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Licensing of explosives facilities

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.¹ In recognition of these dual threats of explosion and diversion, the General Assembly requested the United Nations to develop **guidelines for adequate ammunition management**.² 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.

¹ S/2008/258.

² 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 of ammunition and explosives presents inherent risks to nearby persons and property. A national authority shall therefore have a legal responsibility to ensure that during their storage the explosives present risks that are both tolerable and as low as reasonably practicable (the ALARP principle) .

There are a number of factors that determine the risks from explosives to people or facilities. These include: 1) the quantity and type of explosives; 2) the distance between explosives facilities and people or other facilities; 3) the type of explosives storehouses; 4) the type of public installations and 5) the amount and length of time that people and/or facilities are exposed to the risk.

One of the most efficient means of reducing and/or mitigating the risk and thereby contributing towards protecting the public from the effects of an explosive event is by the use of separation distances. These ensure that people and facilities are always at a tolerably safe distance from the explosives during storage and handling.³ Such distances should be appropriate, recorded and promulgated in the form of an explosives limit licence (ELL) for each individual explosives storehouse (ESH) or facility.

³ See IATG 02.20 *Quantity and separation distances*.

Licensing of explosives facilities

1 Scope

This IATG module introduces and explains the concept and development of explosives limit licences (ELL) for explosives facilities. It should be used in conjunction with IATG 02.20 *Separation and quantity distances*, which provides guidance on the appropriate safety distances to be used within the ELL.

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

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

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.

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 Responsibility for licensing of explosives storage and processing facilities

An appropriate national technical authority shall be responsible for the development and operation of a system of licensing of ammunition storage and processing areas. This should be independent of the ammunition storage units but may be delegated to an ammunition inspectorate.⁴

5 Risk management (LEVEL 2)

5.1 General

All facilities used for storing and processing explosives should be licensed as suitable for the intended purpose. For an explosives licence to be issued the appropriate technical authority shall be satisfied that the facility will generate risks to people that are As Low As Reasonably Practicable (ALARP) when operating within the terms of that licence. This should equate to the tolerable risk that has been determined as appropriate to that society.

ALARP should be achieved by demonstrating that explosives facilities are licensed with due regard to the following principles:

- a) only an authorised limit (see Clause 7.1) sufficient to meet predicted operational needs over the life of the licence should be considered. Due regard should be made to maintaining flexibility of the available storage, handling and processing assets;
- b) whenever reasonably practicable, the authorised limit should be less than the maximum potential limit identified using the system in IATG 02.20 *Separation and quantity distances*;
- c) exposure of the civilian population shall be avoided as far as is reasonably practicable;
- d) although the cost of appropriate storage facilities with effective separation distances will be a factor, it should not be used as a justification for a stockpile management organisation not to fulfil its 'duty of care' to ensure that the risks are ALARP; and
- e) any specific aspects of the licence that may require special management or review processes should be identified and given due consideration.

The prime principle of ALARP should be to think beyond pure licensing regulations as a system of automatic permission and to consider whether the activity could more reasonably and practicably be performed in a safer manner. If safety can be practicably improved beyond the guidance within IATG, then a clear 'duty of care' exists to do so that should be discharged. It should not be enough to rely upon guidance that takes no account of local conditions that might demand or allow a greater level of safety provision. Therefore, for example, it may be permissible within this guidance to place explosives at a reduced QD from people thus increasing their level of risk, but if an alternative location exists, where the activity can be carried out at a greater separation distance, that greater protection to life should be afforded. In this case however, the risks associated with relocating stocks should also be considered in parallel and an overall risk of the storage and transport processes be estimated.

⁴ See Table 3 of IATG 03.10 *Inventory management*.

Further guidance on appropriate risk management principles and processes may be found in IATG 02.10 *Introduction to risk management principles and processes*.

5.2 Specific factors

Specific factors that should be considered during the preparation of an ELL for an explosives storehouse (ESH) or ammunition process building (APB) are:

- a) there should be no mismatch between a theoretical physical capacity of a PES and the space that the Net Explosive Quantity (NEQ) in the form of the authorised munitions in question will occupy. The intended utilisation of the building must therefore be borne in mind and purely hypothetical circumstances discounted (see Clause 7.1);⁵
- b) the ELL for an APB should ensure that the amount of ammunition and explosives present is kept to the reasonably practicable minimum. Accumulations of ammunition and explosives awaiting processing, return to storage or onward transport after processing should be kept to a minimum; and
- c) the number of personnel exposed to explosives risks should always be kept to the reasonably practicable minimum. The head of the ammunition storage unit will ensure all personnel non-essential to that activity will be given appropriate protection from risk and be closely controlled by local procedures.

What is reasonably practicable will inevitably be a matter for technical judgement. However, by 'accepting the risk', the appropriate technical authority shall satisfy itself that, in its professional judgement, its decision is supported by thoroughly researched and balanced arguments that can be expected to hold up before searching scrutiny in any potential legal process. The resulting ELL shall therefore indicate or cross reference, in as much detail as possible, the factors and constraints governing the authorised NEQ limits and the matters that must be addressed, supervised and reviewed for effective safety management.

6 Types of explosives limit licence (ELL) (LEVEL 2)

Previous experience has shown that in order to maintain flexibility in storage, whilst maintaining explosives safety standards, it is advantageous to have a small range of different ELL formats. The following types of ELL should be used:

- a) 'Standard' ELL. This should be the preference for an ELL unless circumstances require the use of one of the other options (see Annex C for an example that may be used);
- b) 'Non-Standard' ELL. This should only be used where there are specific constraints or situations that require regular monitoring (see Annex C for an example that may be used);

⁵ For example, a building should not be licensed for an explosives limit of 25,000kg when the physical space can only be occupied by ammunition with an NEQ of 10,000 kg.

- c) 'Authorised Quantity' ELL. This may be used to authorise the storage of 'ready use' ammunition of HD 1.22, HD 1.32 and HD 1.4 within buildings that are not specifically designed for ammunition storage (e.g. a police station, unit guardroom or training store). The licence shall always specify exactly what types of ammunition by nature, hazard division and compatibility group may be stored and in what quantities. It is recommended that a maximum limit of 10kg of HD 1.22 and/or 1.32 and any quantity of HD1.4 should usually be permitted, although up to 25kg of HD 1.22 and/or 1.32 and any quantity of HD1.4 may be authorised if both the technical authority and operational commander agree the need. Where this is not practicable, due to the number of natures or the changing requirements of the facility, it is permissible to state the maximum authorised NEQ by hazard division and include a statement as to the Compatibility Groups allowed in the licence conditions (see Annex D for an example form that may be used); and
- d) Demolition Site Ammunition storage ELL. This type of ELL should be used for ESH at locations where the disposal of ammunition and explosives takes place (see Annex E for an example form that may be used⁶).

Whichever ELL is authorised it shall always be supported by the ELL Supplementary Matrix (see Annex F), or an explosion consequence analysis (ECA), which shall always be physically attached to the ELL. This matrix clearly explains how the explosives limits contained in the ELL have been determined. The supporting IATG software contains a copy of the ELL Matrix that will automatically calculate the appropriate explosives limits based on the distances entered.⁷

7 Licensing criteria (LEVEL 2)

7.1 Explosives limits

There are two options for authorising the explosives limits in NEQ at a particular PES regardless of the type of ELL:

- a) the Site Potential Limit. This is the potential theoretical NEQ, by HD, which is achievable at a PES after calculating the QDs to the various ES; and
- b) the Authorised Limit. This is the actual limit, authorised by the appropriate technical authority, and reflects the maximum quantity of explosives, by HD, that is actually permitted at that PES.

In order to reduce or mitigate explosive risk to a minimum PES should be licensed to an Authorised Limit, unless flexibility in storage is required over the short term. Over the long term a PES could always be re-licensed to a higher authorised limit should it be necessary.

7.2 'Standard' ELL

This form of ELL shall be used as a preference. It shall be the appropriate ELL when the QD between the PES and ES can be achieved in line with the guidance provided in the QD matrices and tables in IATG 02.20 *Quantity and separation distances*.⁸

⁶ more guidance can be found in the IMAS and IATG 10.10

⁷ These distances and quantity limits are based on the recommended separation and quantity distances contained within IATG 02.20. The software allows the user to change quantity distance coefficients at their own risk.

⁸ In exceptional circumstances, and where qualified personnel are readily available, the national technical authority may consider issuing a Standard ELL based on the results of a quantitative risk assessment conducted as part of an ECA.

7.3 'Non-Standard' ELL

A 'non-standard' ELL shall only be used in exceptional circumstances where the QD recommended at IATG 02.20 *Quantity and separation distances* cannot be met, and when an explosion consequence analysis (ECA)⁹ has been used to determine the appropriate separation distances.

7.4 'Authorised Quantity' ELL

An 'authorised quantity' ELL shall only be used to allow for the storage of 'ready use' ammunition of HD 1.22, HD 1.32 and HD 1.4 within buildings that are not specifically designed for ammunition storage (e.g. a police station, unit guardroom or training store). It shall always specify exactly what types of ammunition may be stored and in what quantities. It is recommended that a maximum limit of 10kg of HD 1.22 and/or 1.32 and any quantity of HD1.4 should usually be permitted, although up to 25kg of HD 1.22 and/or 1.32 and any quantity of HD1.4 may be authorised if both the technical authority and operational commander agree the need.

7.5 'Ammunition Disposal Site' ELL

This type of ELL should be developed for all ammunition and explosives storage facilities (PES) at sites where ammunition and explosives are disposed of.

8 Management of ELL (LEVEL 2)

8.1 Change of circumstances

The head of the ammunition storage unit shall notify the appropriate national technical authority of any change in circumstances that may compromise the integrity of the ELL (e.g. new civilian houses within the agreed QD, an increase in NEQ within an ESH, etc.).

8.2 Distribution of ELL

The authorised ELL should be distributed as follows:

- a) national technical authority – one copy;
- b) ammunition storage unit – three copies (of which one for display); and
- c) ammunition inspectorate – one copy.

8.3 Display of ELL

A copy of the ELL should be prominently displayed in all buildings and areas that are licensed to store or process ammunition and explosives. Although there is no requirement to display the supplementary pages, such as Annex E or an ECA, they should be treated as an integral part of the ELL itself and may be displayed.

8.4 Validity of ELL

8.4.1. Time validity

Once authorised, an ELL shall have a maximum life of 5 years. Licences should not require renewal or amendment within the 5-year life unless:

⁹ Conducted in accordance with the guidance at IATG 02.10 *Risk management principles and processes*.

- a) alterations are made to the PES;
- b) a review is required by significant changes to national legislation;
- c) the ALARP principal can no longer be demonstrated due to change of circumstances (see Clause 8.1); or
- d) a change of use or need arises (e.g. a change from storage to processing).

Once authorised, a 'Non-Standard' ELL has a maximum life of 3 years but may be less at the discretion of the national technical authority.

8.4.2. Licence re-validation or renewal

During the year prior to the expiry date, the licence and its original supporting documentation should be reviewed by the appropriate national technical authority and re-validated against the regulations in force at the time of the review. If the justification for the licence is still valid and the risks remain ALARP, a new licence should be issued.

8.4.3. Extension to licence life

In exceptional circumstances the life of an ELL may be extended for a period of up to 12 months by the national technical authority. Such circumstances may occur when it is believed that 12 months will not be sufficient for the formal re-validation and renewal process to be followed.

8.4.4. Licence amendment

There may be occasions when a minor amendment to a licence is required but a new licence is not justified. In these cases, a copy of the letter, e-mail or signal from the national technical authority should be attached to all copies of the licence pending issue of a new licence. To avoid confusion such amendments should normally be limited to a maximum of three.

8.4.5. Letter of Authority

Where a licence cannot be issued in accordance with the ALARP principal then an appropriate 'Letter of Authority', which formally accepts the risk, should be obtained from the appropriate authority (see Clause 11 of IATG 02.10 *Introduction to risk management principals and processes*).

Copies of the Letter of Authority are to be held with all subject licences for its duration.

8.4.6. Completion of ELL

Only personnel specifically trained for the purpose¹⁰ shall complete and authorise the issue of ELL.

8.4.7. Withdrawal / Suspension of explosives limit licences

If for any reason the national technical authority withdraws or suspends an ELL, the activity authorised by that licence shall cease immediately and shall not be resumed until either a new licence is issued or the licence has been reinstated.

¹⁰ For example, Ammunition Managers as defined in IATG 01.90 – *Ammunition Management Personnel Competences*.

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 01.50 *UN explosives classification system and codes*. UNODA. 2020;
- c) IATG 02.10 *Introduction to risk management principles and processes*. UNODA. 2020;
- d) IATG 02.20 *Quantity and separation distances*. UNODA. 2020;
- e) IATG 03.10 *Inventory management*. UNODA. 2020;
- f) IATG 02.50 *Fire safety*. UNODA. 2020;
- g) IATG 05.20 *Types of buildings for explosives storage*. UNODA. 2020;
- h) IATG 05.40 *Safety standards for electrical installations*. UNODA. 2020.

The latest version/edition of these references should be used. The UN Office for Disarmament Affairs (UNODA) holds copies of all references¹¹ used in this guideline and these can be found at: 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/disarmamentammunition. National authorities, employers and other interested bodies and organisations should obtain copies before commencing conventional ammunition stockpile management programmes.

¹¹ 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:¹²

- a) 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 references¹³ used in this guideline and these can be found at: 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. National authorities, employers and other interested bodies and organisations should obtain copies before commencing conventional ammunition stockpile management programmes.

¹² Data from many of these publications has been used to develop this IATG.

¹³ Where copyright permits.

Annex C (normative) Example Standard / Non-Standard Explosives Limits Licence (ELL)

Standard / Non-Standard ¹⁴ Explosives Limit Licence (ELL) ¹⁸										
IATG Form 02.30C										
PES Number / Designation:					ESH 101					
Unit			Location			Authorised as				
123 Ammunition Depot			Crossways, Bluetown			Explosives Storehouse				
Maximum Authorised NEQ										
HD 1.1		HD 1.2.1		HD 1.2.2		HD 1.3.1		HD 1.3.2		HD 1.4
25,000	and kg	/or ¹⁶ 25,000	and kg	/or ¹⁶ 25,000	and kg	/or ¹⁶ 25,000	and kg	/or ¹⁶ 25,000	and kg	To physical capacity, or _____kg
Aggregation Rules Apply										
Safeguarded Outside Quantity Distance Authorised:					1,200m		Units of Space:			225
Licensed in Accordance With:					IATG 02.20 Quantity Distances as recommended in IATG matrices and QD tables.					
Special Conditions and Notes										
Nil										
Acceptance of Risk:					Yes, as ALARP principle applied.					
Endorsements: ¹⁵					Nil					
Explosives Limit Licence Authorisation										
Signature:		A D Smith			Name:		A D Smith		Rank:	Major
Appointment:		Technical Officer			Unit:		Ammunition Inspectorate (North)			
Date ELL Issued:					12 January 2019					
Date ELL Expires:					11 January 2024					
Attached Documentation:					IATG 02.30F ELL Supplementary Matrix.					
Licence Serial Number:					BT/ESH101/0010					

¹⁴ Delete as appropriate.

¹⁵ Usually applied by national technical authority.

Annex D (normative) Example Authorised Quantity ELL

Authorised Quantity Explosives Limit Licence (ELL)										
IATG Form 02.30D										
Building / Room:				B Company Ammunition Store						
Unit			Location				Authorised as			
1 Mechanised Battalion			Cavalry Barracks, Redtown				Explosives Store			
Maximum Authorised NEQ										
HD 1.1		HD 1.2.1		HD 1.2.2		HD 1.3.1		HD 1.3.2		HD 1.4
NIL	kg	NIL	kg	NIL	kg	NIL	Kg	18	kg	To physical capacity, or _____kg
Authorised Ammunition Types										
HCC	Ammunition Type				Qty	NEQ (kg)		Fire / Supplementary Symbol		
1.3s	Signal Flares				450	18.0		HD 1.3 Fire risk		
1.4S	Round 5.56mm Ball				20,000	Negligible		Nil		
Additional Information / Special Instructions										
1. All ammunition must be stored in its authorised packaging. 2. Fraction packages must be sealed and in their authorised packaging.										
Explosives Limit Licence Authorisation										
Signature:		A D Smith			Name:		A D Smith		Rank:	Major
Appointment:		Technical Officer			Unit:		Ammunition Inspectorate (North)			
Date ELL Issued:					12 January 2019					
Date ELL Expires:					11 January 2024					
Licence Serial Number:					1MR/B/001					

Appendix 1 to Annex E (normative) Guide to ELL Supplementary Matrix

This guide is for use with the IATG ELL Matrix in order to show the POTENTIAL NEQ of the PES (which may be reduced on the front sheet of the ELL itself for management purposes) and to provide proof of the accuracy of the Authorised NEQs on the front sheet of the Licence, if the full potential NEQ is used. It also provides other relevant detail for which there is no space on the Licence (construction details etc.).

Guidance on completion of the ELL Supplementary Matrix follows. The paragraph numbers relate to the equivalent box on the ELL Matrix:

- F.1. Enter Unit in upper case.
- F.2. Enter ELL Ser No e.g. BLUETOWN/ESH/001 or REDTOWN/APB/003.
- F.3. Enter Site No e.g. ESH 1 or APB 3.
- F.4. Enter usage e.g. 'Explosives Storehouse', 'Ammunition Process Building'.
- F.5. Highlight 'YES' or 'NO', whichever is applicable. The criteria for 'Adequate' is 2 x fully manned fire engines within 5 minutes).
- F.6. Select appropriate electrical standard. **(IATG 05.40 Safety standards for electrical installations).**
- F.7. Highlight 'YES' or 'NO', whichever is applicable. **(IATG 05.40 Safety standards for electrical installations).**
- F.8. Enter No if applicable.
- F.9. As for Box 8. **(IATG 02.40 Safeguarding of explosives storage areas (ESA)).**
- F.10. Enter Details e.g.
 - a. Walls: 280mm Cavity Brick
 - b. Roof: 150mm RC
 - c. Doors: 25mm Metal Faced Wood
- F.11. Select appropriate standard for ESH doors. **(IATG 05.20 Types of building for explosives storage).**
- F.12. Enter details e.g. Dust Free Concrete.
- F.13. As for Box 12 e.g. Hot Water Radiators.
- F.14. Intruder Alarm System (IAS). Highlight 'YES' or 'NO', whichever is applicable.
- F.15. Enter No if applicable.
- F.16. Enter details.
- F.17. Enter appropriate symbols for PES.

F.18. The top left half should contain the appropriate quantity distance based on the QD Function (e.g. D5). The bottom right half should contain the appropriate maximum NEQ for that distance. These should be obtained from the appropriate tables within **IATG 02.20 *Quantity and separation distances***.

F.19. The **minimum NEQ from Box 18** should be selected for each HD.

F.20. Licensing Authority Unit Stamp (preferably date stamp), may be signed by Licence signatory.

