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Marking and recordkeeping

Request for feedback

The United Nations invites feedback on this draft ISACS module from qualified practitioners and policymakers from all sectors of the small arms and light weapons community of practice – e.g. government (including police and military); international, regional and sub-regional organizations; civil society and industry – and from all regions of the world.

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Foreword

The United Nations (UN) Coordinating Action on Small Arms (CASA) mechanism strives to improve the UN's ability to work as one in delivering effective policy, programming and advice to Member States on curbing the uncontrolled proliferation and misuse of small arms and light weapons. Established by the Secretary-General in 1998 with the task of coordinating the small arms work of the United Nations, CASA today unites more than 20 UN bodies active in policy development and/or programming related to small arms and light weapons.¹

Building on previous UN initiatives to develop international standards in the areas of mine action (International Mine Action Standards) and disarmament, demobilization and reintegration of ex-combatants (Integrated Disarmament, Demobilization and Reintegration Standards), the United Nations is developing a series of International Small Arms Control Standards (ISACS) with the aim of providing clear and comprehensive guidance to practitioners and policymakers on fundamental aspects of small arms and light weapons control. This document forms part of the ISACS series, as outlined in the table opposite.

ISACS are framed by existing global agreements related to small arms and light weapons control, in particular

- the *UN Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons In All Its Aspects* (UN PoA);
- the *International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons* (International Tracing Instrument) and;
- the *UN Protocol against the Illicit Manufacturing of and Trafficking in Firearms, Their Parts and Components and Ammunition, supplementing the United Nations Convention against Transnational Organized Crime* (UN Firearms Protocol).

ISACS build upon standards, best practice guidelines, model regulations, etc. that have been elaborated at the regional and sub-regional levels and they seek to cover the fundamental areas of small arms and light weapons control on which the United Nations may be called upon to provide advice and guidance.

This ISACS module is being drafted in accordance with the rules given in ISO/IEC Directives, Part 2, *Rules for the structure and drafting of International Standards*, under the oversight of the CASA Working Group on ISACS, co-chaired by the United Nations Office for Disarmament Affairs (UNODA) and the United Nations Development Programme (UNDP).

¹ Current members of the United Nations Coordinating Action on Small Arms (CASA) mechanism are: Department of Economic and Social Affairs (DESA); Department of Peacekeeping Operations (DPKO); Department of Political Affairs (DPA); Department of Public Information (DPI); Office for Disarmament Affairs (UNODA); International Civil Aviation Organization (ICAO); Office for the Coordination of Humanitarian Affairs (OCHA); Office of the Special Adviser on Africa (OSAA); Office of the Special Adviser on the Prevention of Genocide (OSAPG); Office of the Special Representative of the Secretary General for Children and Armed Conflict (OSRSG/CAAC); Office of the United Nations High Commissioner for Human Rights (OHCHR); Office on Drugs and Crime (UNODC); United Nations Children's Fund (UNICEF); United Nations Development Fund for Women (UNIFEM); United Nations Development Programme (UNDP); United Nations Environment Programme (UNEP); United Nations High Commissioner for Refugees (UNHCR); United Nations Human Settlements Programme (UN-HABITAT); United Nations Institute for Disarmament Research (UNIDIR); United Nations Mine Action Service (UNMAS); United Nations Security Council Counter-Terrorism Committee Executive Directorate (CTED) and the World Health Organization (WHO). The United Nations Office for Disarmament Affairs (UNODA) acts as the focal point of CASA.

Working Outline of ISACS

SERIES	MODULE
01 Introduction to ISACS	01.10 Guide to the application of ISACS
	01.20 Glossary of terms, definitions and abbreviated terms
02 Small arms and light weapons control in context	02.10 Small arms and light weapons control in the context of preventing armed violence
	02.20 Small arms and light weapons control in the context of Disarmament, Demobilization and Reintegration
	02.30 Small arms and light weapons control in the context of Security Sector Reform
03 Legislative and Regulatory	03.10 National controls over the manufacture of small arms and light weapons
	03.20 National controls over the international transfer of small arms and light weapons
	03.21 National controls over the end-user and end-use of internationally transferred small arms and light weapons
	03.30 National controls over the access of civilians to small arms and light weapons
	03.40 National coordinating mechanisms on small arms and light weapons control
	03.50 International legal cooperation, criminal offenses and investigations
04 Design and Management	04.10 Designing and implementing National Action Plans
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	04.30 Raising awareness of the need for small arms and light weapons control
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05 Operational Support	05.10 Conducting small arms and light weapons surveys
	05.20 Stockpile management: Weapons
	05.21 Stockpile management: Ammunition
	05.30 Marking and recordkeeping
	05.31 Tracing illicit small arms and light weapons
	05.40 Collection
	05.50 Destruction: Weapons
	05.51 Destruction: Ammunition
	05.60 Border controls and law enforcement cooperation
06 Crosscutting Issues	06.10 Gender and small arms and light weapons
	06.20 Children, Youth and small arms and light weapons

Introduction

The ability to trace illicit small arms light weapons – as well as illicit parts, components and ammunition – back to the point, in space and time, where they passed from the legal to the illicit realm is a prerequisite for taking effective action to prevent further diversions from taking place (ISACS 05.31, *Tracing illicit small arms and light weapons*, provides guidance on the tracing process).

Effective tracing operations themselves depend on two prerequisites of their own, namely unique marking and efficient recordkeeping of small arms and light weapons. Only if a weapon is uniquely identifiable, and if readily accessible records of its history of ownership and movement are available, will it be possible to trace it back to its point of diversion.

Marking and recordkeeping

1 Scope

This module identifies principles and provides guidance for the adequate marking and recordkeeping of small arms and light weapons, their parts, components and ammunition. It covers technical aspects of marking, as well as effective recordkeeping infrastructure, for use at the national level in support of the national tracing system.

This module does not provide guidance on tracing. For this, see ISACS 05.31, *Tracing illicit small arms and light weapons*.

This document is intended to help States adopt and implement measures to ensure that small arms and light weapons, their parts, components and ammunition, are adequately marked and to encourage the small arms and light weapons manufacturing industry to assist in developing means of protecting against the removal and alteration of markings.

It includes an overview of different methods of marking, as well as the types of markings to be applied at the time of manufacture, import and transfer from government stocks to civilian use.

This document is intended to help States establish or improve their marking and recordkeeping systems so that they are better able to identify, and help other States identify, the source of illicit small arms and light weapons and their ammunition. The general principle used is *prevention* of illicit manufacturing of and trafficking in small arms and light weapons, their parts and components and ammunition.

2 Normative references

The following referenced documents are indispensable for the application 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.

International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons

Protocol against the Illicit Manufacturing and Trafficking in Firearms, Their Parts and Components and Ammunition, supplementing the United Nations Convention against Transnational Organized Crime

United Nations Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All its Aspects

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*

UN Recommendations on the Transport of Dangerous Goods: Model Regulations

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISACS 01.20, *Glossary of terms, definitions and abbreviated terms*, and the following apply.

In all ISACS modules, the words 'shall', 'should', 'may' and 'can' are used to express provisions in accordance with their usage in International Organization for Standardization (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 Marking

4.1 Items to be marked

4.1.1 Small arms and light weapons

All small arms and light weapons shall be uniquely marked at time of their

- a) manufacture,
- b) import (unless an import mark was applied at the time of manufacture; see **Clause 4.2.1.1.1 (g) and (h)**),
- c) transfer from government stocks to permanent civilian use,
- d) permanent confiscation by the State (unless disposed of through destruction), and
- e) deactivation.

4.1.2 Parts and components

The frame or receiver shall be marked.

Marks should also be applied to parts and components that are essential to the operation of a small arm or light weapon, including the

- a) barrel, and
- b) slide, cylinder, bolt or breech block.

4.1.3 Ammunition

The smallest packaging units of small arms and light weapons ammunition should be marked.

Individual rounds of small arms and light weapons ammunition may be marked.

4.2 Marking at the time of manufacture

4.2.1 Small arms and light weapons

4.2.1.1 Classic markings

4.2.1.1.1 Content

All small arms and light weapons shall have applied to them, at the time of their manufacture, unique markings containing at least the following information:

- a) the country of manufacture (which should be expressed in accordance with ISO 3166-1, see **Clause 2**); and
- b) the name of the manufacturer,
- c) a serial number unique to the manufacturer.

The following information should also be included in the marking:

- d) year of manufacture (this information may be incorporated into the serial number),
- e) weapon type/model, and
- f) caliber.

The following information may be included in the marking, if known at the time of manufacture:

- g) the country to which the weapon is to be exported, (which should be expressed in accordance with ISO 3166-1, see **Clause 2**); and
- h) the year of export.

NOTE Applying such markings at the time of manufacture will avoid the need to re-mark the weapon at the time of import.

The following information should be included in the marking if the weapon is intended for a domestic State entity:

- i) The domestic State entity for which the weapon is intended (military, police, etc.).

The following information should be included in the marking, in accordance with the requirements of national regulations:

- j) Proof marks

4.2.1.1.2 Form

Markings shall be expressed alphanumerically (i.e. they may consist of both letters and numbers).

NOTE A possible exception to this applies to States that, **before 3 July 2005**, already employed a unique, user-friendly marking system using simple geometric symbols in combination with a numeric and/or alphanumeric code. Such States may continue to use such a marking system if it allows for the easy identification by all States of the country of manufacture. Such States may also, however, change to using purely alphanumeric marking systems, which are more widely recognizable and easier to record in databases, thus increasing the likelihood that tracing operations will be successful.

EXAMPLE: An example of a classical marking as outlined in **Clauses 4.2.1.1.1 and 4.2.1.1.2** is as follows:

XX	-	XXXX	-	99	-	99	-	99999	-	99
Country of manufacture (2-digit ISO country-code)		Manufacturer's name or code		Year of manufacture (2 numbers)		Type/model code		Serial number		Caliber

4.2.1.1.3 Location

Markings shall be applied to a component of the weapon that is essential to its operation, i.e.

- a) the frame/receiver.

In addition, markings should be applied to the following parts:

- b) barrel;
- c) slide, cylinder, bolt or breech block; and
- d) any other part or component essential to the operation of the weapon.

4.2.1.1.4 Appearance

Markings shall be applied to an exposed surface of the small arm or light weapon and shall be

- a) conspicuous without technical aids or tools,
- b) easily recognizable,
- c) readable,
- d) durable, and
- e) recoverable (as far as is technically possible).

4.2.1.1.5 Method

The stamping method should be used to apply markings to small arms and light weapons at the time of their manufacture.

A stamped marking shall have a depth of at least 0.20mm.

NOTE There is a greater possibility of retrieving erased serial numbers that have been applied to the weapon using the stamping method.

4.2.2 Parts and components

Since illicit small arms and light weapons can be assembled from parts and components that have themselves been illicitly manufactured and/or trafficked, parts and components that are essential to the operation of a small arm or light weapon (see **Clause 4.1.2**) should also be marked in accordance with **Clause 4.2.1**, as applicable, at the time of their manufacture.

4.2.3 Ammunition

4.2.3.1 Marking of ammunition packaging

Small arms and light weapons ammunition should be packaged and marked in accordance with the United Nations *Recommendations on the Transport of Dangerous Goods: Model Regulations*.

[Normative Reference]

In addition, in order to facilitate tracing, the following information should be marked on all packaging units – from the largest to the smallest – of small arms and light weapons ammunition:

- a) country of manufacture (which should be expressed in accordance with ISO 3166-1, see **Clause 2**); and
- b) name of the manufacturer,
- c) lot or batch number unique to the manufacturer,
- d) year of manufacture (this information may be incorporated into the lot or batch number),
- e) caliber,
- f) type,
- g) consignor,
- h) consignee (where an entire lot or batch of ammunition is shipped to a single recipient), and
- i) date of consignment.

4.2.3.2 Marking of individual rounds of ammunition

Individual rounds of small arms and light weapons ammunition may also be marked in order to facilitate their tracing when recovered under illicit circumstances. Information that may be marked on individual cartridge cases includes the

- a) country of manufacture (which should be expressed in accordance with ISO 3166-1, see **Clause 2**); and
- b) name of the manufacturer,
- c) lot or batch number unique to the manufacturer,
- d) caliber, and
- e) type.

4.3 Marking at the time of import

4.3.1 Adequately marked weapons

Imported weapons that already possess markings in accordance with **Clause 4.2.1.1.1 a), b) and c)** shall have applied to them at the time of their import additional markings identifying the

- a) country of import and
- b) year of import.

4.3.2 Inadequately marked weapons

Imported weapons that do not possess markings in accordance with **Clause 4.2.1.1.1 a), b) and c)** shall have applied to them at the time of their import additional markings identifying the

- a) country of import,
- b) year of import, and
- c) serial number unique to the importing country.

NOTE Import markings make tracing operations more efficient by allowing the tracing request to be sent directly to the last known country of import.

EXAMPLE An example of an import marking as outlined in this Clause is as follows:

XX	-	99	-	999999
Country of import (2-digit ISO country-code)		Year of import (2 numbers)		Serial number (if weapon is inadequately marked)

4.3.3 Location of import markings

Import markings shall be applied to the part of the weapon that is most essential to its operation (e.g. the frame/receiver) and, in addition, may be applied to other essential parts (e.g. the breech block or bolt and the barrel).

Import markings should be applied adjacent to the weapon's existing markings but should be visibly distinguishable from the existing markings.

4.3.4 Method of import marking

If import markings are applied at the time of manufacture, marking techniques used for classical markings should also be used to apply the import markings, in accordance with Clause 4.2.1.1.5.

If import markings are applied at the time of import, mechanical or laser engraving may be used.

Import markings applied by means of mechanical or laser engraving should have a depth of at least 0.10mm.

4.3.5 Exceptions

Import markings need not be applied to small arms or light weapons that are being

- a) temporarily imported for verifiable, lawful purposes; or

EXAMPLE Examples of verifiable, lawful purposes include hunting, sport shooting, evaluation, exhibitions or repairs.

- b) permanently imported as museum artifacts.

4.4 Marking on transfer from government stocks to permanent civilian use

4.4.1 Light weapons

Light weapons in State stockpiles that are surplus to national requirements should be destroyed in accordance with ISACS 05.50, *Destruction: Weapons*, or may be disposed of by other means

authorized by the State. They should not be transferred from government stocks to permanent civilian use (for further guidance, see ISACS 03.30, *National controls over the access of civilians to the small arms and light weapons*).

4.4.2 Small arms

Small arms in State stockpiles that are surplus to national requirements should be destroyed in accordance with ISACS 05.50, *Destruction: Weapons*, or may be disposed of by other means authorized by the State. Their transfer from government stocks to permanent civilian use should not take place if this would have a negative impact on internal security.

4.4.2.1 Adequately marked weapons

Small arms that are transferred from government stocks to permanent civilian use, and that already possess markings in accordance with [Clause 4.2.1.1.1 a\), b\) and c\)](#), shall have applied to them, at the time of their transfer, a marking identifying

- a) the country transferring the weapons (which should be expressed in accordance with ISO 3166-1, see [Clause 2](#)).

4.4.2.2 Inadequately marked weapons

Small arms that are transferred from government stocks to permanent civilian use, and that do not possess markings in accordance with [Clause 4.2.1.1.1 a\), b\) and c\)](#), shall have applied to them, at the time of their transfer, markings identifying

- a) the country transferring the weapons, and
- b) a serial number unique to the transferring country.

4.4.2.3 Marking methods

The most appropriate method for marking small arms at the time of their transfer from government stocks to permanent civilian use would be mechanical or laser engraving (see [Annex 1](#)).

4.5 Marking of permanently confiscated weapons

4.5.1 General

Small arms and light weapons that are permanently confiscated by the State due to, for example, their having been illicitly manufactured or trafficked, should be disposed of through destruction in accordance with ISACS 05.50, *Destruction: Weapons* [[Normative Reference](#)].

4.5.2 Adequately marked weapons

Permanently confiscated small arms and light weapons that are to be disposed of by means other than destruction and that already possess markings in accordance with [Clause 4.2.1.1.1 a\), b\) and c\)](#), shall have applied to them at the time of their confiscation additional markings identifying the

- a) confiscating country, and
- b) year of confiscation

4.5.3 Inadequately marked weapons

Permanently confiscated small arms and light weapons that are to be disposed of by means other than destruction and that do not possess markings in accordance with [Clause 4.2.1.1.1 a\), b\) and c\)](#), shall have applied to them at the time of their confiscation additional markings identifying the

- a) confiscating country,
- b) year of confiscation, and
- c) serial number unique to the confiscating country.

4.6 Marking of deactivated weapons

Deactivated small arms and light weapons shall have applied to them at the time of their deactivation markings identifying

- a) the country of deactivation,
- b) the year of deactivation, and
- c) a marking indicating that the weapon has been deactivated

4.7 Deterring and counteracting the removal or alteration of markings

4.7.1 Criminalization

The removal or alteration of markings on a small arm or light weapon, without prior authorization from a competent State authority, shall be considered a criminal offence.

A small arm or light weapon that has had markings removed or altered, without prior authorization from a competent State authority, shall be considered illicit.

4.7.2 Countermeasures

Firearms manufacturers should develop measures against the removal and alteration of markings, including measures that allow for the retrieval of information even after markings have been removed or altered.

4.7.3 Security markings

4.7.3.1 General

In addition to the classical markings outlined in **Clause 4.2.1.1**, small arms and light weapons may also possess security markings, in order to provide a back-up in case classical markings are removed or altered.

4.7.3.2 Content

Security markings should contain the same information as classical markings (see **Clause 4.2.1.1.1**).

4.7.3.3 Location

Security markings should be hidden by being applied to parts of the weapon that are difficult to manipulate after the weapon has been manufactured and that, if tampered with, would render the weapon unusable.

EXAMPLE Examples of possible locations for security markings include the ejector, breech, extractor, or inside the barrel.

4.7.3.4 Methods

Depending on the component being marked, the most suitable methods for applying security markings at the time of manufacture are

- a) mechanical and/or laser engraving;
- b) laser perforation directed by computer (laser perforations, covered by a polymer, that can be read as a data matrix under infrared lighting);
- c) drilling small holes inside the barrel that can be read with an ultrasonic sensor;
- d) radiofrequency identification (RFID) technology (RFID tags embedded in a weapon and readable with an RFID interrogator; e.g. an appropriately equipped cellular phone).

5 Recordkeeping

5.1 Records to be kept

5.1.1 Small arms and light weapons

For each individual small arm and light weapon under the jurisdiction of a State, records of the following information, where applicable in each instance, shall be maintained at the national level:

5.1.1.1 All weapons

- a) country of manufacture,
- b) name of manufacturer,
- c) serial number,
- d) year of manufacture,
- e) weapon type/model,
- f) caliber,
- g) location of markings on the weapon (e.g. on the frame/receiver, barrel, etc.), and
- h) ownership information (names, addresses and license numbers of owners up until the point that the weapon leaves the jurisdiction of the State, e.g. through export, destruction, etc.).

The above records shall be kept for all small arms and light weapons, in addition to the records set out in **Clauses 5.1.1.2 – 5.1.1.7**, as applicable.

5.1.1.2 Exported weapons

- a) export authorization number (designated by the exporting State),
- b) import authorization number (designated by the importing State),
- c) transit authorization number(s) (designated by the transit State(s), if applicable),
- d) date of export,
- e) owner of the weapon prior to export,
- f) country to which the weapon has been exported,
- g) entity in receipt of the export (e.g. details of the government agency, wholesaler, retailer, etc.),

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- h) end-user certificate number/identification (issued by the recipient State),
- i) end user,
- j) broker(s), and
- k) transport agent(s) and/or forwarding agencies.

5.1.1.3 Imported weapons

- a) import authorization number (designated by the importing State),
- b) export authorization number (designated by the exporting State),
- c) transit authorization number(s) (designated by the transit State(s), if applicable),
- d) import marking (see **Clause 4.3**),
- e) date of import,
- f) country from which the weapon has been imported,
- g) owner of the weapon prior to import,
- h) entity in receipt of the import (e.g. details of the government agency, wholesaler, retailer, etc.),
- i) end-user certificate number/identification (issued by the importing State),
- j) end user,
- k) broker(s), and
- l) transport agent(s) and/or forwarding agencies.

5.1.1.4 Weapons transferred from government stocks to permanent civilian use

- a) date of transfer,
- b) transferring government entity,
- c) transfer serial number (see **Clause 4.4.3**), and
- d) recipient of transfer.

5.1.1.5 Permanently confiscated weapons not destined for destruction

- a) date of confiscation,
- b) confiscating entity,
- c) grounds for confiscation,
- d) confiscation serial number (see **Clause 4.5.3**), and
- e) method of disposal other than destruction.

5.1.1.6 Deactivated weapons

- a) date of deactivation,

- b) method of deactivation,
- c) entity that carried out the deactivation,
- d) entity that verified the deactivation,

NOTE 1 The entity verifying the deactivation shall be different from the entity that carried out the deactivation.

- e) deactivation verification certificate number, and
- f) recipient of the deactivated weapon.

5.1.1.7 Weapons destined for destruction

- a) date of destruction,
- b) method of destruction,
- c) entity that carried out the destruction,
- d) entity that verified the destruction, and

NOTE 1 The entity verifying the destruction shall be different from the entity that carried out the destruction.

- e) destruction verification certificate number, and

NOTE 2 For further guidance, see ISACS 05.50, *Destruction: Weapons*.

5.1.2 Parts and components

Records shall be maintained of all marked parts and components (see **Clause 4.1.2**) of unassembled and disassembled small arms and light weapons under the jurisdiction of the State. Such records shall contain the same information as set out in **Clause 5.1.1**, where such information is applicable to parts and components.

5.2 Keeper(s) of records

The above records of all small arms and light weapons under the jurisdiction of a State should be maintained in a centralized database administered by a competent State authority.

Should it not be possible to maintain records in a centralized manner, records may be maintained in a decentralized manner, e.g. by administrative sub-units of the State and/or by relevant non-governmental actors including manufacturers, wholesalers, retailers, brokers, transport agents, etc.

Regardless of whether records are maintained in a centralized or in a decentralized manner, they shall be accessible to competent State authorities in accordance with **Clause 5.4**.

5.3 Method of recordkeeping

Records should be maintained in electronic format.

Records shall be backed up so as to prevent data loss in the case of technical failure, theft, fire, etc.

5.4 Access to records

5.4.1 General

Competent State authorities, including the National Focal Point(s) on tracing, shall have full access to all records relating to small arms and light weapons held under the jurisdiction of the State, regardless of whether they are maintained in a centralized or in a decentralized manner.

The holders of records relating to small arms and light weapons, regardless of whether they are governmental or non-governmental entities, shall provide timely responses to requests for information submitted by competent State authorities, in accordance with **Clause 5.4.2**.

5.4.2 Timeframe for information retrieval

Records shall be maintained in such a manner that allows for correct and comprehensive information related to the history of a small arms or light weapon to be retrieved from them within **48 hours** of a request being received from a competent State authority.

5.4.3 Defunct companies

Records held by private companies that are going out of business shall be transferred to and maintained by the National Authority on small arms and light weapons (see ISACS 03.40) or, where one does not yet exist, to a designated competent State authority.

5.5 Duration of recordkeeping

Records relating to the manufacture of small arms and light weapons (see **Clause 5.1.1, a-f**) shall be maintained for at least **30 years**, and should be maintained indefinitely.

All other records, including those relating to the import and export of small arms and light weapons, shall be maintained for at least **20 years**, and should be maintained indefinitely.

Annex A

(informative)

Overview of marking methods

A.1 Stamping

Stamping is the most commonly used technique for marking metal. It involves marking the metal part of the firearm by applying pressure on a mould or matrix bearing the marking to be engraved (indenting), inducing a permanent plastic deformation of the crystalline structure of the material. When the stamping technique is used the crystalline structure of the material that is stamped can actually be altered to a depth six times greater than that of the stamp itself. If someone erases the stamped marking on the surface of the weapon, there can still be a legible trace of the marking in the metal itself. These changes in the physical properties of the material can then be used to help restore the markings if they are erased at the surface. Erased stamped markings can be retrieved in about 1/3 of cases thanks to the deep deformations of the metallic structure.

Applying a marking using a stamping procedure requires a flat surface. If the surface is uneven or is made of very hard material, a more sophisticated micro-percussion process is used (sometimes computer-guided). This process, also called pin stamping can be used both for plastic and metal surfaces. Characters can be applied at a rate of 1 to 5 characters per second from 1 to 80mm size and at different depths. The potential fragility of some parts can limit the use of this process.

Stamping cannot be utilized on plastic and composite materials that are increasingly being used in the manufacture of new generation weapons. In addition, due to its primary applicability to unhardened metals, low-tech stamping machinery is also largely unsuitable for the application of post-production markings. When the parts and components of a firearm have already been manufactured, marking is usually carried out with a technique other than stamping to avoid any damage to the manufactured part.

A.2 Casting

The casting method adds markings directly to the moulds used to manufacture weapon parts. Casting is also used for plastic and composite materials (injection moulds) on which stamping would be impractical. This method remains in limited use, mainly because of the small surface areas available on some weapon parts. Casting is not suitable for marking serial numbers, which need to be unique for each weapon.

A.3 Mechanical engraving

This technique for marking firearms is fairly widely used. Marking is undertaken by removing metal through direct contact with the material. It can also be achieved through Electrical Discharge Machining where the surface layer is heated and vaporized by a continuous electrical discharge. Hardened materials can be marked using this method when traditional techniques such as stamping would be ineffective. However, there can be physical limitations when engraving information on certain surfaces and materials, such as composite materials. This method is also difficult as far as accessibility and resistance of the parts to be marked are concerned, especially if markings are required once the weapon has been assembled.

A.4 Laser engraving

Laser (Light Amplification by Stimulated Emission of Radiation) permits marking of all kinds of surfaces through burning by oxidization and has the advantage of requiring no physical contact with the surface to be marked. It also enables marking of areas inaccessible to other marking procedures, as well as marking of fragile parts where attempts to remove the mark would render the weapon inoperable. It can be used for composite materials or plastics as well as hardened metals that cannot be marked by classical methods such as stamping. Lasers can mark miniscule surfaces with precision, for example surfaces smaller than 1mm² and can contain information either in matrix (data matrix) or bar code format. It is also the most practical method to mark logos, text and numbers on a confined space. The disadvantage of laser engraving is that, if the marking is erased, there is no possibility of recovering it.

In contrast to stamping and mechanical engraving, laser engraving is considerably more time- and resource-efficient. Further, laser marks can be applied to virtually all materials and at any stage of the production process, including at post-production stages. Computer-operated lasers can also be used to mark individual rounds of ammunition and the laser marking process can be integrated into the packaging machinery for ammunition. The ammunition can be marked in the cartridge's groove just prior to being packaged.

Laser marking can be reinforced by sensitizing the surface of the weapon component to be marked to a certain wavelength by using a special product. Information is then marked on the weapon with a laser. The marking is then covered with a layer of paint or a galvanizing product which renders the marking invisible to the naked eye. However the marking is visible when viewed under certain lighting (i.e. infrared or ultraviolet) according to the wavelength for which the surface has been sensitized.

A.5 Radio Frequency Identification

Radio Frequency Identification (RFID) uses an electronic chip embedded in a weapon that carries information about the weapon. These electronic chips can be read from a certain distance using an RFID reader and, if needed, information on the chip can be modified.

A.6 Electro-chemical methods

With electro-chemical methods, an applicator moistened with an electrolyte solution that is connected to an electrical source is placed on a stencil bearing the marking. The stencil is then placed on the surface to be marked. The depth of the marking is regulated with the strength of the electrical current. This method is used on fragile parts of a firearm or certain types of ammunition that will not allow deeper markings. The disadvantage of this type of marking is that if the marking is obliterated, it is unlikely that it could be recovered. In addition, this type of marking is only possible on conductive materials.

A.7 Micro-stamping (ammunition)

Micro-stamping allows for the marking of a weapon's make, model and serial number (or other identifying information) onto a round of ammunition each time a weapon is fired. Markings are applied to the primer and cartridge case of the round of ammunition by laser engravings on the tip of the firing pin and on the breech face, respectively. Spent cartridges are thus imprinted with identifying information of the weapon that fired it.

A.8 Other methods

Additional marking methods currently used in other sectors are being studied for potential use in marking firearms. Chemical tracers can be added to metal and plastics used for the production of firearms components and ammunition powder. Crystallographic and radioactive elements can also be used to mark weapons and ammunition powder. Colorimetric methods permit the use of tracers that are composed of a set of colour layers, to which a fluorescent layer is added for detection. The observed colour sequence represents a unique numeric code for each manufacturer.

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