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**Safeguarding of explosives facilities**



**UN SaferGuard**  
Securing ammunition, protecting lives

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### **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, handling and transportation of 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 explosives present risks to the general public that are both tolerable and as low as reasonably practicable (ALARP).

One of the most efficient means of protecting the public from the effects of an explosive event is by using separation distances, which ensure that they are always at a tolerably safe distance from the explosives during storage and handling. These separation distances frequently extend beyond the boundary of the explosive facility. Past experience has shown that without a system of safeguarding the land outside the facility boundary the civilian population may build dwellings or commercial installations thereby negating the effective separation distance. If this occurs, there should only be two options available to the ammunition storage facility: 1) the explosive quantity permitted for storage shall be reduced within the facility; or 2) the increased risk to the civilian population shall be formally accepted, even if it is above the tolerable risk level. Either option is undesirable. The alternative options of: 1) moving the civilian population from the area; or 2) moving the ammunition storage area: are political decisions outside the scope of these guidelines.

Therefore, to ensure that explosive facilities are not compromised by civil encroachment of private or public land development within the explosion danger area of the facility a system of safeguarding should be established.

# Safeguarding of explosive facilities

## 1 Scope

This IATG module introduces and explains the concept of safeguarding for explosive facilities. A safeguarding system is designed to prevent encroachment into the explosion danger area by the civilian population and hence ensure that appropriate separation and quantity distances are maintained.

## 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 'explosion danger area' refers to *the area surrounding an explosive facility determined by the distances any blast or fragments may be expected to travel due to the detonation of ammunition.*

The term 'exposed site' (ES) refers to *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 (PES) under consideration.*

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

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

The term 'outside quantity distance' (OQD) refers to *the minimum permissible distance between a potential explosion site (PES) and an exposed site (ES) outside the explosives area.*

The term 'potential explosion site' (PES) 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 'purple line' refers to *a continuous line drawn on an ammunition storage area map or plan which encompasses the explosives area and defines the minimum permissible distance between a potential explosion site and inhabited buildings which are by definition of vulnerable construction. It is usually at twice the yellow line or normal inhabited building distance determined by blast considerations.*

NOTE 1 The construction of new inhabited buildings of curtain-wall construction or high rise buildings is restricted.

NOTE 2 The area within the Purple Line is known as the Purple Zone.

The term 'quantity distance' (QD) refers to *the designated safe distance between a potential explosion site (PES) and an exposed site (ES).*

The term 'safeguarding' refers to a consultative procedure with the appropriate local authority whereby safeguarded areas outside boundary fences are established for each explosives establishment.

NOTE 1 Explosives Safeguarding maps for each establishment are produced depicting a Yellow Line based on inhabited building distance (IBD) and a Purple Line, usually but not always, based on 2 x IBD.

NOTE 2 Copies are provided to the appropriate local authority. It is the aim to restrict the construction of any inhabited building, caravan site, or public traffic routes within the yellow line and the construction of curtainwall and high rise buildings with large glazed areas, between the yellow and purple lines.

NOTE 3 All new applications for development within safeguarded areas should be notified to the national technical authority by the appropriate local authority in order that any necessary objections may be lodged.

The term 'separation distance' refers to a generic term for the safe distance between a potential explosion site (PES) and an exposed site (ES).

NOTE 1 Separation distances may or may not involve the use of the quantity distance system. They can be developed through the use of explosion consequence analysis.

The term 'yellow line' refers to a continuous line drawn on an ammunition storage area map or plan which encompasses the explosives area and defines the minimum permissible distance between a potential explosion site and inhabited buildings, caravan sites or assembly places.

Alternatively, it may refer to a line at the inhabited building distance within which the construction of new inhabited buildings, caravan sites and public traffic routes are restricted.

NOTE 1 The area within the Yellow Line is known as the Yellow Zone.

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 Explosives safeguarding system

### 4.1 Rationale

A system of explosives safeguarding<sup>3</sup> may not be required if the legal owners of the explosives facility also own all the surrounding land out to the appropriate separation distance for vulnerable buildings. In many cases, this is unlikely to be the case, and therefore the State should ensure that it maintains a degree of control over the activities that may take place on that land. Certain activities that result in a low density of civilian presence, such as agriculture, should be permitted. Conversely, the building of civilian dwellings should not be permitted within the inhabited building distance (IBD) or, in the case of inhabited buildings which are by definition of vulnerable construction, within the vulnerable building distance (VBD).

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<sup>3</sup> Referred to as safeguarding for the remainder of this guideline.

A formal system of safeguarding that permits the ammunition storage organisation to influence what activities are permitted within the IBD and VBD should be developed and implemented.

## 4.2 System requirements (LEVEL 2)

The development and implementation of an explosives safeguarding system shall require the following:

- a) the development of an appropriate national technical authority, which shall represent the State on behalf of all owners of explosives facilities nationwide. This authority should be actively involved in the implementation of an explosive safeguarding system;
- b) the development of appropriate legislation that enables the owners of the explosives facility (usually the State) to influence future development within the IBD and VBD (see Clause 4.3). The legislation may be used to establish the national technical authority (Clause 4.2(a)). The legislation should not allow the owners of the explosive facility to have a statutory right to unilaterally impose restrictions on development, although it may allow an appropriate Minister to impose such restrictions after all consultation has taken place;
- c) the development of a consultative process between the national technical authority, local authority responsible for authorising building planning permission and the owners of the explosives facility;
- d) the development of an appeals process should planning permission be granted for development within the IBD or VBD despite the safety requirements of the owners of the explosives facility; and
- e) the development of appropriate procedures to be followed by all parties prior to any planning permission being granted for development of land within the IBD or VBD.

## 4.3 System components (LEVEL 2)

Once established a safeguarding system should consist of the following components, which are designed to support effective implementation of the safeguarding system:

- a) safeguarding direction order (SDO). This should be signed at the appropriate level determined by legislation and should require that the local planning authority consult with the owners of the explosive facility before any planning permission is granted for development. A copy of an explosives safeguarding map should form part of the SDO; and
- b) explosives safeguarding map (ESM). This should contain the information at Table 1.

ESM Requirement	Explanatory Notes
ESM Map Scale	<ul style="list-style-type: none"> <li>▪ At least 1:10,000, although 1:2,500 is preferable.</li> </ul>
Aerial Photography	<ul style="list-style-type: none"> <li>▪ Aerial photographs may be used as an alternative to maps.</li> </ul>
Identification of Yellow Zone <sup>4</sup>	<ul style="list-style-type: none"> <li>▪ The Yellow Zone should be indicated by a Yellow Line around the explosives facility.</li> <li>▪ The Yellow Line distance should be at the Inhabited Building Distance (IBD), see IATG 02.20 <i>Separation and quantity distances</i>.</li> <li>▪ If the safeguarding direction order is approved then no inhabited buildings should be developed within the Yellow Zone without the consultation process (Clause 4.2) being followed.</li> </ul>

<sup>4</sup> Colours are used to define the zones within IATG. Other identification systems are permitted.



ESM Requirement	Explanatory Notes
Identification of the Purple Zone	<ul style="list-style-type: none"> <li>▪ The Purple Zone should be indicated by a Purple Line around the explosives facility.</li> <li>▪ The Purple Line distance should be at the Vulnerable Building Distance (VBD), see IATG 02.20 <i>Separation and quantity distances</i>.</li> <li>▪ If the safeguarding direction order is approved then no vulnerable buildings should be developed within the Purple Zone without the consultation process (Clause 4.2) being followed.</li> <li>▪ Such buildings would be high rise buildings, or buildings with curtain walls or glass facades. Facilities such as hospitals, schools or culturally significant monuments or buildings might also be considered as vulnerable buildings.</li> </ul>
Identification of the Red Zone	<ul style="list-style-type: none"> <li>▪ The Red Zone is that area owned by the explosives facility.</li> </ul>
Potential Explosive Limits	<ul style="list-style-type: none"> <li>▪ The Yellow and Purple Lines may be developed based on the Potential Explosive Limits of the Potential Explosion Sites (PES) within the explosives facility rather than the Authorised Limits (Clause 7.1, IATG 02.30 <i>Licensing of explosive facilities</i>). This allows for more flexibility in storage within the explosives facility.</li> </ul>

**Table 1: ESM requirements**

An SDO and an ESM should be produced for each PES except those under an Authorised Quantity licence or only licenced to store HD 1.4. Where there is more than one PES on a site, ie in an Ammunition Storage Area (ASA), an overall, consolidated ESM must be produced showing the outermost yellow and purple lines from all PES.

## 5 Maintenance of the safeguarded area (LEVEL 2)

### 5.1 General

The safeguarding of explosive facilities is crucial to the continued operational effectiveness of a site. Although a statutory system of consultation may ensure that the majority of intended land developments come to the notice of the owners of the explosive facility, the mechanism may not be fool proof. The reasons for this are essentially fourfold:

- a) local authorities may occasionally, through error, omit to inform the owner of the explosive facility about local planning applications;
- b) the local authority maps may not be amended quickly enough in order to reflect any changes made to the safeguarded areas brought about by major changes in explosives licences through extensions to explosives facilities;
- c) landowners within the safeguarded area may develop land without first seeking planning permission from the local authority; and
- d) a national technical authority may not be in place to coordinate activities at sub-clauses a) and b) above.

## 5.2 Explosive safeguarding map (ESM) review and inspection

Regular reviews and physical inspections of the safeguarded area should be conducted to maintain the integrity of explosives facilities and to identify any actual<sup>5</sup> or potential<sup>6</sup> encroachment into the safeguarded area.

The ESM should be formally reviewed, and the land within the safeguarded area physically inspected, on a quarterly basis to ensure that there has been no unauthorised land development (encroachment).

## 5.3 Action on potential encroachments

If an actual, or potential, encroachment is discovered, it is essential that its full nature is determined quickly, but with the utmost discretion. When trying to fully identify the infringement, the following rules should be observed:

- a) the parent ministry of the explosives facility should be contacted without delay so that a formal consultative process with the relevant government ministry or local planning authority may be instigated;
- b) no member of the explosive facility staff should take unilateral action by contacting the local authorities, as this may compromise any future legal processes; and
- c) orders to stop work may only be given by the national technical authority or local authority to personnel working on a building or building site.<sup>7</sup>

Immediate action within the explosives facility, such as stock relocation, may be necessary to ensure that any risk to members of the public is tolerable and ALARP. This could affect quantity and separation distances and may not be an option, so suspension of work should be the priority option for the explosives facility to legally pursue.

Explosives facilities should be aware that landowners may legally carry out certain changes on their property without necessarily seeking planning permission from the local authority. All such changes which come to the notice of the explosives facility are to be notified to the appropriate national authority responsible for explosives licensing, who shall determine the appropriate course of action.

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<sup>5</sup> For example, new buildings are identified.

<sup>6</sup> For example, building activities have just commenced.

<sup>7</sup> If an immediate order to stop work is not given, not necessarily by the owner of the explosives facility but essentially by the local or legal authority, the work on the building or building site may develop so much that it becomes very difficult to dissuade the landowners legally. As both the owner of the explosives facility and the landowners have to comply with the law of the land, a temporary suspension of work may be imposed by the local authority pending settlement of the dispute either through consultative process or through legal means.

## **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 *Glossary of terms, definitions and abbreviations*. UNODA. 2020;
- b) IATG 02.20 *Quantity and separation distances*. UNODA. 2020; and
- c) IATG 02.30 *Licensing of explosive facilities*. 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>8</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/ammunition](http://www.un.org/disarmament/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>8</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>9</sup>

- a) AASTP-1, Edition B Version 1. *NATO Guidelines for the Storage of Military Ammunition and Explosives*. NATO Standardization Organization (NSO). December 2015; <http://nso.nato.int/nso/nsdd/listpromulg.html> 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>10</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/ammunition](http://www.un.org/disarmament/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>9</sup> Data from many of these publications has been used to develop this IATG.

<sup>10</sup> Where copyright permits.

## Amendment record

### Management of IATG amendments

The IATG are subject to formal review on a five-yearly basis. This does not preclude amendments being made within these five-year periods for reasons of operational safety, efficacy and efficiency or for editorial purposes.

As amendments are made to this IATG module they will be given a number, and the date and general details of the amendment will be shown in the table below. The amendment will also be shown on the cover page of the IATG by the inclusion of the amendment number and date.

As the formal reviews of each the IATG module is completed, new editions will be issued. Amendments will be incorporated into the new edition and the amendment record table cleared. Recording of amendments will then start again until a further review is carried out.

The most recently amended, and thus extant, IATG module is posted on [www.un.org/disarmament/ammunition](http://www.un.org/disarmament/ammunition)

Number	Date	Amendment Details
0	01 Feb 15	Release of Edition 2 of IATG.
1	31 March 21	Release of Edition 3 of IATG.