

# INTERNATIONAL AMMUNITION TECHNICAL GUIDELINES

**IATG  
02.50**

Third edition  
March 2021

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## **Fire safety**

### **Warning**

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## Foreword

Ageing, unstable and excess conventional ammunition stockpiles pose the dual risks of **accidental explosions at munition sites** and **diversion to illicit markets**.

The humanitarian impact of ammunition-storage-area explosions, particularly in populated areas, has resulted in death, injury, environmental damage, displacement and disruption of livelihoods in over 100 countries. Accidental ammunition warehouse detonations count among the heaviest explosions ever recorded.

Diversion from ammunition stockpiles has fuelled armed conflict, terrorism, organized crime and violence, and contributes to the manufacture of improvised explosive devices. Much of the ammunition circulating among armed non-State actors has been illicitly diverted from government forces.<sup>1</sup> In recognition of these dual threats of explosion and diversion, the General Assembly requested the United Nations to develop **guidelines for adequate ammunition management**.<sup>2</sup> Finalized in 2011, the International Ammunition Technical Guidelines (IATG) provide voluntary, practical, modular guidance to support national authorities (and other stakeholders) in safely and securely managing conventional ammunition stockpiles. The UN SaferGuard Programme was simultaneously established as the corresponding knowledge-management platform to oversee and disseminate the IATG.

The IATG also ensure that the United Nations entities consistently deliver high-quality advice and support – from mine action to counter-terrorism, from child protection to disarmament, from crime reduction to development.

The IATG consist of 12 volumes that provide practical guidance for ‘through-life management’ approach to ammunition management. The IATG can be applied at the guidelines’ **basic, intermediate, or advanced levels**, making the IATG relevant for all situations by taking into account the diversity in capacities and resources available. Interested States and other stakeholders can **utilize the IATG for the development of national standards and standing operating procedures**.

The IATG are reviewed and updated at a minimum every five years, to reflect evolving ammunition stockpile-management norms and practices, and to incorporate changes due to changing international regulations and requirements. The review is undertaken by the UN SaferGuard Technical Review Board composed of national technical experts with the support of a corresponding Strategic Coordination Group comprised of expert organizations applying the IATG in practice.

The latest version of each IATG module can be found at [www.un.org/disarmament/ammunition](http://www.un.org/disarmament/ammunition).

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<sup>1</sup> S/2008/258.

<sup>2</sup> See also the urgent need to address poorly-maintained stockpiles as formulated by the United Nations Secretary-General in his Agenda for Disarmament, *Securing Our Common Future* (2018).

## Introduction

The storage and handling of ammunition and explosives are operations that present inherent risks to persons and property. A national authority shall therefore have a legal responsibility to ensure that during storage its ammunition and explosives present risks that are both tolerable and As Low As Reasonably Practicable (ALARP).

Any outbreak of fire in the vicinity of the explosives facility, or worse amongst the ammunition and explosives themselves, presents a significant hazard. In these circumstances, there is a very high and immediate risk to life and property. The situation will undoubtedly require specialist fire assistance from the local civilian authority (if this is available). Hence, much detail is provided in this IATG to enable the staff of explosives facilities to liaise effectively with those local authority staff having a responsibility for preventing and fighting fires.

This IATG module contains the principles and philosophy of firefighting, whilst also providing guidance on generic systems and procedures that should be applied. Definitive local policy cannot be provided in this IATG module on such matters as firefighting systems, numbers and the exact location of first aid firefighting equipment as this can only be determined after a detailed risk assessment. This should be undertaken in very close co-operation with specialist fire staff of the national technical authority and the local civilian authority.

Fire safety, and particularly fire prevention, is very dependent on local conditions, consequently management and supervisors within the explosives facility shall actively support and promote fire safety awareness for all personnel, including contractors and visitors to the unit.

# Fire safety

## 1 Scope

This IATG module introduces and explains the fire safety requirements for explosive facilities.

## 2 Normative references

A list of normative references is given in Annex A. These documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

A further list of informative references is given in Annex B in the form of a bibliography, which lists documents that contain additional information related to the contents of this IATG module.

## 3 Terms and definitions

For the purposes of this module the following terms and definitions, as well as the more comprehensive list given in IATG 01.40 *Glossary of terms, definitions and abbreviations*, shall apply.

The term 'fire safety' refers to *a generic term pertaining to fire prevention, firefighting and other fire related matters.*

The term 'potential explosion site' refers to *the location of a quantity of explosives that will create a blast, fragment, thermal or debris hazard in the event of an accidental explosion of its content.*

The term 'ammunition process building (APB)' refers to *a building or area that contains or is intended to contain one or more of the following activities: maintenance, preparation, inspection, breakdown, renovation, test or repair of ammunition and explosives.*

The term 'process building distance' (PBD) refers to *the distance from a building or stack containing explosives to an APB, or from an APB to another APB, which will provide a reasonable degree of immunity for the operatives within the APB(s), and a high degree of protection against immediate or subsequent propagation of explosions.*

NOTE 1 The PBD is a form of Inside Quantity Distance (IQD).

The term 'inhabited building distance' (IBD) refers to *the separation between potential explosive sites and non-associated exposed sites requiring a high degree of protection from an accidental explosion.*

NOTE 1 The IBD is a form of Outside Quantity Distance (OQD).

In all modules of the International Ammunition Technical Guidelines, the words 'shall', 'should', 'may' and 'can' are used to express provisions in accordance with their usage in ISO standards.

- a) **'shall' indicates a requirement:** It is used to indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.
- b) **'should' indicates a recommendation:** It is used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required, or that (in the negative form, 'should not') a certain possibility or course of action is deprecated but not prohibited.
- c) **'may' indicates permission:** It is used to indicate a course of action permissible within the limits of the document.
- d) **'can' indicates possibility and capability:** It is used for statements of possibility and capability, whether material, physical or casual.

## 4 Principles of firefighting in explosive facilities (LEVEL 1)

### 4.1 Above-ground explosive facilities

The following principles should be applied to firefighting in above-ground explosive facilities:

- a) initial direct firefighting activities should be aimed at preventing the ammunition and explosives from being involved in the fire;
- b) for potential explosion sites containing ammunition and explosives of Hazard Division 1.1 (those with a mass explosion hazard), all firefighting activities shall take place from pre-planned and identified positions that are preferably behind hard cover. This should not be less than the appropriate Process Building Distance (PBD) (see Clause 6.1.1 in IATG 02.20 *Separation and quantity distances*);
- c) for potential explosion sites containing ammunition and explosives of Hazard Division 1.1, firefighting crews shall be prepared to immediately withdraw to an appropriate pre-planned safe distance. This shall not be less than the appropriate Inhabited Building Distance (IBD) (see Clause 6.2.2 in IATG 02.20 *Separation and quantity distances*);
- d) if ammunition and explosives of Hazard Division 1.1 do become involved in the fire all firefighting crews shall immediately move to the pre-planned safe distance (at Clause 5c above), even if it is likely to result in the complete loss of stocks. A close watch should then be kept for any secondary fires that may start as a result of any explosion;
- e) following a mass explosion of Hazard Division 1.1 ammunition and explosives as a result of fire, action should be taken to prevent adjoining buildings becoming involved by the application of large quantities of cooling water if practicable;
- f) for potential explosion sites containing ammunition and explosives of Hazard Division 1.2 (those with a projection hazard but no mass explosion hazard) all firefighting activities shall take place from pre-planned and identified positions that are preferably behind hard cover. This should not be less than the appropriate Process Building Distance (PBD) (see Clause 6.1.1 in IATG 02.20 *Separation and quantity distances*);
- g) for potential explosion sites containing Hazard Division 1.2 ammunition and explosives action should be taken to prevent adjoining buildings becoming involved by the application of large quantities of cooling water if practicable;
- h) there is a risk during fires involving ammunition and explosives of Hazard Divisions 1.1 and 1.2 that ammunition may be propelled out of the potential explosion site and either explode on impact or become armed and hence unexploded ordnance (UXO).<sup>3</sup> Fire crews should ensure that these items are not disturbed by misdirected water jets;
- i) for potential explosion sites containing ammunition and explosives of Hazard Division 1.3 (those with a mass fire hazard but no mass explosion hazard) all firefighters shall be aware of the risks of rapid increases of radiant, and sometimes perpendicular jetted, heat. Firefighting activities should concentrate on containing the fire and protecting surrounding buildings;
- j) for potential explosion sites containing ammunition and explosives of Hazard Division 1.4 (those with no significant hazard) fire crews should make use of available cover when fighting the fire. In these cases it may be possible to approach the fire at a range that allows the use of water spray; and
- k) specialist advice shall be obtained on dealing with fires that may involve radiological hazards<sup>4</sup>.

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<sup>3</sup> These UXO will require clearance at a later date by a pre-planned explosive ordnance disposal (EOD) operation.

<sup>4</sup> Some more advanced ammunition systems contain low level radioactive sources and materials (such as tritium).

## 4.2 Underground explosive facilities

The following principles should be applied to firefighting in underground explosive facilities:

- a) the principles at Clause 5.1 above shall also be followed, but as soon as firefighting proves ineffective all personnel shall be immediately evacuated or withdrawn from the facility;
- b) a very rapid response is required to ensure that initial direct firefighting activities may be aimed at preventing the ammunition and explosives from being involved in the fire;
- c) self-contained breathing apparatuses (SCBA) shall be available and used under the direction of the senior fire officer (SFO). No personnel shall enter an underground site under fire without SCBA;
- d) the SFO shall make all decisions regarding the opening or closing of any ventilation systems;
- e) fires involving ammunition containing smoke, incendiary or toxic substances or compositions shall not be fought as they present unacceptable hazards in these circumstances; and
- f) water shall not be used to fight fires where metallic powders<sup>5</sup> are present as the application of water will cause an immediate and violent increase in the burning rate, with the possibility of subsequent explosion. Sites containing such powders should be marked with a NO WATER supplementary hazard warning sign.

## 5 Fire prevention

### 5.1 Fire safety plan (LEVEL 1)

The Head of the explosives facility should be responsible for the development and implementation of a fire safety plan (FSP). The following should be covered as a minimum:

Activity	Remarks
Raising the alarm	<ul style="list-style-type: none"> <li>▪ Fire alarm systems.</li> </ul>
Tasking emergency services	<ul style="list-style-type: none"> <li>▪ A system to ensure the rapid response of supplementary local authority fire and rescue services is required, plus the ability to pass information to them en route if necessary.</li> </ul>
Evacuation plan for personnel	<ul style="list-style-type: none"> <li>▪ This should include appropriate safety distances, arrangements for roll calls and identification if persons are unaccounted for.</li> </ul>
Pre-fire action plans for potential explosion sites (PES)	<ul style="list-style-type: none"> <li>▪ Deployment of warning signs, sprinkler systems, drenching systems and first aid firefighting equipment.</li> </ul>
Site plan	<ul style="list-style-type: none"> <li>▪ This shall be updated on a regular basis to reflect current stock levels.</li> <li>▪ It should include locations of PES, separation distances,<sup>6</sup> location of emergency water supplies, location of energy sources etc.</li> <li>▪ Copies should be made available to ensure they can be rapidly handed over to the local authority Senior Fire Officer (SFO) or other external emergency services.</li> </ul>
Design drawings	<ul style="list-style-type: none"> <li>▪ Line drawings of the PES should be available for the SFO.</li> </ul>
Liaison mechanisms	<ul style="list-style-type: none"> <li>▪ Arrangements for regular liaison with local authority emergency services and regular joint training and briefings.</li> </ul>
Staff training	<ul style="list-style-type: none"> <li>▪ Training requirements for unit staff.</li> </ul>

<sup>5</sup> For example, aluminium powder being stored in manufacturing facilities prior to mixing with high explosive compounds to increase their power.

<sup>6</sup> See IATG 02.20 *Separation and quantity distances*.

Activity	Remarks
Media briefing	<ul style="list-style-type: none"> <li>▪ A pre-agreed media briefing should be available to reassure the local community that appropriate actions are being taken to resolve the situation safely.</li> </ul>

Table 1: FSP requirements

## 6 Fire alarm systems (LEVEL 1)

Fire alarm systems may be mechanical or electrical but should always be:

- a) readily accessible at all times;
- b) clearly visible in the dark; and
- c) positioned so that the alarm can be quickly raised.

Fire alarms should be tested on a regular basis (weekly for electrical systems and monthly for mechanical systems) and the results formally recorded.

## 7 Fire breaks and vegetation (LEVEL 1)

There is a major fire risk with any uncontrolled growth of vegetation, particularly during dry weather conditions. Therefore, grass, trees and vegetation shall be controlled to ensure that they do not present a hazard to explosives.

### 7.1 Control of vegetation

The use of a 'three area plan' to reduce the risk of fire from vegetation for explosive storehouses<sup>7</sup> should be considered. Such a plan should have the following conditions:

- a) Area 1. No vegetation should be permitted within 1 m of a PES (with the exception of earth-covered buildings). This will provide a basic fire-break;
- b) Area 2. Whenever possible, no vegetation over 5 cm in height should be permitted within a further 5 m of a PES (i.e. out to 6 m). No vegetation longer than 5 cm on, or within 5 m of, earth-covered buildings, or on traverses should be permitted within 5 m of a PES. This will allow for the detection of ejected unexploded articles from any explosion; and
- c) Area 3. Beyond 6m, the length of vegetation should be in accordance with a site locally assessed risk.

### 7.2 Control of trees and shrubs

Trees and shrubs may be permitted within explosives areas provided that they do not provide a means by which a fire can bridge a firebreak.

Highly flammable trees such as conifers and spruce should to be kept at least 30 m away from explosives facilities. Other types of tree should be kept at 15 m.

Trees should be regularly maintained by a competent person to ensure that they remain healthy, are less susceptible to storm damage and cannot hazard the PES or the contents.

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<sup>7</sup> Similar principles should also be applied to field storage.

### 7.3 Cut vegetation

Cut vegetation, such as grass clippings, fallen branches, hay, etc., should be removed from the short grass areas around PES immediately after cutting. If the cuttings are removed to a distance of not less than 50 m from a PES, they may be temporarily stacked to await removal. Cuttings should be removed as soon as possible from the date of cutting to avoid becoming a fire hazard.

Cut vegetation should not be burnt within the explosives facility.

### 7.4 Agricultural chemicals

Only chemicals and fertilisers whose residue does not produce or cause a significant fire risk may be used to control vegetation in explosives facilities.

## 8 Fire practices (LEVEL 1)

Fire practices to test arrangements at the unit level should be held at irregular intervals of not less than every two months. The practice shall include fire and evacuation drills for ammunition process buildings.

Regular liaison with the local authority fire and rescue services shall be maintained as their assistance will be required in the event of a major fire. Regular liaison visits and joint exercises should take place on an annual basis so that they are aware of the particular requirements of firefighting within an explosives facility, and that they are familiar with the layout of the explosives facility and the availability of water supplies etc.

Records should be maintained of each fire practice and a post exercise report prepared to identify any deficiencies. These deficiencies, or errors in any drills, should be resolved and a further practice using the new drills carried out asap.

## 9 Evacuation of personnel (LEVEL 2)

Adequate provision shall be made for the requirements in Table 2:

Requirement	Remarks
Means of escape	<ul style="list-style-type: none"> <li>▪ Exit doors shall be kept clear and unobstructed.</li> <li>▪ Clear passageways and gangways through ammunition stocks within a PES shall be maintained. Painted lines should be used on the floor to indicate gangways and passageways.</li> </ul>
Fire access	
Emergency lighting	<ul style="list-style-type: none"> <li>▪ Emergency lighting should be present in above ground explosive facilities.</li> <li>▪ Emergency lighting shall be present in underground explosive facilities.</li> <li>▪ Emergency lighting shall operate independently of, and automatically on failure of, the normal lighting system.</li> </ul>
Luminous guidelines	<ul style="list-style-type: none"> <li>▪ Luminous guidelines indicating exit routes should be present on the floor of underground explosive facilities.</li> </ul>

Table 2: Evacuation requirements

## 10 Firefighting preparation

There is a range of preparatory measures and equipment that should be implemented and/or procured to assist in major firefighting operations in the event of a fire.

## **10.1 Emergency water supplies (LEVEL 2)**

Advice should be obtained from an SFO to determine the amount of emergency water supply (EWS) that should be stored within an explosives facility. As guidance, there should be enough water for two hours initial firefighting and the SFO can advise on the pressure requirements for, and flow rates of, the fire appliances that are likely to be required for initial firefighting.

The EWS should be made up of a combination of mains fire hydrants and emergency water tanks.

### **10.1.1. EWS locations**

Mains fire hydrants should be located no more than 70m from the entry to a PES, whilst EWS tanks should be located no more than 100m from the PES. They should both have hard standing available next to them capable of taking the weight of fully laden fire appliances.

### **10.1.2. Mains fire hydrants**

Mains fire hydrants should be capable of providing a minimum static pressure of 4 bar. If this is not possible then a water flow rate of 75 litres per second should be sustainable from one or more fire hydrants for a minimum of 2 hours.

The outlets of fire hydrants should be of a standard design that is compatible with both the explosive facility's and local authority's fire appliances.

If water supplies are metered there is a possibility that the meter may restrict flow rates. If this is the case a meter by-pass system should be fitted.

### **10.1.3. EWS tanks**

The following may be considered as a form of EWS tank:

- a) natural supplies. Rivers, lakes or tidal waters may all be utilised as an EWS if within the ranges at Clause 10.1.1 (above);
- b) engineered supplies. Reservoirs, canals and man-made ponds fall in this category. Again the ranges at Clause 10.1.1 (above) shall apply; and
- c) static tanks. Open topped tanks may be utilised. These may be above surface, partially buried or fully buried. If above surface consideration should be given to providing fragmentation protection. Experience suggests that static tanks should be of minimum capacity of 114,000 litres.

In very cold weather conditions, a system of gaining access to the water through ice (e.g. ice axes) shall be maintained.

### **10.1.4. Marking of EWS**

Mains fire hydrants and EWS should be clearly marked, and signposts indicating their location should also be provided within the explosives facility. A range of signs that may be used is illustrated at Table 3:

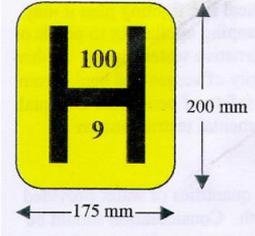
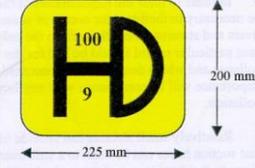
Description	Pictogram
Single Mains Hydrant <sup>8</sup>	
Double Mains Hydrant	
EWS Tank (90,000 litres)	
Direction to EWS Tank (50,000 litres at 200 metres)	

Table 3: EWS signs

The location of mains fire hydrants and EWS tanks shall be clearly marked on the site plan (see Table 1 to Clause 6.1).

#### 10.1.5. Maintenance of EWS

EWS are to be inspected and tested monthly to ensure that they are in working order and that the water is at an appropriate level. Persistent loss of water in non-drought conditions would indicate a leak that requires identification and repair.

Records of inspections and tests should be maintained. These records should include water flow rates, running pressure and static pressure.

### 10.2 Fire signs and symbols (LEVEL 1)

It is essential that external fire crews can rapidly identify the hazards contained within each PES within the explosives facility. Hazard division signs of the 'worst risk' HD should therefore be physically displayed on all PES and on all the approaches to a PES. The hazard division signs should be changed when ammunition and explosives of a particular hazard division are removed from the PES, and replaced with the HD sign of the new 'worst risk' HD (in the order 1.1, 1.2, 1.3, 1.4 or none if no ammunition is within the PES).

Background to the hazard division system is contained in IATG 01.50:2020[E] *UN explosive classification and codes*. Table 1 of Clause 6.1 of IATG 01.50:2020[E] contains the symbols that should be used. These are repeated in Annex C of this this module for convenience.

<sup>8</sup> 100 is the Flow Rate in Litres per Second, and 9 is the Static Pressure in Bar.

There is also a range of supplementary fire signs that should be used to provide advice to fire crews. These cover issues such as the use of SCBA and are at Annex C.

### **10.3 Immediate firefighting appliances (LEVEL 1)**

Immediate firefighting appliances (IFFA) shall be made available within and outside PES.<sup>9</sup> The type and quantity of IFFA<sup>10</sup> should be determined by an appropriate SFO. The requirements for the type and quantity of IFFA should also be determined by the building use:

- a) explosive storehouses (ESH). Portable fire water and foam extinguishers should be available and capable of extinguishing small fires within the ESH due to electrical faults or accidents. Portable extinguishers should be of a size and weight appropriate for use by both men and women. Fire beaters should be available outside the ESH to fight small vegetation fires;
- b) ammunition process buildings (APBs). Fixed IFFA installations such as hose reels should be available within APBs. Fire beaters should be available outside the APB to fight small vegetation fires, although the hose reels should have sufficient length to also do this; and
- c) transit facilities. The risk at transit facilities is usually one of vehicle fires. Fixed IFFA installations such as hose reels should be available within transit facilities. Portable foam IFFA should be available for electrical fires on vehicles. Fire beaters should also be available outside the transit facility to fight small vegetation fires, although the hose reels should have sufficient length to also do this.

### **10.4 Major firefighting appliances**

In some States the local authority fire and rescue service may be available to support firefighting activities, and they would have the major appliances (such as tenders, mobile pumps and extendable ladders) necessary to fight major fires.

For those explosive facilities where local authority fire and rescue support is unavailable a much larger scale of major firefighting equipment should be held within the explosives area. Staff shall be trained to operate such equipment and should also be trained in how to fight major fires. Professional firefighting personnel should be used to develop the appropriate training packages and to deliver such training. Similarly, their advice shall be sought as to the type and quantity of major firefighting equipment required for each particular explosives facility.

## **11 Firefighting**

There should be two types of firefighting measures:

- a) immediate firefighting by unit personnel. This may involve the use of equipment such as portable extinguishers. It shall only be conducted during the early stages of a fire; and
- b) major firefighting. This shall be conducted by trained firefighting personnel and will involve the use of a wide range of equipment such as mobile firefighting appliances and SCBA. It could be undertaken by specially trained unit staff or by local authority fire and rescue services (if available).

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<sup>9</sup> This may not necessarily mean that IFFA are permanently located within explosive storehouses (ESH) as long as they are taken to the ESH on each visit.

<sup>10</sup> ABCE Generic Dry Powder extinguishers are now available that have the versatility to be used on all types of fire. These extinguishers should replace current foam and water extinguishers on a rolling replacement programme.

### 11.1 Unit immediate actions (LEVEL 1)

The following immediate actions should be taken by unit staff if a fire is detected before any ammunition and explosives are involved, and it is small enough to be dealt with by unit level fire-fighting equipment:

- a) Unless ammunition or explosives are already on fire, immediately attempt to extinguish or control the fire with the immediate firefighting equipment available;
- b) sound the fire alarm;
- c) evacuate all non-essential personnel in the immediate vicinity of the fire to an appropriate safe distance;
- d) immediately call the appropriate fire and rescue service and request their assistance (as time may be a factor if first aid firefighting fails); and
- e) prepare personnel for a wider evacuation should immediate firefighting fail to extinguish or control the fire.

Should the immediate firefighting actions fail to control the fire and it begins to spread towards the ammunition and explosives the following immediate action should be taken:

- a) all personnel are to be evacuated to an appropriate safe distance based on the separation distance for the potential explosion site involved in the fire;
- b) a roll call should be taken to ensure that all unit personnel and visitors are accounted for;
- c) the fire and rescue service should be alerted (en route if necessary) that immediate firefighting has failed and that the fire is spreading towards the ammunition and explosives;
- d) the fire safety plan (FSP) should be fully instigated.

### 11.2 Briefing to Senior Fire Officer (LEVEL 1)

The Senior Fire Officer (SFO)<sup>11</sup> will require as much information as possible to allow him/her to develop an action plan on how to most appropriately deal with the incident and how to deploy the firefighting appliances. As well as providing the SFO the site plan and building designs, the following information should be made available as a minimum:

- a) the last known location of any individuals unaccounted for;
- b) the hazard division, type and quantity of ammunition and explosives in the potential explosion site on fire;
- c) the presence of anything that may constitute a special risk (e.g. depleted uranium);
- d) the separation and quantity distances extant for the site;
- e) the location of emergency water supplies;
- f) information from telemetric sources (e.g. temperature and humidity indicators); and
- g) any further information available from eye witnesses.

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<sup>11</sup> The SFO may be a specially trained member of the unit, or, more usually, a senior officer of the local fire and rescue service.

### **11.3 Major fires (LEVEL 2)**

Major fires shall be fought in accordance with the direction and instructions of the SFO based on the principles at Clauses 5.1 and 5.2. Unit personnel shall follow all instructions from the SFO who shall command all firefighting activities. He/she shall be advised on explosive risks by a senior ammunition trained and qualified officer.

## **Annex A** **(normative)** **References**

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of the guideline. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of the guideline are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO maintain registers of currently valid ISO or EN:

- a) IATG 01.40 *Terms, glossary and definitions*. UNODA. 2020;
- b) IATG 01.50 *UN explosive classification system and codes*. UNODA. 2020; and
- c) IATG 02.20 *Separation and quantity distances*. UNODA. 2020.

The latest version/edition of these references should be used. The UN Office for Disarmament Affairs (UNODA) holds copies of all references<sup>12</sup> used in this guideline and these can be found at: [www.un.org/disarmament/un-safeguard/references/](http://www.un.org/disarmament/un-safeguard/references/). A register of the latest version/edition of the International Ammunition Technical Guidelines is maintained by UNODA, and can be read on the IATG website: [www.un.org/disarmament/convarms/ammunition/](http://www.un.org/disarmament/convarms/ammunition/). National authorities, employers and other interested bodies and organisations should obtain copies before commencing conventional ammunition stockpile management programmes.

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<sup>12</sup> Where copyright permits.

## **Annex B** **(informative)** **References**

The following informative documents contain provisions, which should also be consulted to provide further background information to the contents of this guideline:<sup>13</sup>

- a) AASTP-1, Edition B Version 1. *NATO Guidelines for the Storage of Military Ammunition and Explosives*. NATO Standardization Organization (NSO). December 2015; and
- b) DSA03.OME part 2 provides for the safe storage and processing of Ordnance, Munitions and Explosives (OME). UK MOD. November 2020.

The latest version/edition of these references should be used. The UN Office for Disarmament Affairs (UNODA) holds copies of all references<sup>14</sup> used in this guideline and these can be found at [www.un.org/disarmament/un-safeguard/references/](http://www.un.org/disarmament/un-safeguard/references/). A register of the latest version/edition of the International Ammunition Technical Guidelines is maintained by UNODA, and can be read on the IATG website: [www.un.org/disarmament/convarms/ammunition/](http://www.un.org/disarmament/convarms/ammunition/). National authorities, employers and other interested bodies and organisations should obtain copies before commencing conventional ammunition stockpile management programmes.

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<sup>13</sup> Data from many of these publications has been used to develop this IATG.

<sup>14</sup> Where copyright permits.

## Annex C (normative) Fire signs (LEVEL 1)

The following hazard division signs and fire supplementary signs should be used within explosive facilities:

Hazard Division	Description	Pictogram
<b>Hazard division signs</b>		
<b>1.1</b>	Ammunition that has a mass explosion hazard.	
<b>1.2</b>	Ammunition that has a projection hazard but not a mass explosion hazard.	
<b>1.3</b>	Ammunition that has a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.	
<b>1.4</b>	Ammunition that presents no significant hazard.	
<b>1.5</b>	Very insensitive substances, which have a mass explosion hazard.	
<b>1.6</b>	Extremely insensitive articles which do not have a mass explosion hazard.	
<b>Fire supplementary signs</b>		

Hazard Division	Description	Pictogram
N/A	Respiratory protection using SCBA required.	
N/A	Personal protective clothing required.	
N/A	Radiological hazard.	
N/A	Water prohibited.	

Table C.1: Fire signs

