ++45 33923340
Fax: ++45 33933510

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4 FRANCE

Inspecteur de l'armement pour les poudres et explosifs
DGA/IPE
BP 20
92211 SAINT-CLOUD CEDEX - FRANCE
Telephone: 33 1 47 71 43 89
Fax: 33 1 47 71 43 22

5 GERMANY

a. For military ammunition and explosives
Wehrwissenschaftliches Institut für Werk-, Explosiv-und
Betriebsstoffe (WIWEB)
Bundeswehr Research Institute for Materials
Explosives and Petroleum, Oils and Lubricants
(BRIMEPOL)
Grosses Cent
D-53913 SWISTTAL
Tel: ++49 22 22 - 60 08 1
Fax: ++49 22 22 - 18 52

b. For civilian explosives and articles containing explosive substances
Bundesanstalt für Materialforschung und Prűfung (BAM)
Federal Institute for Materials Testing
Unter den Eichen 87
D-12205 BERLIN
Tel: ++49 30 - 81 04 1
Fax: ++49 30 - 81 21 00 6

6 GREECE

7 ITALY

a. Military ammunition and explosives:
MINISTERO DELLA DIFESA
Direzione Generale degli Armamenti Terrestri
Via Marsala 12, 00185 ROMA
Tel: 0039-06-4735-6476
Telefax: 0039-06-4466220

b. No Military ammunition and explosives:
MINISTERO DEI TRASPORTI DELLA NAVIGAZIONE
Dipartimento Trasporti Terrestri
Unità di Gestione Motorizzazione e Sicurezza Trasporto Stradale-MOT4
Via Guispeppe Caraci 36, 00157 ROMA
Tel: 0039-06-41586186
Telefax: 0039-06-41586200

8 LUXEMBURG

9 NETHERLANDS

Directory of Material, Procurement Division
Staff Group Procurement Management
Section Military Committee on Dangerous Goods
PO Box 90822, 2509 LV The Hague
NETHERLANDS
Telephone : --31 70 316 5090
Telefax : --31 70 316 5091

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10 NORWAY

a. For military ammunition and explosives:

1) Hærens forsyningskommandos ammunisjonskontroll
Postboks 24,
N-2831 RAUFOSS
Norway
Tel: ++47 61 19 1230

2) Sjøforsvarets forsyningskomando
Postboks 3,
N-5078 HAAKONSVERN
Norway
Tel: ++47 55 50 2000

3) Luftforsvarets forsyningskommando
Postboks 10,
N-2007 KJELLER
Norway
Tel: ++47 63 80 8000

b) For civilian explosives and articles containing explosive substances:
DIREKTORATET FOR BRANN OG EXPLOSIONSVERN
Postboks 355, Sentrum
N-3101 TØNSBERG
Norway
Tel: ++47 33 39 8800

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11 POLAND

a. Military ammunition and explosives:
General Staff of the Polish Armed Forces
General Logistics Directorate (J4)
Material & Technical Division
00-911 Warszawa 62
24 Lekarska Street
tel: +48 22 6876786
fax: +48 22 6876786

b. Civil ammunition and explosives:
Institute of Industrial Organic Chemistry
(Instytut Przemyslu Organicznego)
03-236 Warszawa
Annopol 6
tel: +48 22 8111231
fax: +48 22 8110799

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12 SPAIN

13 TURKEY

a. For military ammunition and explosives:
Ministry of Defence
ANKARA

b. For non-military explosives:
Ministry of Internal Affairs
ANKARA

14 UNITED KINGDOM

Explosives Storage and Transport Committee
Defence Ordnance Safety Group
Technical Secretariat 2
Ash 2b #3212
MOD Abbey Wood
Bristol BS34 8JH
(civil net) Tel: +44(0) 117 91 35592/35763
Fax: +44(0) 117 91 35903
(mil net) Tel: 9352 35592/35763
Fax: 9352 35903

15 UNITED STATES

a. Military ammunition and explosives:
Chairman DoD Explosives Safety Board
Room 856C, Hoffman Building I
2461 Eisenhower Avenue
Alexandria, VA 22331-0600
USA
Tel: ++1-703-325-8624 (DSN 221-8624)
Fax: ++1-703-325-6227

b. Non-military explosives:
Associate Administrator for Hazardous Materials Safety
Material Transportation Bureau
RSPA/DOT
400 7th Street, S.W.
Washington, DC 20590
USA
Tel: ++1-202-366-0656
Fax: ++1-202-366-3753

DUTIES OF AN AUTHORIZED REPRESENTATIVE

Duties of an authorised representative

1. *General*

a) He is responsible for ensuring that stuffing/unstuffing and loading and unloading is carried out safely and in accordance with this Manual.

b) Prior to the beginning of the operation the Authorized Representative is to liaise with the appropriate local authority to ensure that he has the authority to carry out his duties.

c) He is responsible for stopping the operation in case of unsafe practices or violations of regulations he may observe.

d) He is to bring unsafe practices or violations of regulations to the immediate attention of the appropriate (local) authority.

e) He is to carry out his duties in close co-operation with other experts involved in the operation.

f) He is responsible for ensuring that the means of transportation and their locking devices are serviceable, safe and comply with the regulations.

2. *Stuffing/Unstuffing*

a) He is to bring to the attention of an ammunition expert any load or part load damaged, dropped or found with broken seals in order to confirm its safe condition before proceeding further with stuffing/unstuffing operations.

b) He is to make up and sign the Container Packing Certificate. Examples are given in Appendix 1.

3. *Loading and unloading*

a) He is to be present during the loading, unloading or inter-modal transfer of ammunition and explosives.

b) He is to provide himself with a copy of the regulations relevant to the mode(s) of transport to be used.

c) He is to familiarise himself with the regulations, mentioned under b., so that he can ensure that the means of transport, markings and transport documents conform to those regulations.

d) When a means of transport or freight container loaded with ammunition or the ammunition in it is damaged during transport, the whole load is to be examined by an ammunition expert in order to confirm safe condition for further transport.

MILITARY MULTIMODAL DANGEROUS GOODS FORM

1. Shipper / Consignor / Sender		2. Transport document number		
		3. Page of Pages	4. Shipper's reference	
			5. Freight Forwarder's reference	
6. Consignee		7. Carrier (to be completed by the carrier)		
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labelled / placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.		
8. *This shipment is within the limitations prescribed for: (Delete non-applicable)* PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY		9. Additional handling information		
10. Vessel / flight no and date	11. Port / place of loading			
12. Port / place of discharge	13. Destination			

14. Shipping marks	* number and kind of packages, description of goods	Gross mass (kg)	Net mass	Cube (m^3)

15. Container identification No / Vehicle registration No.	16. Seal number (s)	17. Container/vehicle size & type	18. Tare (kg)	19. Total gross mass (incl tare) (kg)

CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/loaded into the container/vehicle identified above in accordance with the applicable provisions MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/LOADING	21 RECEIVING ORGANISATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition unless stated hereon. RECEIVING ORGANISATION REMARKS:	
20. Name of company	Haulier's name	22. Name of company (OF SHIPPER PREPARING THIS NOTE)
Name / Status of declarant	Vehicle reg no.	Name/Status of declarant
Place and date	Signature and date	Place and date
Signature of declarant	DRIVER'S SIGNATURE	Signature of declarant

* FOR DANGEROUS GOODS: you must specify proper shipping name, hazard class, UN no, packing group (where assigned) and any other element of information required under applicable national and international regulations

MILITARY MULTIMODAL DANGEROUS GOODS FORM

Continuation Sheet

1. Shipper / Consignor / Sender	2. Transport document number	
	3. Page of Pages	4. Shipper's reference
		5. Freight Forwarder's reference

14. Shipping marks	* number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

* FOR DANGEROUS GOODS: you must specify proper shipping name, hazard class, UN no, packing group (where assigned) and any other element of information required under applicable national and international regulations

HANDLING CONTAINERS WITH MILITARY AMMUNITION AND EXPLOSIVES

Handling containers with military ammunition and explosives

1. *Initial survey of facilities for handling containers stuffed with ammunition and explosives*

a) Prior to the decision to utilise a specific facility for handling containers stuffed with ammunition and explosives, port facilities or road or rail terminals, a quality assurance type survey of the considered facilities should be made by a qualified person to verify their capacity to handle ammunition in safe conditions.
In particular it is necessary to make sure that:

1. responsibilities inside the organisation in charge of the facilities are well defined as well as the distribution of the responsibilities between the representatives of this organisation and the Authorized Representative

2. material handling equipment is operated by skilled personnel having knowledge of explosives safety

3. safety instructions for handling containers stuffed with ammunition exist and are known by the personnel who have to apply them

4. all handling equipment is subject to prescribed inspections with written procedures which can be easily checked

5. fire-fighting equipment is sufficient, adequately located and periodically inspected.

b) It is advisable to check the premises and the surroundings, where handling of containers takes place, to ensure recommended quantity distances are observed (see "Manual on NATO Safety Principles for the Storage of Ammunition and Explosives, Parts I-IV": AC/258-D/258).

2. *Survey before and during Handling Operations*

a) Personnel in charge of handling equipment must ensure that before starting any handling operation, that equipment is up-to-date with the prescribed inspections, that their mobile accessories are serviceable and that hoisting capacity is adequate for the work to be done.

b) Only suitable equipment is used for hoisting containers.

c) Local instructions for handling of containers should be complied with.

d) No damaged container may be handled until a proper refit is made and an inspection carried out by a qualified person.

MANUAL OF NATO SAFETY PRINCIPLES

FOR THE TRANSPORT OF

MILITARY AMMUNITION AND EXPLOSIVES

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting form the use of this document".

PART II

TRANSPORT BY ROAD

CHAPTER 1 - GENERAL

Section I - Introduction

2.1.1.1 *Purpose*

a) This part of the Manual contains the safety principles to be used by visiting NATO forces during transport of military ammunition and explosives in military vehicles in host countries.

b) Annex II-B contains additional requirements to be followed by visiting forces in the host country concerned. The principles are not intended to inhibit a visiting force from imposing its own more stringent regulations.

c) This part of the manual does not apply to movement of ammunition in tactical vehicles (see 2.1.2.1.).

d) Derogations from the provisions of this part of AASTP-2 may be made in the case of emergency transport to save human life.

2.1.1.2 *Disclaimer*

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting form the use of this document".

2.1.1.3 *Observation*

THIS PART OF THE MANUAL IS TO BE USED IN CONJUNCTION WITH THE GENERAL REQUIREMENTS OF PART I.

Section II - Definitions

The following definitions explain terms specific to road transport. More general definitions are contained in Part I Chapter 2.

2.1.2.1 *Tactical Vehicle*

A military vehicle which is neither intended nor used for logistic transport of ammunition. The ammunition carried by this type of vehicle is for use by its own weapon(s) and crew, or for direct support in tactical situations. Such vehicles may or may not be fighting vehicles; they may or may not be armoured vehicles.

2.1.2.2 *Military Logistic Vehicle*

A vehicle belonging to or under the orders of the armed forces and which is intended and used for transport of cargo.

CHAPTER 2 - VEHICLE REQUIREMENTS

2.2.0.1 *General*

Military logistics vehicles may be used for the transport of ammunition and explosives. They shall be approved for the transport of ammunition and explosives under national arrangements.

2.2.0.2 *Types of Military Logistics Vehicles*

Military logistics vehicles are defined as follows:

a) Spark ignition military vehicles: any petrol or gasoline fuelled vehicles.

b) Standard Military Vehicles: compression ignition vehicles, other than Special Military Explosives Vehicles. These standard vehicles comprise the bulk of the logistic vehicles in most armies. They should be closed or sheeted. They may be flat-beds or demountable rack vehicles. They may carry containers.

c) Special Military Explosives Vehicles: these are specialised, closed, compression ignition vehicles which meet the standards of ADR type EX/III.

2.2.0.3 *Trailers*

a) If the transport unit includes a trailer, this trailer shall have a coupling device which is quickly detachable and robust; it shall be fitted with an effective braking device which acts on all the wheels, is actuated by the drawing vehicle's service-break control and automatically stops the trailer in the event of breakage of the coupling.

b) A transport unit loaded with ammunition and explosives may in no case include more than one trailer or semi-trailer.

2.2.0.4 *Vehicle Safety Requirements*

a) The vehicle must be roadworthy and inspected regularly. Road and operational safety must be assured.

b) The cargo area must be clean and free from protruding nails etc.

2.2.0.5 *Fire-fighting Appliances*

a) Every transport unit carrying ammunition and explosives shall be equipped with:

1. at least one portable fire extinguisher of minimum capacity 2 kg dry powder (or equivalent rating for suitable extinguishants) suitable for fighting a fire in the engine or cab of the transport unit, and such that, if it is used to fight a fire involving the load, it does not aggravate the fire and, if possible, controls it; however, if the vehicle is equipped with a fixed fire extinguisher automatic or easily brought into action for fighting a fire in the engine, the portable extinguisher need not be suitable for fighting a fire in the engine;

2. in addition to the equipment prescribed under 1. above, at least one portable fire extinguisher of minimum capacity 6 kg dry powder (or equivalent rating for suitable extinguishants) suitable for fighting a tire/brake fire or one involving the load, and such that, if it is used to fight a fire in the engine or cab of the transport unit, it does not aggravate the fire. Motor vehicles with a permissible laden weight of less than 3.5 tons may be equipped with a portable fire extinguisher of a minimum capacity of 2 kg dry powder.

b) The extinguishing agents contained in the fire extinguishers with which a transport unit is equipped shall be such that they are not liable to release toxic gases into the driver's cab or under the influence of the heat of the fire.

c) (Reserved).

d) The portable fire extinguishers conforming the provisions of sub-paragraph a)1. above shall be fitted with a seal verifying that they have not been used. In addition they shall bear a mark of compliance with a standard recognised by a competent authority and an inscription indicating the date when they should next be inspected.

2.2.0.6 *Electrical Equipment*

The rated voltage of the electric lighting system shall not exceed 24 Volts. Batteries shall be adequately secured and protected from damage due to collision, and shall have their terminals protected by an electrically insulating cover.

2.2.0.7 *Miscellaneous Equipment*

Every transport unit carrying dangerous goods shall be equipped with:

a) For each vehicle, at least one scotch of a size suited to the weight of the vehicle and to the diameter of the wheels;

b) The necessary equipment to take the general actions referred to in the safety instructions set out in the Explosive Hazard Warning sheets at Annex C to Part II, in particular:

1. for the protection of the driver, two suitable warning vests and two handlamps (battery powered with non-metallic body safety torches)

2. for the protection of the public, two selfstanding warning signs (e.g. reflective cones or triangles or flashing amber lights which are independent from the electrical equipment of the vehicle).

c) The necessary equipment to take the additional and special actions referred to in the safety instructions set out in the Explosive Hazard Warning sheets and Supplementary Hazard Warning sheets at Annex C to Part II.

2.2.0.8 *Vehicle Marking (Plates)*

Transport units carrying ammunition and explosives shall display two rectangular reflectorised orange-coloured plates of 40 cm base and not less than 30 cm high, set in a vertical plane. The plates shall have a black border not more than 15 mm wide. They shall be affixed one at the front and one at the rear of the transport unit, both perpendicular to the perpendicular axis of the transport unit. They shall be clearly visible. If the size and construction of the vehicle are such that the available surface area is insufficient to affix these orange-coloured plates, their dimensions may be reduced to 300 mm for the base, 120 mm for the height and 10 mm for the black border. Orange coloured plates which do not relate to dangerous goods being carried, or residues thereof, shall be removed or covered. If plates are covered, the covering shall be total and remain effective after 15 minutes engulfment in fire.

2.2.0.9 *Vehicle Labelling (Placarding)*

a) Vehicles carrying packages or articles conforming Hazard Divisions 1.1. through 1.6 shall be labelled in a similar way on both sides and the rear. The compatibility group shall be indicated if the vehicle is carrying ammunition and explosives only belonging to one compatibility group.

b) Each container loaded with ammunition or explosives shall be labelled as in para 2.2.09 c) to e) at both sides and each end;

c) The vehicle shall only bear labels conforming to the most dangerous division in the order 1.1, 1.5, 1.2, 1.3, 1.6 and 1.4.

d) Whenever packages of ammunition are required to carry additional hazard labels, these labels should be shown on the outside of the vehicles.

e) Labels which do not relate to ammunition and explosives being carried shall be removed or covered.

CHAPTER 3 - LOADING AND UNLOADING VEHICLES

2.3.0.1 *Limitations of Quantities carried (by Vehicle type)*

a) The NEM in kg of the ammunition and explosives to be loaded on one transport unit should be limited as indicated in the table below:

Type of vehicle	Hazard Divisions						
	1.1	1.2	1.3	1.4	1.4S	1.5	1.6
Spark Ignition Military Vehicle	50	50	50	300	unlimited	50	50
Standard Military Vehicle	7,500	7,500	7,500	15,000	unlimited	5,000	15,000
Special Military Explosives Vehicle	15,000	15,000	15,000	15,000	unlimited	15,000	15,000

b) Where quantities requiring a Special Military Explosives Vehicle (meeting the standard of ADR Type III) are being carried in containers to or from harbour areas, rail terminals or airports of arrival or departure as part of a multinational journey, a suitable Standard Military Vehicle may be used instead, provided that the containers being carried comply with the appropriate requirements of the IMDG Code, the RID or the ICAO Technical Instructions.

2.3.0.2. *Transport of Small Quantities (and Any Quantity of 1.4S)*

For the transport of ammunition and explosives in quantities not greater than those given in the table below, the following requirements in part II **do not** apply:

- 2.2.0.2. types of vehicles
- 2.2.0.3. trailers
- 2.2.0.5.a)2 additional fire extinguishers
- 2.2.0.6. electrical equipment
- 2.2.0.7.b)c) vehicle equipment
- 2.2.0.8. vehicle markings (plates)
- 2.2.0.9. vehicle labelling (placarding)
- 2.4.1.1.a) escort/attendant
- 2.4.1.1.f) passengers
- 2.4.1.2. education of drivers
- 2.4.1.3 documents to be carried (except that the Transport Document must always be carried)
- 2.4.1.6. convoys.

Table of maximum quantities (Net Explosive Mass) for which the above applies:

Classification		maximum. NEM	multiply factor
1.1	articles	20 kg	50
1.1	substances	20 kg	50
	(UN 0081, 0082, 0084, 0241 only-	50kg)	
1.1 L	articles/substances	None	
1.2	articles	20 kg*	50
1.2	substances	20 kg	50
1.2 L	articles/substances	None	
1.3	articles	20 kg*	50
1.3	substances	20 kg	50
1.3 L	articles/substances	None	
1.4	articles	333 kg	3
1.4	substances	333 kg	3
1.4 L	articles/substances	None	
1.4 S	articles/substances	Unlimited	
1.5	substances	20 kg	50
	(UN 0331, 0332, 0482 only	50 kg)	
1.6	articles	333 kg	3

When mixing loads of different quantity limits, the figures of the actual quantities multiplied by the given factor in the third column, added together may not exceed the total of 1,000.

* Except for ammunition of compatibility group H containing white phosphorous, the figure is considered to be 50 kg gross-mass.

2.3.0.3 *Places of loading and unloading*

a) The following operations are prohibited:

- loading or unloading ammunition or explosives in a public place in a built-up area without special permission from the competent authorities;

- loading or unloading ammunition or explosives in a public place elsewhere than in a built-up area without prior notice thereof having been given to the competent authorities, unless these operations are urgently necessary for reasons of safety.

b) If for any reason handling operations have to be carried out in a public place, then ammunition and explosives of different kinds shall be separated according to the labels:

2.3.0.4 *Cleaning before loading*

Before ammunition and explosives are loaded, the loading surface of the vehicle shall be thoroughly cleaned.

2.3.0.5 *Handling and Stowage*

a) Packages of ammunition or explosives shall be properly stowed on the vehicle and secured by appropriate means to prevent them from being significantly displaced in relation to each other and to the walls of the vehicle. Evenly distributed loads may be protected, for example by the use of side-wall fastening straps, slatboards and adjustable brackets, airbags and anti-slide locking devices. The load is also sufficiently protected within the meaning of the first sentence if each layer of the whole loading space is completely filled with packages.

b) Loads must not extend beyond the cargo floor area.

c) All the provisions in this part which relate to the loading and unloading of vehicles and to the stowage and handling of ammunition and explosives shall also apply to the loading, stowage and unloading of containers onto and from vehicles.

d) During a transport operation a driver or a driver's assistant may not open a package containing ammunition or explosives.

2.3.0.6 *Stowage of Vehicles for Intermodal Transport*

Restraint parameters should be based on the figures in paragraph 1.7.5.6:

2.3.0.7 *Cleaning after Unloading*

If, when a vehicle or container which has been loaded with packaged ammunition or explosives is unloaded, some of the contents are found to have escaped, the vehicle shall be cleaned as soon as possible and in any case before reloading.

2.3.0.8 *Fire Precautions*

The use of fire or naked flame, and smoking, shall be prohibited on vehicles carrying ammunition or explosives, in their vicinity and during loading and unloading of ammunition or explosives.

2.3.0.9 *Refuelling*

Refuelling is prohibited during loading and unloading ammunition and explosives.

2.3.0.10 *Loading and Unloading in Containers*

The provisions of this part which relate to the loading and unloading of vehicles and the stowage and handling of ammunition and explosives shall also apply to the loading and unloading of ammunition or explosives in containers (see Part I, Chapter 7, Sections V and VI for details).

2.3.0.11 *Running of engine during loading and unloading*

Except where the engine has to be used to drive pumps or other appliances for loading and unloading the vehicle and the laws of the country in which the vehicle is operating permit such use, the engine shall be shut off during loading and unloading operations.

2.3.0.12 *Safety Checks*

a) The driver of the vehicle is to ensure that the load is secured before the start of the journey and that no part of is likely to fall from the vehicle during the journey.

b) On completion of loading, the vehicle is to be checked to ensure that it is not loaded beyond its maximum capacity.

2.3.0.13 *Mixed Loading*

In addition to the mixing rules within Class 1, packages bearing the label for Class 1 (except 1.4S) may not be mixed with any other dangerous goods of Classes 2 to 9. This prohibition also applies to a transport unit consisting of a motor vehicle and a trailer.

CHAPTER 4 - SAFETY IN TRANSIT

Section I - Normal procedures

2.4.1.1. *General*

a) Vehicles must be accompanied by an escort/attendant, who shall be able to take over from the driver.

b) Ammunition and explosives should be transported, as far as possible, during daylight hours. When it is necessary for a journey to include an overnight stop, the visiting force is to make suitable arrangements for the security and safety of the ammunition at a staging point before the journey is started in accordance with STANAG 2156.

c) Whenever practicable routes should avoid built up areas, dense traffic and poor road conditions. Consideration should be given to dangerous road junctions, steep gradients, narrow streets, prohibited areas including tunnels, bridges and ferries and areas which are known to be affected by fog and wind. Where possible a reconnaissance of the route should be undertaken.

d) No unauthorised person and no person suspected to be under the influence of drugs or alcohol should be allowed to approach ammunition and explosives.

e) No person is allowed to travel in a load compartment.

f) No passengers may be carried on vehicles transporting ammunition and explosives.

2.4.1.2 *Education of driver*

Drivers must be properly trained. The minimum requirements for the education of drivers should comprise:

1. General requirements for the transportation of dangerous goods.

2. Hazard characteristics of ammunition and explosives.

3. Preventive and safety measures appropriate to the hazard.

4. What to do after an accident (first aid, road safety, basic knowledge about the use of protective equipment etc.).

5. Hazard marking and information.

6. Duties and responsibilities during the transport, including mixed loading and precautions during loading and unloading.

7. The purpose and method of operation of technical equipment (including fire extinguishers) on vehicles.

8. Prohibitions on mixed loading in the same vehicle, container or transport unit.

9. Precautions to be taken during loading and unloading of ammunitions and explosives.

2.4.1.3 *Documents to be Carried in the Transport Unit*

Drivers of vehicles carrying military ammunition and explosives must carry the documents given below, which must be carried in the driver's cab. Any such documents which are not applicable to the ammunition and explosives actually on board the vehicle shall be kept separate from pertinent documents in such way as to prevent confusion. The consignor or operator of the vehicle responsible for briefing them shall ensure that the drivers concerned understand and are capable of carrying out their instructions properly. The documents are as follows:

1. A Military Multimodal Dangerous Goods Form (an example of which is at APPENDIX 1 to ANNEX I-B) including the CONTAINER/VEHICLE PACKING CERTIFICATE signed by the Authorised Representative.

2. Explosives Hazard Warning Sheets, in the form of Accident Information Sheets describing the different hazard divisions, and Supplementary Hazard Warning Sheets, all giving the required safety measures and precautions. These should be prepared by each nation, based on the information given in Annex II-C and, if listed, additional regulations listed in Annex II-B.

3. A valid certificate of training, issued by a National Authority, for transportation of ammunition and explosives.

4. A permit authorising the transport operation, supplied by the competent authority, when explosives samples, n.o.s., or explosives packaged as P101 are carried.

5. Where necessary a road movement credit (AMovP 3, Chap 3) which will include an authorised route and staging posts.

2.4.1.4 *Fire Precautions*

a) Smoking, fire and naked lights are not allowed in the vehicle, or within 25 m of it. Matches and lighters must be contained in a closed metal box under supervision of the driver.

b) If spare fuel is carried, it must only be carried in UN certified jerricans.

c) The engine and lights are to be switched off before refuelling takes place.

d) The position of camouflage nets on vehicles is to be carefully chosen to reduce the fire risk.

2.4.1.5 *Speed Limits*

The speed of the vehicle should conform to local traffic laws and be consistent with road and weather conditions. In the absence of local traffic laws or posted speed limits, the speed shall not exceed 85 km/h.

2.4.1.6 *Convoy*

In a convoy (more than two vehicles) the first and last vehicles, and the fifth and each successive fifth vehicle, must be accompanied by an assistant. When vehicles carrying ammunition and explosives travel in convoy, a distance of not less than 50 m shall normally be maintained between each transport unit and the next.

2.4.1.7. *Halts*

a) Periodic halts should be made initially after 30 minutes and thereafter at intervals of not more than two hours of driving to check stability and security of the load and to ensure that there is no overheating of any part of the vehicle. Such halts should be made only where there is no hazard to other road-users and at least 300 m, if possible, from inhabited buildings and assembly places.

b) During thunderstorms, vehicles are not to stop in built up areas, or under trees or other features which would attract a lightning strike. Halts in a suitable place should always be made if road or weather conditions become very bad.

2.4.1.8 *Parking Restrictions*

a) Parking is not allowed within 300 m of inhabited buildings or assembly places.

b) A distance of 50 m is required between parked vehicles loaded with ammunition and explosives, but exceptionally a distance of not less than 25 m may be used if local conditions demand this.

c) Vehicles must not be left unattended outside a secure area.

d) No transport unit carrying ammunition and explosives may be parked without the parking brakes being applied.

2.4.1.9 *Use of Warning Signs*

When the vehicle stops on the road during darkness, bad weather, breakdowns or when involved in an accident, two self-standing warning signs (as specified in paragraph 2.2.0.7) shall be placed on the road following the guidance given in paragraph 2.4.2.1.1.

Section II - Emergency procedures

2.4.2.1 *Action in the event of a Breakdown*

If a vehicle transporting ammunition and explosives breaks down, the vehicle crew must ensure that:

1. Other traffic is warned by putting out the warning signs mentioned in paragraph 2.4.1.9. Where these are triangles or reflective cones they should be put at a distance of approximately 100 m in front of and behind the vehicle. Where they are flashing amber lights, they should be put approximately 10 m in front of and behind the vehicle. In each case these distances may be varied according to local road and/or weather conditions.

2. The vehicle may be towed to a safe area, clear of the traffic lanes, and at least 300 m from inhabited buildings.

3. No smoking, naked flames or unauthorised persons are to be allowed within 25 m of the vehicle.

4. Minor repairs may be carried out providing they are without risk of fire or other hazard.

5. Major repairs, i.e. requiring movement of the vehicle to a repair garage, should not be carried out until the load has been transferred to a relief vehicle. The appropriate authority of the host country (see Annex II-A) or the commanding officer of the nearest unit of his own force in the host country should be contacted and a relief vehicle and work party requested as required.

2.4.2.2 *Action in the event of an Accident*

When a vehicle, transporting ammunition and explosives, is involved in an accident the crew must:

1. Take immediate steps to safeguard the load, ensure that other traffic is warned as per paragraph 2.4.2.1.1. that spectators are kept at a safe distance, prevent smoking and the use of matches or naked lights within 25 m.

2. Notify the local police authorities about the accident details.

3. On arrival of the police at the scene, advise them of the nature of the load, hazards involved and safety precautions required.

4. Contact the appropriate authority of the host country (see Annex II-A) and request necessary assistance.

5. Inform the consignor or consignee unit, depending upon which of the two is closest.

6. Ensure that ammunition and explosives are not moved without authority of a qualified person.

2.4.2.3 *Action in the event of a Fire*

When a vehicle, transporting ammunition and explosives, is involved in a fire the crew must take action according to the Explosive Hazard Warning Sheets and Supplementary Hazard Warning Sheets issued to the driver.

2.4.2.4 *Explosives Hazard Warning Sheets - Accident Information Sheets*

a) As a precaution against any accident or emergency that may occur or arise during transport, the Accident Information Sheet describing the Hazard Division of the load and the required safety measures and precautions shall be present in a language the driver is able to read and to understand, and in all languages of the countries of origin, transit and destination of the transport.

b) When ammunition and explosives of different Hazard Divisions (mixed load) are loaded into the same vehicle, the accompanying Accident Information Sheet is that belonging to the most dangerous Hazard Division in the order 1.1, 1.5, 1.2, 1.3, 1.6 and 1.4.

2.4.2.5 *Supplementary Hazard Warning Sheets*

If the ammunition to be transported contains an additional hazardous substance some of which are listed below, the pertaining Supplementary Hazard Warning Sheet should be carried along. If ammunition containing several additional hazardous substances is transported, the Supplementary Hazard Warning Sheets for each of these substances should be carried along.

Listing of additional hazardous substances which may be contained in ammunition in addition to or instead of explosives and for which a Supplementary Hazard Warning Sheet may be required:

Hazardous Substance	Code Designation
White Phosphorus	WP
Chlorobenzylidene Malonic Acid Dinitrile, also termed Ortho-Chlorobenzalmalononitrile	CS
Chloroacetophenone	CN
Titanium Tetrachloride	FM
Hexachloroethane	HC
Red Phosphorus	RP
Thermite	TH
Pyrotechnic Charges	PT
Calcium Phosphide	CP
Unsymmetrical Dimethyl Hydrazine	UDMH
Inhibited Red Fuming Nitric Acid	IRFNA
Depleted Uranium	DU
Otto Fuel	OF

2.4.2.6 Explosives hazard warning sheets, consisting of accident information and supplementary hazard warning sheets prepared by each nation, should be based on the information given in ANNEX II-C and if listed, additional regulations listed in ANNEX II-B. (AASTP-2).

The need to consider supplementary hazards, and the criteria for determining them, are given at paragraph 1.4.0.5 in Part I.

2.4.2.7 *Protective equipment*

As an "appropriate respiratory protective equipment" for self-protection of the crew, when carrying ammunition and explosives of compatibility group "G", an NBC protective mask with a combined filter according to a corresponding standard would be sufficient in most cases, whereas in individual cases a special filter type might be required.

2.4.2.8 *First Aid*

The provision and administration of an "Adrenocortical Steroid Dosing Aerosol (e.g. Auxilosone, Beclomethasone and the like) as a First Aid treatment during the transport of special types of ammunition is left to the national authorities.

NATIONAL POINTS OF CONTACT FOR ROAD REGULATIONS

Country	Address and telephone number

BELGIUM

Armed Forces/Etat-Major Général
Operations Division/Sous-section transport (JSO-G/Tpt):
Quartier Reine Elisabeth,
Rue d'Evere
1140 BRUSSELS
Tel: ++32 2/701.31.42
Fax: ++32 2/701.34.87

Armed Forces/Etat-Major de la Force Terrestre
Section Logistique (GS4-Rav 5)
(for technical and safety problems)
Quartier Reine Elisabeth,
Rue d'Evere
1140 BRUSSELS
Tel: ++32 2/701.35.90
Fax: ++32 2/701.30.99

Groupe Contrôle des Mouvements
Etat-Major
Kwartier Maj. HOUSIAU - Bloc L18
Martelarenstraat, 181
1800 VILVOORDE (PEUTIE)
Tel: Transport Coordination: 02/255 5495
Officer S3: 02/255 5456
Bureau ROAD: 02/255 5458
Fax: 02/255.59.89

BELGIUM (continued)

Bureaux Locaux de Transport (BLT):

BLT BRUSSELS
Kwartier Maj. HOUSIAU - Bloc B10
Martelarenstraat, 181
1800 VILVOORDE (PEUTIE)
Tel: Commander : 02/255 5464
Bureau ROAD: 02/255 5494
Fax: 02/255 5480

BLT GENT
Coupure Rechts 100-102
9000 Gent
Tel: Secretariat 09/267 3626 or 3628
Fax: 09/267 3627

BLT LEOPOLDSBURG
Hechtelsesteenweg
Kamp van Beverloo
3970 LEOPOLDSBURG
Tel: Commander: 011/39 8579
Bureau ROAD: 011/39 8580
Fax: 011/39 8990

BLT LIÈGE
Quartier SLt Joncker
Rue St Laurent 79
4000 LIÈGE
Tel: Commander 04/220 8470
Section Road 04/220 8473
Fax: 04/220 8479

BLT NAMUR
Quartier Plaine de Belgrade
5001 BELGRADE
Tel: Commander 081/72 8450
Coordination 081/72 8454
Fax: 081/72 8455

BELGIUM (continued)

Bureau d'Exploitation Portuaire (BHU) Antwerpen
Marialei 53-54
2018 Antwerpen
Tel: Commander 03/285 7480
Fax: 03/285 7484

Bureau Exploitation Portuaire (BHU) Zeebrugge
Kwartier Knaepen
Veerbootstraat 20,
8380 BRUGGE 5
Tel: Commander 050/54.2980
Fax: 050/54.2984

CANADA

The Dangerous Goods Emergency Response Plan for the Department of National Defence is activated by contacting the Duty Officer at National Defence Operations Centre, Area Code 613, Telephone No.: 992-2708;

DENMARK

Movement Traffic Control Center
Army Operational Command Denmark
P.O. Box 59
DK 7470 KARUP J
Telephone: (++45) 9962 4970, ext 6808
Fax (++45) 9962 4978
E-Mail: hok-log08@mil.dk

FRANCE

Etat-Major de l'Armée de Terre (EMAT)
Bureau logistique - Section mouvement transport transit
14, rue Saint-Dominique
00453 ARMEES - FRANCE
Telephone - during office hours: 33 1 42 19 32 37
- outside office hours: 33 1 42 19 47 83

GERMANY

1. National Point of Contact for Road Regulations
German Armed Forces Hazmat Custodian
Joint Support Command
NBC-Defence/Safety Division - Branch IV
Postfach 906110
D-51127 Kőln
Tel: ++49 211-88 (Operator)
Fax:

2. Authorities for Emergencies:
Federal Ministry of Defense
Bundeswehr Operations Center
Postfach 1328
D-53003 BONN
Tel: ++49 228 - 12 5500
Fax: ++49 228 - 12 6636

GREECE Will be given

ITALY In any case of emergency, local Command of Carabinieri (MP) shall be called or one of the nearest Military Commands:

COMMANDO DELLE FORZE OPERATIVE TERRESTRI
(COMFOTER)
37100 VERONA
Tel: 0039-045-8095111
Telefax: 0039-045-8017162

COMANDO LOGISTICO D'AREA NORD
(COMLOG NORD)
35100 PADOVA
Tel: 0039-049-820197
Telefax: 0039-049-8202152

COMANDO LOGISTICO D'AREA SUD
(COMLOG SUD)
80100 NAPOLI
Tel: 0039-081-7080766
Telefax: 0039-081-7080727/0039-081-7513839

NETHERLANDS National Point of Contact for Road Regulations:

DMTO, Movcon-section
MPC 53P
PO Box 3003
3800 DA Amersfoort
Telephone: --31 346 338686
Fax: --31 346 338696
(In case of an accident the general emergency number: 112)

POLAND

In case of breakdown, accident or fire:

- Tel 997, depending upon risk situation the operator will initiate appropriate activities through the emergency and protection of population system;
- contact duty staff officer of the General Logistics Directorate, General Staff of the Polish Armed Forces, Warszawa
  tel: (0) 22 6875965
  fax: (0) 22 6874701

NORWAY

a. Civilian Emergency Authorities:

Southern Norway:
Hovedredningssentral Stavanger
Tel: 5164 6000

Northern Norway:
Hovedredningssentral Bodø
Tel: 7552 1267

b. Military Emergency Authorities:

South/West Norway:
Distriktskommando Sørvestlandet
Kristiansand MIL,
N-4604 KRISTIANSAND
Tel: 38 03 6000

Eastern Norway:
Distriktskommando Østlandet
PB 4024 Postterminalen
N-2301, HAMAR
Tel: 62 51 5000

Mid Norway:
Distriktskommando Trøndelag
Trondheim MIL
N-7001 TRONDHEIM
Tel: 73 99 5000

North Norway:
Distriktskommando Nord-Norge
PB 60

N-9401 HARSTAD
Tel: 77 01 4000

PORTUGAL		Will be given
SPAIN	1.	In case of breakdown or accident - Contact duty staff officer at territorial command HQ (Capitania General de la Region) or Traffic Civil Guard agent for any help. - Contact duty staff officer of the General Staff on the Army, Madrid, Phone 91-5327251.
	2.	Prior to journey telephone numbers of each Capitania General to be crossed should be noted.
	3.	Depending upon risk situation nearest police station can be contacted.

TURKEY	a.	Civil Authorities:	- Nearest police station. - City or province Gendarme Unit Command
	b.	Military Authorities:	- Garrison Command - Military Police

UNITED KINGDOM	1.	JSEODOC *Joint Service Explosive Ordnance Disposal Operations Centre* (manned 24 hours a day) Vauxhall Barracks DIDCOT Oxfordshire OX11 7ES Civil tel: 01235 513360/61/62 fax: 01235 513355 Mil. tel: 723 3360/61/62 fax: 723 3355
	2.	The nearest police station

UNITED STATES

1. In all cases the local or state police must be notified immediately
2. The nearest military base is to be contacted when it has been determined that Explosive Ordnance Disposal assistance is required.
3. The consignee is to be notified as soon as possible as to the condition of cargo and expected delay in delivery.
4. A detailed written report must be sent to Department of Transportation whenever there is any unintentional release of hazardous material during transportation.

ADDITIONAL REGULATIONS TO BE FOLLOWED BY VISITING FORCES IN HOST COUNTRIES

B E L G I U M

Additional regulations		Reference to Manual
Limitations on the load		
The net explosive weight is NOT to exceed 8000 kg.		Part II Chapter 3
Electrical detonators should always be carried in metal containers.		
Speed		
In urban centres:	Max 30 km/h	Para 2.4.1.5.
Outside urban centres:	Max 50 km/h	
On the motorway:	For single vehicles: On a horizontal road the speed will not be less than 70 Km/H. The Max speed shall not exceed 75 Km/H. The speed of a marked convoy is allowed to be under 70 Km/H, but shall not be less than 40 Km/H.	

C A N A D A

Additional regulations	Reference to Manual
Equipment The vehicle must also be equipped with: a. approved electro-static discharge straps; b. when icy roads are probable, a set of tyre chains for those wheels that are driven by the engine; and c. when carrying palletised ammunition, a tool capable of cutting the pallet banding.	Para 2.2.0.3.
Vehicle markings The vehicle must display: a. Four dangerous goods placards appropriate for the ammunition or explosives being transported. Placards will be displayed on the front, rear and both sides of the vehicle; and b. a sign affixed to the rear of the vehicle stating "This vehicle stops at uncontrolled railway crossings".	Para 2.2.0.4.
Stability and safety of loads Vehicle loads shall not exceed 80% of the rated capacity of the vehicle except for Hazard Division 1.4 Compatibility Group S which may be loaded to the rated capacity of the vehicle.	Part II Chapt 3
Routes Selected routes should avoid bridges, tunnels and ferries which restrict the transport of explosives. Major urban centres have signed dangerous goods routes which shall be utilised.	Para 2.4.0.1.

Additional regulations	Reference to Manual
When it is necessary to pass through a city, town or village carrying Hazard Division 1.1, 1.2 or 1.3 explosives, advance notice shall be given to local fire and police departments.	
Routes should be planned to avoid overnight stopovers. When necessary Department of National Defence establishments should be utilised for layovers.	
Routes having a minimum speed limit should be avoided.	
Vehicle Separation Vehicles spacing of at least 100 metres shall be maintained while moving or halted.	Para 2.4.1.6.
Halts Vehicles should be halted in open country after approximately 16 km and thereafter at two hour intervals to check security and stability of the load and to ensure that there is no overheating of any part of the vehicle.	Para 2.4.1.7.
Speed The speed of vehicles transporting ammunition and explosives shall conform to all local traffic laws, ordinances and bye-laws and be consistent with road and weather conditions, but in no case exceed 90 km per hour.	Para 2.4.1.5.
Parking restrictions Vehicles must be spaced 100 m apart.	Para 2.4.1.8.b)

D E N M A R K

Additional regulations	Reference to Manual
National regulations deviating from the safety principles in this manual are only requested to be followed by national forces. Visiting forces are therefore requested only to follow the safety principles in this manual	

F R A N C E

Additional regulations	Reference to Manual
Vehicle markings The black border of the orange-coloured boards may not exceed 15 mm. Further the back and the sides of the vehicle also must be marked with an orange-coloured board (placard) 25x25 cm, showing a black exploding bomb in the upper corner. NOTE: The military authority can, if he finds it necessary, exclude the use of these placards).	Para 2.2.0.4.
Mixed loading Fuzes must be in safety packages.	Part I Chapter 5
Stability and safety of loads The total weight of the ammunition may not exceed 20.000 kg either for a single vehicle or for a vehicle with a trailer. Furthermore it is forbidden: - to load or unload ammunition in public places except in the case of a serious incident (accident, breakdown, fire); -to open the ammunition package in the vehicle.	Part II Chapter 3
Loading and unloading Loading and unloading are forbidden in a built-up area, unless these operations are urgently necessary for reasons of safety.	Para 2.3.0.3
Fire precautions Spare fuel may not be carried.	Para 2.4.1.4.b)
Parking restrictions Parking in a public place is authorized only in the framework of the transport. Parking in a public place for storage is forbidden. - if the duration of the parking is between 2 and 12 hours, the distance between the vehicle and an habitation must be more than 10 metres (for 1.4, only if the weight is more than 3000 kg).	Para 2.4.1.8.b)

- if the duration is above 12 hours, the parking in a built-up area is allowed only in an authorized vehicle park. Outside a built-up area, parking is authorized in a public place. The distance between the vehicle and an habitation must be more than 50 metres (for 1.4, only if the weight is more than 3000 kg), except for vehicles with 1.4 goods, the distance between 2 vehicles must be more than 50 metres.

Advice on road transport is to be obtained from:

1er Commandement de Logistique Operationnelle
Section Transports
BP 28 57998 METZ ARMEES
Tel: 03 8752 2527/38
Fax: 03 8752 2514

Notification under AMovP3 Chapter 3 is to be given to:

Centre Operationnel de Transit Interarmees de Surface (C.O.T.I.S.)
BP 28 57998 METZ ARMEES
Tel: 03 8752 2735
Fax: 03 8752 2530

GERMANY

Additional regulations	Reference to Manual
Mixed loads In road transport, packages with ammunition of UN-Nos. 0015 or 0016 containing Hexachloroathane (HC) or red phosphorous (RP) are not provided with model No. 8 Danger Labels. These packages may be transported by road together with other packages displaying a Danger Label conforming to models Nos. 1 or 1.4.	Part I Chapter 5
Separation of vehicles in convoy The distance is at least 50m	Para 2.4.1.6
Action in a breakdown Para 2.4.1.9. Under bad visibility conditions the warning triangles are to be placed at a distance of 150 to 250 m in front of and behind the vehicle	Para 2.4.1.9

G R E E C E

Additional regulations	Reference to Manual

Will be given.

I T A L Y

Additional regulations	Reference to Manual
Mixed loads - Compatibility Groups Packages labelled n. 1, 1.4, 1.5 or 1.6 may be stowed together in the same vehicle in accordance with formalities shown in the following table	Para 1.5.0.3.

Compatibility group *	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**J**	**L**	**N**	**S**
A												
B				(1)								
C											(2)(3)	
D				(1)							(2)(3)	
E											(2)(3)	
F												
G												
H												
J												
L										(4)		
N			(2)(3)	(2)(3)	(2)(3)						(2)	
S												

NOTES

Mixed loading authorized.

* Admissibility to the road transport of goods in compatibility group K should be authorised by competent authority.

(1) Packages of substances and articles in compatibility group B and D may be loaded in the same vehicle, providing that they should be transported in container or in a separate compartment approved by competent authority, to prevent any transmission of detonation from articles in compatibility group B to substances or articles in compatibility group D.

Additional regulations | Reference to Manual

(2) Different types of articles of division 1.6, compatibility group B, may only be transported together when is proven that there is no additional risk of sympathetic detonation between the articles. Otherwise they should be treated as division 1.1.

(3) Articles of compatibility group N transported together with substances or articles of compatibility group C, D or E, should be considered as having the characteristics of compatibility group D.

(4) Packages containing substances and articles in compatibility group L, should only be stowed with packages containing the same substances and articles type within compatibility group L.

Type of Military Logistic vehicles — Para 2.2.0.2

Vehicles meet the standards of ADR types EX/II and EX/III

Miscellaneous Equipment — Para 2.2.0.7

Every transport unit should be equipped with two scotches.

Vehicle Marking (Plates) — Para 2.2.0.8

The transport unit must bear on lateral sides a plate written in red box capital letters "EXPLOSIVES".

Limitations of Quantities carried (by vehicle type) — Para 2.3.0.1

1. The NEM in Kg of the ammunitions and explosives to be loaded on one transport unit should be limited as indicated in the table below (7.5.5.2 ADR prescriptions):

Division	1.1		1.2	1.3	1.4		1.5 & 1.6	
Item No	01°	1°-12°	13°-25°	26°-34°	35°-45°	46°-47°	48°-49°	50°-91°
Transport unit								
EX/II	6,25	1000	3000	5000	15000	unlimited	5000	unlimited
EX/III	18,75	16000	16000	16000	16000	unlimited	16000	unlimited

2. Vehicle loads shall not exceed two thirds of the permitted carrying capacity of the vehicle. In any case the height of the load can't pass the height of the front, side and rear boards of the vehicle.

Additional regulations	Reference to Manual
Transport of small quantities 1.1.3.6 ADR prescriptions applies	Para 2.3.0.2
Places of Loading and Unloading Distance between vehicles when loading and unloading in a public place should be not less than 50 m.	Para 2.3.0.3.b)
Escort/Assistant A qualified person other than the driver in charge of the vehicle is always required when the transport unit moves alone.	Para 2.4.1.1.a)
Education of driver A valid driving licence, issued by National Military Competent Authorities, for the transport only of liquid substances in solution or moistened, phlegmatized with volatile or liquid etc. In any case, the drivers employed for a transport of articles and solid substances should be trained on: - general regulations on the transport of ammunitions and explosives; - driver's duties and responsibilities for the specific transport; - hazards connected with the transport goods, specific precautions for obviating them and how to behave in case of accident; - information on labelling and placarding of the load, and in case of a convoy, on the other transport units; - equipment and performances of the vehicle; - transport activity; - accident prevention and control. The driver must subscribe and carry a personal certificate of such training signed by the sending Commander.	Para 2.4.1.2
Speed limits 1. Outside inhabited centres 50 Km/h 2. Inside inhabited centres 30 Km/h	Para 2.4.1.5
Convoy 1. The presence of qualified second driver is not always required on board each vehicle. In fact for a truck convoy it is possible to provide a smaller number of qualified second drivers whenever it is possible to face the necessary substitutions manoeuvring the available personnel.	Para 2.4.1.6

Additional regulations	Reference to Manual

2. Outside inhabited centres the distance between vehicles with total mass over 3.5t should be not less than 100 m.

Halts — Para 2.4.1.7.a)

Halts should be made at least:
- 500 m far from inhabited buildings and assembly places;
- 100 m far from level crossings.

If for any reason it is not possible and vehicles have to stop for some hours, the nearest Carabinieri Station should be immediately notified.

Parking Restrictions — Para 2.4.1.8.a)

Parking is not allowed within 500 m of inhabited buildings or assembly places.

Action in the event of Breakdown — Para 2.4.2.1.1

The amber lights and the triangles at a distance respectively of 50 and 100 metres in front of and behind the vehicle.

NETHERLANDS

Additional regulations	Reference to Manual
a. There is no requirement for the driver's assistant to hold a valid ADR-certificate, but in that case he is not allowed to act as driver of the vehicle.	
b. The prohibition of mixing ammunition and explosives with dangerous goods of Classes 2 to 9 apply to each transport unit.	
c. The mixing of 1.1B fuzes and ammunition of compatibility group E or F in one vehicle is prohibited.	1.5.0.3
d. A military transport of ammunition and explosives conducted by a civilian vehicle under the orders of the armed forces must be accompanied or driven by a military representative.	
e. The authority for the application of STANAG 2155 (Road Movement Bid and Credit) for the Netherlands: DVVO/Traffic and Transport Coordination Cel PoBox 3003 3800 DA Amersfoort Tel: ++31 346 332770 Fax: ++31 346 332636	

N O R W A Y

Additional regulations	Reference to Manual
1. Transportation of ammunition on vehicles where the loading surface could be subject to uncontrolled heating is prohibited.	Para 2.2.0.1.
2. During winter tyre-chains are required.	Para 2.2.0.7.
3. The NEM in kg of ammunition to be loaded on a Standard Military Vehicle is limited to 15,000 kg for all hazard divisions, except for 1.4S. Standard military vehicles should only be used for transportation of ammunition: - during/for practice exercises - to meet operational important demands - for replacement of the units' ready load ammunition	Para 2.3.0.1.
4. The requirement for extra fire extinguishers do apply for small quantities.	Para 2.3.0.2.
5. Current Norwegian regulations do not have the requirement for the assistant to be able to take over from the driver.	Para 2.4.1.1.a)
6. Mobile telephone should be available in a Special Military Explosives Vehicle. All military vehicles transporting ammunition should carry radio communication.	
7. Transportation of ammunition is limited or prohibited in some tunnels and roads. Information should be given by the Norwegian authorities.	

POLAND

Additional regulations	Reference to Manual
Equipment The vehicle must also be equipped with a tool capable of cutting the pallet banding, when carrying palletized ammunition.	para 2.2.0.3
Speed Outside urban centres - 80 km/h (speedways); in urban centres - 50 km/h; outside urban centres - 70 km/h (ordinary roads).	para 2.4.1.5
Halts The places of the periodic halts should be provided according to "the Movement Credit" issuing by MOD of Poland. In the event extended halts advise the authority mentioned in "the Movement Credit".	para 2.4.1.7

S P A I N

Additional regulations	Reference to Manual
ADR or its derivative national regulation, the TPC, governs transport of dangerous civil goods. Military regulation adhere to it obligatorily by Order of MOD 7/1986. Exemptions are granted in case of defence interest	
Vehicle construction requirements Only fuels with an flammable point over 55 C are permitted. The tension of the vehicle electrical system must not exceed of 24 volts.	Para 2.2.0.1
Vehicle safety requirements A number of empty vehicles are added to convoy to provide for obliged transfers when breakdown occurs. It is stated in transport order.	Para 2.2.0.2
Vehicle markings Marking boards must be 40 x 40 cm at the back and front fairly up to make them clearly visible. The military authority may exclude this use for security reasons.	Para 2.2.0.4
Compatibility in loading ADR Marginal 11.403 applies.	Part I Chapter 5
Stability and safety of loads Maximum load shall not exceed 90 percent of the rated capacity of vehicle. ADR marginal 11.401 applies.	Part I Chapter 3

Additional regulations	Reference to Manual
Special safety requirements Transport of ammunition and explosives is forbidden from 1st of July to 15th September. Waivers may be granted by Army Transport Authority in case of urgency. It is also forbidden from Saturday 1300 hours to Sunday 2400 hours	Part II Chapter 4
Safety in transit. General No alcoholic beverages are allowed from six hours prior to start until the end of travel. When an overnight is envisaged the territorial command in Annex A has to be contacted to make suitable arrangements. This overnight stop is included in the transport order.	Para 2.4.1.1
Instruction to drivers Besides normal driving training necessary to obtain the military driving license, drivers are given a special, short course upon transport of ammo. and explosives, their effects, hazards, safety measures, actions in case of accidents, fire, etc. Before a specific mission a transport order is issued comprising all necessary conditions of execution.	Para 2.4.1.2
Fire precautions Smoking as well as carrying matches or ignition devices is forbidden in the vehicle and within 25 m around. Two portable fire extinguishers must be carried.	Para 2.4.1.4
Speed Maximum speed through urban areas is 40 km/h. Maximum speed through tunnels is 60 km/h.	Para 2.4.1.5
Separation of vehicles in convoy 80 m. 200 m through tunnels.	Para 2.4.1.6

Additional regulations	Reference to Manual
Halts Halts are established in transport order to check the load and resting. In duration of journey is expected to last more than 4 hours a halt of 30 minutes is prescribed; or two of 20 min. or three of 15.	Para 2.4.1.7
Parking restrictions A minimum distances of 350 m from built-up areas or inhabited building must be observed.	Para 2.4.1.8
Emergency procedures The chief of convoy, driver or assistant will adopt safety and security measures according to instructions in Hazard Warning Sheet, knowledge acquired during course and Circulation Code provisions, reporting immediately to nearest authority, police station, Traffic Civil Guard agent or military organisation who in turn will inform the Civil/Military Province Governor. The Civil Province Governor will act as indicated in the established Actuation Plan permanently approved by the General Director of Civil Protection. The Military Governor will activate, as appropriated, the technical assistance with pertinent instructions and responsibilities	Part II Chapter 2

T U R K E Y

Additional regulations	Reference to Manual
Will be given	

U N I T E D K I N G D O M

Additional regulations	Reference to Manual
Fire precautions Smoking and the use of naked lights is forbidden within a radius of 10m from where the ammunition and explosives are being carried, loaded or unloaded, or within 50m when refuelling.	Para 1.3.1.9.
Compatibility Group K Ammunition and explosives of compatibility group K are only to be transported for purposes of Explosive Ordnance Disposal (EOD) under arrangements made with the national authorities	Para 1.5.0.2.
Civilian vehicle under the control of the armed forces A civilian vehicle is regarded as being under the control of the Armed Forces only if the driver or attendant is a military or civilian employee of the visiting force. In the case of a convoy, at least the first and last vehicle, and the fifth and each successive fifth vehicle, must have such a driver or attendant on board.	Para 2.4.1.6.
Trailers The breaking requirements do not apply to small trailers.	Para 2.2.0.3.
Vehicle equipment 1. Wheel scotches are not required in UK.	Para 2.2.0.7.
2. Wherever pallets are carried, a tool must be carried capable of cutting the high tensile steel strapping around them. This is required for each independent vehicle, or on least every fifth vehicle when in convoy.	Para 2.4.1.9.

Additional regulations	Reference to Manual
Limitations of Quantities carried (by Vehicle type) 1. The maximum quantity of ammunition and explosives in hazard division 1.1 allowed for different types of vehicles depends on the compatibility group as well as the hazard division. Advice must be sought on the precise rules before bringing hazard division 1.1 into UK. 2. In UK vehicles equivalent to the AASTP-2 Standard Military Vehicle are allowed a maximum of 5000 NEM, rather than 7500 NEM.	Para 2.3.0.1.
Transport of Small Quantities The small quantity figures are greater than those in AASTP-2 in some cases. The rules concerning escorts/attendants are not changed in any way when transporting small quantities.	Para 2.3.0.2
Attendant In UK the attendant need no longer possess a vocational training certificate, and it is not necessary that he should be able to take over from the driver *[2003 change]*.	Para 2.4.1.1.a)
Fire Precautions - Spare Fuel Spare fuel in jerricans is not to be carried except where specifically authorised for exceptional reasons.	Para 2.4.1.4.b)
Convoys - Distances The distance between vehicles in convoy displaying orange plates should be at least 100 m on normal roads and 200 m on dual carriageways and motorways. In urban areas this may be reduced to 50 m.	2.4.1.6.
Explosive Hazard Warning Sheets The Explosive Hazard Warning Sheets used in UK are CEFIC TREMCARDs. No fire evacuation distances are given on these sheets.	Para 2.4.2.4

Additional regulations	Reference to Manual
Supplementary Hazardous Load Warning Sheets	Para 2.4.2.5.

The Supplementary Hazardous Load Warning Sheets required in UK are the following. Those marked * must be obtained from the UK authorities if the appropriate explosives are carried.

a. Depleted Uranium (AASTP-2 Annex II-C may be used)

b. White Phosphorous (AASTP-2 Annex II-C may be used)

c. Sub-Munitions which may Arm on Ejection*

d. Triethyl Aluminium (TEA).*

e. Rapier missile nose-cones.*

(* Instructions regarding Electro Explosive Devices (EEDs) are contained in the 'Notice to Crews' given to all drivers of vehicles carrying explosives)

Contacts for Advice and Notification for Road Transport

Advice from:
Explosives Storage and Transport Committee (ESTC)
Defence Ordnance Safety Group 2
Ash 2b #3212
MOD Abbey Wood, Bristol BS34 8JH
Tel: ++117 91 35763
Fax: ++117 91 35903

Royal Air Force
SO2 Mov DG, HQ Strike Command
RAF High Wycombe, Bucks HP14 4UE
Tel: ++1494 467677
Fax: ++1494 466872

Notification to:
Logistic Support Operations
Headquarters Land Command,
Erskine Barracks
Wilton, Salisbury, Wilts SP2 0AG
Tel: ++1722 433210

U N I T E D S T A T E S

Additional regulations	Reference to Manual
Vehicle markings Each vehicle or container is to be placarded on each end and each side. The placards are enlarged UN labels measuring 273.0 mm on each side, the outer 12.7 mm must be white. The centre of the placard is to have letters 56.4 mm high with a 9.5 mm stroke as follows: EXPLOSIVES A(1.1 AND 1.2) EXPLOSIVES B(1.3) DANGEROUS(1.4)	Para 2.2.0.4
Marking Standards Must be marked with US DOT requirements.	Part I Chapter 6
Mixed loading Mixing by DOT regulations only.	Part I Chapter 5
Fire precautions Spare fuel may not be carried.	Para 2.4.1.4.b)
Separation of vehicles in convoy A distance of 300 ft is required.	Para 2.4.1.6
Halts Not allowed to stop on travelled portion of road except for breakdown.	Para 2.4.1.7

EXPLOSIVES HAZARD WARNING SHEETS

ached. They do not have AASTP-2 page numbers but the date of the extant issue is shown.
in electronic form, for which instructions will be given separately

ION SHEETS

	28 June 2000
	28 June 2000
	28 June 2000
	28 June 2000
	28 June 2000
	28 June 2000

ARD WARNING SHEETS

stances which may be contained in ammunition in addition to or instead of explosives

	WP	12 July 2000
Acid Dinitrile		
enzalmalononitrile)		
	CS/CN	12 July 2000
	FM	12 July 2000
	HC	12 July 2000
	RP	12 July 2000
	TH	12 July 2000
	PT	12 July 2000
	CP	12 July 2000
ydrazine	UDMH	12 July 2000
Acid	IRFNA	12 July 2000
	DU	12 July 2000
	OF	12 July 2000

Accident Information Sheet ROAD

CLASS 1, DIVISION 1.1, ADR

UN – Number(s):



LOAD • Ammunition and explosives

NATURE OF DANGER
- Mass Explosion
- Blast
- High velocity fragments and debris
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached

Emergency:	
Austria	133
Belgium	100
Czech	158
Denmark	112
France	17
Germany	110
Italy	112
Netherlands	112
Norway	112
Poland	997(112)
Slovenia	113

PERSONAL PROTECTION
- Two self standing warning devices
- Warning vest or warning clothes for each crewmember
- Hand lamp for each crewmember
- See also supplemental hazard warning sheet, if attached

GENERAL • **KEEP CALM**

DRIVER ACTIONS
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary
- Stop engine. No naked lights; no smoking
- Secure accident area. Mark road hazard with warning devices
- Warn road users and passers-by about hazards. Advise to keep upwind if necessary.
- Provide first aid
- Guard cargo and keep unauthorized persons at least 25 meters away
- Do not touch dropped or projected ammunition
- Notify own agency/activity

ADDITIONAL AND/OR SPECIAL ACTIONS BY DRIVER
- Supplementary hazard warning sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire)
- Fight fire with all available means

ESTABLISHED FIRE – (cargo on fire)
- DO NOT fight fire
- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- Always seek significant cover (such as strongly built structure) Avoid glass surfaces

FIRST AID • Standard unless supplemental hazard warning sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:
- For further information call:

NATO AC/258 Group of Experts on the Safety Aspects of Transportation and Storage of Ammunition and Explosives, 1110 Brussels, Belgium

28 JUN 00

- Emergency Service fire withdrawal distance recommendations

FIRE **ESTABLISHED FIRE – (cargo on fire)**

- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- **Keep all persons (except firefighting personnel) away from fire area**

  Low risk -- at least 870 meters (up to 7500 kg NEM); 1120 meters (up to 16000 kg NEM)
  - Always seek significant cover (such as strongly built structure); avoid glass surfaces
- **Minimum distance for firefighting personnel**

  Medium risk to personnel – 435 meters (up to 7500 kg NEM); 560 meters (up to 16000 kg NEM)

  High risk to personnel – 188 meters (up to 7500 kg NEM); 250 meters (up to 16000 kg NEM)
- Fight ambient fires from covered position

Accident Information Sheet ROAD

CLASS 1, DIVISION 1.2, ADR

UN – Number(s):



LOAD • Ammunition and explosives

NATURE OF DANGER
- Progressive Explosions
- Fragments and debris
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached

PERSONAL PROTECTION
- Two self standing warning devices
- Warning vest or warning clothes for each crewmember
- Hand lamp for each crewmember
- See also supplemental hazard warning sheet, if attached

Emergency:	
Austria	133
Belgium	100
Czech	158
Denmark	112
France	17
Germany	110
Italy	112
Netherlands	112
Norway	112
Poland	997(112)
Slovenia	113

GENERAL • **KEEP CALM**

DRIVER ACTIONS
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary
- Stop engine. No naked lights; no smoking
- Secure accident area. Mark road hazard with warning devices
- Warn road users and passers-by about hazards. Advise to keep upwind if necessary.
- Provide first aid
- Guard cargo and keep unauthorized persons at least 25 meters away
- Do not touch dropped or projected ammunition
- Notify own agency/activity

ADDITIONAL AND/OR SPECIAL ACTIONS BY DRIVER • Supplementary hazard warning sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire)
- Fight fire with all available means

ESTABLISHED FIRE – (cargo on fire)
- DO NOT fight fire
- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- Always seek significant cover (such as strongly built structure) Avoid glass surfaces

FIRST AID • Standard unless supplemental hazard warning sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:
- For further information call:

- Emergency Service fire withdrawal distance recommendations

FIRE **ESTABLISHED FIRE – (cargo on fire)**

- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- **Keep all persons (except firefighting personnel) away from fire area**

  Low risk -- at least 1000 meters

  - Always seek significant cover (such as strongly built structure); avoid glass surfaces
- **Minimum distance for firefighting personnel**

  Medium risk to personnel – 390 meters

  High risk to personnel – 135 meters
- Fight ambient fires from covered position

Accident Information Sheet ROAD

CLASS 1, DIVISION 1.3, ADR

UN – Number(s):



LOAD • Ammunition and explosives

NATURE OF DANGER
- Explosions
- Fire; possibility of mass fire
- Firebrands may be projected
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached

Emergency:	
Austria	133
Belgium	100
Czech	158
Denmark	112
France	17
Germany	110
Italy	112
Netherlands	112
Norway	112
Poland	997(112)
Slovenia	113

PERSONAL PROTECTION
- Two self standing warning devices
- Warning vest or warning clothes for each crewmember
- Hand lamp for each crewmember
- See also supplemental hazard warning sheet, if attached

GENERAL • **KEEP CALM**

DRIVER ACTIONS
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary
- Stop engine. No naked lights; no smoking
- Secure accident area. Mark road hazard with warning devices
- Warn road users and passers-by about hazards. Advise to keep upwind if necessary.
- Provide first aid
- Guard cargo and keep unauthorized persons at least 25 meters away
- Do not touch dropped or projected ammunition
- Notify own agency/activity

ADDITIONAL AND/OR SPECIAL ACTIONS BY DRIVER • Supplementary hazard warning sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire)
- Fight fire with all available means

ESTABLISHED FIRE – (cargo on fire)
- DO NOT fight fire
- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- Always seek significant cover (such as strongly built structure) Avoid glass surfaces

FIRST AID • Standard unless supplemental hazard warning sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:
- For further information call:

NATO AC/258 Group of Experts on the Safety Aspects of Transportation and Storage of Ammunition and Explosives, 1110 Brussels, Belgium

28 JUN 00

- Emergency Service fire withdrawal distance recommendations

FIRE **ESTABLISHED FIRE – (cargo on fire)**

- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- **Keep all persons (except firefighting personnel) away from fire area**

  Low risk -- at least 160 meters

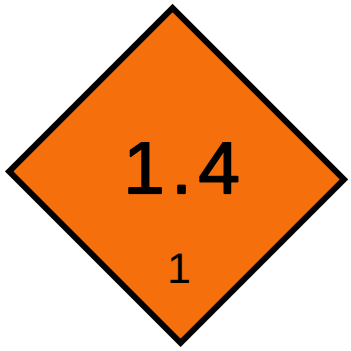
  - Always seek significant cover (such as strongly built structure); avoid glass surfaces
- **Minimum distance for firefighting personnel**

  High risk to personnel – 60 meters
- Fight ambient fires from covered position

Accident Information Sheet ROAD

CLASS 1, DIVISION 1.4, ADR

UN – Number(s):



LOAD • Ammunition and explosives

NATURE OF DANGER
- Moderate fire
- Effects largely confined to package
- Limited flight distance of fragments
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached

Emergency:	
Austria	133
Belgium	100
Czech	158
Denmark	112
France	17
Germany	110
Italy	112
Netherlands	112
Norway	112
Poland	997(112)
Slovenia	113

PERSONAL PROTECTION
- Two self standing warning devices
- Warning vest or warning clothes for each crewmember
- Hand lamp for each crewmember
- See also supplemental hazard warning sheet, if attached

GENERAL • **KEEP CALM**

DRIVER ACTIONS
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary
- Stop engine. No naked lights; no smoking
- Secure accident area. Mark road hazard with warning devices
- Warn road users and passers-by about hazards. Advise to keep upwind if necessary.
- Provide first aid
- Guard cargo and keep unauthorized persons at least 25 meters away
- Do not touch dropped or projected ammunition
- Notify own agency/activity

ADDITIONAL AND/OR SPECIAL ACTIONS BY DRIVER
- Supplementary hazard warning sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire)
- Fight fire with all available means

ESTABLISHED FIRE – (cargo on fire)
- Fight fire
- Evacuate casualties as quickly as possible from hazard area
- Keep all persons except firefighters well away from the area for the fire

FIRST AID • Standard unless supplemental hazard warning sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:
- For further information call:

- Emergency Service fire withdrawal distance recommendations

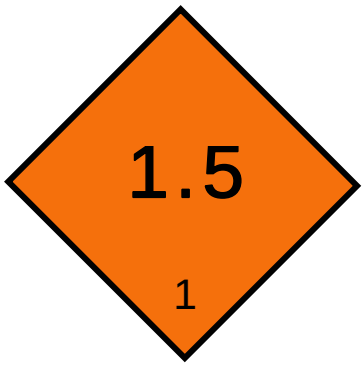
FIRE E**STABLISHED FIRE – (cargo on fire)**

- **Keep all persons (except firefighting personnel) away from fire area**
- **No minimum distance for firefighting personnel**

Accident Information Sheet ROAD

CLASS 1, DIVISION 1.5, ADR

UN – Number(s):



LOAD • Ammunition and explosives

NATURE OF DANGER
- Mass Explosion
- Blast
- High velocity fragments and debris
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached

PERSONAL PROTECTION
- Two self standing warning devices
- Warning vest or warning clothes for each crewmember
- Hand lamp for each crewmember
- See also supplemental hazard warning sheet, if attached

GENERAL DRIVER ACTIONS
- **KEEP CALM**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary
- Stop engine. No naked lights; no smoking
- Secure accident area. Mark road hazard with warning devices
- Warn road users and passers-by about hazards. Advise to keep upwind if necessary.
- Provide first aid
- Guard cargo and keep unauthorized persons at least 25 meters away
- Do not touch dropped or projected ammunition
- Notify own agency/activity

ADDITIONAL AND/OR SPECIAL ACTIONS BY DRIVER
- Supplementary hazard warning sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire)
- Fight fire with all available means

ESTABLISHED FIRE – (cargo on fire)
- DO NOT fight fire
- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- Always seek significant cover (such as strongly built structure) Avoid glass surfaces

FIRST AID • Standard unless supplemental hazard warning sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material
- For further information call:

Emergency:	
Austria	133
Belgium	100
Czech	158
Denmark	112
France	17
Germany	110
Italy	112
Netherlands	112
Norway	112
Poland	997(112)
Slovenia	113

NATO AC/258 Group of Experts on the Safety Aspects of Transportation and Storage of Ammunition and Explosives, 1110 Brussels, Belgium

28 JUN 00

- Emergency Service fire withdrawal distance recommendations

FIRE **ESTABLISHED FIRE – (cargo on fire)**

- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- **Keep all persons (except firefighting personnel) away from fire area**

  Low risk -- at least 1100 meters
  - Always seek significant cover (such as strongly built structure); avoid glass surfaces
- **Minimum distance for firefighting personnel**

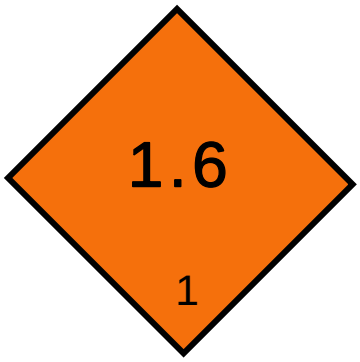
  Medium risk to personnel – 550 meters

  High risk to personnel – 246 meters
- Fight ambient fires from covered position

Accident Information Sheet ROAD

CLASS 1, DIVISION 1.6, ADR

UN – Number(s):



LOAD • Ammunition and explosives

NATURE OF DANGER • Fire and heat
• Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached

PERSONAL PROTECTION • Two self standing warning devices
• Warning vest or warning clothes for each crewmember
• Hand lamp for each crewmember
• See also supplemental hazard warning sheet, if attached

Emergency:	
Austria	133
Belgium	100
Czech	158
Denmark	112
France	17
Germany	110
Italy	112
Netherlands	112
Norway	112
Poland	997(112)
Slovenia	113

GENERAL DRIVER ACTIONS • **KEEP CALM**
• Notify police with reference to ammunition.
• Notify fire brigade (via police) if necessary
• Stop engine. No naked lights; no smoking
• Secure accident area. Mark road hazard with warning devices
• Warn road users and passers-by about hazards. Advise to keep upwind if necessary.
• Provide first aid
• Guard cargo and keep unauthorized persons at least 25 meters away
• Do not touch dropped or projected ammunition
• Notify own agency/activity

ADDITIONAL AND/OR SPECIAL ACTIONS BY DRIVER • Supplementary hazard warning sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire)
• Fight fire with all available means

ESTABLISHED FIRE – (cargo on fire)
• Fight fire
• Evacuate casualties as quickly as possible from hazard area
• Keep all persons except firefighters well away from the area for the fire

FIRST AID • Standard unless supplemental hazard warning sheet specifies, if attached.

ADDITIONAL INFORMATION • Emergency Service fire withdrawal distance recommendations on reverse.
• Brief description of material:

• For further information call:

- Emergency Service fire withdrawal distance recommendations

FIRE **ESTABLISHED FIRE – (cargo on fire)**

- Evacuate casualties as quickly as possible from hazard area
- Leave area of fire immediately
- **Keep all persons (except firefighting personnel) away from fire area**

  Low risk -- at least 174 meters

  - Always seek significant cover (such as strongly built structure); avoid glass surfaces
- **No minimum distance for firefighting personnel**

UN – Number(s):

SUPPLEMENTARY HAZARD WARNING SHEET

Ammunition containing White Phosphorus (WP)

WP

LOAD	Ammunition containing white phosphorus, which is: • Colorless to yellow wax-like substance • Pungent, garlic-like smell
NATURE OF DANGER	• Phosphorus poisoning • Ignites upon contact with atmospheric oxygen producing thick fumes which are detrimental to health • On contact with water, caustic phosphoric acid is produced • Irritation of skin, eyes and respiratory tract; cauterization is possible • Substance hazardous to water
PERSONAL PROTECTION	• Appropriate respiratory protective equipment • One 500 ml eye flushing bottle with fresh tap water for each individual • One container with 20 liters fresh tap water • Three liters of 5% sodium bicarbonate solution
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing or a heat protection suit (affording heat protection comparable to asbestos) • Spray water continuously on extinguished phosphorus fires or cover with moist sand/soil
FIRST AID	• Remove quickly all clothing affected by phosphorus to prevent phosphorus burning through to skin. If this is impossible: • Plunge skin or clothing affected by phosphorus in cold water or moisten strongly to extinguish or prevent fire. Then immediately remove affected clothing and rinse affected skin areas with cold sodium bicarbonate solution or with cold water • Moisten skin and remove visible phosphorus (preferably under water) with squared object (knife-back etc.) or tweezers. Do not touch phosphorus with fingers! • Throw removed phosphorus or clothing affected by phosphorus into water or allow to burn in suitable location • Cover phosphorus burns with moist dressing and keep moist to prevent renewed inflammation • In case of eye contact, prop eyelids open and rinse eyes with water for 10 to 15 minutes For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Chloroacetophenone (CN) or** **Chlorobenzylidene Malonic Acid Dinitrile (CS),also termed Ortho-Chlorobenzalmalononitrile**	CS CN

LOAD	(CN**)** Ammunition containing Chloroacetophenone, which is: • Colourless to white or slightly yellowish crystals or powder. • Nasty smell. • Heavier then water; **or** (CS) Ammunition containing Chlorobenzylidene Malonic Acid Dinitrile which is: • White to slightly yellowish substance. • Slightly pepper-like to pungent smell.
NATURE OF DANGER	• Irritation of eyes, skin and respiratory tract. • Nausea, vomiting and cauterization. High concentrations will cause severe noxious effects. Detrimental to health when inhaled and swallowed. • Potential hazard to waters and sewage treatment plants.. • Substances hazardous to water may be produced in the event of fire. • CN -- Slow reaction with water producing a caustic mixture.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 1iters fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Cover all parts of the body
FIRST AID	• Remove affected clothing. • In the event of skin irritations, thoroughly rinse and wash affected skin areas. • In case of eye contact, hold eyelids open and rinse with tap water 10 to 15 minutes while rolling eyes in all directions. Refer to ophthalmologist if necessary. • In event of vomiting, place head in lateral position. Call physician to accident site. **EMERGENCY SERVICES advice:** • In the event of a respiratory arrest immediately apply expired-air ventilation or breathing apparatus and provide oxygen feed, if indicated For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Titanium Tetrachloride (FM)**	FM

LOAD	Ammunition containing Titanium Tetrachloride (FM), which is: • Colorless or yellowish fluid.
NATURE OF DANGER	Extremely caustic. • Reacts strongly with moisture or water, developing heat and forming hydrochloric acid during reaction.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 1iters of fresh tap water
ADDITIONAL AND: OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing or a heat protection suit affording heat protection comparable to asbestos • Cover non-burning exposed FM with ground limestone to neutralize
FIRST AID	Action to be taken: • Remove immediately contaminated clothing. • Rinse affected body parts with plenty of water and cover with sterile dressing (no treated burn dressing) • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Call physician to accident site. • Protect from body heat loss . • Transport casualties preferably in a lying position. **EMERGENCY SERVICES advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Hexachloroethane (HC)**	HC

LOAD	Ammunition containing Hexachloroethane (HC), which is: • Solid Substance • Insoluble in water
NATURE OF DANGER	Zinc chloride fume poisoning. • After ignition, high concentration of fumes with caustic effects • is produced, particularly in cold and dry air. • Irritation of eyes and respiratory tract. • Substances hazardous to water may be produced in the event of fire.
PERSONAL PROTECTION	Appropriate respiratory protective equipment.
ADDITIONAL AND: OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke or fumes: • Short stay: wear appropriate respiratory protective equipment. **EMERGENCY SERVICES advice**: In the event of a longer stay, • wear self-contained breathing apparatus; • cover all parts of the body.
FIRST AID	Symptoms of zinc chloride fume poisoning: • Irritation of the eyes. • Irritation of the upper respiratory tract and hoarseness. • Pains in the chest, especially behind the sternum. • Severe coughing, breathing difficulties and feeling of suffocation. Action to be taken**:** • Rush affected persons to nearest physician. • Transport casualties preferable in a lying position. **EMERGENCY SERVICES advice**: • If possible, apply oxygen douche (set • equipment to 8 liters Oxygen/min). For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Red Phosphorus (RP)**	RP

LOAD	Ammunition containing Red Phosphorus, which is: • Solid substance. • Insoluble in water.
NATURE OF DANGER	Combustion produces fumes which are detrimental to health. Irritation of eyes and respiratory tract, cauterization is possible. • In the event of fire substances are produced that are hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus
FIRST AID	Action to be taken: • Remove immediately contaminated clothing. • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Have victim lie down even if feeling healthy. • Transport casualties preferably in a lying position. • Ensure medical care **EMERGENCY SERVICES advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus • If possible, provide oxygen feed. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Thermite (TH)**	TH

LOAD	Ammunition containing Thermite, which is: • Solid substance, metal mixture. • Insoluble in water.
NATURE OF DANGER	• Develops high temperatures in the event of fire. • Generation of explosive gases in connection with water.
PERSONAL PROTECTION	Appropriate respiratory protection equipment.
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: **DO NOT USE WATER** for fire fighting. Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing or heat protection suit affording heat protection comparable to asbestos
FIRST AID	• Move affected persons to fresh air. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Pyrotechnic Charges (PT)**	PT

LOAD	Ammunition containing Pyrotechnic Charges (PT), which are: • Solid substances. • Fairly soluble in water.
NATURE OF DANGER	In fire: • Ammunition may cause intense burning or explosions. • Caustic or poisonous gases may be produced. Hazardous to water
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 1iters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Cover all parts of body **DO NOT** use water to fight fire
FIRST AID	Action to be taken: • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. **EMERGENCY SERVICES advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

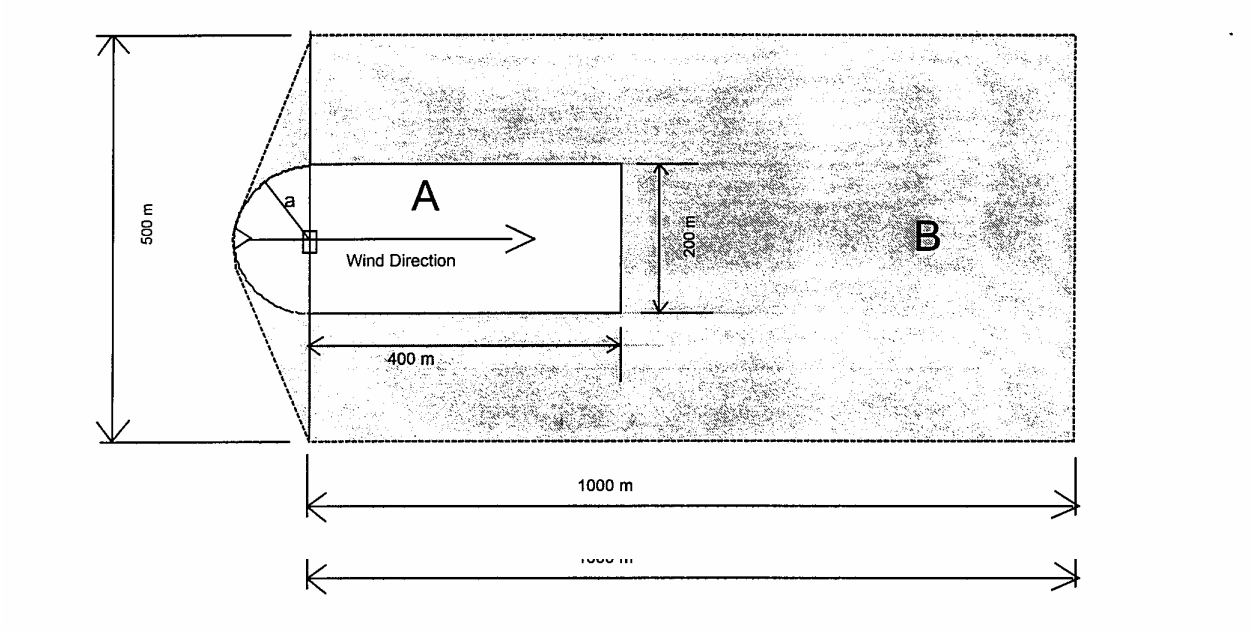
UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Calcium Phosphide (CP)**	CP

LOAD	Ammunition containing Calcium Phosphide (CP), which is: • Solid substance. • Smell of rotten fish, carbide or garlic.
NATURE OF DANGER	• Easily combustible. • Reacts strongly with water (self-igniting) by forming highly toxic and explosive hydrogen phosphide. • Irritation of skin, eyes and respiratory tract. • Danger of poisoning by inhalation (notably near ground level), swallowing or skin contact. • Substance hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 1iters fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing impermeable against toxic agents and flame resistant.
FIRST AID	Symptoms of poisoning: • Irritation of the eyes, nasal/pharyngeal mucosa and skin. • Coughing, feeling of tightness, shortness of breath. • Headache, dizziness, ringing in the ears. • Nausea, vomiting and diarrhoea. • Rise in pulse rate, tendency to collapse. Unconsciousness, spasm Action to be taken: • In the event of a respiratory arrest apply immediately expired-air ventilation. • Rush affected persons to hospital. Transport only in a lying position. Half-sitting position is permissible in case of breathing difficulties. • In case of eye contact, hold eyelids open and rinse with tap water 10 to 15 minutes while rolling eyes in all directions. • In the event of skin contact with calcium phosphide rinse with plenty of water and subsequently cover with sterile dressing material For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Unsymmetrical Dimethyl Hydrazine (UDMH)**	UDMH

LOAD	Ammunition containing Unsymmetrical Dimethyl Hydrazine (UDMH), which is: • Colorless liquid with pungent ammonia-like odor • Completely water miscible.
NATURE OF DANGER	• Nonpersistent and highly flammable, caustic and toxic. • Spontaneous reaction upon contact with oxygen-rich substances (e.g. acid, rust). • Vapours are heavier than air and combined with air from explosive mixtures. • Acid burns on eyes and respiratory organs are possible (pulmonary edema). • Substance hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • Protective clothing • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 1iters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	**Evacuate immediately the hazard area.** **Hazard area description on reverse** Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **INTERVENTION PERSONNEL advice**: • In event of longer stay: wear self contained breathing apparatus and protective clothing • Capture runoff from leak or firefighting operation
FIRST AID	Symptoms of intoxication/acid burn: • Eyes, nasal and pharyngeal mucous membranes, respiratory tract smart. • Slight tussive irritation causing slight cough which subsides after approximately 20 to 30 minutes. • Trembling, dizziness, possibly convulsion, unconsciousness. • Skin smarts, blisters appear. Action to be taken: • Remove immediately contaminated clothing. • Rinse affected body parts with plenty of water and cover with sterile dressing (no ointment, cream or oily solutions) • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Call physician to accident site.. • Transport promptly casualties for medical treatment in a lying position. **INTERVENTION SERVICE advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus • In case of victim dyspnoea, half sitting position is permitted For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Unsymmetrical Dimethyl Hydrazine (UDMH)**	UDMH *(reverse)*



Explanations: a = 100 m Radius

1. **LEAK:**
   Hazard Area **A** must be evacuated.
   Hazard Area **B** applies if the danger to the environment cannot be cleared away within one hour.

2. **FIRE:** Hazard Area **A and B** must be evacuated.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Inhibited Red Fuming Nitric Acid (IRFNA)**	IRFNA

LOAD	Ammunition containing Inhibited Red Fuming Nitric Acid (IRFNA), which is: • Brown liquid • Red-brown to yellow vapors with pungent, acrid odor when exposed to air • Completely water miscible.
NATURE OF DANGER	• Fire-conductive, caustic, and toxic. • Ignites flammable solids (e.g. wood, cotton) upon contact. • Violent reactions upon contact with flammable liquid (explosion hazard). • Vapours cause acid bums on skin, eyes, and respiratory organs (pulmonary edema). • Substance hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • Protective clothing • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	**Evacuation immediately of the hazard area.** **Hazard area description on reverse** Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **INTERVENTION PERSONNEL advice**: • In event of longer stay: wear self contained breathing apparatus and protective clothing • Capture runoff from leak or firefighting operation
FIRST AID	Symptoms of intoxication/acid burn: • Skin, eyes, nasal and pharyngeal mucous membranes, respiratory tract smart. • Slight tussive irritation causing slight cough which subsides after approximately 20 to 30 minutes. • Dysponea, vomiting, shock. Action to be taken: • Remove immediately contaminated clothing. • Rinse affected body parts with plenty of water and cover with sterile dressing (no ointment, cream or oily solutions) • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Transport promptly casualties for medical treatment in a lying position. **INTERVENTION SERVICE advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus • If swallowed, and if conscious, make victim sip large quantity of water, possibly with milk added. DO NOT make victim vomit. • In case of victim dyspnoea, half sitting position is permitted. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Inhibited Red Fuming Nitric Acid (IRFNA)**	IRFNA *(reverse)*

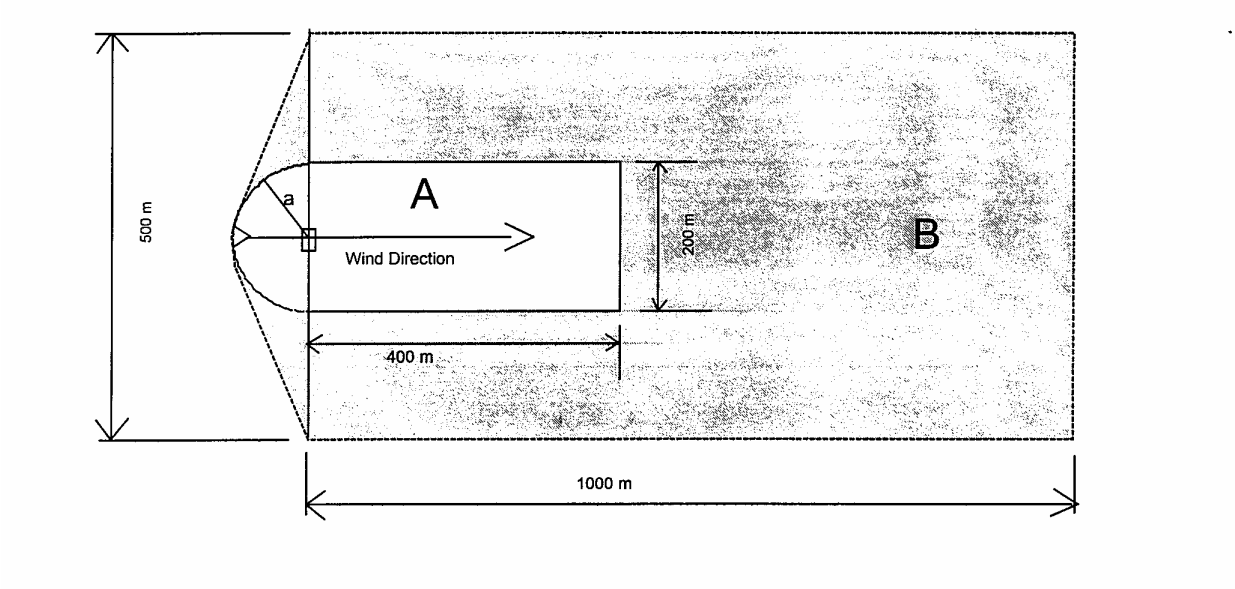


Figure 1
Explanations: a = 100 m Radius

1. **LEAK:**
   Hazard Area **A** must be evacuated.
   Hazard Area **B** applies if the danger to the environment cannot be cleared away within one hour.
   .
2. **FIRE:** Hazard Area **A and B** must be evacuated.

UN – Number(s):	**SUPPLEMENTARY HAZARD WARNING SHEET** **Ammunition containing Depleted Uranium (DU)** DU

LOAD	Ammunition containing Depleted Uranium (DU), which is: • Dull silver to blue-black metal. • Very heavy. • Low specific activity. No radiation hazard involved under transport conditions.
NATURE OF DANGER	• Combustible metal at approximately 300 degrees Celsius. • Forms toxic (heavy metal) oxide dust of low specific activity when burning. Smoke and resulting dust may include Uranium Oxide. • Impairment of health caused by inhalation, swallowing, or when oxide dust gets into wounds. • Possible hazard to water and sewage treatment plants.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • Protective gloves
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: • Keep up-wind, out of area affected by smoke. • Warn residents of populated areas to close doors and windows in smoke movement direction for several hundred meters. For short stay: • Wear respiratory protective equipment • Wear protective gloves **EMERGENCY SERVICES advice:** • Wear self contained breathing apparatus • Cover all parts of the body. • Put down smoke with water spray, containing water runoff. • Fight fire as if magnesium; **DO NOT** use halons. • To prevent Uranium Oxide spread, survey equipment and personnel before departing the scene.
FIRST AID	• If a person is affected by smoke or breathes dust, remove to hospital. • Inform medical personnel that victim may be contaminated with Uranium Oxide. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

UN – Number(s):

SUPPLEMENTARY HAZARD WARNING SHEET
Ammunition containing Otto Fuel 11 (OF)

OF

LOAD	Ammunition containing Otto Fuel II (OF), which is: • Oily liquid. • Not miscible in water. • Heavier than water.
NATURE OF DANGER	• Heating of closed containers may cause bursting due to pressure. • Detrimental to health when inhaled and swallowed. High concentrations will cause severe noxious effects.. • Potential Hazard to waters and sewage treatment plants
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 1iters of fresh tap water • Protective gloves for each individual
ADDITIONAL AND/ OR SPECIAL ACTIONS BY DRIVER	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment. • Wear protective gloves to discover leakage **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear chemical protective clothing outfit
FIRST AID	Symptoms of intoxication: • Irritation of nasal nucosa and rhinostenosis. • Splitting headache. • Dizziness, disorientation and disorder of balance. • Irritation of the eyes. • Contact with skin leads to a yellow skin hue. Action to be taken: • Move casualties into fresh air, put them on the ground in a comfortable position, loosen tight clothing, prevent chilling • In case of respiratory arrest, start artificial respiration (mouth to mouth or breathing apparatus) immediately. • Remove affected clothing (usually identifiable by yellow colour). • Rinse affected parts of the body with lots of water. • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • If Otto Fuel has been swallowed, provoke vomitting. • Call physician to accident site. Transport casualties preferably in a lying position. • In case of danger of loosing consciousness handle and transport casualties in a stable lateral position For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

MANUAL OF NATO SAFETY PRINCIPLES

FOR THE TRANSPORT OF

MILITARY AMMUNITION AND EXPLOSIVES

Disclaimer:

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation wich could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document".

PART III

TRANSPORT BY RAIL

CHAPTER 1 - GENERAL

Section I - Introduction

3.1.1.1 *Purpose*

a) This part of the Manual contains the safety principles to be used by visiting NATO forces during transport of military ammunition and explosives by rail in host countries.

b) All transport by rail, including that by military train, is to be done under the regulations of RID. Attention is drawn to 3.3.1.1, which shows the derogations applicable to military consignment. Additional recommendations for military purposes are shown at Section 2 of Chapter 3 of this part of AASTP-2.

c) Annex III-A contains additional requirements to be followed by visiting forces in the host country concerned. The principles are not intended to inhibit a visiting force from imposing its own more stringent regulations.

3.1.1.2 *Disclaimer*

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document".

3.1.1.3 *Observation*

THIS PART OF THE MANUAL IS TO BE USED IN CONJUNCTION WITH THE GENERAL REQUIREMENTS OF PART I (see Chapter 2).

Section II - Definitions

The following definitions explain terms specific to carriage by rail transport. More general definitions are contained in Part I Chapter 2.

3.1.2.1 *Isolating Wagon (Barrier Wagon)*

Any empty or loaded wagon EXCLUDING those loaded with ammunition or other goods which require any danger labels and those designed to carry flammable materials.

3.1.2.2. *Military Train Carrying Ammunition*

A special train composed exclusively of wagons loaded with ammunition and/or explosives to which has been allocated an 'International Identification code' in accordance with STANAG 2158. Military trains may also have carriages or wagons for escorts

CHAPTER 2 – RID AND AASTP-2 PART 1

3.2.1.1 *References AASTP-1 Part I*

a) AASTP-2 Part 1 contains general information which is largely harmonised with ADR and RID. RID marginals covering matters common to road and rail transport are not therefore mentioned further in Part III. Chapters are included on the following matters:

- Definitions of terms.
- General safety requirements.
- Classification.
- Limitations on transport.
- Packing, marking and labelling standards.
- Freight containers.

b) The chapters above contain more specific information, reflected in RID, on:

- Overpacks (Secondary packages).
- Salvage packaging.
- Acceptance for intermodal carriage (preceding or subsequent transport by sea or air).
- Mixed loading with other dangerous goods.

c) The chapters above also contain specific information, not reflected in RID, on:

- Artificial lighting for loading and unloading outside daylights hours.
- Notification of supplementary hazards.

CHAPTER 3 - SPECIFIC RECOMMENDATIONS

Section I – Recommendations based on RID

3.3.1.1 *General*

For military consignments, i.e. consignments of substances and articles of Class 1 belonging to the armed forces or under the orders of the armed forces, derogations are applicable (see the following items).

RID Marginal 143

3.3.1.2 *Marking of Packages – Military Description*

In the case of military consignments within the meaning of 3.3.1.1., carried as a full wagon load, the packages may bear the descriptions by the competent military authority in place of the descriptions conforming to Marginal 101, Table 1, column. 2.

RID Marginal 105(1)

3.3.1.3 *Danger Labels on Packages*

For the carriage of military consignments within the meaning of 3.3.1.1., as a full wagon load, it shall not be necessary for packages to bear the danger labels prescribed in marginal 105(2) and (3), provided that the mixed loading requirements prescribed in marginal 130(1) and (2) are observed in the basis of the information in the consignment note, in accordance with marginal 115(1).

RID Marginal 105(4)

3.3.1.4 *Consignment Note – Military Description and entry as 'Military Consignment'*

In the case of military consignments within the meaning of 3.3.1.1., the description prescribed by the competent military authority may be used in place of the descriptions in accordance with marginal 101, Table 1, column 2.
For the carriage of military consignments to which the derogations in accordance with the items 3.3.1.2., 3.3.1.3. and 3.3.1.5. apply, the following shall be entered in the consignment note: 'Military Consignment'.

RID Marginal 115(8)

3.3.1.5 *Military Consignments in Open Wagons*

Within the meaning of 3.3.1.1., military consignments of substances and articles of Class 1 which form part of military equipment and of the structure of military material, may also be loaded onto open wagons under the following conditions:

- consignments shall be accompanied by the competent military authority, or by order of this authority,
- means of initiation not having at least two effective protective devices shall be removed, unless the substances and articles are placed in locked military vehicles.

RID Marginal 120(1)

3.3.1.6 *Substances of Compatibility Group A*

Explosive substances of compatibility group A (ADR Class 1 marginal 2101, item 01 classification code 1.1A) are not to be accepted for carriage.

RID Marginal 130(1)

3.3.1.7 *Explosives by Piggyback Transport*

a) Road vehicles handed over for carriage by piggyback transport, as well as their contents, shall comply with the provision of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR). However, explosive substances of compatibility group A (3.3.1.6.) are not to be accepted:

RID Marginal 15

b) Road vehicles carrying ammunition can be transported by rail if the following rules governing piggyback transportation are observed:

- Vehicles and their loads must meet the provisions of the ADR.
- For mixed loading on vehicles, the compatibility loading requirements for road transport (ADR) apply.
- Explosive Hazard Warning Sheets/Supplementary Hazard Warning Sheets must be available in the cab of the vehicles and attached to the bill of lading.
- Proper hazard labels must be placed on both sides of the wagon.

RID Marginal 15

c) The rules for open wagons must be observed (3.3.1.5).

RID Marginal 120(1)

3.3.1.8 *Labelling of wagons*

a) Hazard labels which identify the cargo must be placed on the two sides of the wagons carrying the shipping packages. If the wagon carries ammunition and explosives of different compatibility groups, these groups are not to be indicated on the hazard labels.

RID Marginal 125(1)

b) Wagons carrying full loads containing the following items shall in addition bear, in or alongside the label-holder, the following ‘shunting’ labels:

- labels conforming to model No. 13 for wagons containing items 1 to 13, 19, 22 to 26, 28, 31 to 34.

- labels conforming to model No. 15 for wagons containing item 2, No. 0160, and item 4, Nos 0072, 0075, 0083, 0133, 0143, 0146, 0150, 0208, 0219, 0226, 0340, 0341, 0391, 0394 and 0411.

RID Marginal 125(5)

c) Wagons in which packages are loaded to be carried as military consignments, within the meaning of 3.3.1.1., and which in conformity with 3.3.1.3. do not bear danger labels, shall bear on both sides the following danger labels:
- labels conforming to model No. 1 for wagons containing substances and articles of item 1 to 34
- labels conforming to model No. 1.4 for wagons containing substances and articles of item 35 to 47
- labels conforming to model No. 1.5 for wagons containing substances of item 48
- labels conforming to model 1.6 for wagons containing substances of item 50

RID Marginal 125(7)

3.3.1.9 *Isolating wagon*

a) Each wagon carrying ammunition and explosives or containers with ammunition and explosives must be separated from wagons transporting flammable or oxidising substances by two 2-axle or one multiple-axle isolating wagon.

RID Marginal 141

b) Due to the potential for instantaneous propagation between Hazard Division 1.1 ammunition and the very large net explosive weights possible by rail transport, it is recommended that no more than two wagons with a Hazard Division 1.1 load designation be coupled together. Isolate pairs of 1.1 designated wagons with one or more non-hazardous wagons or wagons designated 1.4. A higher risk is assumed if the isolating wagons are designated 1.2, 1.5, 1.6 or 1.3. The isolation will allow for the possibility for emergency withdrawal distances to be based upon two wagonloads versus an entire train load.

Section II – Additional Recommendations

3.3.2.1 *Restraint Parameters*

Restraint parameters should be based on the figures in paragraph 1.7.5.6:

3.3.2.2.1 *Closing of Wagons and Containers*

No closed wagon, container or package may be opened during transport operations without the presence of an Authorized Representative.

3.3.2.3 *National Information*

National information about the composition of the train is given in Annex. III-A.

3.3.2.4 *Denial of Access*

No person who is not connected with the loading or unloading operation must be allowed without reasonable cause to approach, enter or remain within 25m of the wagon or container being loaded or unloaded. Every reasonable precaution must be taken to prevent unauthorised access to or theft of explosives.

3.3.2.5 *Seals or Locks*

Where there are seals or locks, these must be undamaged on wagons and containers which are to be unloaded.

3.3.2.6 *Mechanical Handling*

If mechanical equipment is used to load or unload explosives, it must conform to the safety conditions.

3.3.2.7 *Continuity of Loading and Unloading*

Once begun, loading and unloading is to be completed as quickly as possible. If loading or unloading has stop before completion, the load and the wagon or container must be secured.

3.3.2.8 *Supplementary Hazard Information*

The need to consider supplementary hazards, and the criteria for determining them, are given at paragraph 1.4.0.5 Part I.

NATIONAL INFORMATION ABOUT THE COMPOSITION OF THE TRAIN

a. Length

b. Maximum gross weight of the load

c. Maximum explosive contents

d. Other requirements

1 BELGIUM

a. 600 m

b. (1) Civilian goods train: 4 wagons

(2) Composite military train: 4 wagons

(3) Military goods train: 1,100 tonnes gross

c. (1) The gross weight of secondary explosives of classification code 1.1 D transported on the train must not exceed 100 tonnes.

(2) The overall gross weight of black powder (classification code 1.1 C) transported on the train must not exceed 200 tonnes.

d. Types of containers - maximum load

(1) The large containers used must conform with ISO standards and satisfy the CSC provisions.

(2) The total gross weight of a large container must not exceed 18,600 kg. When the weight is less than 5,000 kg., the container must be secured to the wagon by means of steel wires or cables.

2 CANADA

a. 130 railcars, based on length of siding capacity, not regulations.

b. 118 t (cars and contents)

c. No limits established

d. Nil.

3 DENMARK

a. No specific limitations for ammunition trains. Train length depends on the braking conditions, and a maximum length of 835 m should not be exceeded.

b. No specific limitations. The load gross weight of a train is determined by the traction power of the engine and the railway line conditions.

c. The total Net Explosives Mass in any one wagon must not exceed 5.000 kg when passing the tunnels between Zealand/Funen and Zealand/Sweden

d. Nil.

4 FRANCE

a. No limitations except those resulting from the operating conditions.

b. See a. above.

c. No limits established.

d. A wagon loaded with ammunition or explosives of Hazard Division 1.1. must not be the last wagon of the train.

5 GERMANY

a. No specific limitations for ammunition trains. Train length depends on the number of axles and the braking conditions; a maximum length of 700 m should not be exceeded.

b. No specific limitations. The load gross weight of a train is determined by the traction power of the engine and the railway line conditions.

c. No restrictions.

d. Points of Contact are as Annex II-B

6 GREECE

a. 400 to 600 m

b. 80% of the loaded wagons "payload".

c. 15% of the authorised load.

d. Nil.

7 ITALY

a. 550 to 600 m, depending on the length allowed by the railway line.

b. Depends on the traction power of the engine and the railway line conditions.

c. Up to 30 wagons filled with explosives, with a maximum limit of 18 t per axle. For most railway stations (specified in a list) a weight of 20 t per axle is admitted, provided that requirement b. is not disregarded.

d. Nil.

8 NETHERLANDS

a. No specific limitations for ammunition trains. A maximum length of 600 m should not be exceeded.

b. Not restricted, except by rail operating considerations.

c. Depends upon the place where the loading/unloading takes place. Loading and unloading of military shipments of ammunition is only allowed with a special permit, setting the conditions (limits) for loading/unloading, on behalf of the Chairman Military Committee on Dangerous Goods.

d.
- If marking and labelling is in French, German, Italian or English, marking in Dutch is not necessary.
- Class 1 goods may only be transported as wagon load.
- Loading and unloading is only allowed under supervision by or on behalf of the consignor.
- Military shipments must be notified at least five days in advance.
- Escorts are only necessary if this is ordered by the military authorities.
- For stopovers of more than three hours the local authorities must be notified.
- Goods of Class 1 must be unloaded from the train and removed from the location as soon as possible, but ultimately within eight hours after arrival of the train.

9 NORWAY

a. Maximum length 850 m. Train length and speed may be limited by grades, capacity of engine, braking conditions or railway lines conditions.

b. Limited by wagons capacity or by factors under a.

c. Gross tonnage of train will govern.

d. Wagons without sparkshields could carry ammunition load with brakes decoupled.
Ammunition should not be the last wagon in the train, but trailed by at least two wagons which should not need any danger label.
With reference to 3.1.2.1. and 3.2.0.5., insulating wagons should also be used between wagon carrying ammunition and locomotive, wagon with personnel or live animals, or wagons with goods which require danger labels 3, 4.1, 4.2, 4.3, 5 or 6.1.

10 PORTUGAL

a. Maximum 500 m, including isolating wagons.

b. 24 t per wagon; maximum 240 t per train.

c. 2 t per wagon; maximum 20 t per train.

d. Loaded wagons with spark shields or without brakes.

11 SPAIN

a. No limitations. Maximum length governed by locomotive(s) traction.

b. 80% of the wagon payload if car is fitted with roller bearings, otherwise, only 50% is allowed. No restrictions regarding number of cars.

c. No limits established.

d. In time of crisis, Civil Province Governors or Military Authority may authorise ammunition and explosives to be transported on passenger trains. The same applies when ammunition constitutes the prescribed load of the unit being transported. Also exceptionally, a mixed train can be used to convey ammunition if no pure goods-train is operated on a particular line.

12 TURKEY

a. Maximum 810 m including non explosives wagons.

b. Maximum gross weight of the load: As wagon tonnage capacity, the entire train is limited by 12 wagons.

c. Maximum explosive contents: see b. above.

d. Other requirements: Enclosed wagons with spark shields, without brakes.

13 UNITED KINGDOM

a. Not restricted, except by rail operating considerations.

b. See a. above.

c.

Type of Explosive by Hazard Division	Maximum NEQ in tonnes in any group of adjacent containers or wagons	Minimum Separation Distance in Metres between groups of containers or wagons
1.1	40	80
Any combination of 1.1, 1.3 & 1.5	Aggregate of 40	80
1.3 and 1.5 alone or mixed	120	40

(1) No container or wagon may carry more than 20 tonnes NEQ (other than HD 1.4). A freight container, however, must not be loaded with more than 16 tonnes so that it can be carried with other modes of transport.

(2) Explosives of different HDs (other than HD 1.4) carried in the same container or wagon shall be deemed to be within the Division that comes highest in the following list: HD 1.1 (highest), 1.5, 1.2, 1.3 and 1.6 (lowest).

(3) Where HD 1.2 is carried with HD 1.5, they shall both be deemed to be HD 1.1.

(4) There is no limit to the amount of HD 1.2 which may be carried, except when loaded with Divisions other than HD 1.4, when it should be aggregated according to Note 2.

(5) There is no limit on the amount of HD 1.4 which may be carried (subject to the loading limit of the wagon).

(6) Minimum separation distances specified in the above table may be made up of any rail wagon suitable for movement on the train, including those containing HD 1.2 and 1.4.

(7) Barrier wagons providing a separation distance of at least 11m are to be provided

(a) Between the locomotive and the first wagon containing explosives.

(b) Between the last wagon containing explosives and the guards brake van, if provided

(8) Barrier wagons may be of any type, either empty or loaded with non-dangerous goods of a gross weight exceeding 8,150 kgs (8 tonnes)

Example : A group of containers or wagons containing 40 tonnes of Division 1.1 explosives must be separated by at least 80m from a group containing, say, 40 tonnes of mixed Divisions 1.1, 1.2, 1.3 and 1.5 or 40m from a group containing a mixture of 120 tonnes of Divisions 1.3 and 1.5 or 80m from a group containing a mixture of Divisions 1.2 and 1.5.

14	UNITED STATES

a. No maximum length specified by regulation, length is governed by operating considerations.

b. No maximum gross weight of the entire train limited by regulation. Operating conditions (grades, capacity of the engine,...) may be the limiting factors.

c. No maximum explosive contents specified by regulation. However, the conditions of b. above may be the limiting factors.

d. Nil.

SPECIAL AGREEMENT

(reserved)

MANUAL OF NATO SAFETY PRINCIPLES

FOR THE TRANSPORT OF

MILITARY AMMUNITION AND EXPLOSIVES

Disclaimer:

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document".

PART IV

TRANSPORT BY MILITARY AIRCRAFT

CHAPTER 1 - GENERAL

Section I - Introduction

4.1.1.1 *Purpose*

This part of the Manual gives the required information about the safety principles and procedures to be used as a guide for the transport of military ammunition and explosives by military cargo and passenger/cargo aircraft including helicopters (i.e. civilian and combat aircraft are not included).

4.1.1.2 *Disclaimer*

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document".

4.1.1.3 *Observation*

THIS PART OF THE MANUAL IS TO BE USED IN CONJUNCTION WITH THE GENERAL REQUIREMENTS OF PART I.

Section II - Definitions

The following definitions explain terms specific to carriage by air transport. More general definitions are contained in Part I Chapter 2.

4.1.2.1 *Aircraft Explosives Cargo Area*

Any area specifically designated and/or licensed for loading or unloading ammunition and explosives from aircraft, and for parking aircraft loaded with ammunition and explosives, which meets applicable quantity-distance criteria.

4.1.2.2 *Cargo Aircraft*

An aircraft, other than a passenger or a passenger/cargo carrying aircraft, carrying freight or property.

4.1.2.3 *Dangerous Air Cargo*

Articles or substances which are capable of posing a significant risk to health, safety or property when transported by air. These may include explosives, compressed gasses, oxidisers, flammable, toxic, radio active, corrosive and magnetic articles and/or substances.

4.1.2.4 *Explosive Decompression*

The sudden and total loss of aircraft pressurisation at flight altitude above cabin pressure.

4.1.2.5 *Operational Necessity*

An operational necessity exists when the use of any mode of transportation other than air prevents the receipt of an explosives store by a specific time, thereby impairing the authorised operational mission concerned.

4.1.2.6 *Passenger Aircraft*

An aircraft carrying any individual(s) other than flight crew or crew member(s).

4.1.2.7 *Passenger Cargo Aircraft*

An aircraft designed to facilitate the carriage of both passengers and cargo in the main aircraft compartment. These aircraft are known as Combi or Passenger Cum Freight (PCF) aircraft. Small consignments of restricted types of ammunition and explosives may be allowed by international regulations.

CHAPTER 2 - CONDITIONS OF TRANSPORTATION

4.2.0.1 *Principles Employed*

The conditions for the transportation of ammunition and explosives in military aircraft are based upon the principle that nations accept each other's explosives cargo, provided that the consignor nation's regulations and any appropriate STANAGs are complied with.
There are, however, certain aspects of documentation and restrictions on explosives cargo that are of joint concern to consignor and consignee nation as indicated below.

4.2.0.2 *Offer of Ammunition and explosives for Transportation*

a) The consignor must ensure that the ammunition and explosives are processed for clearance for air transportation in accordance with national regulations and that it is correctly packed, sealed, marked to indicate the nature of the contents, and labelled with the appropriate warning labels. The need to consider supplementary hazards, and the criteria for determining them, are given at paragraph 1.4.0.5 in Part I.

b) The consignor is also responsible for ensuring that the cargo is fit for air transportation.

c) The presentation of the Safety Certificate, see paragraph 4.2.0.3, implies that action at subparagraphs a. to b. above has been completed.

4.2.0.3 *Certification of Safety*

a) Ammunition and explosives should not be accepted for transportation by air unless the consignor has certified that the consignment complies with the requirements of this Manual. The ammunition and explosives of each compatibility group should have a Certificate of Safety worded in accordance with STANAG 3854:

"This is to certify that the contents of the packages in this consignment are suitably packed, labelled, marked, wrapped and are in a proper condition for air transport in accordance with national regulations in force".

b) A Safety Certificate should be provided by the consignor in triplicate. The three copies should be used as follows:

1. One is retained by the consignor air cargo transportation authority.

2. Another is sent to the air cargo transportation squadron at the dispatching airfield.

3. Another is sent with the cargo to the air cargo transportation squadron at the destination airfield.

c) A Safety Certificate should be dated and signed by an appropriate ammunition specialist who has inspected and approved the condition of the ammunition and explosives, and has personally checked that the items to be presented for movement comply with the regulations for their transportation by air. The person signing a Safety Certificate must be a qualified officer, a non-commissioned officer or a qualified civilian of equal status and, where national regulations require it, should be authorised in writing by the proper authority.

d) A recommended form is shown in Annex IV A.

4.2.0.4 *Special Handling Instructions*

When the explosives cargo is of such a nature that special handling instructions are necessary, these should be specified in the form shown in Annex IV A. Any additional instructions, e.g. tests to be carried out during the flight, must be attached to the form.

4.2.0.5 *Explosives Transportation Request*

a) Permission for the transportation of an explosives cargo must be obtained in advance from the host nation(s). This request should be made in accordance with the consignor nation's regulations, and should contain the details in paragraph 4.2.0.7.

b) A list of the nominated military air cargo transportation co-ordinating authorities is given in Annex IV C.

c) Requests to enter or to overfly countries en-route must be cleared through the national embassy or embassies concerned in accordance with existing national regulations.

4.2.0.6 *Cargo Manifests*

When ammunition and explosives are carried, the cargo manifest should whenever practicable be annotated "EXPLOSIVES" in red letters and brought to the attention of the aircraft Commander.

4.2.0.7 *Allocation Signals*

a) Dispatching and destination airfields and en-route stations require advance information regarding an explosives cargo, so that preparatory action can be taken for its reception, safe custody and/or dispersal.

b) Details of the cargo on individual flights should be forwarded to the destination airfield as well as to all en-route airfields by signal from the air cargo transportation authority of the originating airfield. The following information should be included:

1. Date of departure and arrival.
2. Consignee unit.
3. Dispatching unit.
4. Description of cargo, quantity and Net Explosives Quantity.
5. The hazard division and the compatibility group of the ammunition and explosives (Part I, Chapter 4)
6. Any special conditions of transport.

c) This signal should reach the consignee airfield concerned in sufficient time to allow planning to avoid violation of explosives quantity-distance criteria.

4.2.0.8 *Use of NATO Languages for Documents*

The Safety Certificate (paragraph 4.2.0.3.) and other appropriate documents should be in one of the NATO official languages as well as that understood by the responsible crew member.

CHAPTER 3 - INSTRUCTIONS FOR AIRCRAFT COMMANDERS

4.3.0.1 *Air Cargo Instructions Document*

The Commander of a military aircraft must be furnished with a form originated by the consignor - "Certificate of Safety, Special Handling Instructions and Instructions for Commanders of Aircraft Transporting Ammunition and Explosives" - at the dispatching air cargo airfields. The recommended form is shown in Annex IV A.

4.3.0.2 *Briefing of Aircraft Commander*

The aircraft Commander should be briefed on the types of ammunition and explosives in the cargo and the air manifest should be signed by the aircraft Commander or a delegated flight crew member to signify that satisfactory briefing has been accomplished.

4.4.0.1 *Ventilation*

Where any explosives cargo is capable of giving off toxic or explosive vapours, the aircraft Commander should ensure maximum ventilation of the cargo compartment, consistent with the comfort and safety of the passengers and flight crew in flight. While the aircraft containing this type of cargo is on the ground, maximum ventilation of the cargo compartment should be maintained.

4.4.0.2 *Subsidiary Hazards*

The carriage of additional crew members and troops together with toxic or debilitating ammunition or weapons is to be avoided unless operationally justified. Crew members and troops are to be provided with the necessary protective equipment e.g. respirators.

4.4.0.3 *Notification to Air Traffic Controller at Destination Airfield*

On arrival in the vicinity of the destination airfield, the aircraft Commander should notify the air traffic Controller by R/T of:

1. Aircraft identification number
2. Hazard divisions of the ammunition and explosives
3. Net Explosives Quantity of each hazard division
4. Estimated time of arrival

4.4.0.4 *Fire Extinguishers*

Aircraft should be provided with additional fire extinguishers deemed appropriate for the type(s) of cargo. When additional or special type extinguishers are required, the consignor nation should provide them.

4.4.0.5 *Requirements for Hazard Warnings*

Parked aircraft containing explosives cargo should display appropriate warnings, sited in a conspicuous position and covering all approach angles as a warning to taxi-ing aircraft, vehicular or pedestrian traffic, and for fire-fighting purposes. The authorities of the airfield at which the aircraft lands should be responsible for displaying the appropriate hazard warnings by the aircraft. An acceptable sign for the identification of an aircraft carrying explosives is shown at Annex IV-D.

4.4.0.6 *Posting of Guards*

Guards should be posted for security and safety purposes at the parking location of the cargo aircraft containing explosive consignments.

4.4.0.7 *Prohibition of Smoking*

Smoking in the cargo compartment of aircraft carrying ammunition and explosives and within 25m of the handling area is forbidden.

4.4.0.8 *Flight Crew Protective Equipment*

Flight crews and any technical escorts should be provided with suitable respiratory masks or breathing apparatus and protective clothing when this is considered necessary.

4.4.0.9 *Escorts*

a) Technical escorts should be provided by the consignor nation if required by either the carrier or national regulations.

b) The technical escorts should be responsible for the safety and security of the ammunition and explosives, this is to be under the direction of the Aircraft Captain during periods of flight operation.

c) A specimen set of orders for technical escorts is given in Annex IV B.

4.4.0.10 *Aircraft Parking*

Aircraft carrying explosives cargo shall be parked in Aircraft Explosives Cargo Area.

4.4.0.11 *Lightning Risk Conditions*

Should lightning risk conditions exist which require action on the part of the Aircraft Commander, he is to be informed of this. After landing he should be instructed to taxi the aircraft to a designated Aircraft Explosives Cargo Area (Chapter 6) and to vacate the aircraft. No unloading should be undertaken until the risk has passed.

CHAPTER 5 - STOWING AND UNLOADING OF AIRCRAFT

Section I - General requirements

4.5.1.1. *Preparation of Aircraft*

Before an aircraft is used for transportation of ammunition and explosives certain preparations indicated below must be made.

1. Electrical Grounding of Aircraft

   Before loading or unloading explosives cargo, the aircraft should be electrically grounded so that resistance to ground does not exceed 10000 ohms (10 kÛ) and otherwise in accordance with host nation specifications. For helicopters with underslung loads correct procedures must be followed to discharge static electricity to protect despatching or receiving personnel and electro-explosive devices.

2. Aircraft Switches

   All aircraft switches should be in the "OFF" position except cabin/cargo compartment light switches when auxiliary power units are used for loading/off-loading assistance.

3. Wheel Chocks

   Wheel chocks should be in position.

4. Stowing/Unloading Area

   The stowing/unloading and parking of aircraft with explosive cargo should be accomplished in approved areas as laid down in Chapter 6. The host nation should be responsible for selecting the stowing/parking areas.

5. Smoking

   Smoking and the carrying of matches, lighters or other flame producing devices are not permitted on the flight line or aprons or in the aircraft parking area or in the cargo aircraft.

6. Refuelling

   Aircraft refuelling is not permitted whilst loading/off-loading is taking place. Aircraft should whenever possible, be refuelled prior to loading.

7. Ground Handling Equipment

   The host nation is to notify the operator of the aircraft of any specific safety requirements as detailed in its national regulations for ground handling equipment, e.g. the use of spark and flame arresters on motor vehicles.

8. Fire Cover

   Whenever possible a suitable crash-fire vehicle should be in attendance when handling explosive consignments onto or off an aircraft. If no crash-fire vehicle is available during the handling of explosives appropriate fire-fighting equipment and personnel should be at hand. Direct communications to the air traffic control should be possible.

4.5.1.2 *Inspection of Packages containing Ammunition and Explosives*

a) All explosives cargo must be inspected before and after loading to detect evidence of improper packaging or damage to the contents. Packages showing evidence of leaking, damage, broken seals or incomplete markings, must be rejected until an authorised representative certified them either fit or unfit for transportation.

b) The authenticity seals on packages and unit loads must be intact. Packages with seals damaged should be set aside for examination by an Authorized representative. If the packages are found to be serviceable and complete, the packages may be re-sealed and restored to the cargo load. Packages should not be loaded in aircraft if there is any doubt regarding the serviceability of the packages or their contents.

c) Suspect packages should not be examined or repaired in close proximity to the aircraft. A distance of at least 50 m from the nearest point of the aircraft should be observed.

d) Packages must show the Authorized technical name; unpackaged ammunition, pallets of ammunition and the containerised unit loads must show the classification code. Labelling and marking should be in accordance with Chapter 9.

e) Consignments must be packed as specified in the packing standards of the consignor country.

f) Consignments must be checked to see that they meet the requirements of Chapter 2.

4.5.1.3 *Storage and Call Forward*

a) Ammunition and explosives are classified into compatibility groups for storage and transportation (Part I, Para 1.4.0.3) and are allocated to hazard divisions. They should therefore be stored in accordance with the principles in the Storage Manual AC/258-D/258 while awaiting call forward for transportation.

b) Explosive consignments in transit should be kept in licensed and approved locations in accordance with compatibility group mixing rules. The mixing of consignments of explosives with general cargo in the transit area should be avoided. Explosives are to be isolated from other classes of dangerous goods.

c) Explosives cargo should not be retained at dispatching airfields longer than is necessary. The controlling air cargo transportation authority should call forward the cargo so that it arrives at the dispatching airfield immediately before it is required for loading. Similarly, on the basis of the information in the Allocation Signal (paragraph 4.2.0.7), arrangements should be made for explosives cargo to be collected by consignees as soon as possible after unloading from aircraft.

d) Ammunition and explosives in transit, which may be retained at airfields due to exceptional circumstances, should be kept in safe areas in accordance with the principles in the Storage Manual.

e) Bays for palletising ammunition and explosives into aircraft unit loads may be located outside the explosive storage area for convenience of the dispatching authority. It must be sited at appropriate Interior or Exterior Quantity-Distances from aircraft and other essential installations on the airfield, in accordance with the criteria in the Storage Manual. These bays must be clearly marked to indicate the nature of the danger and appropriate fire-fighting equipment provided. Exits must be available near the bays so that personnel can escape readily and ammunition and explosives can be removed quickly, in case of fire or other emergency.

4.5.1.4. *General Requirements for Stowage*

a) The physical handling on the ground and the stowing and unloading of explosives cargo into and out of aircraft should be carried out under the supervision of qualified personnel. During operations or exercises, or in areas where a qualified supervisor is not available, the stowing and/or unloading may be supervised by the escort or air loadmaster. Ammunition and explosives should be stowed so that they are:

1. In separate bays from general cargo and segregated by explosives compatibility groups (Part 1, Para 1.4.0.3) as far as possible.
2. Easily accessible in flight without moving other cargo. They should not be stored in belly holds.
3. Near to an exit to facilitate jettisoning or unloading in an emergency.
4. Away from sources of heat and away from danger of sparks such as auxiliary power generators and inverters.
5. Away from articles which are liable to puncture the containers.

b) If ammunition and explosives are stowed in vehicles, special care must be taken to prevent movement during flight. Explosives cargo should be readily identifiable.

4.5.1.5 *Precautions under Lightning Risk Conditions*

The safety precautions mentioned below should be observed during the handling, stowing or unloading of ammunition and explosives on and off cargo aircraft during serious lightning risk conditions.

a) Ammunition and explosives Handling

All stowing/unloading of ammunition and explosives should cease and ammunition and explosives in the process of being moved to or from the aircraft should be taken to the nearest Explosives Area or designated Aircraft Explosives Cargo Area. Waiting vehicles containing ammunition and explosives should be driven to the nearest designated area. Ammunition and explosives should not be left adjacent to an aircraft.

b) Ammunition and explosives in Aircraft

1. On the ground

Load hatches should be closed. The aircraft and loading area should be vacated. All external power sources should be disconnected by qualified personnel. All personnel should be made aware of the dangers of activating aircraft electrical circuits in close proximity to ammunition and explosives whilst a serious lightning risk condition is in force.

2. Prior to landing

The Captain of the aircraft must be advised as in paragraph 4.4.0.10. No unloading may be undertaken until the risk has passed.

c) Safe Parking Area

A designated Aircraft Explosives Cargo Area (paragraph 4.6.0.2) should be used to park cargo aircraft loaded with ammunition and explosives in the event of landing during lightning risk conditions.

Section II - Use of hazard classifications

4.5.2.1 *Notification of Hazard Classification*

It is the responsibility of the consignor nation to notify those concerned of the correct hazard division and compatibility group of each item of ammunition and explosives being transported by air. When doubt exists, advice must be sought from the competent authority of the consignor nation.

4.5.2.2 *Use of Hazard Divisions to Determine Quantity-Distances*

Knowledge of the correct hazard division of each item being transported by air is necessary for consignor and host nations to select suitable Aircraft Explosives Cargo Areas which meet applicable quantity-distance criteria (see Chapter 6).

CHAPTER 6 - PARKING OF AIRCRAFT LOADED WITH AMMUNITION AND EXPLOSIVES

4.6.0.1 *Quantity-Distances*

Recommendations on both the Interior and Exterior Quantity-Distances, which should be observed from parked cargo aircraft loaded with ammunition and explosives, are contained in the NATO RESTRICTED DOCUMENT AC/258-D/328(4th Revise) - Quantity-Distance Principles for Airfields Used Only by Military Aircraft - dated 17th August, 1984 with later corrigenda.

4.6.02 *Designation of Aircraft Explosives Cargo Areas*

Aircraft Explosives Cargo Areas should be designated by the host nation in accordance with that nation's regulations.

CHAPTER 7 - MAINTENANCE PROCEDURES ON LOADED AIRCRAFT

4.7.0.1 *Consignor Nations Airfields*

On consignor nation's airfields, the servicing of parked aircraft loaded with explosives cargo should be in accordance with that nation's regulations.

4.7.0.2 *Host Nation Airfields*

The servicing of parked aircraft loaded with explosives cargo should be in accordance with the requirements of the host nation. The necessary instructions should be given by the airfield authority of the host nation where the aircraft is located.

4.7.0.3 *General Principles to be Followed*

Notwithstanding Para 4.7.0.1. and 4.7.0.2., the following general principles should be observed: if the aircraft is to undergo minor repairs in the Aircraft Explosives Cargo Area, or if major repairs in any part of the aircraft are required, or if the aircraft Commander considers it necessary, then the explosives cargo should be unloaded and stored temporarily in accordance with the principles in the Storage Manual.

CHAPTER 8 - GENERAL CRITERIA FOR PACKAGES TRANSPORTED BY AIR

Section I - Physical phenomena

4.8.1.1 *Difference between Air and Surface Modes*

Transporting materials by air presents conditions, such as atmospheric temperatures, pressures and vibration frequencies, which differ from those normally encountered on the surface.

4.8.1.2 *Temperature*

Very low temperatures are more common in air transport than in surface transport but heaters in the cargo compartment can be used to protect stores susceptible to freezing. Very high temperatures normally occur in aircraft only when they are parked.

4.8.1.3 *Vibration*

Vibrations encountered in aircraft extend to higher frequencies (18000 cycles per minute) than in surface transport (1500 cycles per minute). The primary cause for concern is their effect upon glass and metal containers and closures. The precautions taken to prevent opening of screw-type closures in surface transport should be the same where air transport is concerned. However, high frequency vibrations or repeated flexing of flat surfaces of metal containers can cause fatigue failure and/or opening of seams. To prevent this, the standard practice is to pack metal containers to present a tight, firm fit in the exterior transport container.

4.8.1.4 *Pressure*

The reduction in atmospheric pressure encountered in air transportation presents the one condition which should receive the most consideration by the consignor and transporting agency. The following principles are based upon a maximum flight altitude of about 15000 m (45000 ft). Therefore it is possible that the internal pressure in a container that does not leak air at this altitude will attain a value equal to the difference between the pressure on the ground and the atmospheric pressure at 15000 m. For a perfectly sealed container, the internal pressure can attain a value of about 90000 N/m2 at 15000 m altitude. This does not take into account the temperature of the air within the void space of the container. In the case of a sealed metal container of a volatile liquid which has been stored in the sun for a prolonged period of time, there is an increased internal pressure due to the increased temperature within the container.

Therefore, if this container is put aboard an aircraft and transported within a short period of time after its removal from storage, the resultant internal pressure in flight consists of both the increase in pressure due to storage temperature and the increase in pressure due to the reduced atmospheric pressure at the flight altitude. Due to adjustment of the temperature within the container to that of the cargo compartment of the aircraft, the effect of the ground storage temperature is minimised. Since this temperature adjustment is relatively slow, it is recommended to reduce the temperature within a container, before loading aboard aircraft, to that of the air at ground level.

Pressurised cargo holds of aircraft will not necessarily attain the pressure corresponding with the flight altitude discussed above unless by emergency or explosive decompression (see paragraph 4.1.2.4.). In these circumstances the pressure differential will be rapidly induced and the container adjustment will be similarly rapid. It is essential therefore to ensure that sealed containers intended for air transportation in pressurised aircraft shall not in themselves constitute a hazard by becoming explosive in the case of accidental loss of pressure in the aircraft.

Section II - Packaging

4.8.2.1 *General*

The packaging should take account of the following requirements:

1. The material of the container should be compatible with the material being carried, i.e. the container material should not react with the substance being carried.
2. Plastic bags or pouches should not be used. Where plastic containers are acceptable, only containers constructed of rigid plastic should be used.
3. The inside containers should be of suitable shock absorbent material to prevent movement, breaking or leakage.
4. The closure should be resistant to loosening by vibration during transportation.
5. The container should be leakproof regardless of temperature, humidity and altitude changes.
6. A minimum ullage of 5 to 10% should be left in containers holding explosive liquids, to allow for any expansion of the contents on a build up of vapour pressure.
7. The container should be capable of withstanding explosive decompression.

4.8.2.2 *Screw-Cap Closures for Metal Containers*

Such a closure does not leak at high altitudes provided that the container has a new or sound gasket. When a container has been in stock for a long time the gasket may loose resiliency, so leakage can occur when transported by air. However, when gaskets have been replaced, as required, and screw-caps securely and properly closed, no serious difficulty should occur during air transportation of metal containers with screw-cap closures.

4.8.2.3 *Hermetically Sealed Metal Containers*

These containers are frequently used for transporting explosive items. If properly constructed, containers should withstand approximately 100000 N/m2 internal pressure with bulging being the only noticeable effect. Therefore the transportation of such containers by air should not impose a hazard to flight personnel.

4.8.2.4 *Electro-Explosive Devices (EEDs)*

Ammunition items containing EED must not be accepted for air transport unless certified by appropriate authority to be safe in the Electro-Magnetic Radiation (EMR) environments as defined in the Storage Manual, Part I (AC/258-D/258).

CHAPTER 9 - MARKING AND LABELLING OF EXPLOSIVES PACKAGES

4.9.0.1 *Marking*

Additional to the required markings on packages of ammunition and explosives given in paragraph 1.6.0.2. each package offered for air transportation must be marked with:

1) the net quantity of explosive;

2) the gross mass of the package.

CHAPTER 10 - PALLETISED LOADS OF AMMUNITION AND EXPLOSIVES

4.10.0.1 *Criteria*

When it is necessary to palletise cargo loads or unit loads of ammunition and explosives, the dimensions should not, if possible, exceed the preferred dimensions below.

Preferred Dimensions[1]	
Length	1200 mm
Width	1000 mm
Height	1000 - 1050 mm
Weight	1000 - 1130 kg
Overhang on Short Side	40 mm
Overhang on Long Side	50 mm

4.10.0.2 *Securing of Load*

Both the packages on each pallet and the pallets themselves must be strapped or interlocked to provide stability during handling and flight without total reliance on the cargo aircraft tie down devices.

4.10.0.3 *Emergency Tools*

A bandcutter for opening palletised loads and a sharp knife should be available for use in flight during emergencies.

1. Measurement in conformance with STANAG 2828

RECOMMENDED FORM - AMMUNITION AND EXPLOSIVES CERTIFICATE OF SAFETY AND SPECIAL HANDLING INSTRUCTIONS

Recommended form - ammunition and explosives certificate of safety and special handling instructions

<table>
<tr><td colspan="4">Shipper

Consignee</td><td colspan="4">Airway Bill No

page ... of ... pages
Shipper's Reference Number
optional</td></tr>
<tr><td colspan="4">Two completed and signed copies of this declaration must be handed to the operator</td><td colspan="4" rowspan="4">WARNING

Failure to comply in all respects with the applicable Dangerous Goods Regulations may be in breech of the applicable law, subject to legal penalties.

This Declaration must not in any circumstances be completed and/or signed by a consolidator or a forwarder.</td></tr>
<tr><td colspan="4">TRANSPORT DETAILS
AIRPORT OF DEPARTURE</td></tr>
<tr><td colspan="2">PASSENGER AND CARGO AIRCRAFT</td><td colspan="2">CARGO AIRCRAFT ONLY</td></tr>
<tr><td colspan="4">Airport of destination:</td></tr>
<tr><td colspan="8">shipment type:
non-radioactive θ radioactive θ</td></tr>
<tr><td colspan="8">NATURE AND QUANTITY OF DANGEROUS GOODS</td></tr>
<tr><td>Proper shipping name</td><td>class or div.</td><td>UN-serial nr.</td><td>subsidiary risk</td><td>NEQ</td><td>gross mass</td><td>packing</td><td>authorisation</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="8">Additional Handling information:</td></tr>
<tr><td colspan="8">I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labelled and are in all respects in the proper condition for transport by air according to the applicable international and national government regulations.

Place and date: Signature, name, title,
....
....
See warning above.
(reverse)</td></tr>
</table>

Recommended form - instructions for commanders of aircraft transporting ammunition and explosives

1. *Normal Tower Reporting Procedures*

Prior to take-off or landing, the aircraft Commander must advise airfield control of cargo identification.

2. *Emergency Tower Reporting Procedures*

a. Declaring an emergency:
The aircraft commander must advise airfield control of the emergency, and request fire cover, as soon as possible.

b. Information to be given to airfield control:
The following detail must be given when declaring an emergency as soon as possible afterwards:
(1) the hazard divisions in the cargo;
(2) where possible, the Net Explosives quantity in each division;
(3) the number of persons on board;
(4) any other information considered pertinent concerning the cargo.

3. *Hazards and Fire-fighting Principles*

The hazards and fire-fighting procedures that apply to the various hazard divisions are as follows:

(a)
Hazard Division 1.1

Hazards:
mass detonation with blast and high velocity projections.

Fire-Fighting:
Tackle fire only during incipient stage, abandon scene when explosions are involved in fire.

(b)
Hazard Division 1.2

Hazards:
high velocity projections.

Fire-Fighting:
Tackle fire during incipient stage. Retreat when explosions begin, unless protection is available, and tackle secondary fires keeping at least 300 m from source of explosions.

(c)
Hazard Division 1.3

Hazards:
fire, possible mass fire with intense radiation and minor explosions. The fire hazard is not greater than that presented by a burning aircraft.

Fire-Fighting:
Tackle fire during incipient stage. Retreat if fire cannot be controlled, unless protection is available, and tackle secondary fires.

(d)
Hazard Division 1.4

Hazards:
No significant hazard

Fire-fighting:
Tackle fire without reservation

(e)
Hazard Divisions 1.5

Hazards:
Mass explosion with blast (though with very little probability of detonation)

Fire-Fighting:
Tackle fire only during incipient stage, don't fire and abandon scene when explosives are or will be involved in fire.

(f)
Hazard Division 1.6

Hazards:
Fire, possible mass fire with intense radiation. The fire hazard is not greater than that presented by a burning aircraft.

Fire-fighting:
Tackle fire during incipient stage. Retreat if fire cannot be controlled, unless protection is available, and tackle secondary fires.

RECOMMENDED INSTRUCTIONS TO ESCORT RESPONSIBLE FOR AMMUNITION AND EXPLOSIVES CARRIED IN CARGO AIRCRAFT

Recommended instructions to escort responsible for ammunition and explosives carried in cargo aircraft

1. *General*

Due to their special nature, ammunition and explosives should be escorted by qualified personnel during air transportation.

2. *Responsibilities of the Escort*

In order to ensure the safety and security of the explosives cargo the escort should assume the following responsibilities:

1. Loading and unloading

Supervising the safety aspects of loading and unloading operations.

2. Safety during Flight Operations

Supervising the safety of the explosives cargo during flight operations under the direction of the Aircraft Commander.

3. Intermediate Stops

Ensuring the safety and security of the explosives cargo.

4. Jettisoning

Jettisoning the explosives cargo when ordered by the Aircraft Commander.

5. Advice to the Aircraft Commander

Giving advice to the Aircraft Commander on all matters concerning the ammunition and explosives carried.

3. *Supervision of Loading*

The following precautions are taken:

1. Packages

The seals of the explosives packages should be intact. Damaged packages should not be accepted.

2. Stowage

Ammunition and explosives should be segregated from other dangerous goods and stowed near exits.

3. Order of Stowage

When a consignment of ammunition and explosives consists of more than one Classification Code, the items to be jettisoned first should be loaded nearest to the exits (see paragraph 4).

4. Fire Extinguishers

At least two additional fire extinguishers appropriate to the type of ammunition and explosives stowed should be carried in aircraft. These extinguishers should be stowed in the same compartments as the ammunition and explosives.

4. *Supervision of Unloading*

The following precautions are to be taken:

1. All ammunition and explosives are handled with care.

2. All explosives packages listed in the cargo manifest(s) are unloaded from the aircraft.

3. After unloading, a physical check of the aircraft is made to ensure that all ammunition and explosives have been unloaded.

5. *Safety and Security at Intermediate Stops*

a) At a Military Airfield

At intermediate stops at military airfields, the escort should be responsible for ensuring that ammunition and explosives being carried are off-loaded if:

1. The aircraft is to undergo repair necessitating removal of the ammunition and explosives.

2. The Aircraft Commander considers it necessary.

In these circumstances, the airfield authority should be requested to make arrangements for the proper storage of the ammunition and explosives. When stacked in the open ammunition and explosives should be guarded at all times. When it is not necessary to off-load ammunition and explosives or exceptionally, when the Aircraft Commander considers it not practicable, the aircraft should be positioned at a distance from buildings, installations or other aircraft as required by safety regulations. In the absence of any regulations at the airfield, the table in this Annex should be used as a guide. The aircraft should display prominent hazard warnings and a guard should remain with the aircraft.

b) At a Non-Military Airfield

When an intermediate stop is made at a non-military airfield, ammunition and explosives should not normally be off-loaded and the aircraft should be parked and guarded in the manner detailed in subparagraph 5.a. If the Aircraft Commander considers it necessary to off-load ammunition and explosives, he should advise the nearest NATO military formation and endeavour to arrange for a guard. When national forces are not available in a non-NATO country, he should obtain local assistance through the Military or Air Adviser/Attaché.

6. *Jettisoning*

Explosives packages should be jettisoned only when ordered by the Aircraft Commander. If possible, ammunition and explosives should not be jettisoned over areas where injury to persons or damage to property is likely.

7. *Quantity-Distances*

Explosives safety distances are governed by the Net Explosives Quantity and the hazard division(s) of the ammunition and explosives. In the absence of any regulations, the following table should be used as a guide when calculating quantity-distances from a consignment of ammunition and explosives to another aircraft, installation, inhabited building, assembly place or public traffic route (see Chapter 6).

Net Explosives Quantity (kg) not exceeding	Distance (m)
2000	270
3000	300
4000	350
5000	380
6000	400
7000	420
8000	440
9000	460
10000 or greater	480

NATIONAL POINTS OF CONTACT FOR AIR REGULATIONS

	Country	Address	Telephone number
1	Belgium	Air Staff Action: VDV/Mun Info: SAMO (Single Air Management Organisation)	Tel: 0032/2/701 4990 Fax: 0032/2/701 4033 Tel: 0032/2/752 4582 Fax: 0032/2/752 4421
2	Canada	Director General Transportation National Defence Headquarters MGen George R. Pearkes Building Ottawa, Canada K1A OK2	613-992-4047
3	Denmark	Flyvertaktisk Kommando Koelvraa DK-7470 Karup	(++45) 9962 4950 ext 5624
4	France	Etat-Major de l'Armée de l'Air (EMAA) Bureau logistique - Section transport 26, Boulevard Victor 00457 ARMEES - France	Tel: 33 1 45 52 31 77
5	Germany	Federal Ministry of Defense Fü S II 5 Postfach 13 28 D-53003 Bonn	Tel: ++49/228-129383 Fax: ++49/228-129388
6	Greece	Research Branch HAFC/3rd S0/5	
7	Italy	STATO MAGGIORE DELL 'AERONAUTICA COMANDO SQUADRA AEREA (CSA) 00175 ROMA	Tel: 0039-06-24292660 Fax: 0039-06-2413813

	Country		Address	Telephone number
8	Netherlands		Royal Netherlands Airforce C-TL/ATO PO Box 20703 2500 ES Den Haag	Tel: --31 70 3396201 Fax: --31 70 3396202
			Directorate Air Material Aircraft Division / MPGWM Binckhorstlaan 135, 2516 BA The Hague	Tel: --31 70 3396569
		OR	Tactical Airstaff Air Transport Operations ALO / VGS Binckhorstlaan 135, 2516 BA The Hague	Tel: --31 70 3396250
9	Norway		Transportation/customs office Material administration branch Royal Norwegian Air Material Command PB 10, N-2007 KJELLER	63 80 8000
10	Portugal			
11	Spain		Air Force Headquarters Section of Operative Planning (Duty Officer of AFH) Madrid	341.244 2354
			Air Transport Command Section 3 (Operations) Zaragoza	3476.22 4398 22 6040
12	Turkey			

	Country	Address	Telephone number
13	United Kingdom	Defence Transport and Movements Agency (SO2 Air Freight Policy) Defence Logistics Organisation (DLO) Andover Hampshire SP11 8HT :	Civil Network Tel: +44(0) 1264 382908 Fax: +44(0) 1264 382881 Military Network: Tel: 94391 2908 Fax: 94391 2881
14	United States	Directorate of Transportation AFLC/LOTPP Wright-Patterson Air Force Base Ohio 45433 USA Telegraphic Address: Ruvaria/AFLC/LOTPP Wright Patterson AFB, Ohio	513-257 3422 513-257 4503

RECOMMENDED SIGN
AIRCRAFT LOADED WITH EXPLOSIVES

AIRCRAFT

LOADED WITH

EXPLOSIVES

MANUAL OF NATO SAFETY PRINCIPLES

FOR THE TRANSPORT OF

MILITARY AMMUNITION AND EXPLOSIVES

Disclaimer:

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document".

PART V

TRANSPORT IN SHIPS AND HARBOURS

CHAPTER 1 - GENERAL

Section I - Introduction

5.1.1.1 *Purpose*

To set forth the principles governing the transportation of military ammunition and explosives in harbours of NATO countries and those prescribed for stowage and segregation in merchant ships used partly or fully for the transportation of military ammunition. Separate sections and annexes provide a compendium of information. It is emphasised that the information and guidance given in this part of the Manual applies to transportation and stowage in merchant ships only. It does NOT necessarily apply to naval ships, the regulations for which are laid down by the Naval Authorities of the country concerned. In particular it is the responsibility of these authorities to draw their inspiration from this part of the Manual to elaborate the regulations applicable to the auxiliary ships, under military control, transporting ammunition and explosives.

5.1.1.2 *Disclaimer:*

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document."

5.1.1.3 *Observation*

THIS PART OF THE MANUAL IS TO BE USED IN CONJUNCTION WITH THE GENERAL REQUIREMENTS OF PART I.

Section II - Definitions

The following definitions explain terms specific to transport by sea. More general definitions are contained in Part I Chapter 2.

5.1.2.1 *Harbour Area*

The Harbour Area means any area in which the loading into, or unloading from, ships of ammunition and explosives is governed by statutory regulations or by-laws imposed by, or with the approval of, the Competent National Authority.

5.1.2.2 *Harbour Master*

The person appointed by the harbour authority to exercise in the area under its control the responsibilities set out in Para 5.3.1.2 of this part of the manual.

5.1.2.3 *Hold or Compartment*

For the purpose of segregating incompatible dangerous cargoes, the words 'hold' and 'compartment' are deemed to mean a space enclosed by steel bulkheads, and/or steel plating, and permanent decks. The boundaries of such a space shall be resistant to fire and liquid.

NOTE: Shelter-'tweendeck compartments (See Figure V-1) may be used for the stowage of dangerous cargoes only when the bulkheads meet the foregoing requirements.

5.1.2.4 *In containers or the like*

In the context of on-deck stowage of ammunition and explosives this means any clean substantial weatherproof box structure which can be secured to the ship's structure, including a portable magazine, a closed freight container, a closed road vehicle and a closed rail wagon. Whenever this stowage is specified, stowage in deckhouses, mast lockers and oversized weatherproof packages (overpacks) is also acceptable.

5.1.2.5 *Machinery spaces of category "A"*

These are those spaces and trunks to such spaces which contain:

1. internal combustion machinery used for main propulsion;

2. internal combustion machinery used for purposes other than main propulsion where such machinery has in the aggregate a total power output of not less than 375 kW; or

3. any oil-fired boiler or fuel unit.

5.1.2.6 *Magazine*

A magazine is an enclosure designed to protect certain goods of Class 1 from damage by other cargo during loading and unloading, and adverse weather conditions when in transit, and to prevent unauthorised access. A magazine may be a fixed structure in the ship, a closed freight container, the load-carrying compartment of a closed vehicle or a portable magazine.

5.1.2.7 *Overstowed*

This means that a package or container is stowed directly on top of another. However, with regard to explosives stowage, such goods may themselves be stacked to a safe level but other goods should not be stowed directly on top of them.

5.1.2.8 *Secured to the ship's structure*

In the context of on-deck stowage of ammunition and explosives this means that any unit, e.g. "in containers or the like" or large unpacked articles, should be securely stowed and lashed to prevent the shifting of the goods.

5.1.2.9 *Shipborne Barge*

Shipborne barge or barge means, for the purpose of this section, an independent, non-self-propelled vessel, specially designed and equipped to be lifted in a loaded condition and stowed aboard a barge-carrying ship or barge feeder vessel.

NOTE: The definitions given above, have been agreed internationally and are used throughout the IMDG Code Volumes for all classes, including ammunition and explosives.

Section III - Segregation

5.1.3.1 Segregation is defined in the terms stated below, for easy reference to Figure V-1 the terms are numbered.

1. Away from: means effectively segregated so that incompatible substances cannot interact dangerously in the event of accident, but may be carried in the same hold or compartment, or on deck if a minimum horizontal separation of 3 m projected vertically is obtained.

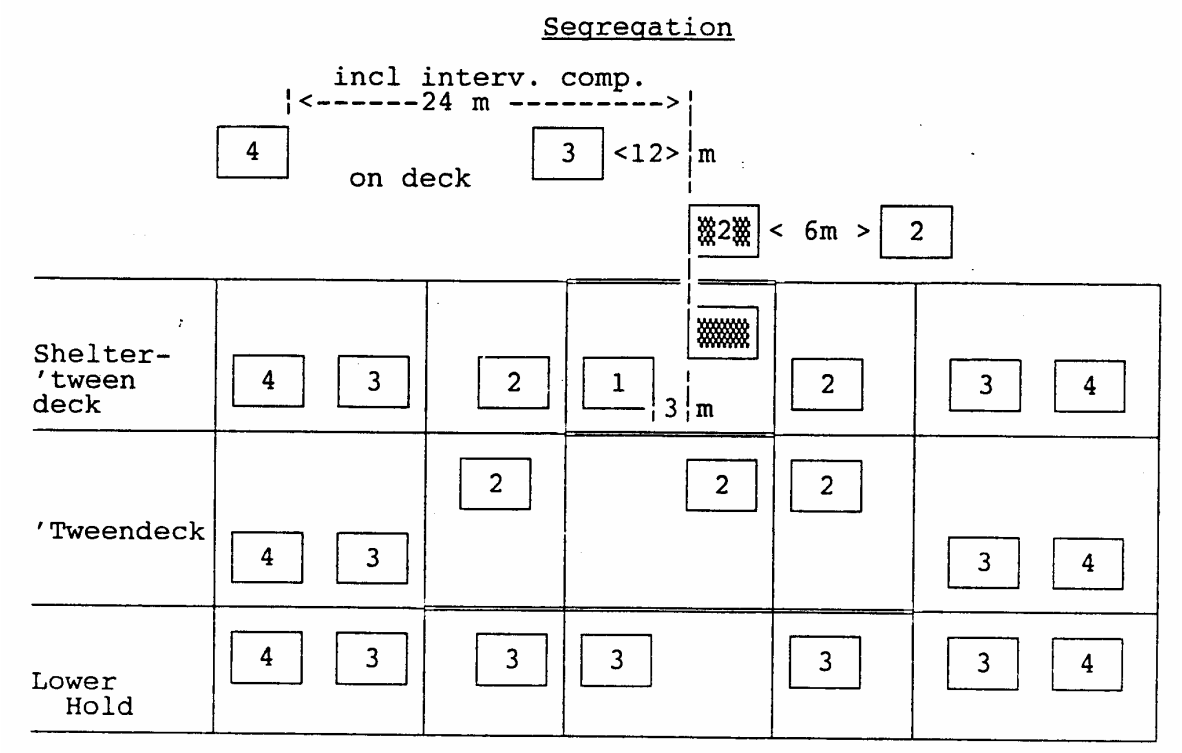
2. Separated from: in different holds or compartments when stowed under deck. Provided an intervening deck is resistant to fire and liquid, a vertical separation - i.e. in different compartments - may be accepted as equivalent to this segregation. For "on deck" stowage this segregation means a separation of at least 6 metres horizontally.

3. Separated by a complete compartment or hold from: means either a vertical or a horizontal separation. If the intervening decks are not resistant to fire and liquid, then only a longitudinal separation i.e. by an intervening complete compartment (see 4 below) is acceptable. For "on deck" stowage this segregation means a separation by a distance of at least 12 metres horizontally. The same distance has to be applied if one package is stowed "on deck', and the other one in an upper compartment.

4. Separated longitudinally by an intervening complete compartment or hold from: vertical separation alone does not meet this requirement. Between a package "under deck" and one "on deck" a minimum distance of 24 metres including a complete compartment must be maintained longitudinally. For "on deck" stowage, this segregation means a separation by a distance of at least 24 metres longitudinally.

5.1.3.2 For segregation in special types of transport, see Chapter 5 of this part of the Manual.

FIGURE V - 1



The numbers correspond to the terms 1. to 4. under "Segregation" in paragraph 5.1.3.1. The shaded block represents the block of cargo from which the specified degrees of segregation are required.

======= resistant to liquid or fire

CHAPTER 2 - PRINCIPLES FOR TRANSPORT IN SHIPS

Section I - Construction and equipment

5.2.1.1 *Lightning protection*

A lightning conductor earthed to the sea should be provided on any mast or similar structure, unless effective electrical bonding is provided between the sea and the mast or structure, from its extremity and throughout to the main body of the hull structure. Steel masts in ships of all welded construction may be considered to comply with this requirement.

5.2.1.2 *Electrical Installations*

Electrical cables should not pass through a compartment being used for the stowage of ammunition and explosives. If, however, this is unavoidable, ammunition and explosives should be sited in a safe position relative to the cable. All electrical equipment should meet the required standard (see Annex V-A). Before stowage of the goods is commenced, all electrical equipment which needs to be energised during the voyage for the safe operation of the ship, should be inspected and tested by a skilled person to ensure that they are safe and to determine satisfactory insulation resistance and continuity of the cable cores and continuity and earthing of metal sheathing or armouring, and should be so certified by that person. Cable joints should be avoided where possible. When joints are unavoidable, they should be enclosed in metal-clad junction boxes of the recognised standard (see annex V-A). Any electrical circuits not meeting the required standard, or terminating in holds in which ammunition and explosives are to be stowed should be isolated from the supply so that no part of the circuit within the compartment is energised. The method of isolation may be by opening of switches or circuit breakers, or disconnection from bus bars or by the removal of links in the system. In any case, the means, or access to the means of disconnection and of reconnection should be padlocked off and under the control of a responsible person.

5.2.1.3 *Artificial Lighting*

All lighting should be of the fixed type and should meet the relevant inspection, test and installation standards of this section.

5.2.1.4 *Fire fighting equipment*

For requirements for fire-fighting equipment, see Chapter 4 of this part of the manual.

Section II - Stowage

5.2.2.1 *General*

The principles adopted internationally for the stowage and segregation of explosives in ships are embodied in the International Maritime Dangerous Goods Code for Class 1 (ammunition and explosives). Since the Code applies to military as well as commercial items, the principles here stated are presented as an abstract of the relevant portion of the IMO document. The terms used in this chapter are defined, where necessary, in Chapter 1, section II and III of this part of the Manual.

5.2.2.2 *Stowage Arrangements*

Different kinds of ammunition and explosives, according to their properties, require different stowage arrangements, e.g. certain substances require to be stowed in an isolated space secured from interference. For the purpose of easy reference, each different method of stowage has been described as a stowage arrangement, as set out below. It should be noted that the provisions of Ordinary Stowage are also applicable to the other stowage arrangements. The minimum stowage arrangements provided for ammunition and explosives are shown on the individual schedules in the IMDG Code.

5.2.2.3 Most explosive articles carried by sea are given ordinary stowage. The exceptions are those for which "magazine" of "special stowage" has been prescribed.

5.2.2.4 The provisions of paragraphs 5.2.1.1., 5.2.1.2., 5.2.2.5. under g),h) and i) need not to be applied to ammunition and explosives of hazard division 1.4, compatibility group S. This ammunition may be stowed together with all other ammunition and explosives except those in compatibility group A or L.

5.2.2.5 *Ordinary Stowage*

a) Ammunition and explosives should be stowed in a cool part of the ship and should be kept as cool as practicable while on board. Stowage should be stowed "away from" all sources of heat including sparks, flame, steam-pipes, heating coils, etc.

b) The compartment should be clean, dry and free of dust from other cargo.

c) Bilges should be examined and any residue of previous cargo removed therefrom.

d) Ammunition and explosives must be properly stowed and secured to prevent significant movement when subjected to accelerations during the voyage. The restrained load in a container, portable magazine or in a vehicle should be properly secured in position and should be capable to withstand the following accelerations shown in paragraph 1.7.5.6:

e) It may be necessary during the voyage to jettison a package of a consignment of ammunition and explosives if there is danger of involvement in a fire. This should be borne in mind when stowage is planned.

f) Fibreboard boxes should be stowed under deck, or if they are stowed on deck should be so protected that at no time they are exposed to the weather or to seawater.

g) Ammunition and explosives, other than those in Hazard Division 1.4, compatibility group S should be stowed as far away as possible from living quarters and machinery spaces. They should not be stowed below or above such spaces unless separated from it by at least one intervening compartment. In the horizontal plane ammunition and explosives should always be separated from living quarters and machinery spaces by a permanent steel A-class bulkhead; explosives of Hazard Division 1.1, 1.2, 1.3, 1.5 or 1.6 should not be stowed within 3 metres from this bulkhead, projected vertically. Unless the separation bulkhead between the machinery space of category "A" and a compartment containing ammunition and explosives is insulated to class "A-60" standard of the IMDG-code, additional measures, as indicated in annex V-B, should be taken for ammunition and explosives other than in hazard division 1.4, compatibility group S.

h) Where ammunition or explosives are stowed "away from" bulkheads bounding living quarters or machinery spaces the intervening space may be filled with cargo that is not readily combustible.

i) Ammunition and explosives should be stowed in a safe position relative to electrical equipment and cables. Additional physical protection should be provided, where necessary, to minimise possible damage to the electrical equipment and cables, especially during loading and unloading.

5.2.2.6 *Magazine stowage*

a) All substances except "EXPLOSIVE SUBSTANCES, N.O.S." in compatibility group G, L or S are given magazine stowage. "Type A" applies to those substances that should be kept clear of steelwork. All other substances are given magazine stowage "type B" except those in compatibility group A for which "type C" is provided. Some sensitive articles are also given magazine stowage "type B". Detonators and similar articles classified as 1.1B or 1.2B are given magazine stowage "type C".

b) In the case of goods of class 1 allocated to magazine stowage "type A", the magazine additionally guards against friction between any spilled contents from packages and the ship's sides and bulkheads. Magazines may be positioned in any part of the ship conforming with the general stowage conditions for ammunition and explosives but magazines which are fixed structures should be sited so that their doors, where fitted, are easily accessible. A "type A" magazine constructed in the square of a cargo space should not be loaded from the top unless special precautions are taken during loading.

c) Magazine stowage "type A"

As for ordinary stowage but ammunition and explosives requiring this type of stowage should be stowed in a magazine which should be close-boarded on the cargo sides and should have a close-boarded floor. The ship's sides and bulkheads should be clean and free from rust or scale and if utilised as part of the structure they should be protected by battening or sweatboards spaced not more than 15 cm apart. All stanchions and other unprotected ironwork should be similarly clean and battened. The deckhead should be clean and free from rust or scale; it need not be battened. The top of the stow within the magazine should be at least 30 cm from the deckhead. When other ammunition or explosives are stowed in a magazine with goods requiring magazine stowage "type A", it is essential to ensure that their packagings have no exposed external parts made of ferrous metal or aluminium alloy.

d) Magazine stowage "type B"

As for "type A", except that the floor need not be close-boarded but should be sparred or protected by wooden pallets or dunnage. Battening of the ship's sides, bulkheads and stanchions is not required. Arrangements should be made to provide a secure stowage at the ship's side. A compartment may be used for magazine stowage "type B" without a magazine structure provided that:

1. such items are stowed on sparred gratings, wooden pallets of an approved type, or dunnage, directly on the deck and not on other cargo;

2. other cargo stowed in the same compartment is not readily combustible (e.g. items packaged in straw, etc., should be avoided);

3. the position of stowage is such that there is direct access to the hatchway; and

4. ammunition and explosives thus stowed and other cargo in the same compartment should be so secured as to eliminate the possibility of significant movement. Where an entire deck is utilised as a magazine, the stowage should be so arranged that the goods stowed therein will be removed from the ship before working any cargo in any decks above or below that deck in the same hold.

e) Magazine stowage "type C"

These should be constructed as for "type B" except that they should be positioned as near as practicable to the centre-line of the ship; they should not be positioned closer to the ship's side than a distance equal to one eighth of the beam or 2.4 metres, whichever is the lesser.

5.2.2.7 *Special Stowage*

a) This stowage is allocated to certain articles of which the principal hazard is that of fire and leakage of the contents, accompanied by dense smoke or tear-producing or toxic fumes, (compatibility group L). Where on-deck stowage is recommended but not possible, the goods should always be subject to special stowage.

b) Ammunition and explosives allocated to this category should be stowed as far away as practicable from living quarters and from work areas, and should not be overstowed. Portable steel magazines, freight containers or vehicles used for goods of this category should not be positioned closer to the ship's side than a distance equal to one eighth of the beam or 2.4 metres, whichever is the lesser.

c) Goods in compatibility groups G or H may be carried in portable steel magazines. A steel freight container which prevents leakage of contents may also be used for this purpose. Alternative arrangements may also be agreed by the competent authority concerned.

d) Goods of only one compatibility group should be stowed in any one compartment. When separate compartments are not available, the competent authority may allow goods in compatibility groups G and H to be stowed in the same compartment not less than 3 metres apart, provided they are placed in separate portable steel magazines.

e) Goods in compatibility group K or L should be carried in portable steel magazines.

5.2.2.8 *On-deck stowage*

a) On-deck stowage is always permitted and in some cases it is recommended. It should be noted that in some individual schedules portable magazines, waterproof or other special box structures are specified for on-deck stowage. In most cases "containers or the like" are specified.

b) The ammunition and explosives should be stowed as near as practicable to the ship's centreline.

c) The ammunition and explosives should not be stowed within a horizontal distance of 6 metres from any open fire, machinery exhausts, galley uptakes, lockers used for combustible stores, or other potential sources of ignition. They should always be so stored as to ensure clear walkways and be "away from" all other facilities necessary for the safe working of a ship and be clear of fire hydrants, steam pipes and means of access and be not less than a horizontal distance of 8 metres from the bridge, living quarters and life-saving appliances.

d) Where ships are fitted with container fastening arrangements (such as stools, etc.), freight containers containing ammunition and explosives may be overstowed by containers with compatible goods of class 1, or non dangerous cargoes. Where ships are not fitted with container fastening arrangements, freight containers packed with ammunition and explosives should be stowed in the bottom layer only (for freight container stowage see also Chapter 5, section III of this part of the manual).

Section III - Separation of ammunition and explosives of different compatibility groups

5.2.3.1 *General*

The principle of compatibility grouping of ammunition and explosives, as set forth in the "Manual on NATO Principles for the Storage of Ammunition and Explosives" (AC/258-D/258), Part I, Chapter 3, is the same as that adopted by international agreement for the stowage of explosives in ships and is embodied in the IMDG Code.

5.2.3.2 *Principle of Compatibility Grouping*

The safety of ammunition and explosives would be best assured by stowing each kind separately, but considerations of practicability and economics preclude so ideal a stowage. In practice, a proper balance of the interests of safety against the other relevant factors necessitates a degree of mixed stowage of several kinds of ammunition and explosives. The extent of such mixing in stowage is determined by the COMPATIBILITY GROUP of the items. See chapter 4 and 5 of part I of this Manual.

5.2.3.3 The principle of compatibility grouping equally applies to transport of ammunition and explosives inside a magazine, a freight container, a rail wagon, a vehicle or a shipborne barge as well as to the transport of such means of transport loaded with ammunition and explosives.

5.2.3.4 *Segregation on deck*

When ammunition and explosives in different compatibility groups are carried on deck, they should be stowed not less than 6 metres apart unless their mixed stowage is allowed according to Part I of this Manual.

5.2.3.5 *Segregation in single-hold ships*

In a single-hold ship transporting no dangerous cargo other than ammunition and explosives, segregation should be as for larger ships except that:

1. ammunition and explosives in hazard division 1.1 or 1.2 of compatibility group B may be stowed in the same hold as substances of compatibility group D provided that:

   - the net explosives mass of compatibility group B goods does not exceed 50 kg; and
   - such goods are stowed in a portable steel magazine which is stowed at least 6 metres from the substances of compatibility group D.

2. Goods in hazard division 1.4 of compatibility group B may be stowed in the same hold as substances of compatibility group D provided that they are separated by either a distance of at least 6 metres or by a steel division.

Section IV - Segregation of ammunition and explosives from other cargo

5.2.4.1 *Segregation from other Dangerous Goods*

a) Hazard Divisions 1.1, 1.2, 1.5 and 1.6

As other dangerous goods may under accident conditions affect the integrity of a package containing ammunition and explosives, segregation from other dangerous goods is necessary. The stowage should be so arranged at all times that ammunition and explosives in Hazard Divisions 1.1, 1.2, 1.5 and 1.6 are kept:

1. Separated from:

Other than flammable gases (2.2 and 2.3)	Class 2
Poisons*	Class 6.1
Radioactive materials	Class 7

2. Separated longitudinally by an intervening complete compartment or hold from:

Flammable gases (2.1)*	Class 2
Flammable liquids	Class 3
Flammable solids	Class 4.1
Spontaneously combustible substances	Class 4.2
Substances which are dangerous when wet	Class 4.3
Oxidizing substances	Class 5.1
Organic peroxides	Class 5.2
Infectious substances	Class 6.2
Corrosives	Class 8

For segregation from dangerous goods of Class 9, see individual schedules for that class in the IMDG Code. For segregation from dangerous goods in limited quantities, see section 18 of the "General Introduction" in the IMDG-Code.

b) Hazard Division 1.3

Ammunition and explosives in Hazard Division 1.3 should be kept:

1. Separated from:

Other than flammable gases (2.2 and 2.3)	Class 2
Poisons*	Class 6.1
Radioactive materials	Class 7
Corrosives	Class 8

2. Separated by a complete compartment or hold from:

Flammable solids	Class 4.1
Spontaneously combustible substances	Class 4.2

3. Separated longitudinally by an intervening complete compartment or hold from:

Flammable gases (2.1)*	Class 2
Flammable liquids	Class 3
Substances, dangerous when wet	Class 4.3
Oxidizing substances	Class 5.1
Organic peroxides	Class 5.2
Infectious substances	Class 6.2

For segregation from dangerous goods of Class 9, see individual schedules for that class in the IMDG Code. For segregation from dangerous goods in limited quantities, see section 18 of the "General Introduction" in the IMDG-Code.

c) Hazard Division 1.4

Ammunition and explosives in Hazard Division 1.4. should be kept:

1. Away from:

Other than flammable gases	
(2.2 and 2.3)	Class 2

2. Separated from:

Flammable gases (2.1)*	Class 2
Flammable liquids	Class 3
Flammable solids	Class 4.1
Spontaneously combustible substances	Class 4.2
Substances, dangerous when wet	Class 4.3
Oxidizing substances	Class 5.1
Organic peroxides	Class 5.2
Radioactive materials	Class 7
Corrosives	Class 8

3. Separated longitudinally by an intervening complete compartment or hold from:

Infectious substances	Class 6.2

For segregation from dangerous goods of Classes 6.1 and 9, see individual schedules for these classes in the IMDG Code. For segregation from dangerous goods in limited quantities, see section 18 of the "General Introduction" in the IMDG-Code.

Note *

Poisonous gases which are also flammable should be segregated as Class 2.1 gases.

d) Nitrates and Blasting Explosives

Notwithstanding the foregoing ammonium nitrate and sodium nitrate of class 5.1 may be stowed together in the same magazine with blasting explosives (except Blasting Explosive, Type C, UN No. 0083) provided that the aggregate is treated as blasting explosives under class 1.

e) Special Substances

The following chemical substances, because of their extreme flammability may not be conveyed in a ship loaded with ammunition and explosives. These substances are:

	UN No.	Class
CARBON DISULPHIDE	1131	3.1
NICKEL CARBONYL	1259	3.1
DIETHYL ZINC	1366	4.2
DIMETHYL ZINC	1370	4.2
PYROPHORIC LIQUIDS, N.O.S.	2845	4.2
MAGNESIUM ALKYLS	3053	4.2

This restriction does not apply in the case of:

- ammunition in division 1.4, compatibility group S; or
- explosive articles for life-saving purposes as identified in the individual schedules, if the total net explosives mass of such articles does not exceed 50 kg per ship; or
- ammunition in compatibility groups C, D and E, if the total net explosives mass does not exceed 10 kg per ship; or
- ammunition in compatibility group G other than fireworks and those requiring special stowage, if the total net explosives mass does not exceed 10 kg per ship.

f) Where however, the ship is transporting ammunition and explosives and dangerous goods of extreme flammability, they are to be segregated in accordance with paragraph 5.2.4.1 .1, .2 and .3 and care should be taken that they are stowed in parts of the ship as remote as possible from each other.

5.2.4.2 *Segregation from Non-dangerous Goods*

a) In general it is not necessary to segregate ammunition and explosives from other cargo of a non-hazardous nature.

b) Mail, baggage and personal effects, however, should not be stowed in the same compartment as, or in compartments immediately above or below, ammunition and explosives other than those in Compatibility Group S.

c) Where ammunition and explosives are stowed against an intervening bulkhead, mail, etc., on the other side of the bulkhead should be stowed "away from" it, preferably with the intervening space filled by other non-dangerous cargo.

d) In order to avoid contamination

- a substance or article for which toxicity is indicated by a "poison" subsidiary risk label should be stowed "separated from" foodstuffs, except when the substance or article and the foodstuffs are in different closed cargo transport units; in such cases the segregation requirement "away from" may be applied;

- a substance or article for which corrosivity is indicated by a CORROSIVE subsidiary risk label should be stowed "away from" foodstuffs;

- the individual schedules should always be consulted for individual requirements for stowage and segregation.

Section V- Documentation

5.2.5.1 *General Information*

Marking and labelling of packages is always required in accordance with the general principles in paragraphs 1.6.0.2 and 1.6.0.3 of Part I. This includes subsidiary risk labelling where required. In addition, to satisfy the requirements for declaration and shipper's certification, the transport documentation must give a proper description of the explosives carried, according to the marking and labelling information and the quantities concerned.

5.2.5.2 *Additional Information*

There are, however some supplementary hazards which are not indicated by the hazard divisions and compatibility group of the explosives. The shipper should provide an indication of any such hazard on the dangerous goods documentation. This is apart from the general rule on subsidiary risk labels. The criteria for determining supplementary hazards is given at paragraph 1.4.0.5 in Part I.

CHAPTER 3 - PRINCIPLES FOR TRANSPORT IN HARBOURS

Section I - General principles

5.3.1.1 *Preliminary Notice*

Before any explosives are brought into a Harbour Area, whether in a vehicle or ship notice in advance as required by the receiving country (generally 48 hours) should be given to the Harbour Master of the Classification Code of ammunition and explosives, Net Explosives Quantity of each hazard division to be conveyed, the name of the ship into or from which the explosives are to be loaded or unloaded, the expected time of arrival (in the case of an incoming ship) and the time when it is proposed to load or unload the explosives.

5.3.1.2 *Responsibilities of the Harbour Master*

To ensure the safety of any Harbour Area in which ammunition and explosives are conveyed, the Harbour Master directs where explosives ships must be berthed, moored or anchored and where vehicles loaded with explosives must be parked whilst in the area. He also directs at what places in the Harbour Area explosives must be loaded or unloaded, and is responsible for enforcement of safety requirements, in consultation with the Authorised Representative.

5.3.1.3 *Flags and Lights*

It is internationally agreed that "Whilst in a harbour area, ships which have on board any explosives, other than those permitted to be carried on passenger ships, shall at all times display:

1. by day, whether at anchor, moored at a berth, or underway, a red flag ("B" flag), and

2. by night, solely when moored or anchored, a red light so positioned as to give unbroken light visible round the horizon in clear weather."

Section II – Safety principles and Quantity-distances

5.3.2.1 *Introduction*

a) A detailed description of safety principles for ammunition and explosives in ports and harbour areas is given in AASTP-1, Part IV, Chapter 6. It includes the calculation of net explosives quantity (NEQ), protection levels, and the application of quantity-distance between vessels (loaded, loading or unloading) and shore facilities.

b) These distances are summarised in Tables 6-I, 6-II and 6-III of that chapter. As however there may be cases where information in these tables is useful purely for transport matters, they are repeated in a modified form in AASTP-2 and attached to this Section II as annexes. This is a brief explanation. Where more detail is required AASTP-1 must be consulted.

5.3.2.2 *Protection Levels*

a) Protection levels are described as **A**, **B** or **C** (from AASTP-1 para 1.4.1.9.). These are applied to exposed sites (ES) in relation to associated potential explosive sites (PES) for HD 1.1 and 1.2. Each level of protection contains three elements, the application of which is dependent on the particular ES under consideration. The levels and elements con be described and related broadly as follows:

b) Levels of Protection for HD 1.1

TABLE A

Element		Level of Protection given		
		A	**B**	**C**
1	**Propagation** Likelihood of propagation of an explosion between PES and ES (applies to ES which contain explosives)	High degree of protection against immediate propagation of explosions or fire	Limited degree of protection against immediate propagation of explosions or fire	Limited degree of protection against immediate propagation of explosions for barricaded vessels
2	**Damage** Probable damage to ES (applies to all ES)	Damage to vessels limited to superstructures and non –vital structural members	Damage to adjacent vessels will include buckling of the hull and superstructure	Adjacent vessels will suffer serious buckling of the hull and superstructure, and damage due to fragment, penetration and blast
3	**Casualties** Probable casualties resulting at ES (applies to all ES)	Some injuries to exposed personnel at ES, are likely to suffer due to fragments, debris & firebrands	Exposed personnel at ES, are likely to suffer death from fragments, debris & firebrands	Exposed personnel will suffer serious injury or death from blast, fragments and firebrands

For HD 1.1 protection level **A** should be applied wherever practicable. A lower level of protection is acceptable when it is unlikely that significant numbers of personnel will be exposed to blast and debris hazards. At a shorter separation distance, berthing of vessels in tandem at the same pier or anchorage will help to decrease the fragment hazard to the explosive cargo because of the additional protection afforded by the bow and stern.

c) Levels of protection for HD 1.2

1) Levels of protection are **A** and **B**. Protection level **A** should be used whenever practicable. Protection level **B** may be acceptable when it is unlikely that significant numbers of personnel will be exposed to fragments, debris and/or lobbed ammunition hazards.

2) Protection level **A** requires a minimum distance between vessels loaded with ammunition and explosives of:

– 90 m for ammunition up to 60 mm calibre

– 135 m for ammunition above 60 mm calibre

These distances will apply to barricaded and unbarricaded vessels for any quantity of ammunition and explosives.

3) Protection level **B** requires a minimum distance between vessels loaded with ammunition and explosives of 90m. This will apply to barricaded and unbarricaded vessels and to any quantity if ammunition and explosives. A lesser distance is acceptable if means are available to flood the vessel rapidly (see AASTP-1 para 1.4.1.5.e)

5.3.2.3 *Quantity Distances*

The quantity distances which apply for various levels of protection are set out in the following tables:

Table B Quantity-Distance table for vessels

Table C Summary of quantity-distances to be observed for seagoing vessels loaded with or loading or unloading military ammunition and explosives in ports and harbour areas.

Table D Quantity-distances to be observed for seagoing vessels loaded with or loading or unloading military ammunition and explosives of HD 1.1 in naval ports during periods of tension.

Q-D TABLE FOR VESSELS

TABLE B

NEQ **Q kg**	**Quantity-Distances** **m**				
	SD1	SD2	SD3	SD4	SD5
500	60	39	135	130	7
600		41		135	7
700		43		145	8
800		45		150	8
900		47		155	8
1 000		48		160	8
1 200		52		175	9
1 400		54		180	9
1 600		57		190	10
1 800		59		195	10
2 000		61		205	11
2 500		66		220	11
3 000		70		235	12
3 500		73		245	13
4 000		77	135	255	13
5 000		83	140	275	14
6 000	60	88	150	295	15
7 000	62	92	155	310	16
8 000	64	96	160	320	16
9 000	67	100	170	335	17
10 000	69	105	175	345	18
12 000	74	110	185	370	19
14 000	78	120	195	390	20
16 000	81	125	205	405	21
18 000	84	130	210	420	21
20 000	87	135	220	435	22
25 000	94	145	235	470	24
30 000	100	10	250	500	25
35 000	105	160	265	530	27
40 000	110	165	275	550	28
50 000	120	180	295	590	30
60 000	130	190	315	630	32
70 000	135	200	330	660	33
80 000	140	210	345	690	35
90 000	145	220	360	720	36
100 000	150	225	375	750	38
130 000	160	245	395	790	40
140 000	170	250	420	840	42
160 000	175	265	435	870	44
180 000	185	275	455	910	46
200 000	190	285	470	940	47
250 000	205	305	510	1 020	50
300 000	215	325	540	1 080	53
350 000	230	340	570	1 140	56
400 000	240	355	590	1 180	59
500 000	255	380	640	1 280	63
1 000 000	320	480	800	1 600	80
Distance Functions	SD1= $3.2\ Q^{1/3}$	SD2= $4.8\ Q^{1/3}$	SD3= $8.0\ Q^{1/3}$	SD4= $16.0\ Q^{1/3}$	SD5= $0.8\ Q^{1/3}$

NOTE: Quantity-Distances for Inhabited Buildings and Public Traffic Routes (including main shipping routes) are given in Part I, paragraphs 1.4.1.14 and 1.4.1.15.

SUMMARY OF QUANTITY-DISTANCES TO BE OBSERVED FOR SEAGOING VESSELS LOADED WITH OR LOADING OR UNLOADING MILITARY AMMUNITION AND EXPLOSIVES IN PORTS AND HARBOUR AREAS

TABLE C

Protection Levels are shown as **A, B, C** (explanation at Table A) and > **A** (better than A)

Quantity – Distance Tables (for SD1 – SD4) are at Table B.

	Potential Explosion Sites (PES)		
Exposed Sites (ES)	Vessels loaded with explosives		Vessels loading or unloading explosives (including at anchorage)
	Barricaded	Unbarricaded	Unbarricaded [e]
Vessels loaded with explosives (also applies to unbarricaded explosives on piers and jetties)	*HD 1.1* SD3[a] >**A** SD2 **B** SD1 **C** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min	HD 1.1 SD3[a] **A** (135m minimum) SD2 **B** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min	HD 1.1 SD4[b] >**A** SD3[b] **A** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min
Vessels loading or unloading explosives (also applies to unbarricaded explosives on piers and jetties)	*HD 1.1* SD4[b] >**A** SD3[b] **A** SD2 **B** SD1 **C** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min	*HD 1.1* SD4[b] >**A** SD3[b] **A** SD2 **B** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min	*HD 1.1* SD4[b] >**A** SD3[b] **A** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min
Other berthed cargo vessels	*HD 1.1* SD4[b)c)] >**A** SD3[b)c)] **A** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min	*HD 1.1* SD4[b] >**A** (180m minimum) SD3[b)c)] **A** *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min	*HD 1.1* SD4[b] >**A** (180m minimum) SD3[b)c)] A *HD 1.2* any qty, **AB**[d] *HD 1,3* any qty, 60m min *HD 1.4* any qty, 25m min
Holding Areas	*All HD* SD3	*All HD* SD3	*All HD* SD3
POL jetties	*All HD* SD4[f]	*All HD* SD4[f]	*All HD* SD4[f]
Port facilities, inhabited buildings, public traffic routes, main shipping routes, explosives workshops	g)	g)	g)

a) Ships moored in tandem may use SD2 distances.

b) SD3 is the minimum distance which should be applied where the exposed vessels are under military control and the controlling authority determines the exposure to be operationally necessary. SD4 distances are recommended otherwise as giving protection better than level **A**.
This will limit damage to that of a very minor nature and virtually eliminate death and serious injuries.
Special considerations may be required to afford greater separation for tanker vessels with unusually sensitive cargoes.

c) SD3 distances can be used if space limitations prohibit SD4 distances.

d) See Table A, para 5.3.2.2.c)

e) When loading or unloading, all vessels are considered as unbarricaded.

f) A minimum distance of 450m to be observed from above-ground POL storage tanks.

g) Quantity-distances in Part 1 Table 1 – Column e, Rows 18, 19 and 20.

QUANTITY-DISTANCES TO BE OBSERVED FOR SEAGOING VESSELS LOADED WITH OR LOADING OR UNLOADING MILITARY AMMUNITION AND EXPLOSIVES OF HD 1.1 IN NAVAL PORTS DURING PERIODS OF TENSION

TABLE D

PES / ES	Vessels Loaded with explosives		Vessels loading or unloading explosives	
	Barricaded	Unbarricaded	Barricaded	Unbarricaded
Vessels loaded with explosives	SD1[c)]	SD2[c)]	SD2[c)]	SD2[c)]
Vessels loading or unloading explosives	SD2[c)]	SD2[c)]	SD2[c)]	SD2[c)]
Other cargo vessels	SD2	SD2	SD2	SD2
Port Facilities	SD3[a)]	SD3[a)]	SD3[a)]	SD3[a)]
Inhabited Buildings	SD3[a)]	SD3[a)]	SD3[a)]	SD3[a)]
Public Traffic Routes and Main Shipping Routes	SD2	SD2	SD2	SD2
Explosives Workshops and Holding Areas	½ SD2 (2.4 $Q^{1/3}$)	D7 (traversed ES) D9 (untraversed ES)	D7 (2.4 $O^{1/3}$)	½ SD2 (traversed ES) SD2 (untraversed ES)
POL Jetties	SD3[b)]	SD3[b)]	SD3[b)]	SD3[b)]

NB: The distances in this table provide a minimum standard of protection of level B (i.e. a limited degree of protection against immediate propagation of an explosion.

NOTES: a) SD4 to vital facilities.

b) SD4 to unprotected POL tanks subject to a minimum distance of 450m

c) Vessels to be berthed in tandem to minimise fragment hazard

Section III – Loading and Unloading

5.3.3.1 *General*

The provisions of paragraphs 5.2.1.2, 5.2.1.3 and 5.3.2.2, do not apply where the only ammunition and explosives in the ship are those of Hazard Division 1.4.

5.3.3.2 *Artificial Lighting*

Electric lights, except arc lights, are the only form of artificial lighting permitted whilst loading and unloading ammunitions and explosives.

5.3.3.3 *Precautions against lightning*

Ship and lighter loading/unloading must be suspended during thunderstorms and hatches must be closed.

5.3.3.4 *Radio and Radar Working*

a) Some explosive articles contain electro-explosive devices which are extremely sensitive to electromagnetic radiation from external sources of energy such as radio and/or radar transmitters. For protection during loading or unloading of all explosive articles all equipment such as radio transmitters and radar transmitters should be de-energised by opening the main switches controlling the equipment and tagging them to ensure that the devices are not re-energised until loading or unloading has ceased.

b) During loading or unloading of ammunition no radio or radar transmitters should be used except for VHF-transmitters on the ship, in cranes or elsewhere in the vicinity, provided the power output of a VHF transmitter does not exceed 25 W and no part of its aerial system passes within the minimum safe distance of 2 metres from the ammunition.

c) Ammunition that is sensitive to electro-magnetic radiation from external sources should be stowed at a safe distance from the ship’s radio cabin, receiving or transmitting apparatus, radio antenna or lead-in, with due regard to the character of the ship and the degree of screening off the articles. This precaution should be applied also to the ship’s radar installation.

5.3.3.5 *Mechanical Aids to Stowage*

All mechanical aids to stowage, whether power driven or not, should be properly maintained and should be inspected before use to ascertain that they are in good working condition. Power driven mechanical aids should comply with an appropriate recognised standard and should be serviced in accordance with the manufacturer's maintenance schedule.

5.3.3.6 *Defective Packages*

Any leaky, broken or otherwise defective packages, including packages which have been affected by moisture, containing ammunition and explosives should not be accepted for shipment. Advice should be sought from the shipper concerning withdrawal, repair or replacement. No repair of damaged or defective packages should be permitted on board the ship. In all cases of spillage, refer to the IMO Emergency Procedures for Ships Carrying Dangerous Goods (EmS).

5.3.3.7 *Protection Against Weather*

Care should be taken during loading and unloading of ammunition and explosives to prevent packages from becoming wetted, since, in some cases, the hazard might be aggravated by wetting of the contents.

5.3.3.8 *Security*

To ensure the security of ammunition and explosives, a responsible person should be present at all times whilst the hatches of compartments containing such cargo are open. Unauthorised persons should never be permitted access to spaces in which ammunition and explosives are stowed. Magazines should always be secured against unauthorised entry when loading is completed, or when loading or unloading is stopped. Ammunition and explosives should be tallied into and out of the ship. Packages containing ammunition and explosives should not be opened on board ship (see also paragraph 5.3.2.6).

5.3.3.9 *Bunkering*

No bunkering with fuel oil should be permitted during loading or unloading of ammunition and explosives except those in Hazard Division 1.4, compatibility group S, unless with prior authorisation of the port authority, and under conditions prescribed by that authority.

Section IV - Special national requirements

5.3.4.1 *Classification of Explosives*

Whilst most countries have adopted The International System of Classification of Explosives, others have given declarations of intention to adopt it, so there may be currently differing requirements in the classification systems operative in NATO member countries.

5.3.4.2 *Marking of Packaged or Unpackaged Military Ammunition and Explosives*

Marking and labelling of military ammunition and explosives should be in accordance with the provisions given in paragraphs 1.6.0.2 and 1.6.0.3 of this manual.

5.3.4.3 *Loading and Unloading - Restrictions on the Number of Barges and Vehicles*

Requirements vary slightly; they may be summarised as follow:

1. No restrictions (or none specified) - Denmark, Netherlands.

2. Restrictions imposed, on a case-by-case basis, by harbour authorities - Greece, Italy, Norway.

3. Numbers restricted to those necessary to avoid interruption of loading or unloading - Germany, United Kingdom.

4. Numbers based on total quantity-distance requirements and available space - United States.

5.3.4.4 *Explosives Limits in Harbours*

These necessarily vary considerably; they are governed in most cases by environmental and other quantity-distance factors. The details furnished by member countries are given in Annex V-C.

5.3.4.5 *Berthing Requirements*

There are varying requirements in the harbours of the NATO countries; these are given in Annex V-D.

5.3.4.6 *Anchorages*

Provisions for the designation of anchorages for ships carrying explosives - as distinct from dock or quayside berths - varies for different countries. Details of national requirements, together with anchorage quantity limits (when applicable) are given in Annex V-E.

5.3.4.7 *Regulations*

The position in different NATO countries regarding regulations and the extent to which there are differences between military and commercial ships and between military and commercial harbours is given in Annex V-F.

5.3.4.8 *Competent Authority Approval*

a) Approvals, permits or certificates issued by the Competent National Authority or by a body authorised by and under the responsibility of that Competent National Authority should be recognised by other countries where such issue is referred to in this part of the Manual.

b) Such approvals, permits or certificates should at least comply with the requirements of the International Convention for the Safety of Life at Sea, 1974 as amended, and the standards of the IMDG-Code.

c) Addresses in individual countries to which inquiries regarding Competent National Authority approvals can be referred are given in Annex V-G, which will be kept up to date by publication of revised lists.

CHAPTER 4 - FIRE-FIGHTING PRINCIPLES

5.4.0.1 *Fire Precautions*

For general advice and guidance on fire precautions: refer to the "General Introduction, Section 16" in the IMDG Code.
Detailed fire-fighting recommendations are contained in the IMO Emergency Procedures for Ships Carrying Dangerous Goods (EmS).

5.4.0.2 The greatest risk in the handling and transportation of ammunition and explosives is that of fire from a source external to the goods and it is vital that any fire should be detected and extinguished before it can reach the ammunition and explosives; consequently it is essential that fire precautions, fire-fighting measures and equipment should be of high standard and ready for immediate application and use.

5.4.0.3 Smoking should be prohibited in places designated by the Master and the Port Authority. "NO SMOKING" notices or signs should be displayed.
Matches, lighters, fire, naked lights and other ignition sources should be prohibited in places designated by the Master and the Port Authority.

5.4.0.4 No repair work should be carried out in a hold in which ammunition and explosives are present. Special care should be exercised in carrying out repairs in holds adjacent to those containing ammunition and explosives. No welding, burning, cutting or riveting operations involving the use of fire, flame, spark or arc-producing equipment should be carried out in any space other than machinery spaces and workshops where fire-extinguishing arrangements are available and, if in port with prior authorisation of the port authority.

5.4.0.5 *Equipment Aboard the Ship*

a) Compartments containing ammunition and explosives and adjacent cargo spaces should be provided with a fire-detection system. If such spaces are not protected by a fixed fire-extinguishing system, they should be accessible for fire-fighting operations.

b) Ships transporting ammunition and explosives should be provided with a power operated fire pump which, together with its power source and sea connections, should be located outside the machinery space. Two sets of breathing apparatus should also be provided on board.

5.4.0.6 *Mobility of Ships at Quayside or Dock Berths*

Ships transporting military ammunition and explosives with the exemption of Hazard Division 1.4 should be kept afloat at all times and should be capable of being moved speedily in case of need. Towing wires should be kept in readiness for immediate use, and towing vessels should be in attendance.

CHAPTER 5 - SPECIAL TYPES OF TRANSPORT

Section I - Transport of military ammunition and explosives in shipborne barges on barge-carrying ships

5.5.1.1 Because of the structural difference between barge-carrying and conventional ships, Section 19 of the General Introduction" of the IMDG-Code contains special or additional provisions and recommendations concerning the transportation of dangerous goods in shipborne barges on barge-carrying ships.

5.5.1.2 *Applicability*

The provisions of this chapter are applicable to shipborne barges in which ammunition and explosives are carried while aboard barge-carrying ships or barge feeder vessels.
Except as otherwise specified in this chapter, all the provisions laid down for ammunition and explosives in this part of the Manual should apply to the transportation of ammunition and explosives in shipborne barges on barge-carrying ships.

5.5.1.3 *Stowage*

a) Stowage provisions as given in chapter 2, section II equally apply to barges loaded with ammunition and explosives aboard barge carrying ships.

b) Fixed magazines may be built within a shipborne barge. Portable magazines and freight containers may also be used as magazines within such a barge.

c) When transporting ammunition and explosives requiring special stowage, the following should apply:

- goods in compatibility group G or H should be in portable steel magazines or in freight containers unless other arrangements are approved by the competent authority; and

- goods in compatibility group K or L should be in portable steel magazines at all times.

5.5.1.4 *Segregation between Shipborne Barges on Barge-carrying ships*

a) When a shipborne barge is loaded with two or more substances with different requirements for segregation, the most stringent segregation applicable should be applied.

b) "Away from" and "separated from" require no segregation between shipborne barges.

c) "Separated by a complete compartment or hold from" means, for barge-carrying ships with vertical holds, that separate holds are required. On barge-carrying ships having horizontal barge levels, separate barge levels are required and the barges should not be in the same vertical line.

d) "Separated longitudinally by an intervening complete compartment or hold from" means, for barge-carrying ships with vertical holds, that separation by an intervening hold or engine room is required. On barge-carrying ships having horizontal barge levels, separate barge levels and a longitudinal separation by at least two intervening barge spaces is required.

5.5.1.5 *Fire-fighting*

Care should be taken to ensure that the fixed fire-detection and fire-fighting equipment on board the barge-carrying ship are properly installed and/or connected to the barges loaded with ammunition and explosives. Depending on the type of equipment, ventilation openings in the barges should be opened or closed.

Section II - Transport of military ammunition and explosives on roll-on/roll-off ships

5.5.2.1 Because of the structural difference of such ships from conventional ships, Section 17 of the "General Introduction" of the IMDG-Code contains special or additional provisions and recommendations concerning the transportation of dangerous goods on roll-on/roll-off ships.

5.5.2.2 *Applicability*

The provisions of this chapter are applicable to transport units in which ammunition and explosives are carried while aboard roll-on/roll-off ships.
Except as otherwise specified in this chapter, all the provisions laid down for ammunition and explosives in this Manual should apply to the transportation of ammunition and explosives in transport units on roll-on/roll-off ships.

5.5.2.3 All vehicles used for the transport of ammunition and explosives should be structurally serviceable (see Part I, chapter 7 of this manual).

5.5.2.4 All vehicles or trailers used for the transportation of ammunition and explosives must have lashing arrangements for securing the vehicle on the ship and preventing the movement of the vehicle on its springs during the sea voyage.

5.5.2.5 *Placarding of transport units*

Each transport unit loaded with ammunition and explosives should display the appropriate placards (enlarged hazard warning labels) on each side and on the back of the unit.

5.5.2.6 *Stowage*

a) Stowage provisions as given in chapter 2, section II equally apply to transport units loaded with ammunition and explosives aboard roll-on/roll-off ships.

b) Ammunition and explosives requiring special stowage should normally be carried in special explosives vehicles except that those in compatibility group G or H may also be carried in portable steel magazines or freight containers. Closed vehicles may be used as magazines; other types of vehicles may be used for goods requiring ordinary stowage.

c) Vehicles used for ammunition and explosives requiring magazine stowage "type A" should be fitted with a close-boarded floor and should have a non-metallic lining.

d) Deck stowage is always permitted and, in some cases, recommended.

5.5.2.7 *Segregation*

Vehicles transporting ammunition and explosives require no segregation from each other provided that mixed loading as set out in Part I of this manual is permitted. Where this is not permitted the vehicles should be "separated from" one another.

5.5.2.8 The term "separated from" aboard roll-on/roll-off ships is defined as set out in Table V-1.

TABLE V-1 SEGREGATION ABOARD RO/RO SHIPS

			Fore and aft	Athwartship
Horizontal	closed versus closed	On Deck	at least 6 metres	at least 3 metres
		Under Deck	at least 6 metres or one bulkhead	at least 3 metres or one bulkhead
	closed versus open	On Deck	at least 6 metres	at least 3 metres
		Under Deck	at least 6 metres or one bulkhead	at least 6 metres or one bulkhead
	open versus open	On Deck	at least 6 metres	at least 6 metres
		Under deck	at least 12 metres or one bulkhead	at least 12 metres or one bulkhead

NOTE: All bulkheads and decks should be resistant to fire and liquid

Section III - Transport of military ammunition and explosives in freight containers and vehicles on ships

5.5.3.1 *General remarks*

For general advice and guidance on the transportation of ammunition and explosives in freight containers refer to Section 12 and in vehicles refer to Section 17 of the "General Introduction" in the IMDG-Code and to part I of this Manual.

5.5.3.2 "Open top"-containers may be used for the transportation of ammunition and explosives requiring ordinary stowage. In all other cases the container must comply with the appropriate stowage requirements.

5.5.3.3 *Certification in the Transport Documentation*

All shipments of ammunition and explosives of hazard Division 1.1 or 1.2 should be accompanied by a statement, which may appear on the transport documentation, certifying that the freight container or the vehicle is structurally serviceable as defined in part I of this Manual.

5.5.3.4 *Stowage*

a) When ammunition and explosives are packed in a freight container, the freight container may be regarded as a magazine, but not as a separate compartment.

b) In ships other than specially fitted container ships, freight containers should be stowed in the bottom layer only.

5.5.3.5 *Segregation*

a) Freight containers packed with ammunition and explosives require no segregation from each other provided that mixed loading as set out in Part I of this manual is permitted. Where this is not permitted the containers should be "separated from" one another.

b) The term "separated from" aboard full container ships or in special container holds on other ships, is defined as set out in Table V-2.

A "container space" means a distance of not less than 6 metres fore and aft or not less than 2.4 metres athwartship.

TABLE V-2 SEGREGATION ON BOARD CONTAINER SHIPS

Vertical	**NOT in the same vertical line UNLESS segregated by a deck**			
			Fore and aft	Athwartship
Horizontal	closed versus closed	on deck	one container space	one container space
		under deck	one container space or one bulkhead	one container space
	closed versus open	on deck	one container space	one container space
		under deck	two container spaces or one bulkhead	two container spaces
	open versus open	on deck	one container space	two container spaces
		under deck	one bulkhead	one bulkhead

NOTE: All bulkheads and decks should be resistant to fire and liquid.

Section IV - Transport of ammunition and explosives on passenger ships

5.5.4.1 For the purpose of this Class the terms "Passenger ship" and "cargo ship" are used as laid down in the SOLAS Convention.

5.5.4.2 Ammunition and explosives in hazard division 1.4, compatibility group S, may be transported in any amount on passenger ships. No other explosives may be transported on passenger ships except any one of the following:

1. explosive articles for life-saving purposes as identified in the individual schedules in the IMDG-code, if the total net explosives mass of such articles does not exceed 50 kg per ship; or

2. ammunition and explosives in compatibility groups C, D, E and N, if the total net explosives mass does not exceed 10 kg per ship; or

3. ammunition in compatibility group G other than those requiring special stowage, if the total net explosives mass does not exceed 10 kg per ship; or

4. ammunition in compatibility group B, if the total net explosives mass does not exceed 5 kg per ship.

5.5.4.3 Notwithstanding the provisions of subparagraph 5.5.4.2. additional quantities or types of ammunition and explosives may be carried in passenger ships in which there are special safety measures approved by the competent authority.

5.5.4.4 *Stowage*

Goods of Class 1 which may be carried in passenger ships exceeding 10 kg are identified on the individual schedules of the IMDG-code. They should be stowed in accordance with table V-3.

TABLE V-3 STOWAGE ARRANGEMENTS ON PASSENGER SHIPS

Name Division	Samples, explosive	Goods, N.O.S. Class 1	Goods shipped under a specific proper shipping name												
			Compatibility group												
			A	B	C	D	E	F	G	H	J	K	L	N	S
1.1	d	d	c	e	e	e	e	c	e	-	c	-	c	-	-
1.2	d	d	-	e	e	e	e	c	e	c	c	c	c	-	-
1.3	d	d	-	-	e	-	-	c	e	c	c	c	c	-	-
1.4	d	d	-	b	b	b	b	c	b	-	-	-	-	-	a
1.5	d	d	-	-	-	e	-	-	-	-	-	-	-	-	-
1.6	d	d	-	-	-	-	-	-	-	-	-	-	-	e	-

a = As for cargo ships, on deck or under deck.

b = As for cargo ships, on deck or under deck, in portable magazines only.

c = Prohibited. This provision overrides all others.

d = As specified by the competent authority of the country concerned, with regard to the provisions of the introduction to class 1 in the IMDG-code.

e = In containers or the like, on deck only.

ELECTRICAL STANDARDS

(paragraph 5.2.1.2. refers)

ELECTRICAL STANDARDS

	RISK INVOLVED	REQUIREMENT FOR ELECTRICAL EQUIPMENT INCLUDING JUNCTION BOXES AND VENT FANS[1]
1.	Explosive dust only	Equipment to have enclosure IP6X and temperature class T5.
2.	Flammable vapour only	Equipment to be Ex i(b) IIAT5 or Ex d IIAT5; luminaries only may be Ex e IIT5
3.	Explosive dust and flammable vapour	Equipment to be Ex i(b) IIAT5 with IP6X enclosures or Ex (d) IIAT5 with IP6X enclosures; luminaries only may be Ex e IIT5 with IP6X enclosures.

In all above cases, cables should be:

1. enclosed in heavy gauge, solid drawn or continuously butt welded and galvanised conduit; or

2. protected by electrically continuous metal sheathing or metallic wire armour, braid or tape; or

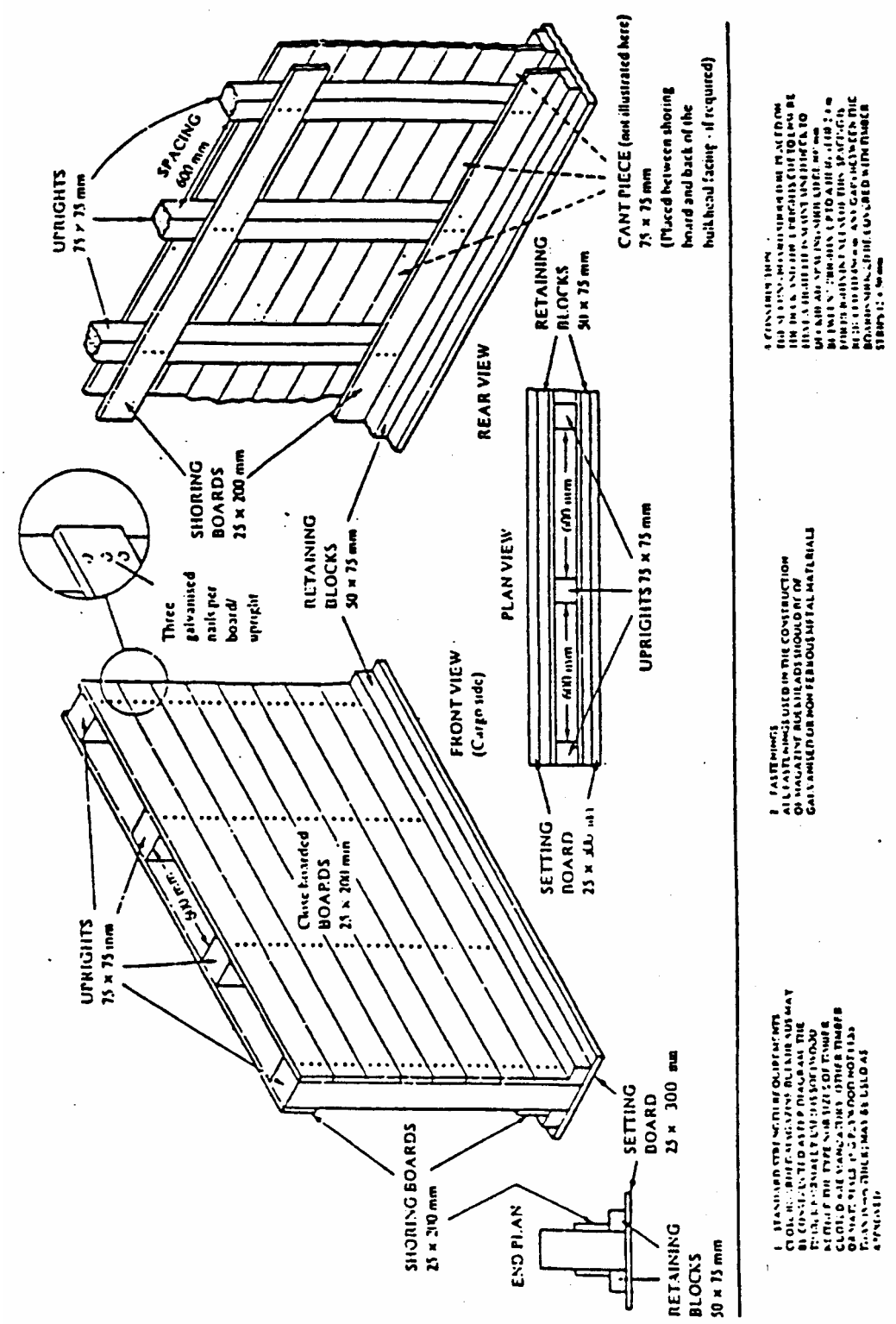
3. of the mineral insulated metal covered type.

[1] Reference is made to the Recommendations published by the International Electrotechnical Commission (IEC) and, in particular, to Publication 529 - Classification of Degrees of Protection provided by Enclosures.

ADDITIONAL MEASURES

(paragraph 5.2.2.5.g) refers)

EXAMPLE OF THE CONSTRUCTION OF A MAGAZINE BULKHEAD (OR SIDEWALL)



PERMISSIBLE QUANTITIES OF MILITARY AMMUNITION AND EXPLOSIVES IN HARBOURS OF NATO COUNTRIES

(Paragraph 5.3.3.4 refers)

1 BELGIUM

The maximum permitted quantity of explosives is decided by the harbour authorities in their individual regulations.

2 CANADA

a. The maximum quantities that may be transported in a commercial vessel at the following national ports, which are under control of Canada Ports Corporation are shown below. The Canada Ports Corporation Harbour Master is the final approving authority. A permit authorising the movement of explosives through the ports must be obtained before the explosives can enter the port. The permit will specify the pier to be used and any other conditions imposed upon the shipment.

Port	Haz.Div 1.1/1.5 (Kg)(1)	Haz.Div 1.2 (Kg)(1)	Haz.Div 1.3 (Kg)(1)	Haz.Div 1.4 (Kg)(1)
Prince Rupert, BC	160,000	Unlimited	Unlimited	Unlimited
Vancouver, BC	4,500	90,000	227,000 (2)	270,000 (2)
Montreal, PQ Berth 62 East	3,500	7,000	140,000	Unlimited
Contrecoeur, PQ	215,000	1,000,000	1,000,000	Unlimited
Sept-Iles, PQ	10,000	10,000	300,000	300,000
Quebec, PQ 160,000	Unlimited	Unlimited	Unlimited	
St. John, NB	12,000	70,000 (3) Unlimited (4)	Unlimited	Unlimited
Halifax, NS (5)	14,000	90,000 (3) 250,000 (4)	Unlimited	Unlimited

NOTES:

		(1) Quantities in the table are Net Explosive Quantities except as noted. (2) Quantities are gross weights. (3) Hazard Division 1.22. (4) Hazard Division 1.21. (5) Quantities shown are containerised. Stuffing and destuffing of containers is not allowed in the port area. b. Explosives may be loaded or discharged in Canadian ports which are not under the control of Canada Ports Corporation. The Public Harbours and Port Facilities Act, Revised Statistics 1985, Public Harbour Regulations, and the appointed Harbour Master for the port are the final authorities.
3	DENMARK	The maximum permitted quantity of explosives being decided by the harbour authorities in each individual case.
4	FEDERAL REPUBLIC OF GERMANY	No restrictions at Nordenham. In other German ports, restrictions as to hazard classes and maximum Net Explosives Mass (NEM) based on regulations, issued by the Federal Government (Seeschiffahrtsstraßenordnung) and/or the respective State/Local Authority (Port Safety Regulations).
5	FRANCE	The quantities of explosives admitted in French harbours vary from one harbour to the other. Inside one harbour they may vary according to the piers used and, concerning the explosives which are on board, according to their position in the ship. This is the result of different hazard zones generated in each case. Information may be obtained from the local harbour authorities.
6	GREECE	There are restrictions according to category of ammunition, net and gross weight of explosives (no details given).
7	ITALY	No restrictions are contemplated on transportation of commercial explosives (no separate information has been given for military explosives). Tonnage limitations be prescribed by port authorities from time to time, according to the situation in each single port insofar as port reception capacities and infrastructure are concerned.
8	NETHERLANDS	- Transport of ammunition with sea-going (commercial) vessels is totally governed by civil regulations. - Loading/unloading ammunition being transported under responsibility

		of the armed forces is only allowed at locations with a special permit on behalf of the Minister of Defence, issued by the Chairman Military Committee on Dangerous Goods. Local (port) authorities may act according the standards given by this permit. Information on the above is to be obtained from: Secretariat Military Committee on Dangerous Goods DMKL/Bevo/MILAN PoBox 90822 2509 LV The Hague Tel: 0031 70 3165090 Fax: 0031 70 3165091
9	NORWAY	The maximum quantities of explosives permitted in a ship in Norwegian harbours are normally specified in the harbour regulations for each port, but these quantities are too small to be of practical interest in this context. However, the harbour regulations which mostly are based on recommended standard, permit to a great extend waivers (concessions). Such waivers (concessions) are decided by the harbour authorities on a case-by-case basis. (New regulations are presently under consideration and will probably closely follow the regulations recommended by IMO).

10	PORTUGAL	At present, the maximum permitted quantity of explosives is decided by the harbour authorities in each individual case.
11	SPAIN	
12	TURKEY	As reflected at AC/15(PB/IWT)WP/111, Annex L, Turkish Ports, permissible quantity is decided in each individual case.
13	UNITED KINGDOM	The entry of ships carrying explosives in UK harbours is governed the Dangerous Substances in Harbour Areas Regulations 1987 (Statutory instrument 1987/37). Explosives limits for individual berths and anchorages in commercial harbours are calculated by the UK Health and Safety Executive. Explosives limits can be obtained from individual harbour authorities.
14	UNITED STATES	NAD Earle, N.J.: 10 million lbs net for pier area. NWS Concord,Cal.: 9 million lbs net for each of two two-berth piers; 6 million lbs net for a third two-berth pier. MOT Sunny Point: 7 million lbs net for each of 6 berths. Indian Island Annex US Naval Torpedo Station, Keyport, Washington: 2 million lbs net one berth.

BERTHING REQUIREMENTS IN HARBOURS OF NATO COUNTRIES

(Paragraph 5.3.3.5 refers)

1	BELGIUM	The distance between ships is decided by harbour authorities in each individual case.
2	CANADA	a. Designated berthing locations are specified for each Canada Ports Corporation. These will be advised on each explosives loading certificate which also stipulates berthing requirements. b. The Canada Shipping Act Part X details the requirements for berthing in public harbours.
3	DENMARK	The distance between ships is decided by the authorities in each individual case.
4	FEDERAL REPUBLIC OF GERMANY	a. Port of NORDENHAM Standard minimum distance between an ammunition-carrying ship and a non-ammunition-carrying ship to be 30 m and between two ammunition-carrying ships to be 50 m. b. Other Ports In other German ports, minimum separation distances between ships as being ordered by local port authorities.
5	FRANCE	The distances between ships are decided by the local harbour authorities in each individual case.
6	GREECE	In principle, loading and unloading of ammunition in merchant ports is prohibited. However, in certain harbours where loading and unloading is not possible inside the harbour, a special off-port area, under strict surveillance and far from the berthing area and any other areas with considerable activity, is designated. The distance between ships unloading explosives and other ships is designated according to the Harbour Regulations or to special orders of the Harbour Master in co-operation with the Harbour Naval and Military Commands, and also according to the conditions in the port and the category of the explosives.
7	ITALY	There is no standard distance, but harbour authorities decide on a case-by-case basis, according to specific safety requirements.
8	NETHERLANDS	Safety distances are given in coordination with local port authorities according the standards for the special permit for loading/unloading ammunition on behalf of the Minister of

		Defence, issued by the Chairman Military Committee on Dangerous Goods.
9	NORWAY	Harbour authorities decide on a case-by-case basis, according to specific safety requirements. Standard minimum distance between ships containing explosives and other ships or inhabited buildings - 300 m.
10	PORTUGAL	Lisbon harbour: Only one ship at the same time, loading and unloading ammunition, at Dock no. 5. The minimum distance between an ammunition ship and a merchant ship is 100 m. Leixoes harbour: Only at the South Dock. The minimum distance between an ammunition ship and a merchant ship is 20 m. Other harbours: The minimum distances are decided by the local harbour authorities on a case-by-case basis.
11	SPAIN	
12	TURKEY	As reflected at AC/15(PB/IWT)WP/111, Annex L Turkish ports, Harbour authorities decide on a case by case basis.

13	UNITED KINGDOM	1. Berthing distances between ships containing explosives and other ships or vehicles containing explosives are designed to prevent propagation of explosion or fire from one to the other. These distances are specified in "The Dangerous Substances in Harbour Areas Regulations 1987" (Statutory Instrument 1987/37). 2. Mobility of ships at quayside or dock berths. (para 5.4.0.6. refers) a) The requirement for towing vessels to be in attendance can be met in certain circumstances by the use of "haul off" moorings positioned at sufficient distance from the quayside or dock berth to enable a ship to haul itself off the jetty to a safe distance in the event of a fire or other hazardous event on or near the jetty. b) At remote, fully licensed berths within the limits of a dockyard port where no member of the public, or public facilities are at risk, a towing vessel need not be in attendance providing: (1) no explosives or dangerous goods are being handled on board the ship; and (2) no explosives or dangerous goods are present on the jetty; and (3) a towing vessel can be in attendance within 1 hour. c) At berths in lightly populated areas within the limits of a dockyard port, where the frequency for a requirement to move a loaded RFA (or equivalent vessel of visiting forces) from a berth, in an emergency, has been properly assessed as negligible, then a towing vessel need not be in constant attendance provided the conditions in 2.b)(1) and (2) above apply, and a tug can be in attendance within the assessed time for any need to move the vessel.
14	UNITED STATES	Berths at each installation (see Annex V-C) are specifically designated. Separation is based upon the quantity allowed at each berth.

ANCHORAGES FOR SHIPS TRANSPORTING MILITARY AMMUNITION AND EXPLOSIVES IN HARBOUR AREAS IN NATO COUNTRIES

(Paragraph 5.3.3.6 refers)

This Annex summarises the information supplied by member countries regarding the designation of places in harbour areas at which explosives ships may anchor and at which the normal requirements governing quantity limits and berthing distances (Annexes V-C and V-D) do not apply.

1	BELGIUM	This question is decided by the harbour authorities in each individual case.
2	CANADA	Normally ships carrying explosives are not permitted to anchor in Canadian ports, however, the port authority may designate locations as required.
3	DENMARK	This question is decided by the harbour authorities in each individual case.
4	FEDERAL REPUBLIC OF GERMANY	Anchorages and berths to be used under conditions as and upon direction by local shipping control centre. For advice, contact local shipping control centre on appropriate VHF-channel according to list of Radio Stations.
5	FRANCE	This question is decided by the local harbour authorities in each individual case.
6	GREECE	The statement by Greece is that no provision is made - but see the Greek provision for special "off-port" areas for the berthing of explosives ships (Annex D).
7	ITALY	In major ports, anchorage places are indicated by the harbour authorities. No list of ports and harbours is available; the matter is the responsibility of local harbour authorities. The port of Talamone in the province of Grosseto is reserved only for loading and unloading of explosives.
8	NETHERLANDS	No provision - other than that indicated under Netherlands information in Annex C.
9	NORWAY	In major ports, anchorage places are indicated by the harbour authorities through special orders. No list of such ports and anchorages is available.
10	PORTUGAL	Leixoes harbour: Ships carrying explosives are not permitted to anchor. Other harbours: It is decided by the harbour authorities in each individual case.
11	SPAIN	
12	TURKEY	As reflected at AC/15(PB/IWT)WP/111, Annex L Turkish ports, it is decided by the harbour authorities in each individual case.
13	UNITED	The entry of ships carrying explosives in UK harbours is governed the

	KINGDOM	Dangerous Substances in Harbour Areas Regulations 1987 (Statutory instrument 1987/37). Explosives limits for individual berths and anchorages in commercial harbours are calculated by the UK Health and Safety Executive. Explosives limits can be obtained from individual harbour authorities.
14	UNITED STATES	Anchorages are specifically designated in the vicinity of each of the port installations quoted in Annex C where fully loaded ships may be anchored.

REGULATIONS FOR TRANSPORT OF MILITARY AMMUNITION AND EXPLOSIVES IN HARBOURS OF NATO COUNTRIES

(Paragraph 5.3.3.7 refers)

This Annex summarises in general terms the position regarding regulations and the extent to which there are differing requirements between military and commercial ships and military and commercial ports.

Member countries were asked to give answers to the following questions:

a. Whether there are separate regulations for military transport or military shipment of explosives and ammunition, as distinct from purely commercial transport or shipment of the same.

b. Whether commercial ships chartered or requisitioned by military authorities are considered to be military ships.

c. Whether the requirements outlined in this Part of the Manual apply only to commercial ships, with full or part cargoes of military explosives in commercial ports and harbours - or whether they apply also to commercial ships in military ports.

d. Whether there are separate "Service" regulations applicable to military ships in military ports (the term "military" applies here to all arms of the Services).

The information supplied is summarised below.

1	BELGIUM	a. Yes, the transportation regulations IF 24 apply to military ammunition transported in commercial ships. For the transport of commercial ammunition in commercial ships the IMO regulations apply. b. Commercial ships requisitioned by the Belgian Navy are considered as military ships. c. Yes. d. Yes.

2	CANADA	a.	Yes. 1. Military explosives carried in warships are controlled by Canadian Forces Technical Order C-09-153-003/TS-000. 2. Military explosives are transported on public highways in accordance with Canadian Forces Technical Order C-09-153-001/TS-000. 3. The carriage of purely commercial shipments in ships is governed by the Ministry of Transport Dangerous Goods Shipping Regulations. 4. Commercial road transport of explosives is in accordance with the Transportation of Dangerous Goods Act. 5. All rail shipments of explosives are controlled by the Canadian Transport Regulations for the Transportation of Dangerous Commodities by Rail.
		b.	Yes, as distinct from consignments which constitute only a partial load.
		c.	Yes.
		d.	Yes.
3	DENMARK	a.	Yes. The rules in the "Standard Regulations" concerning loading or unloading of explosives do not apply to warships.
		b.	Danish regulations do not consider this case.
		c.	The requirements apply to ships in military as well as commercial ports.
		d.	Yes.
4	FEDERAL REPUBLIC OF GERMANY	a.	Yes. For German Naval Vessels in German Naval Bases, the regulations of the German Naval Manuals MDv 660/1 (Schutz- und Sicherheitsbestimmungen für den Umgang mit Munition an Bord) and MDv 760/1 (Munitionsvorschriften für die Marine, Sicherheitsbestimmungen für die Munitionsübernahme und -abgabe im Hafen) apply. For merchant vessels in civilian (commercial) ports the respective Port Safety Regulations in conjunction with Federal and State Safety Regulations apply. Port Safety Regulations in conjunction with Federal and State Safety Regulations apply as well for vessels in civilian (commercial) ports.
		b.	No. Those ships do not change status unless otherwise directed by Federal Government in time of crisis or war.
		c.	The requirements outlined in this Part of the Manual apply in general to commercial ships in commercial ports. They apply also to chartered commercial ships in naval bases in conjunction with naval manuals mentioned under paragraph a. and additional safety regulations and requirements as German Navy Authorities may direct.
		d.	Yes. See paragraph a. first subparagraph.

5	FRANCE	a. The transportation regulations apply to military ammunition transported in commercial ships. b. Commercial ships requisitioned by the marine Nationals are considered as military ships. c. The transportation regulations are the same for commercial ships transporting commercial as well as military explosives in commercial ports. For the military ports there exist particular rules. d. Naval ships (warships) in military ports are subject to special regulations.
6	GREECE	a. IMO Regulations are in effect. b. Yes. c. Yes. d. Yes.
7	ITALY	a. IMO regulations are in effect, but civil regulations do not apply to warships. b. A Military transport is to be considered, the transport ordered by military authorities using a full rented commercial ship. c. The requirements outlined apply to commercial ships in commercial and military ports. d. Naval ship (warship) in military ports are subject to special regulations. .
8	NETHERLANDS	a. No, but civil regulations do not apply to warships. b. Transport will be considered as MILITARY transport provided it is carried out: 1. with the approval of, by order of or on the directions of a Netherlands military authority or authority from an allied agency; 2. under a Netherlands military escort, unless otherwise determined, with vehicles or ships owned, requisitioned or chartered by the military authority/agency, whilst in addition the loading and unloading of the ship is carried out under the supervision of Netherlands military personnel or civilian employees of the Ministry of Defence. c. Yes. d. Yes.
9	NORWAY	a. The civilian regulations are in force for all ships except naval ships. There exist also military regulations generally including the civilian regulations and with additional requirements, the application of which varies according to the circumstances. In this context it has to be emphasised that besides the civil restrictions will apply for shipping military

		ammunition and explosives. In addition, approval from the Material Command of the appropriate Service -or the Ministry of Defence - must be obtained. Any transport of military ammunition and explosives is carried out in accordance with rules and regulations laid down by the MOD as far as the internal military procedure is concerned. Otherwise ordinary civil law and procedure come into effect. In co-operation with municipal councils, harbours are selected for loading/ unloading of military explosives. In these harbours, military authorities have a close co-operation with local harbour authorities, State Railways and others, and take care of all details of the necessary arrangements as the nature of the cargo requires. b. Yes - and the stricter procedure outlined in sub-paragraph a. above for military transports will apply. c. The requirements apply to all commercial ships with full or part cargoes of military explosives in all Norwegian ports. d. Yes - but see also sub-paragraph a. above
10	PORTUGAL	a. IMO regulations are in effect. b. Yes. c. Yes. d. Yes.
11	SPAIN	
12	TURKEY	a. Yes. b. Yes. c. The requirements apply to all commercial vessels with full or part cargoes of military explosives in all Turkish military or civilian ports. d. Yes.
13	UNITED KINGDOM	a. The Dangerous Substances in Harbour Areas Regulations 1987 covers both military and commercial explosives in commercial harbours. b. When handling explosives no distinction is made. c. The requirements apply to commercial ships with full or part cargoes of military explosives in all UK ports -military or otherwise. d. Yes.
14	UNITED STATES	a. Yes. b. No (however regulations governing shipment of military ammunition and explosives apply). c. Yes - the requirements apply to all ships except combat ships. d. Yes.

NATIONAL POINTS OF CONTACT FOR SEA REGULATIONS

NATIONAL POINTS OF CONTACT FOR SEA REGULATIONS

1	BELGIUM	Head Office Administration de la marine et de la navigation intérieure 104 rue d'Arlon Bruxelles - Belgique Tel.: 02.233.12.11 Antwerp Office: Inspection Maritime Quai Tavernier, 37 Anvers - Belgique Tel.: 031.33.12.75 Telex: 35028 B
2	CANADA	The Chairman Board of Steamship Inspection Canadian Coast Guard Tower "A" Ottawa KIA ON 7 - CANADA Tel.: (613) 992-0242 Telex: 0533128
3	DENMARK	Government Ships Inspection Service Vermundsgade 38 C DK-2100 Copenhagen Ø Tel.: ++45 3917 4400 Fax.: ++45 3917 4401
4	FRANCE	Direction des Affaires Maritimes et des Gens de la Mer Sous-Direction de la Sécurité Maritime 3, Place de Fontenoy 75700 PARIS - France Telephone: 33 1 44 49 80 00
5	GERMANY	Federal Ministry of Defense WV IV 3 Postfach 1328 D-53003 BONN Tel: ++49 228 - 12 1660 Fax: ++49 228 - 12 1659
6	GREECE	Ministry of Mercantile Maritime Safety of Navigation Division Gr. Lambraki Av. 185 18 Piraeus, Greece Telex: 021-2022, 2273 YEN GR

7	ITALY	MINISTERO DEI TRASPORTI E DELLA NAVIGAZIONE Comando Generale del Corpo delle Capitanerie di Porto 6° Reparto - Sicurezza della Navigazione - 16100 GENOVA Tel: 0039-010-2412515 Telefax: 0039-010-2412797
8	NETHERLANDS	Military Committee on Dangerous Goods DM/V/Stafgp V/MCGS PO Box 90822 2509 LV The Hague Netherlands Telephone: --31 70 316 5090 Fax: --31 70 316 5091
9	NORWAY	Norwegian Maritime Directorate P.O. Box 8123 Dept. N-0032 OSLO NORWAY Tel.: 22 45 4500 Telex: 21 557sdirn
10	PORTUGAL	
11	SPAIN	Direccion General de la Marina Mercante Ministerio de Transportes, Turismo y Comunicaciones Ruiz de Alarcon No 1 Madrid 14 - Spain Tel.: 232-84-20 or 232-85-20 Telex: 27298 MAMER EO
12	TURKEY	Ministry of Transport / ANKARA Turkish Naval Forces Command / ANKARA Turkish Fleet Command / GÖLCÜK Northern Area Command (COMSARNORTH) / ISTANBUL Southern Area Command (COMSARSOUTH) / IZMIR
13	UNITED KINGDOM	Maritime and Coastguard Agency Spring Place 105 Commercial Road Southampton SO15 1EG Tel.: 01703 329 100 Fax: 01703 329 204

14	UNITED STATES	Office of Hazardous Materials Transportation U.S. Department of Transportation Attn: Exemption and Approvals Division (DHM 30) - U.S.A. Tel.: (202) 755-4962 Telex: 892427 DOT WASH D.C.

For national competent authorities responsible for approval and authorisations in respect of the transport of radioactive material see also the International Atomic Energy Agency's (IAEA) National Competent Authorities List N^{o} 17 of December 1987.

MANUAL OF NATO SAFETY PRINCIPLES

FOR THE TRANSPORT OF

MILITARY AMMUNITION AND EXPLOSIVES

Disclaimer:

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document".

PART VI

TRANSPORT ON INLAND WATERWAYS

CHAPTER 1 - GENERAL

Section I - Introduction

6.1.1.1 *Purpose*

a) The object of this part of the Manual is to establish safety principles for the guidance of those concerned with the transport of military explosives on inland waterways.

b) This part of the Manual is not intended to be a substitute either for international codes, such as the European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) or for national regulations, but should be read in conjunction with them.

c) During transport of military ammunition and explosives on inland waterways armed forces are basically subject to the provision of ADN and the pertinent regulations applying to adjacent waters, respectively. Exemptions for visiting forces can be granted on the basis of Para 4. ADN, by the competent authorities, on request.

d) However, with the object of reducing to a minimum the need to refer to other publications, much of the text of the ADN for Class 1 is embodied in the following chapters of this part of the Manual. Similarly, the annexes hereto are intended to provide as much information as possible on the specific requirements of member countries in the context of this part of the Manual.

6.1.1.2 *Disclaimer*

"The use of the principles and techniques given in this document is, in the opinion of the Group of Experts, the best available at the time of publication. Adherence to these principles should enhance the safety of ammunition and explosive operations. It does not ensure or guarantee a risk-free situation, neither can the principles cater for every possible situation which could be encountered. Because of the inherent danger in handling ammunition and explosives, the Group of Experts cannot be held responsible for any mishap or accident resulting from the use of this document"

6.1.1.3 *Observation*

THIS PART OF THE MANUAL IS TO BE USED IN CONJUNCTION WITH THE GENERAL REQUIREMENTS OF PART I.

Section II - Definitions

The following definitions explain terms specific to carriage by inland waterways transport. More general definitions are contained in Part I Chapter 2.

6.1.2.1 *Bulkhead*

A metal wall or partition, generally vertical, both of whose faces are inside the vessel and which is bounded by the bottom, the side plating, a deck, the covering or another bulkhead.

6.1.2.2 *Hold*

A part of the vessel which, whether covered by hatchway covers or not, is bounded fore and aft by bulkheads and is intended either to carry dangerous goods in packages or in bulk.

6.1.2.3 *Vessel*

Any vessel able to using an inland waterway.

CHAPTER 2 - CONSTRUCTION AND EQUIPMENT OF VESSELS

6.2.0.1 *Certificate of Approval*

Each vessel carrying explosives must be provided with a certificate of approval. This certificate shall attest that the vessel has been inspected and that its construction and equipment comply with ADN regulations.

CHAPTER 3 - LOADING, UNLOADING AND TECHNICAL PRECAUTIONS

6.3.0.1 *Loading and Unloading Sites*

Loading and unloading operations are only permitted at the places designated or approved for this purpose by the local composite authority (this includes explosives of 1.4S).

6.3.0.2 *Time and Duration of Loading Operations*

Loading and unloading operations shall not start without permission in writing from the competent authority. This provision applies also to loading and unloading other goods when explosives of Class 1 are on board. This permission approval is not required for ammunition belonging to division 1.4

6.3.0.3 *Night Time Operations*

If loading or unloading is authorised at night or in conditions of poor visibility, effective lighting must be provided as follows (see also para 1.3.1.14.):

1. By portable electric lamps having their own source of power, and of the certified safe type.

2. If provided from the deck, by properly secured electric lamps which shall be positioned in such a way that they cannot be damaged.

3. Where these lamps are positioned on deck in the protected area, they shall be of a limited explosions risk type.

6.3.0.4 *Supervision of Loading/Unloading Operations*

Loading and unloading must be supervised by an authorised representative (Paragraph 6.4.0.2) of the sending/receiving force. This person must be familiar with the detailed provisions for handling and stowage of cargo contained in ADN Marginal 11 414. (See also para 6.4.0.2. for the Model N9 3 ADN certificate of training).

6.3.0.5 *Smoking, Fire and Naked Light*

The use of fire and naked lights as well as smoking is prohibited during loading, unloading and handling of ammunition and explosives, or while the holds are open or the explosives are located at a distance of less than 50 m from the vessel.

6.3.0.6 *Electrical Equipment*

The use of radiotelephone or radar transmitters is not permitted during loading, unloading and handling of ammunition and explosives of other than division 1.4. This does not apply to VHF transmitters of the vessel, in cranes or in the vicinity of the vessel, provided the power of such a transmitter does not exceed 25W and no part of its aerial is located at a distance less then 2m from the explosives.

6.3.0.7 *Limitation of the Load*

a) The maximum net explosives mass given in Table VI-1 must not be exceeded.

b) When loading explosives of different divisions in compliance with the compatibility loading requirements (paragraph 6.3.0.8.), the total cargo shall not exceed the smallest maximum net mass given in the table for explosives of the most dangerous division loaded, in the order of 1.1, 1.5, 1.2, 1.3, 1.6, 1.4.

c) Where the net explosives mass carried is not known Table VI-1 shall apply to the gross mass of the cargo.

Table VI-1 – Maximum Net Explosives Mass (NEM)

Subdivision	Maximum NEM	Remarks
1.1	15,000 kg	In at least 3 batches of not more than 5,000 kg each; distance between batches not less than 10m
1.2	50,000 kg	
1.3	300,000 kg	Not more than 100,000 kg per hold (a wooden bulkhead fitted for the purpose of subdividing a hold is acceptable).
1.4	Unlimited	
1.5	15,000 kg	In at least 3 batches of not more than 5,000 kg each; distance between batches not less than 10m
1.6	300,000 kg	Not more than 100,000 kg per hold (a wooden bulkhead fitted for the purpose of subdividing a hold is acceptable).

6.3.0.8 *Compatibility Loading Requirements*

a) Ammunition/explosives of divisions 1.1, 1.2, 1.3, 1.5 or 1.6 must not be stowed together with other dangerous goods in the same cargo hold. In adjacent cargo holds they must be separated by a distance of at least 12m.

b) Ammunition/explosives are to be stowed in the same cargo hold only if the respective combination is allowed according to the Table below.

Note: This Table deviates from the one in Part 1. Para 1.5.0.2

Table VI-2 – Combination of Compatibility Groups

Compatibility Groups	B	C	D	E	F	G	H	J	K	L	N	S
B	X											X
C		X	X	X		X					X[2)]	X
D		X	X	X		X					X[2)]	X
E		X	X	X		X					X[2)]	X
F					X							X
G		X	X	X		X						X
H							X					X
J								X				X
K									[4)]			
L										X[1)]		
N		X[2)]	X[2)]	X[2)]							X[3)]	X
S	X	X	X	X	X	X	X	X				X

X Combined loading allowed

1) Ammunition and explosives of Compatibility Group L are to be combined only with similar ammunition and explosives of the same Compatibility Group.

2) Ammunition of Compatibility Group N should normally not be transported together with items from other Compatibility Groups, except those of S. If, however, items of Compatibility Group N are combined with items of C. D. or E, the Compatibility Group N ammunition is to be treated as if it were belonging to Compatibility Group D.

3) Ammunition of different categories of subdivision 1.6, Compatibility Group N, must not be transported as a combined item of subdivision 1.6.

4) Ammunition of Compatibility Group K is only permitted at the discretion of national authorities.

CHAPTER 4 - OPERATING REGULATIONS

6.4.0.1 *Passengers and Authorised Persons*

Passengers are not allowed to be carried. Apart from the crew only persons who (although not being members of the crew) normally live on board, and persons who are on board in an official capacity, are authorised to be on board.

6.4.0.2 *Supervision of Movement*

A specialist must accompany the cargo during the whole transport operation. A specialist is somebody who is familiar with ADN. This has to be certified by a competent authority or an agency approved by that authority. The certificate (ADN Model No 3) will be acquired after having received an officially recognised training and successfully passed a qualifying examination in AND

6.4.0.3 *Smoking and Use of Fire and Naked Light*

Smoking and the use of fire and naked light is prohibited on board the vessel, except in the accommodation and the wheelhouse, provided that windows, doors, skylights and hatches are kept closed. “No Smoking” signs have to be provided at appropriate places.

6.4.0.4 *Transport Documents*

Prior to loading the consignor has to provide the master of the vessel with the following information contained in a transport document:

- Proper shipping name
- UN number
- Classification Code
- The capital letters ADN, ADR, RID, or IMDG-Code
- Number and description of shipped goods
- Gross and net explosives mass
- Name and address of consignor
- Name and address of consignee.

The transport document may also be of the type required for shipment by another means of transport. The document is to be written in the official language of the consignor’s nation and of the countries of transit and destination.

6.4.0.5 *Explosives Hazard Warning Sheets and Supplementary Hazard Warning Sheets*

The consignor has to provide the ship operator with written instructions on what to do in case of accidents or incidents; these instructions will contain concise information on:

- the hazardous nature of ammunition carried and on necessary safety precautions;
- measures to be taken in case of fire, and means which may not be used for fire fighting;
- measures and assistance required in case that individuals come into contact with released dangerous substances;
- materials and additional protective equipment; if the equipment aboard is inadequate.

These instructions should be prepared in the language of the consignor and the countries of transit and destination.

Examples of Explosives Hazard Warning Sheets and Supplementary Hazard Warning Sheets are included in Annex VI-C. The need to consider supplementary hazards, and the criteria for determining them, are given at paragraph 1.4.0.5 in Part I.

6.4.0.6.1 Operation of Vessels

a) The following rules apply to vessels carrying ammunitions/explosives of divisions 1.1, 1.2, 1.3, 1.5 or 1.6

b) When the transport of ammunition/explosives is performed by vessels navigating in pushed convoys or site-by-side formations, the competent authority may impose restrictions on the dimensions of such convoys or formations. Nevertheless, the use of a motorised vessel giving temporary towing assistance in permitted.

c) When under way, a vessel shall keep away from any other vessel not less than 50m if possible.

d) Where navigation of a vessel threatens to become dangerous owing either to external factors (bad weather, unfavourable conditions of the waterway, etc) or the condition of the vessel itself (accident or incident), the vessel shall be stopped at a suitable berthing area as far away as possible residential areas, harbours, civil engineering structures or storage tanks for gas or flammable liquids, regardless of sub-paragraph c) above. The local competent authority shall be notified without delay.

NATIONAL POINTS OF CONTACT FOR INLAND WATERWAY REGULATIONS

1	BELGIUM	Military Authorities Armed Forces/Etat-Major Général-Division Opérations-Sous Section Transport (JSO-G/Tpt) Secrétariat CIVN Quartier Reine Elisabeth 1140 Brussels	Tel: 02/701.3483 Fax: 02/701.6945
2	FRANCE	Authorities for emergencies: The Prefect of the department	
3	GERMANY	National Point of Contact Federal Ministry of Defense WV IV 3 Postfach 1328 D-53003 BONN	Tel: ++49 228-12 1660 Fax:++49 228-12 1659
		Authorities for Emergencies Federal Ministry of Defense Bundeswehr Operations Center Postfach 1328 D-53003 BONN	Tel:++49 228 -12 5500 Fax:++49 228-12 6636
4	ITALY	Military Authorities ISPETTORATO LOGISTICO DELL 'ESERCITO Reparto Coordinamento e Supporti Generali Ufficio Movimenti e Trasporti Viale Castro Pretorio 123 00185 ROMA	Tel: 0039-06-404098 Fax: 0039-06-4884040
5	NETHERLANDS	National Point of Contact for Inland Waterway Regulations: Military Committee on Dangerous Goods DM/Stafgp V/MCGS PO Box 90822 2509 LV The Hague Netherlands	Tel: --31 70 316 5090 Fax: --31 70 316 5091

6	UNITED KINGDOM	JSEODOC *The Joint Service Explosives Ordnance Disposal Operations Centre,* (manned 24 hours a day) Vauxhall Barracks Didcot Oxfordshire OX11 7ES	Civil network: Tel: ++44 1235 513360 ++44 1235 513361 ++44 1235 513362 Fax: ++44 1235 513355 Military network: Tel: 94234 3360/ 61/62 Fax 94234 3355

ADDITIONAL REGULATIONS TO BE FOLLOWED BY VISITING NATO FORCES IN HOST COUNTRIES

(reserved)

1	FRANCE	The french regulation is ADNR

EXPLOSIVES HAZARD WARNING SHEETS

The following sheets are attached. They do not have AASTP-2 page numbers but the date of the extant issue is shown. The sheets may be obtained in electronic form, for which instructions will be given separately

ACCIDENT INFORMATION SHEETS

Class 1 Hazard Division 1.1	21 March 2002
Class 1 Hazard Division 1.2	21 March 2002
Class 1 Hazard Division 1.3	21 March 2002
Class 1 Hazard Division 1.4	21 March 2002
Class 1 Hazard Division 1.5	21 March 2002
Class 1 Hazard Division 1.6	21 March 2002

SUPPLEMENTARY HAZARD WARNING SHEETS
for additional hazardous substances which may be contained in ammunition in addition to or instead of explosives

White Phosphorus	WP	21 March 2002
Chlorobenzylidene Malonic Acid Dinitrile (also termed Ortho Chlorobenzalmalononitrile) or Chloroacetophenone	CS/CN	21 March 2002
Titanium Tetrachloride	FM	21 March 2002
Hexachloroethane	HC	21 March 2002
Red Phosphorus	RP	21 March 2002
Thermite	TH	21 March 2002
Pyrotechnic Charges	PT	21 March 2002
Calcium Phosphide	CP	21 March 2002
Unsymmetrical Dimethyl Hydrazine	UDMH	21 March 2002
Inhibited Red Fuming Nitric Acid	IRFNA	21 March 2002
Depleted Uranium	DU	21 March 2002
Otto Fuel	OF	21 March 2002

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.1

UN – Number(s):



LOAD
- Ammunition and explosives.

NATURE OF DANGER
- Mass Explosion.
- Blast.
- High velocity fragments and debris.
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached.

PERSONAL PROTECTION
- See Supplementary Hazard Warning Sheet, if attached.

GENERAL ACTIONS
- **KEEP CALM.**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary.
- Display STAY-AWAY-SIGNAL
- Provide First Aid.
- Notify own agency/activity.

ADDITIONAL AND/OR SPECIAL ACTIONS
- Supplementary Hazard Warning Sheet attached: YES NO

	Police	Fire-br.
Austria	133	122
Belgium	101	100
Bulgaria	166	166
Croatia	92	93
Czech Rep.	158	150
France	17	18
Germany	110	112
Hungary	07	05
Italy	112	115
Netherlands	112	112
Poland	997	998
Romania	055	
Slovakia	150	158
Slovenia	113	112
Switzerland	117	118
UK	999	999

FIRE

DEVELOPING FIRE – (cargo not yet on fire):
- Fight fire with all available means.

ESTABLISHED FIRE – (cargo on fire):
- DO NOT fight fire.
- Anchor ship.
- Abandon ship.

FIRST AID
- Standard unless Supplementary Hazard Warning Sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:

- For further information call:

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.1

• Emergency Service fire withdrawal distance recommendations

FIRE

ESTABLISHED FIRE – (cargo on fire):

- Evacuate casualties as quickly as possible from hazard area.
- Leave area of fire immediately.
- **Keep all persons (except firefighting personnel) away from hazard area:**
  Low risk -- at least 1100 meters.
- Always seek significant cover; avoid glass surfaces
- **Minimum distance for firefighting personnel:**
  Medium risk to personnel – 550 meters.
  High risk to personnel – 240 meters.
- Fight ambient fires from covered position.

(REVERSE)

EXPLOSIVE HAZARD WARNING SHEET INLAND WATERWAYS
CLASS 1, DIVISION 1.2

UN – Number(s):



LOAD
- Ammunition and explosives.

NATURE OF DANGER
- Progressive Explosions.
- Fragments and debris.
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached.

PERSONAL PROTECTION
- See Supplemental Hazard Warning Sheet, if attached.

GENERAL ACTIONS
- **KEEP CALM.**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary.
- Display STAY-AWAY-SIGNAL.
- Provide First Aid.
- Notify own agency/activity.

ADDITIONAL AND/OR SPECIAL ACTIONS
- Supplementary Hazard Warning Sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire):
- Fight fire with all available means.

ESTABLISHED FIRE – (cargo on fire):
- DO NOT fight fire.
- Anchor ship.
- Abandon ship.

FIRST AID
- Standard unless Supplementary Hazard Warning sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:

- For further information call:

	Police	Fire-br.
Austria	133	122
Belgium	101	100
Bulgaria	166	166
Croatia	92	93
Czech Rep.	158	150
France	17	18
Germany	110	112
Hungary	07	05
Italy	112	115
Netherlands	112	112
Poland	997	998
Romania	055	
Slovakia	150	158
Slovenia	113	112
Switzerland	117	118
UK	999	999

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.2

• Emergency Service fire withdrawal distance recommendations:

FIRE

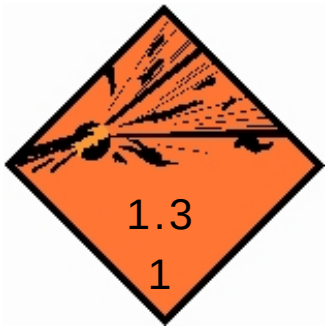
ESTABLISHED FIRE – (cargo on fire):

- Evacuate casualties as quickly as possible from hazard area.
- Leave area of fire immediately.
- **Keep all persons (except firefighting personnel) away from hazard area:**
  Low risk -- at least 1000 meters.
- Always seek significant cover;avoid glass surfaces.
- **Minimum distance for firefighting personnel:**
  Medium risk to personnel – 480 meters.
  High risk to personnel – 135 meters.
- Fight ambient fires from covered position.

(REVERSE)

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.3

UN – Number(s):



LOAD
- Ammunition and explosives.

NATURE OF DANGER
- Explosion.
- Fire, possibility of mass fire.
- Firebrands may be projected.
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached.

PERSONAL PROTECTION
- See Supplementary Hazard Warning sheet, if attached.

GENERAL ACTIONS
- **KEEP CALM.**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary.
- Display STAY-AWAY-SIGNAL.
- Provide First Aid.
- Notify own agency/activity.

ADDITIONAL AND/OR SPECIAL ACTIONS
- Supplementary Hazard Warning Sheet attached: YES NO

	Police	Fire-br.
Austria	133	122
Belgium	101	100
Bulgaria	166	166
Croatia	92	93
Czech Rep.	158	150
France	17	18
Germany	110	112
Hungary	07	05
Italy	112	115
Netherlands	112	112
Poland	997	998
Romania	055	
Slovakia	150	158
Slovenia	113	112
Switzerland	117	118
UK	999	999

FIRE

DEVELOPING FIRE – (cargo not yet on fire):
- Fight fire with all available means.

ESTABLISHED FIRE – (cargo on fire):
- DO NOT fight fire.
- Anchor ship.
- Abandon ship.

FIRST AID
- Standard unless Supplementary Hazard Warning Sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:

- For further information call:

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.3

• Emergency Service fire withdrawal distance recommendations:

FIRE

ESTABLISHED FIRE – (cargo on fire):

- Evacuate casualties as quickly as possible from hazard area.
- Leave area of fire immediately.
- **Keep all persons (except firefighting personnel) away from hazard area:**
  Low risk -- at least 300 meters.
- Always seek significant cover; avoid glass surfaces.
- **Minimum distance for firefighting personnel:**
  Medium risk to personnel – 150 meters.
  High risk to personnel – 150 meters
- Fight ambient fires from covered position.

(REVERSE)

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.4

UN – Number(s):



LOAD
- Ammunition and explosives.

NATURE OF DANGER
- Moderate fire.
- Effects largely confined to the package.
- Limited flight distance of fragments.
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached.

PERSONAL PROTECTION
- See Supplementary Hazard Warning Sheet, if attached.

GENERAL ACTIONS
- **KEEP CALM.**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary.
- Display STAY-AWAY-SIGNAL.
- Provide First Aid.
- Notify own agency/activity.

ADDITIONAL AND/OR SPECIAL ACTIONS
- Supplementary Hazard Warning Sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire):
- Fight fire with all available means.

ESTABLISHED FIRE – (cargo on fire):
- Fight fire.
- Anchor ship.
- Evacuate casualties as quickly as possible from hazard area.

FIRST AID
- Standard unless Supplementary Hazard Warning Sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:

- For further information call:

	Police	Fire-br.
Austria	133	122
Belgium	101	100
Bulgaria	166	166
Croatia	92	93
Czech Rep.	158	150
France	17	18
Germany	110	112
Hungary	07	05
Italy	112	115
Netherlands	112	112
Poland	997	998
Romania	055	
Slovakia	150	158
Slovenia	113	112
Switzerland	117	118
UK	999	999

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.4

• Emergency Service fire withdrawal distance recommendations:

FIRE

ESTABLISHED FIRE – (cargo on fire):
- **Keep all persons (except firefighting personnel) away from hazard area.**
- **No minimum distance for firefighting personnel:**

(REVERSE)

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.5

UN – Number(s):



LOAD
- Explosive substance.

NATURE OF DANGER
- Mass Explosion.
- Blast.
- High velocity fragments and debris.
- Self-sustained fire.
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached.

PERSONAL PROTECTION
- See Supplementary Hazard Warning Sheet, if attached.

ACTIONS
- **KEEP CALM.**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary.
- Display STAY-AWAY-SIGNAL.
- Provide First Aid.
- Notify own agency/activity.

ADDITIONAL AND/OR SPECIAL ACTIONS
- Supplementary Hazard Warning Sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire):
- Fight fire with all available means.

ESTABLISHED FIRE – (cargo on fire):
- DO NOT fight fire.
- Anchor ship.
- Abandon ship.

FIRST AID
- Standard unless Supplementary Hazard Warning Sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material**:**
- For further information call:

	Police	Fire-br.
Austria	133	122
Belgium	101	100
Bulgaria	166	166
Croatia	92	93
Czech Rep.	158	150
France	17	18
Germany	110	112
Hungary	07	05
Italy	112	115
Netherlands	112	112
Poland	997	998
Romania	055	
Slovakia	150	158
Slovenia	113	112
Switzerland	117	118
UK	999	999

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.5

• Emergency Service fire withdrawal distance recommendations:

FIRE

ESTABLISHED FIRE – (cargo on fire):

- Evacuate casualties as quickly as possible from hazard area.
- Leave area of fire immediately.
- **Keep all persons (except firefighting personnel) away from hazard area.**
  Low risk -- at least 1100 meters.
- Always seek significant cover; avoid glass surfaces
- **Minimum distance for firefighting personnel:**
  Medium risk to personnel – 550 meters.
  High risk to personnel – 240 meters.
- Fight ambient fires from covered position.

(REVERSE)

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.6

UN - Number(s):



LOAD
- Ammunition.

NATURE OF DANGER
- Fire and heat.
- Potential additional environmental hazards – see Supplementary Hazard Warning Sheet, if attached.

PERSONAL PROTECTION
- See Supplementary Hazard Warning Sheet, if attached.

GENERAL ACTIONS
- **KEEP CALM.**
- Notify police with reference to ammunition.
- Notify fire brigade (via police) if necessary.
- Display STAY-AWAY-SIGNAL.
- Provide First Aid.
- Notify own agency/activity.

	Police	Fire-br.
Austria	133	122
Belgium	101	100
Bulgaria	166	166
Croatia	92	93
Czech Rep.	158	150
France	17	18
Germany	110	112
Hungary	07	05
Italy	112	115
Netherlands	112	112
Poland	997	998
Romania	055	
Slovakia	150	158
Slovenia	113	112
Switzerland	117	118
UK	999	999

ADDITIONAL AND/OR SPECIAL ACTIONS
- Supplementary Hazard Warning Sheet attached: YES NO

FIRE

DEVELOPING FIRE – (cargo not yet on fire):
- Fight fire with all available means.

ESTABLISHED FIRE – (cargo on fire):
- Fight fire.
- Anchor ship.
- Evacuate casualties as quickly as possible from hazard area.

FIRST AID
- Standard unless Supplementary Hazard Warning Sheet specifies, if attached.

ADDITIONAL INFORMATION
- Emergency Service fire withdrawal distance recommendations on reverse.
- Brief description of material:

- For further information call:

EXPLOSIVE HAZARD WARNING SHEET
INLAND WATERWAYS
CLASS 1, DIVISION 1.6

- Emergency Service fire withdrawal distance recommendations:

FIRE

ESTABLISHED FIRE – (cargo on fire):
- **Keep all persons (except firefighting personnel) away from Hazard area.**
- **No minimum distance for firefighting personnel.**

(REVERSE)

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing White Phosphorus (WP)** **ON INLAND WATERWAYS**	WP

LOAD	Ammunition containing white phosphorus, which is: • Colorless to yellow wax-like substance • Pungent, garlic-like smell
NATURE OF DANGER	• Phosphorus poisoning. • Ignites upon contact with atmospheric oxygen producing thick fumes, which are detrimental to health. • On contact with water, caustic phosphoric acid is produced. • Irritation of skin, eyes and respiratory tract; cauterization is possible. • Substance hazardous to water
PERSONAL PROTECTION	• Appropriate respiratory protective equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters fresh tap water. • Three liters of 5% sodium bicarbonate solution.
ADDITIONAL AND/ OR SPECIAL ACTION	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing or a heat protection suit (affording heat protection comparable to asbestos) • Spray water continuously on extinguished phosphorus fires or cover with moist sand/soil
FIRST AID	• Remove quickly all clothing affected by phosphorus to prevent phosphorus burning through to skin. If this is impossible: • Plunge skin or clothing affected by phosphorus in cold water or moisten strongly to extinguish or prevent fire. Then immediately remove affected clothing and rinse affected skin areas with cold sodium bicarbonate solution or with cold water. • Moisten skin and remove visible phosphorus (preferably under water) with squared object (knife-back etc.) or tweezers. Do not touch phosphorus with fingers! • Throw removed phosphorus or clothing affected by phosphorus into water or allow to bum in suitable location • Cover phosphorus burns with moist dressing and keep moist to prevent renewed inflammation. • In case of eye contact, prop eyelids open and rinse eyes with water for 10 to 15 minutes. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Chloroacetophenone (CN) or Chlorobenzylidene Malonic Acid Dinitrile (CS), also termed Ortho-Chlorobenzalmalononitrile** **ON INLAND WATERWAYS**	CS CN

LOAD	(CN**)** Ammunition containing Chloroacetophenone, which is: • Colourless to white or slightly yellowish crystals or powder. • Nasty smell. • Heavier then water; **or** (CS) Ammunition containing Chlorobenzylidene Malonic Acid Dinitrile which is: • White to slightly yellowish substance. • Slightly pepper-like to pungent smell.
NATURE OF DANGER	• Irritation of eyes, skin and respiratory tract. • Nausea, vomiting and cauterization. High concentrations will cause severe noxious effects. Detrimental to health when inhaled and swallowed. • Potential hazard to waters and sewage treatment plants.. • Substances hazardous to water may be produced in the event of fire. • CN -- Slow reaction with water producing a caustic mixture.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Cover all parts of the body
FIRST AID	• Remove affected clothing. • In the event of skin irritations, thoroughly rinse and wash affected skin areas. • In case of eye contact, hold eyelids open and rinse with tap water 10 to 15 minutes while rolling eyes in all directions. Refer to ophthalmologist if necessary. • In event of vomiting, place head in lateral position. Call physician to accident site.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Chloroacetophenone (CN) or Chlorobenzylidene Malonic Acid Dinitrile (CS), also termed Ortho-Chlorobenzalmalononitrile** **ON INLAND WATERWAYS**	CS CN

	EMERGENCY SERVICES advice: • In the event of a respiratory arrest immediately apply expired-air ventilation or breathing apparatus and provide oxygen feed, if indicated For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Titanium Tetrachloride (FM)** **ON INLAND WATERWAYS**	FM

LOAD	Ammunition containing Titanium Tetrachloride (FM), which is: • Colorless or yellowish fluid.
NATURE OF DANGER	• Extremely caustic. • Reacts strongly with moisture or water, developing heat and forming hydrochloric acid during reaction.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing or a heat protection suit affording heat protection comparable to asbestos • Cover non-burning exposed FM with ground limestone to neutralize
FIRST AID	Action to be taken: • Remove immediately contaminated clothing. • Rinse affected body parts with plenty of water and cover with sterile dressing (no treated burn dressing) • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Call physician to accident site. • Protect from body heat loss . • Transport casualties preferably in a lying position. **EMERGENCY SERVICES advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Hexachloroethane (HC)** **ON INLAND WATERWAYS**	HC

LOAD	Ammunition containing Hexachloroethane (HC), which is: • Solid substance. • Insoluble in water.
NATURE OF DANGER	• Zinc chloride fume poisoning. • After ignition, a high concentration of fumes with caustic effects is produced, particularly in cold and dry air. • Irritation of eyes and respiratory tract. • Substances hazardous to water may be produced in the event of fire.
PERSONAL PROTECTION	Appropriate respiratory protective equipment.
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: Throughout area affected by smoke or fumes: • Short stay: wear appropriate respiratory protective equipment. **EMERGENCY SERVICES advice**: In the event of a longer stay, • wear self-contained breathing apparatus; • cover all parts of the body.
FIRST AID	Symptoms of zinc chloride fume poisoning: • Irritation of the eyes. • Irritation of the upper respiratory tract and hoarseness. • Pains in the chest, especially behind the sternum. • Severe coughing, breathing difficulties and feeling of suffocation. Action to be taken: • Rush affected persons to nearest physician. • Transport casualties preferable in a lying position. **EMERGENCY SERVICES** advice: • If possible, apply oxygen douche (set equipment to 8 liters Oxygen/min). For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Hexachloroethane (HC)** **ON INLAND WATERWAYS**	HC

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF
ammunition containing Red Phosphorus (RP)
ON INLAND WATERWAYS

RP

LOAD

Ammunition containing Red Phosphorus, which is:

- Solid substance.
- Insoluble in water.

NATURE OF DANGER

- Combustion produces fumes which are detrimental to health. Irritation of eyes and respiratory tract, cauterization is possible.
- In the event of fire substances are produced that are hazardous to water.

PERSONAL PROTECTION

- Appropriate respiratory protection equipment.
- One 500 ml eye flushing bottle with fresh tap water for each individual.
- One container with 20 liters of fresh tap water

ADDITIONAL AND/ OR SPECIAL ACTIONS

In event of moderate fire or development of fumes:

Throughout area affected by smoke and fumes:

- Short stay: wear appropriate respiratory protection equipment

EMERGENCY SERVICES advice: In event of longer stay:
Wear self contained breathing apparatus

FIRST AID

Action to be taken:

- Remove immediately contaminated clothing.
- If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions.
- Have victim lie down even if feeling healthy.
- Transport casualties preferably in a lying position.
- Ensure medical care

EMERGENCY SERVICES advice:

- In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus
- If possible, provide oxygen feed.

For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Thermite (TH)** **ON INLAND WATERWAYS**	TH

LOAD	Ammunition containing Thermite, which is: • Solid substance, metal mixture. • Insoluble in water.
NATURE OF DANGER	• Develops high temperatures in the event of fire. • Generation of explosive gases in connection with water.
PERSONAL PROTECTION	Appropriate respiratory protection equipment.
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: **DO NOT USE WATER** for fire fighting. Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing or heat protection suit affording heat protection comparable to asbestos
FIRST AID	• Move affected persons to fresh air. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Pyrotechnic Charges (PT)** **ON INLAND WATERWAYS**	PT

LOAD	Ammunition containing Pyrotechnic Charges (PT), which are: • Solid substances. • Fairly soluble in water.
NATURE OF DANGER	In fire: • Ammunition may cause intense burning or explosions. • Caustic or poisonous gases may be produced. Hazardous to water
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Cover all parts of body **DO NOT** use water to fight fire
FIRST AID	Action to be taken: • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. **EMERGENCY SERVICES advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF
ammunition containing Calcium Phosphide (CP)
ON INLAND WATERWAYS

CP

LOAD	Ammunition containing Calcium Phosphide (CP), which is: • Solid substance. • Smell of rotten fish, carbide or garlic.
NATURE OF DANGER	• Easily combustible. • Reacts strongly with water (self-igniting) by forming highly toxic and explosive hydrogen phosphide. • Irritation of skin, eyes and respiratory tract. • Danger of poisoning by inhalation (notably near ground level), swallowing or skin contact. • Substance hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear protective clothing impermeable against toxic agents and flame resistant.
FIRST AID	Symptoms of poisoning: • Irritation of the eyes, nasal/pharyngeal mucosa and skin. • Coughing, feeling of tightness, shortness of breath. • Headache, dizziness, ringing in the ears. • Nausea, vomiting and diarrhoea. • Rise in pulse rate, tendency to collapse. Unconsciousness, spasm Action to be taken: • In the event of a respiratory arrest apply immediately expired-air ventilation. • Rush affected persons to hospital. Transport only in a lying position. Half-sitting position is permissible in case of breathing difficulties. • In case of eye contact, hold eyelids open and rinse with tap water 10 to 15 minutes while rolling eyes in all directions. • In the event of skin contact with calcium phosphide rinse with plenty of water and subsequently cover with sterile dressing material For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Calcium Phosphide (CP)** **ON INLAND WATERWAYS**	CP

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF
ammunition containing Unsymmetrical Dimethyl Hydrazine (UDMH)
ON INLAND WATERWAYS

UDMH

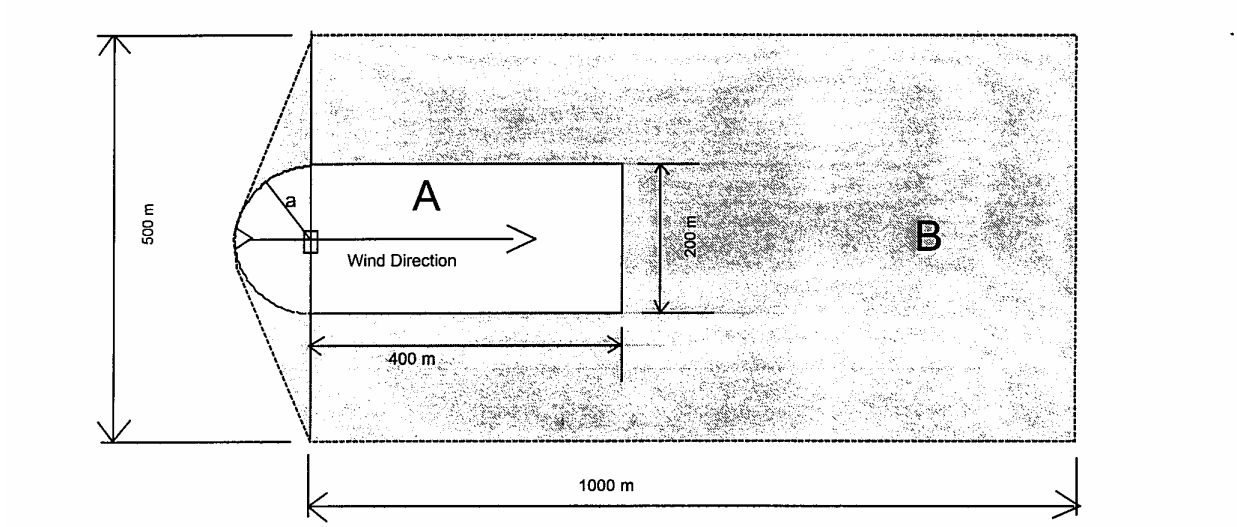
LOAD	Ammunition containing Unsymmetrical Dimethyl Hydrazine (UDMH), which is: • Colorless liquid with pungent ammonia-like odor • Completely water miscible.
NATURE OF DANGER	• Nonpersistent and highly flammable, caustic and toxic. • Spontaneous reaction upon contact with oxygen-rich substances (e.g. acid, rust). • Vapours are heavier than air and combined with air from explosive mixtures. • Acid burns on eyes and respiratory organs are possible (pulmonary edema). • Substance hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • Protective clothing • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS	**Evacuate immediately the hazard area.** **Hazard area description on reverse** Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **INTERVENTION PERSONNEL advice**: • In event of longer stay: wear self contained breathing apparatus and protective clothing • Capture runoff from leak or firefighting operation
FIRST AID	Symptoms of intoxication/acid burn: • Eyes, nasal and pharyngeal mucous membranes, respiratory tract smart. • Slight tussive irritation causing slight cough which subsides after approximately 20 to 30 minutes. • Trembling, dizziness, possibly convulsion, unconsciousness. • Skin smarts, blisters appear. Action to be taken: • Remove immediately contaminated clothing. • Rinse affected body parts with plenty of water and cover with sterile dressing (no ointment, cream or oily solutions) • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Call physician to accident site.. • Transport promptly casualties for medical treatment in a lying position. **INTERVENTION SERVICE advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus • In case of victim dyspnoea, half sitting position is permitted For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

(Reverse)

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF
ammunition containing Unsymmetrical Dimethyl Hydrazine (UDMH)
ON INLAND WATERWAYS

UDMH



Explanations: a = 100 m Radius

1. **LEAK:**
   Hazard Area **A** must be evacuated.
   Hazard Area **B** applies if the danger to the environment cannot be cleared away within one hour.

2. **FIRE:** Hazard Area **A and B** must be evacuated.

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF ammunition containing Inhibited Red Fuming Nitric Acid (IRFNA) ON INLAND WATERWAYS

IRFNA

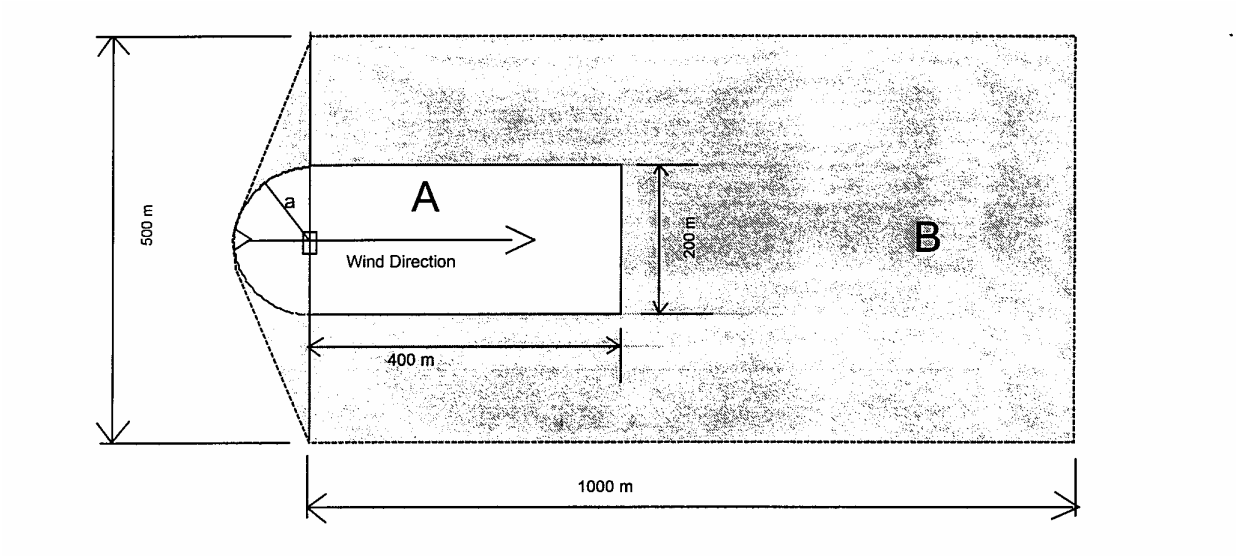
LOAD	Ammunition containing Inhibited Red Fuming Nitric Acid (IRFNA), which is: • Brown liquid • Red-brown to yellow vapors with pungent, acrid odor when exposed to air • Completely water miscible.
NATURE OF DANGER	• Fire-conductive, caustic, and toxic. • Ignites flammable solids (e.g. wood, cotton) upon contact. • Violent reactions upon contact with flammable liquid (explosion hazard). • Vapors cause acid bums on skin, eyes, and respiratory organs (pulmonary edema). • Substance hazardous to water.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • Protective clothing • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water
ADDITIONAL AND/ OR SPECIAL ACTIONS	**Evacuation immediately of the hazard area.** **Hazard area description on reverse** Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment **INTERVENTION PERSONNEL advice**: • In event of longer stay: wear self contained breathing apparatus and protective clothing • Capture runoff from leak or firefighting operation
FIRST AID	Symptoms of intoxication/acid burn: • Skin, eyes, nasal and pharyngeal mucous membranes, respiratory tract smart. • Slight tussive irritation causing slight cough which subsides after approximately 20 to 30 minutes. • Dysponea, vomiting, shock. Action to be taken: • Remove immediately contaminated clothing. • Rinse affected body parts with plenty of water and cover with sterile dressing (no ointment, cream or oily solutions) • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • Transport promptly casualties for medical treatment in a lying position. **INTERVENTION SERVICE advice:** • In the event of respiratory arrest apply immediately expired-air ventilation or breathing apparatus • If swallowed, and if conscious, make victim sip large quantity of water, possibly with milk added. DO NOT make victim vomit. • In case of victim dyspnoea, half sitting position is permitted. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF ammunition containing Inhibited Red Fuming Nitric Acid (IRFNA) ON INLAND WATERWAYS

IRFNA

(*reverse*)



Explanations: a = 100 m Radius

1. **LEAK:**
   Hazard Area **A** must be evacuated.
   Hazard Area **B** applies if the danger to the environment cannot be cleared away within one hour.
.
2. **FIRE:** Hazard Area **A and B** must be evacuated.

SUPPLEMENTARY HAZARD WARNING SHEET **FOR THE TRANSPORTATION OF** **ammunition containing Depleted Uranium (DU)** **ON INLAND WATERWAYS**	DU

LOAD	Ammunition containing Depleted Uranium (DU), which is: • Dull silver to blue-black metal. • Very heavy. • Low specific activity. No radiation hazard involved under transport conditions.
NATURE OF DANGER	• Combustible metal at approximately 300 degrees Celsius. • Forms toxic (heavy metal) oxide dust of low specific activity when burning. Smoke and resulting dust may include Uranium Oxide. • Impairment of health caused by inhalation, swallowing, or when oxide dust gets into wounds. • Possible hazard to water and sewage treatment plants.
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • Protective gloves
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: • Keep up-wind, out of area affected by smoke. • Warn residents of populated areas to close doors and windows in smoke movement direction for several hundred meters. For short stay: • Wear respiratory protective equipment • Wear protective gloves **EMERGENCY SERVICES advice:** • Wear self contained breathing apparatus • Cover all parts of the body. • Put down smoke with water spray, containing water runoff. • Fight fire as if magnesium; **DO NOT** use halons. • To prevent Uranium Oxide spread, survey equipment and personnel before departing the scene.
FIRST AID	• If a person is affected by smoke or breathes dust, remove to hospital. • Inform medical personnel that victim may be contaminated with Uranium Oxide. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

SUPPLEMENTARY HAZARD WARNING SHEET

FOR THE TRANSPORTATION OF
ammunition containing Otta Fuel (OF)
ON INLAND WATERWAYS

OF

LOAD	Ammunition containing Otto Fuel II (OF), which is: • Oily liquid. • Not miscible in water. • Heavier than water.
NATURE OF DANGER	• Heating of closed containers may cause bursting due to pressure. • Detrimental to health when inhaled and swallowed. High concentrations will cause severe noxious effects.. • Potential Hazard to waters and sewage treatment plants
PERSONAL PROTECTION	• Appropriate respiratory protection equipment. • One 500 ml eye flushing bottle with fresh tap water for each individual. • One container with 20 liters of fresh tap water • Protective gloves for each individual
ADDITIONAL AND/ OR SPECIAL ACTIONS	In event of moderate fire or development of fumes: Throughout area affected by smoke and fumes: • Short stay: wear appropriate respiratory protection equipment. • Wear protective gloves to discover leakage **EMERGENCY SERVICES advice:** In event of longer stay: • Wear self contained breathing apparatus • Wear chemical protective clothing outfit
FIRST AID	Symptoms of intoxication: • Irritation of nasal nucosa and rhinostenosis. • Splitting headache. • Dizziness, disorientation and disorder of balance. • Irritation of the eyes. • Contact with skin leads to a yellow skin hue. Action to be taken: • Move casualties into fresh air, put them on the ground in a comfortable position, loosen tight clothing, prevent chilling • In case of respiratory arrest, start artificial respiration (mouth to mouth or breathing apparatus) immediately. • Remove affected clothing (usually identifiable by yellow colour). • Rinse affected parts of the body with lots of water. • If eyes are affected, hold open eyelids and rinse immediately with water for 10 to 15 minutes, rolling eyeballs in all directions. • If Otto Fuel has been swallowed, provoke vomitting. • Call physician to accident site. Transport casualties preferably in a lying position. • In case of danger of loosing consciousness handle and transport casualties in a stable lateral position. For urgent information regarding assessment and treatment of noxious effects, contact poison control or medical treatment center.

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