

Loss Prevention Standard

LPS 1183 Part 1: Issue 4.3

Requirements and testing procedures for the LPCB approval and listing of safe storage units

Part one: Safes and strongrooms

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Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 1 of 29

CONTENTS		PAGE
PARTICIPATING ORGANISATIONS		2
REVISION OF LOSS PREVENTION STANDARDS		2
FOREWORD		3
1	SCOPE	4
2	DEFINITIONS	4
3	ABBREVIATIONS	8
4	REQUIREMENTS	9
5	TEST METHODS	11
6	CLASSIFICATION	27
Table of amendments issued since publication		29

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 2 of 29

PARTICIPATING ORGANISATIONS

This standard was prepared by Expert Group G and approved by the LPC Fire and Security Board of BRE Global Ltd. The following organisations participated in the preparation of this standard:-

Association of British Insurers
 Association of Builders Hardware Manufacturers
 Association of Chief Police Officers
 Association for Specialist Fire Protection
 British Fire Protection Systems Association
 British Security Industry Association
 Chief & Assistant Chief Fire Officers Association
 Door & Shutter Manufacturers' Association
 Electrical Contractors Association
 Health & Safety Executive
 Office of the Deputy Prime Minister
 Police Scientific Development Branch
 Risk Engineers Data Exchange Group
 Royal Institution of Chartered Surveyors
 Special Services Group

REVISION OF LOSS PREVENTION STANDARDS

Loss Prevention Standards will be revised by issue of revised editions or amendments. Details will be posted on our website at www.redbooklive.com

Technical or other changes which affect the requirements for the approval or certification of the product or service will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments. (See amendments table on page 29)

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

USERS OF LOSS PREVENTION STANDARDS SHOULD ENSURE THAT THEY POSSESS THE LATEST ISSUE AND ALL AMENDMENTS.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 3 of 29

FOREWORD

This standard identifies the evaluation and testing practices for the LPCB approval and listing of products. LPCB Listing of life safety and security products for inclusion in the "Red Book" is based on the following:

- i. Satisfactory product performance during testing and audit testing
- ii. Satisfactory product construction
- iii. Satisfactory manufacturing processes
- iv. Satisfactory product service experience.

This Loss Prevention Standard is based on the draft standard "Secure Storage Units, Methods of Test and Classification for Resistance to Burglary; Part 1 Safes and Strongrooms" prepared by CEN/TC 263 WG1 "Burglary Resistance" reference N20 1992-07-27.

Differences between this standard and the CEN draft standard are:

- a) Clause 4.1.1 – Locking

Locking requirements will be specified in later issues of LPS 1183 when a European Standard for Safes Locks (CEN TC 263) is available.

- b) Clause 6.2, Table 3 – Minimum requirements for the determination of the resistance grade.
 - i) The 'Number and Quantity of Locks' column in Table 3 of the CEN draft does not apply to this standard.
 - ii) A Resistance Grade '0' is defined in this standard with Minimum Resistance Values (RU) of 30 for partial access and 30 for complete access.

NOTES

Compliance with this LPS does not of itself confer immunity from legal obligations. Users of LPSs should ensure that they possess the latest issue and all amendments.

LPCB welcomes comments of a technical or editorial nature and these should be addressed to "the Technical Director" at enquiries@breglobal.co.uk.

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Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 4 of 29

1 SCOPE

This standard defines the methods for type-testing and classifying secure storage units according to 2.1 to one of several resistance grades after determining their resistance against burglary.

Classification to resistance grades is made after destructive type tests and comparison of the results with defined minimum resistance values and the minimum design requirements. Using numerical factors, each test and/or additional test carried out to determine the burglary resistance is characterised by a resistance value. This resistance value evaluates resistance according to the type of access gained, the time taken and the tools used.

NOTE 1A: Resistance values are determined in laboratories and are used exclusively for the purpose of rating and classifying different types of product. The values can also be used for designing security systems with the proviso that, depending on the criminal, the conditions at the place of the crime and the availability of tools, considerably longer time values are likely to occur in real burglary attacks.

NOTE 1B: Secure storage units which have been classified according to the prescribed type test and whose manufacture is subject to a quality assurance schedule may be approved by an accredited certification body as secure storage unit of resistance grade if all the other requirements have been fulfilled.

NOTE 1C: Approval may be extended to other storage units of similar design if:

a) in the opinion of the certification bodies, the results of the tests and/or additional tests are valid for the product variants;

or;

b) tests and/or additional tests carried out on suitable sample units show that the resistance values of the product variants to be sufficient.

2 DEFINITIONS

2.1 Secure storage unit: system of physical security elements used to store documents, cash and valuables and accessed through opening(s) fitted with one or more locks.

There are different types of secure storage units:

2.1.1 Safe: burglar resisting secure storage unit which has an inside base area $\leq 2\text{m}^2$ providing protection against burglary attacks according to 6.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 5 of 29

2.1.1.1 Free-standing prefabricated safe: secure storage unit whose burglar protection as measured according to 6 originates in the prefabrication and which does not have holes through their protection other than those for locks, cables (up to the size limit of 4.1.2), or for anchoring or base-fixing.

2.1.1.2 Built-in safe: secure storage unit some of whose burglary protection as measured according to 6 is due to its being at least partly encased (usually with concrete) during installation.

Special types of built-in safes are:

- **Underfloor safe:** secure storage unit which is accessed from the top through a lockable lid which is removable or hinged.
- **Wall safe:** secure storage unit intended for installation in a building wall and having a lockable access door at the front.

2.1.2 Strongroom: secure storage unit whose inside base area is $\geq 2 \text{ m}^2$ (with inside dimensions of $\geq 1 \text{ m}$ in each direction), providing protection against burglary attacks according to 6.

2.1.2.1 Strongroom wall, ceiling and base may be

- monolithic, cast in-situ constructions;
- constructed from prefabricated panels (modular method);
- constructions which combine both in-situ and prefabricated elements.

2.1.2.2 Strongroom door: a door giving access to a strongroom secured by locks and boltwork, and which is type-tested together with its frame and any portion of wall necessary for the testing.

2.1.2.3 Wall penetration: penetration through the strongroom wall for ventilation or deposit of goods.

Possible kinds of wall penetrations are:

- always open;
- usually open, but may be closed in case of emergency;
- usually closed, but can be opened if necessary.

When determining the resistance value, any adjoining part of the strongroom wall has to be taken into account.

2.2 Sample unit: units which fulfil the requirements for being tested and on which test or additional tests can be performed. Sample units may be component parts or section of secure storage units or complete secure storage units.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 6 of 29

- 2.3 Test sample:** the totality of the sample units, component parts and section of secure storage units made available for testing by the applicant.
- 2.4 Type test:** the totality of the tests and/or additional tests necessary for classifying a secure storage unit.
- 2.4.1 Test:** all the events occurring and the work performed in the carrying out on one particular type of access attack.
- 2.4.2 Additional test:** proof of performance required, in addition to the minimum resistance value, for classification to a specific grade.
- 2.5 Operating time:** the interval between the moment when a tool or tools make contact with the sample unit and the moment when that tool or tools cease to be in contact with the sample unit, and during which the sample unit undergoes changes which are due to the use of tools from the tool catalogue. Operating time also includes any time taken to extract tools (or parts of tools) whose removal is necessary to continue the test.
- NOTE 2:** The operating time does not include:
- a) the time of a temporary interruption of a test, ordered by the testing team leader on the grounds of operative safety, due to the emission from the sample unit of excessive gas, smoke, soot etc., or for cleaning or removing debris from the work area;
 - b) any time the testing leader authorizes for inspection/checks of the unit under test;
 - c) the time taken by an operative, or operatives, to check on progress being made with a particular attack tool by inspection after the removal of the attack tool from contact within the unit, if ordered by the testing team leader.
- 2.6 Resistance time:** the sum of the operating times of a test or additional test.
- 2.7 Resistance unit (RU):** the burglary resistance of a structure in which it takes one minute to obtain access using a tool carrying the coefficient of 1 and the basic value 0.
- 2.8 Resistance grade:** the classification given in Table 3, which is characterised by minimum resistance values (in RU) for complete and partial access (partial access applies only to safes).
- 2.9 Resistance value:** numerical value in RU calculated for each test by multiplying the resistance time by the tool coefficient of the highest category of tool used and adding to this the sum of basic values for the tools used.
- 2.10 Basic value:** a number allocated to a specific tool expressed in RU.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 7 of 29

- 2.11 Tool coefficient value:** a number allocated to a group of tools expressed in RU/min.
- 2.12 Access**
- 2.12.1 Partial access:** hole of sufficient size for passage of a rigid test block according to 5.3.5 to the interior of the sample unit.
- 2.12.2 Complete access**
- Holes of sufficient size for passage through the wall or door of a rigid test block according to 5.3.5.2 to the interior of the sample unit.
- Additionally, there are the following types of complete access:
- The removal of a built-in safe from the sample unit;
 - The removal of a door;
 - The opening of a door to a clear width of 300 mm over at least 80% of the inside height.
- 2.13 Locking mechanism:** the totality of locks and boltwork.
- 2.13.1 Lock:** device able to recognise a coded security input and which actuates a blocking function by movement of at least one physical element.
- 2.13.2 Boltwork:** the mechanism by which a shut door is secured such that until it is withdrawn the door cannot be opened except by destructive attack.
- 2.13.3 Relocking device:** system comprising blocking and detection elements which will prevent the boltwork from being withdrawn if a burglary attack is detected. It can be part of the locking mechanism (active or live relocker) or an independent unit (passive relocker).
- 2.13.4 to close:** to shut the secure storage unit so that bolting becomes possible.
- 2.13.5 to bolt:** to throw the boltwork (or lock bolt if the secure storage unit has no boltwork).
- 2.13.6 to lock:** to secure the unit or block a thrown boltwork by action of a lock.
- 2.14 Non-destructive attack:** method or process which leads to complete or partial access without causing a permanent deterioration of the secure storage unit and carried out without knowing the locking code.
- 2.15 Tools:** by definition, devices are required to prove a partial or complete access of products which qualify for classification. These devices are called tools. The resistance value is altered by their use.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 8 of 29

Tools are divided into the following groups, whereas the brackets indicate the relevant section of the tool catalogue according to 5.3.4.1:

- hand-operated tools (A1..B5)
- specially made tools (A6..B6)
- electric made tools (A7..S10)
- thermal tools (B11..S11)
- tool-specific accessories (row T)
- miscellaneous tools (row M)
- non tools (row N)

2.16 Special tools: Tools constructed in such a way that they can be used either by themselves or in combination with another tool to enhance the effectiveness of a test. They do not, however, replace commercially available tools or processes.

2.17 Technical documentation: the totality of all design documents, material specification, testing certificates and other technical information supplied for the type test.

3 ABBREVIATIONS

This standard contains the following abbreviations:

<u>Symbol</u>	<u>Parameter</u>	<u>Unit</u>
	Basic value	RU
C _j	tool coefficient	RU/min
dia	diameter	mm
	decimetre	dm
	gram	g
l	internal storage capacity	m ³
	joule	J
	kilogram	kg
	kilo-newton	kN
M	mass of explosive charge	g
	metre	m
	millimetre	mm
r	radius	mm
R _{min}	minimum resistance value	RU
R	resistance value	RU
T	time in seconds or minutes	s or min
W	resistance time	min

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 9 of 29

4 REQUIREMENTS

4.1 Design

4.1.1 Locking

Locking requirements will be specified in later issues of LPS 1183 when a European Standard for Safes Locks (CEN TC 263) is available.

4.1.2 Optional features

Optional features are:

- a) Time locks and/or time delay locks, these may be mounted in addition to the locks specified in 4.1.1.
- b) Cable entry openings which are less than 100 mm². These, together with an extra protection associated with them, shall be shown on the construction drawings and be present in the sample unit offered for the type test. When such openings are present but not used they shall be securely obstructed or plugged by the producer. Obstructions and plugs may not be removed from outside without leaving traces.

NOTE 3A: The certification body/testing house can be asked to approve, without any further testing, a secure storage unit, having the same cable entry openings with the same extra protection at alternative positions.

NOTE 3B: In secure storage units having an EX designation cable entry openings must not exceed 100mm². They are only permitted at the positions in the tested sample unit. These holes must be so constructed that explosives (e.g. PETN fuses or charges) cannot be entered into the secure storage unit through such holes.

- c) Cables for penetration detection systems are permitted in secure storage units. They shall be included in the construction drawings of the secure storage unit and be present in the sample unit for testing.

NOTE 4: Upon application the certification body/testing house may subsequently permit the mounting of cables for penetration detection systems on the basis of an amended construction drawing without requiring another type test.

- d) Wall penetrations are permitted in secure storage units. They shall be included in the construction drawings of the secure storage unit and be present in the sample unit for testing.

4.2 Technical documentation

The applicant shall furnish to the testing house technical information on the secure storage unit to be tested. An application for type testing shall be accompanied by

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 10 of 29

technical documentation (in the language of the testing house or in the English language) giving details of the design features of the secure storage unit and of any test samples required under 5.1.

This technical documentation shall include the following information:

- a) type of secure storage unit, e.g. Free-standing prefabricated safe, built-in safe, strongroom door, strongroom wall, etc., and a listing of the different sizes of unit;
- b) manufacturing details:
 - name of manufacturer;
 - place of manufacture;
 - relationship of applicant to manufacturer;
 - company responsible for design.
- c) drawings of the sample units showing:
 - weight, outside and inside dimensions, manufacturing tolerances;
 - horizontal and vertical cross sections;
 - the number, layout and features of locks, boltwork and relocking devices;
 - the location and design of any local areas of special protection;
 - details of the fastening and/or fitting or anchoring of all elements relevant to physical security;
 - construction and position of joints and connections, the means by which door and frame are joined to walls, the means by which prefabricated panels are joined;
 - marking, position and dimensions of any holes which pass through the protection with a detailed representation of specially protected areas;
 - details of any other features relative to physical security.
- d) a listing of the lock options giving the manufacturer and model number of each lock which may be fitted;
- e) the full extent to which the doors are intended to open;
- f) a specification of the materials or device(s) intended to generate gas, smoke, soot, etc. In the event of physical attack or which may generate harmful substances during testing (see 5.2.3, Note 5);
- h) the nature and position of any cables and/or facilities for penetration detection systems, for the mounting of electro-mechanical securing devices alarm devices etc.;
- i) instructions for the installation of built-in safes and security elements and/or instructions for the preparation of concrete or any other elements relevant to physical security;

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 11 of 29

For built-in safes, the applicant shall provide details of the encasement, which are to be the details and recommendation the applicant supplies to customers or installers, including:

- proportion of body which is to be encased;
- the minimum size and section thickness of the encasement;
- the minimum quality of encasement material (for concrete, the aggregate type, flowability of the freshly prepared mass and the 28-day cube compression strength);
- any reinforcement or anchoring to be included within the encasing mass;

For monolithic cast in-situ construction strongroom walls, the applicant shall provide the details and recommendations which the applicant supplies to customers and installers, including:

- minimum quality of concrete (types and proportions of aggregates, cement and any other constituents, flowability of the freshly prepared mass, 28-day cube compression strength);
- wall thickness;
- reinforcement or anchoring to be included in the strongrooms wall, including construction and position of joints and connections, and means by which door and frame are joined to walls and means by which armouring and anchoring are joined to elements.

Details are to be given for all sizes of product to which the applicant wishes the type tested classification to apply.

Each sheet of the technical documentation shall be given a clear identification and issue description indicating the date of issue and the name of the applicant or manufacturer.

The testing house shall check the technical documentation for completeness. Where the test samples are not described in sufficient detail, the technical documentation has to be completed.

5 TEST METHODS

5.1 Sampling

5.1.1 Selection of sample units

Choice and form of sample units must guarantee that the tested material will allow type testing to be carried out as basis for classification.

Any optional features which may have an influence upon the burglary resistance classification must be defined. Options which represent the least resistant version to

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 12 of 29

which the applicant desires the classification to apply must be present in the sample unit.

5.1.2 Making of sample units

If sample units are specially made by the testing house (e.g. built-in safes), then this shall be done using the component parts supplied by the applicant and following the instructions for installation supplied. At the applicant's request, the quality of the work will be inspected and a report issued giving all details.

5.1.3 Additional test samples

In addition to the sample units according to 5.1.1, further test samples shall be supplied at the testing house's request.

5.2 Initial examinations

5.2.1 Checking of identity

Prior to the beginning of the type test, the testing house shall verify, by visual examination and checking of dimensions, that the sample units conform with the details supplied by the applicant, are fitted with any agreed additional features and comply in all other ways with any agreement between applicant and testing house. If, in the course of the checking, it is found out that the sample unit does not conform to the construction drawings, type testing shall not be performed until the details supplied by the applicant (clause 4.2) or the sample units have been modified accordingly.

5.2.2 Initial examinations

Prior to performing the actual type testing, the testing house is entitled to carry out preliminary tests and make exploratory access. These shall not affect the tests required to determine the resistance grade.

5.2.3 Programme for testing

The resistance values are determined by the parameters of choice of attack tools and method of attack. In keeping with the testing aim, the testing house has the task of choosing those tools and methods of attack which are most likely to yield the lowest resistance values.

NOTE 5: Type testing shall be carried out according to the current state of the art and using safety equipment to protect the operatives to at least current safety and health legislation. In order to ensure a reasonable standard of testing, testing houses are required to participate regularly in audits, cooperative tests, experience-sharing events and other suitable training measures. Corresponding agreements shall be made with other testing houses.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 13 of 29

5.3 Type test

5.3.1 Testing object

The type test serves to establish the resistance values of the sample unit(s) to enable a determination of the resistance grade according to 6 on the basis of the required minimum resistance values.

The objective of all tests shall be measuring resistance value in resistance units to discover resistance values for partial and/or complete access.

5.3.2 Testing team

The testing team shall comprise:

- a testing team leader whose function is to plan, direct and supervise the testing work on a sample unit, together with the subsequent production of a test report in accordance with 5.5;
- a time keeper whose function is confined to time keeping and the compiling of the testing work event record;
- two test operatives whose function is to carry out the necessary testing work on the sample unit as directed by the testing team leader.

At any given time, the testing team leader may substitute himself for one of the test operative and participate in the type test.

The testing house shall have the option of retaining the services of independent technical experts in an advisory capacity who may be consulted prior to, during or subsequent to the type test. The applicant shall be advised of the identity of the technical experts

5.3.3 Testing observers

Observers at the type test may comprise:

- Nominees of the applicant;
- Nominees of the certification body, e.g. surveyors;
- Representatives of the testing house management.

The testing house may limit the total number of observers admitted. Any individuals wishing to be present during individual tests or additional tests, other than those wholly employed by the testing house, will need to be approved by the applicant.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 14 of 29

5.3.4 Attack Tools

5.3.4.1 Classification of tools (tool catalogue)

Tools and accessories are distinguished by their performance (tool categories – group A - S) and/or their kind and mode of operating of the individual tool (row 1 - N), Table 1.

This tool catalogue does not contain specific tools but gives performance features to distinguish the various types of tools according to their performance and /or mode of operation, as well as the relevant basic values in RU. This neutral presentation allows the user of this standard to judge and verify the performance of classified products without having specific knowledge of the tools used.

5.3.4.2 Explanation of categories

Tools category B includes tool of category A.

Tools category C includes tools of categories A and B.

Tool category D includes tools of categories A, B and C.

Tool category S (strongrooms) includes tools of categories A, B, C and D.

Safes can only be type-tested with tools of categories A, B, C and D.

Strongrooms (doors and walls etc) can be type-tested with tools of categories A, B, C, D and S.

5.3.4.3 Miscellaneous

Safety measures necessary to ensure the safety of the operator(s) are to be taken. Tool safety devices such as guards, fuses and other current limiting features and/or maximum speed controls, must not be removed or altered.

Tools are to be used for the purpose for which they are designed. If a tool replaces another type of tool, the coefficient of the replaced or simulated tool (if higher) is applicable.

Example: If a screwdriver is used as a punch then it is not regarded as a hand(dis)-assemble tool, but as tool-specific accessory with a basic value of 1RU.

Alterations to tools other than those permitted as 'Specially made tools' may not be made; for instance, it is not permitted to enlarge nozzles, lengthen electrodes, rods or levers, sharpen masonry drill bits, etc.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 15 of 29

5.3.4.4 List of tools

Taking into account the specifications given in Table 1, the test laboratories provide, harmonise and continue if appropriate a list containing all tools. This tool list must be submitted for inspection during the tests. Any sheet in the list must be dated.

The allocation of the tools to individual tool groups is as follows:

Group 1: Hand (dis)assembling tools

These tools are used for non-destructive assembling and disassembling of detachable elements, e.g. detach screwings, pins of bolts, snap rings etc.

Examples: screwdrivers, fork/ring wrenches.

Group 2: Hand gripping tools

These tools are used for the gripping (lever transmission) of tools and materials, e.g. fixing of chisel, etc.

Examples: universal pliers, pipe wrenches, chisel holders, forge tongs.

Group 3: Hand levering tools

Physical force is transmitted by a lever, e.g. prise up a door, to push in, ram a steel sheet or thin pieces, etc.

Examples: stable screwdrivers, tyre levers, hand levers, crow bars.

Group 4: Hand sawing/filing/cutting and drilling tools

These tools are used to shatter, split or smash various materials and to propel different accessories such as chisels, drift punches and wedges.

Examples: hammers, hand axes, pick axes.

Group 5: Hand hammering tools

These tools are used to shatter, split or smash various materials and to propel different accessories such as chisels, drift punches and wedges.

Examples: hammers, hand axes, pick axes.

Group 6: Specially made tools

These tools are tools which are usually not commercially available but are conceived or provided especially for certain purposes by the testing laboratories. If appropriate,

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 16 of 29

sources of electricity not exceeding the working voltage may be used for attacks dealt to electro-mechanical security devices.

Certain simple tools which can be easily made, such as wire hooks, loops and rings are allocated to Group M (miscellaneous 'tools').

Tools of Groups 1 to 6 are to be used by physical strength only.

Group 7: Electric without impact

These tools are used to drill or cut (without impacting option); their working voltage is supplied by a source of electricity.

Examples: drilling machines including cutting and/or cooling fluids.

Group 8: Electric rotary with impact option

These are electric drilling machines which can be used with or without impacting option.

Examples: hammer drills, jack hammers, concrete breakers including cutting and/or cooling fluids.

Group 9: Electric impacting without rotation

Examples: building hammer.

Group 10: Electric grinding/slitting

Examples: electric disc cutters, diamond core drills including cutting and/or cooling fluids.

Tools of Group 7-10 are used with external supply terminals and thus – as a rule (exception: tool category A) – depend on external sources of power.

Group 11: Thermal cutting/melting

These thermal tools receive the necessary energy either by an exothermic chemical reaction (heating/cutting gas, solid matter/cutting gas) or by arc cutting.

Examples: gas cutting and welding, oxygen lance, electric cutting and welding.

Group T: Tool-specific accessories

These include drills, saw blades, corundum discs, nozzles, electrodes. These are consumable and/or replaceable items used together with tools in Groups 1 – 11. Their use is represented by a basic resistance value.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 17 of 29

Group M: Miscellaneous tools

This group includes tools, special procedures and devices which cannot be subsumed under the defined tools but still are to be taken into account. Their use is timed.

Examples: battery lamps, cooling/cutting agents, chemicals, hydraulic equipment, fibre optic and electronic devices.

Group N: Non-tools

These are tools used to enhance testing work. Their use is not timed but represented only by a basic value.

5.3.5 Test blocks

5.3.5.1 Test blocks to measure partial access

Test blocks of 150mm length shall be used for measuring partial access:

- a) a test block with a circular 125mm diameter cross section;
- b) a test block with a square cross section with 112mm side length; the corners rounded with $r = 5\text{mm}$;
- c) a test block with a rectangular cross section with 100mm x 125mm side lengths; the corners rounded with $r = 5\text{mm}$.

For all measurements except radii, the tolerance shall be $\pm 1\text{mm}$.

5.3.5.2 Test blocks to measure complete access

Test blocks of 400mm length shall be used to measure complete access:

- a) a test block with a circular 350mm diameter cross section;
- b) a test block with a square cross section with 315mm side length; the corners rounded with $r = 10\text{mm}$.
- c) a test block with a rectangular cross section with 300mm x 330mm side lengths; the corners rounded with $r = 10\text{mm}$.

For all measurements except radii, the tolerance shall be $\pm 3\text{mm}$.

5.3.5.3 Type testing requirements

The following requirements shall be observed during all tests and additional tests:

- a) The testing team leader shall be responsible for the conduct of the type test.
- b) Only members of the testing team shall participate in the testing work. The observers according to 5.3.3 shall not partake in or hinder the testing work.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 18 of 29

- c) Testing shall only be done in areas or against features which in the opinion of the testing team leader have not been weakened by earlier tests. If opinions differ, a second sample must be provided.
- d) Any holes (other than those through the base of a safe and which are provided for anchoring) which are present in the sample unit can be exploited in the type test.
- e) If a lack of conformity of the sample unit and technical documentation is discovered during a test, the applicant will have to modify the technical documentation or alter the sample unit.
If this causes the testing house to conclude that the testing objective cannot be achieved, the test will be discontinued, and, if necessary, repeated (for which another sample unit may be needed).
- f) Testing tools shall be prepared so that they are ready for immediate use. Set-up times for first assembly are included in the basic values and will thus not be additionally added for the determination of the resistance value. For example, power drills will be fitted with a drill bit, angle grinders fitted with a cutting disc, torches fitted with the appropriate nozzles, drill stands attached to the sample, etc.
- g) Prior to the beginning of each test or additional test, the sample unit shall be closed and locked, to the extent that this is possible, unless the testing team leader and applicant agree otherwise.
- h) Non-destructive attacks (manipulation or lock picking) aimed at locks are not permitted.
- i) The use of explosives and the bringing about of explosion-like processes are not permitted within the framework of the testing work according to 5.3.7. Test methods for determining the resistance against explosives are described under 5.4.2.
- j) During any one test two electric power tools, two thermal tools or an electric power tool and a thermal tool shall not be used simultaneously.
- k) If tools of group 5 are used with both hands, the operating time is determined by the number of blows and is limited to 250 per tool category. The following operating times will be calculated from the number of blows struck and used to determine the resistance value:

Tools of category A:

- 1/60 minute per blow (direct impact)
- 1/40 minute per blow (load transmission via tools of Group T)

Tools of category B:

- 1/30 minute per blow (direct impact)
- 1/15 minute per blow (load transmission via tools of Group T)

To protect the operator(s), in the case of combined use of a hand impact tool and a chisel, a specially constructed chisel holder may be used. Such a chisel holder will be regarded as a hand gripping tool.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 19 of 29

- l) A test or additional test shall be continued until the access appropriate to the type of attack is achieved. The testing team leader may abandon a test if no more information necessary for determining the resistance grade can be reasonably expected. This may occur when the resistance value discovered in previous attacks is exceeded.

An abandoned test shall count as one of the number required under 5.3.7.

5.3.7 Test attacks

5.3.7.1 Free-standing prefabricated safes

The testing will comprise at least:

- a) one partial access attack against the area of the body wall or the door of the sample unit;
- b) one complete access attack against the body or the door (including the frame and the encasement if appropriate).

Additional attacks according to (a) and (b) are required against wall, ceiling, base or door if of a different construction and for which the resistance value can be reasonably expected to be lower (e.g. in the area of pre-existing holes).

5.3.7.2 Built-in safes

The testing will comprise at least:

- a) one attack aimed at the door or lid (including the frame and encasement, if appropriate) to achieve complete or partial access;
- b) one attack to remove the built-in safe from the sample unit (complete access)

5.3.7.3 Strongroom walls

The tests comprise at least one complete access.

Additional complete access attacks (for which additional sample units may be needed) are required against walls, ceiling or base if the sample has areas or zones of different construction and for which the resistance value can reasonably be expected to be lower (e.g. in the area of pre-existing holes).

5.3.7.4 Strongroom doors

The tests comprise at least one complete access attack aimed at the sample unit representing the door (including frame and adjoining wall sections if necessary).

Additional complete access attacks are required if the sample has areas or zones of different construction and for which the resistance value can reasonably be expected to be lower (e.g. in the area of pre-existing holes).

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 20 of 29

5.3.8 Time measuring

For each test, the operating times shall be measured using at least two independent measuring instruments (chronometers).

The measuring inaccuracy of these instruments must not exceed 0.05 minutes (for each 10 minutes), and the graduation shall be at least 0.01 minutes.

The testing team leader shall ensure that the operating times are recorded by at least two persons. The time recorded by the person responsible for keeping the event record shall be used as operating time (rounded to the next full 1/60 or 1/100 minute). Only in the case of a recording error or instrument failure will the second time recorded be used as operating time, if so directed by the testing team leader.

The beginning and the end of each recording of time shall be clearly indicated by an acoustic or optical signal. The current operating and testing times shall be visible for any testing observers.

5.3.9 Testing work event record

A testing work event record will be compiled during the type test and shall contain the following information:

- a) event record reference number;
- b) testing house name;
- c) date and place of the test;
- d) composition of testing team, indicating who was the testing team leader, the time keeper and who were the test operatives;
- e) names of testing observers;
- f) characterisation of type of secure storage unit;
- g) identification of sample unit;
- h) description of each type of attack made (in chronological order) giving details of the point of attack, attack tools, measurements made and events, together with a record of all operating times and reference to any photographic or video records made.

Tool Category No.	A	5 RU/min	B	7.5 RU/min	C	10 RU/min	D	15 RU/min	S	35 RU/min	RU
1	Hand (dis)assembling	weight ≤ 1.5 kg length ≤ 400 mm	weight ≤ 3 kg length ≤ 400 mm	5							
2	Hand gripping	weight ≤ 1.5 kg length ≤ 400 mm	length ≤ 1500 mm	7							
3	Hand levering	length ≤ 750 mm	length ≤ 1500 mm	7							
4	Hand sawing/filing/ cutting & drilling	weight ≤ 1.5 kg length ≤ 400 mm		0							
5	Hand hammering	head weight ≤ 1.5 kg moment ≤ 1.0 kg m length ≤ 750 mm	head weight ≤ 3 kg moment ≤ 2.5 kg m length ≤ 1000 mm	5							
6	Specially made	power consumption ≤ 500W weight ≤ 1.5 kg length ≤ 400 mm	power consumption ≤ 800W weight ≤ 3 kg length ≤ 750 mm	18							
7	Electric without impact	power consumption ≤ 500W weight ≤ 3 kg	power consumption ≤ 800W weight ≤ 3 kg	7		power consumption ≤ 1350W drilling rig	25				
8	Electric rotary with impact option		power consumption ≤ 800W single blow energy ≤ 6 J	11		power consumption ≤ 1350W single blow energy ≤ 15 J	11				
9	Electric impacting without rotation		power consumption ≤ 800W single blow energy ≤ 6 J	11		power consumption ≤ 1350W single blow energy ≤ 20 J	25				
10	Electric grinding/sliding									power consumption ≤ 11,000W/ 245 drill length ≤ 450 mm drill length ≤ 1000 mm saw	245 300 245
11	Thermal cutting/melting		power consumption ≤ 800W	14		power consumption ≤ 2300W with abrasive disc with diamond disc	25 35			power consumption ≤ 2300W with rig drill length ≤ 450 mm drill length ≤ 1000 mm	49 63
T	Tool-specific accessories		oxygen consumption ≤ 50 l/min STP	14		oxygen consumption ≤ 250 l/min STP	28			oxygen consumption ≤ 750 l/min STP power source ≤ 350A	42 25
M	Miscellaneous tools	HSS Drill saw blade chisel wedge punch hook commercial fishing device	1 1 1 1 1 1 1	1 1 1 1 1 1 1	2 2 - 4 4	HSS/carbide tipped drills chisel/bits disc ø ≤ 230 mm width ≤ 2.5 mm diamond disc ≤ 230 mm nozzle acids/alkali each litre used	3 4 - 5 5	rod/rn ø ≤ 16mm electrodes outside ø ≤ 6.5 mm length ≤ 1200 mm outside ø ≤ 6.5 mm inside ≤ 3.5 mm length ≤ 450 mm nozzle diamond core drill length ≤ 400 mm length ≤ 1000 mm	4 7	3m oxygen lance diamond core drill length ≤ 450 mm each additional 100 mm length ≤ 1000 mm wallsaw	32 5 6 14 28
N	Non-tools	torch measuring equipment	1 0	1 0	7 7	maestic/foam each 300ml jack ≤ 30 kN	7 7	flexible endoscope hydraulic equipment I ram ≤ 200 kN, each pressure application	35 35		

Table One

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 22 of 29

5.4 Additional testing

5.4.1 Safes whose mass is less than 1000kg must have at least one hole by which they can be strongly anchored. If a sample has a mass of less than 1000kg, or if its type testing is intended to provide approval for a range of sizes any of which have a mass of less than 1000 kg, then the sample must have (an) anchoring hole(s) identical with those which will be present in such safes.

Every anchoring hole will be tested. The test will use the type and size of anchor bolt which the applicant recommends for fixing the safe. For each hole a bolt will be fitted from the inside and a force applied (to the protruding portion) in a direction which attempts to pull the bolt head through the safe's wall or base. The force for each bolt to be applied is:

Safes of Grade 0, I, II and III 50 kN

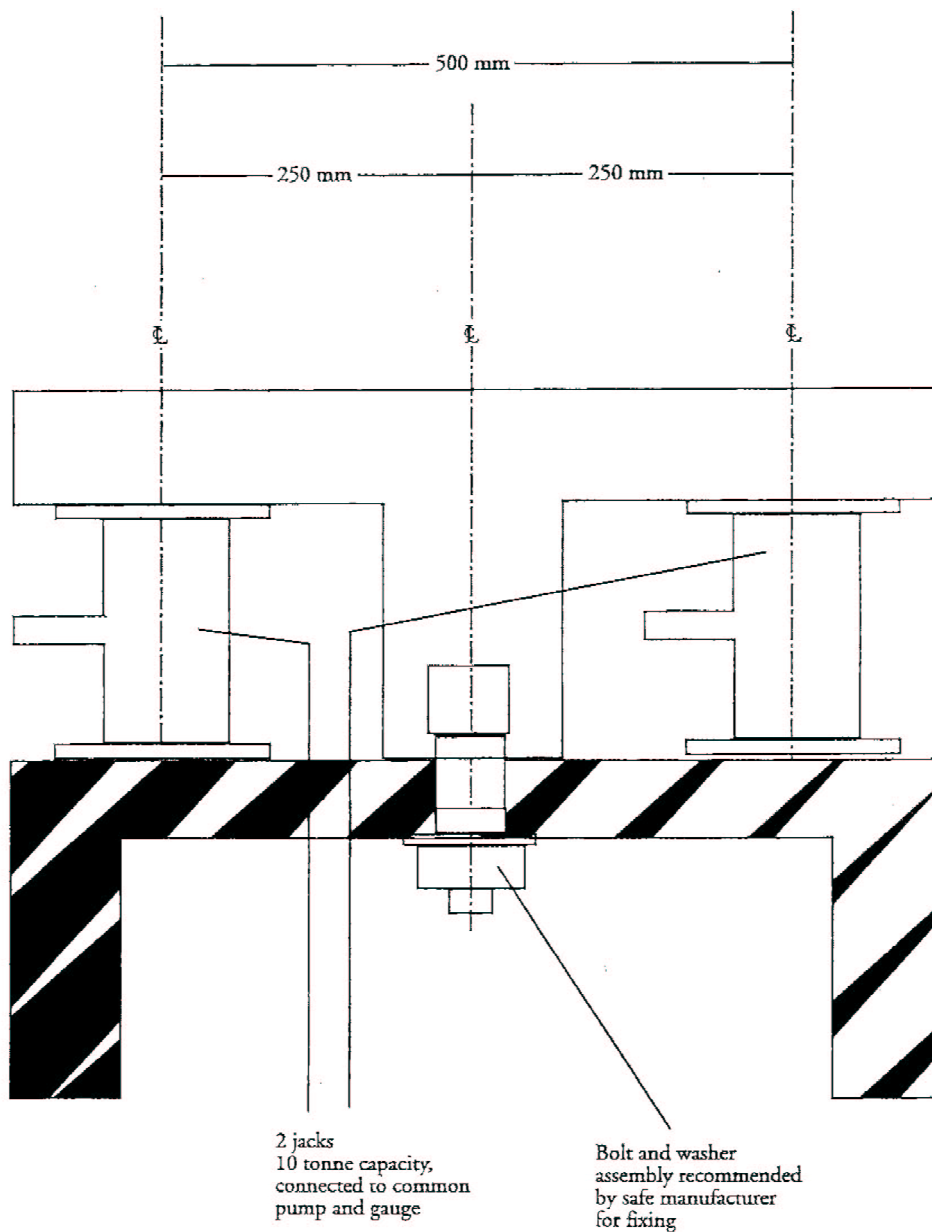
Safes of Grade IV and higher 100 kN

These forces must be sustained without the bolt failing or the bolt head being pulled through the wall or base.

A means by which this test may be carried out is shown in Figure 1.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 23 of 29

Figure 1 - Fixing Test



Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 24 of 29

5.4.2 Resistance to explosives (EX)

5.4.2.1 Scope of additional test

a) Safes:

- one complete access

or

- one partial access

If during pre-detonation work a penetration is made which is sufficiently large to allow a rigid test block of 20mm dia., length 150mm, to reach the interior, testing will be made by an internal charge. For this purpose, the charge shall be positioned at the geometric centre of the storage volume, the safe locked, and the charge detonated by leads passing through the penetration previously made.

If a sufficiently large access to the interior cannot be made within the pre-detonation limit (see 5.4.2.4), the charge will be placed in the partly completed hole, stemmed, and detonated.

The available explosive charge mass M will be 100 grams. If the sample unit has an internal storage capacity exceeding 350dm^3 , the charge mass M will be calculated according to the formula (200g max):

$$M = V \times k_{\text{PETN}} \leq 200\text{g}$$

where

M is the charge mass in grams (200g max)

V is the internal volume of the safe in dm^3

k_{PETN} is equal to $0.2857\text{g}/\text{dm}^3$

b) Strongroom doors and walls, etc.

Testing of these will involve at least:

- one attack to achieve complete access and aimed at the door area, including the frame and adjoining walls, if appropriate;
- one complete access attack on the sample unit representing the strongroom wall.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 25 of 29

The available explosives charges mass M will be 250 grams. Units of resistance grades IX and higher, the charge mass M will be calculated according to the formula (500g max.):

$$M = K \times c_{\text{PETN}} \leq 500\text{g}$$

where

M is the charge mass in gram (500g max)

K is the minimum resistance value in RU according to Table 3 for the relevant resistance grade (complete access)

M_{PETN} is equal to 0.25g/RU

5.4.2.2 Method and objectives

Additional testing with explosives will only be carried out at the applicant's request on secure storage units classified in resistance grades V to XIII inclusive, and will be for the purpose of determining the resistance against attacks with explosives. The method of testing, the type of explosives and the tools to be used for pre- and post-detonation work shall be chosen by the testing house.

5.4.2.3 Sample units

Testing with explosives shall be carried out against and undamaged empty sample unit, unless the testing team leader and the applicant agree that the damage sustained in earlier testing will not influence the result of the explosives test. The additional test can only be carried out on sample units or objects of the same design which have been classified under 6.2.

The internal capacity of safes being submitted to 'additional testing with explosives' should as far as possible in the range of 250dm³ to 350dm³

5.4.2.4 Test conditions

Pre-detonation work and post-detonation work using attack tools of tool categories A to D according to 5.3.4.1 are permitted for carrying out the explosives test. The use of such tools is limited, for the pre-detonation work, to 25% of the minimum resistance value in RU of the resistance grade (complete access) to which the sample unit was previously approved, and to 5% for the post-detonation work. The basic values of tools used in both pre and post detonation work is added once only. This additional test shall be passed after 5% of post-detonation work.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 26 of 29

5.4.2.5 Explosive

PETN explosive with the following properties will be used:

- density (1 500 ± 50) kg/m³
- energy (5 000 ± 500) J/g
- detonation velocity (7 000 ± 500) m/s

5.4.2.6 Evaluation and result

Pre-detonation work and post-detonation work shall be deemed to be one test, i.e., the same tool coefficient shall apply to both types of work. For the purposes of this additional test, the explosives used shall be formally allocated to tool category A.

The sample unit shall be deemed to meet the additional test if the values stipulated in 5.4.2.4 are exceeded for post-detonation work to achieve access, or if the intended access cannot be achieved. In this case, the resistance grade of the sample unit shall be marked by the additional classification EX.

5.5 Test report

From the event records, a test report shall be prepared which will contain all relevant details pertaining to the type testing.

In particular, the test report shall indicate:

- a) name of manufacturer and place and year of manufacture;
- b) detailed listing of the technical documentation which has been checked and of any changes made;
- c) identification of the sample units;
- d) description and result of any exploratory access made according to 5.2.2;
- e) the testing programme developed on the basis of the initial examination results;
- f) date and place of type testing;
- g) the composition of the testing team, the names of the testing team leader, the time keeper and the test operators;
- h) specifications of the attack tools used;
- i) the resistance value for each test;
- j) results of any additional tests;
- k) classification of the sample units;
- l) acceptance records of the sample units, if any.

Two copies of the report shall be sent to the applicant, for which a receipt will be obtained. At least one copy will be retained by the testing house for filing, and shall be safeguarded for a period of 10 years.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 27 of 29

6 CLASSIFICATION

6.1 Calculation of resistance values

6.1.1 Calculation of resistance time

The resistance time in minutes shall be calculated by summing all operating times

6.1.2 Determination of tool coefficients

According to 5.3.4.1, a specific tool coefficient is allocated to each tool category.

Tool category	Tool coefficient
A	5.0
B	7.5
C	10.0
D	15.0
S	35.0

The tool coefficient relevant for a particular test or additional test shall be the tool coefficient of the highest category used.

6.1.3 Resistance value in resistance units

For each test or additional test, the resistance value in resistance units (RU) shall be determined by the following method:

a) value for the resistance time:

The resistance time calculated according to 6.1.1 shall be multiplied by the tool coefficient of the highest category of tool used and determined according to 6.1.2 and, if appropriate, be rounded to the next full 1/100 RU.

b) basic values:

For each of the tools used in the test, the basic values shall be summed and the total added to the values calculated according to a) above.

The sum of these values, rounded to the next full RU, represents the resistance value for the test.

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 28 of 29

6.2 Determination of the resistance grade

After carrying out sufficient test to establish the minimum resistance values according to 5.3.7, resistance grade will be allocated.

This resistance grade shall be characterised by having:

- a) all resistance values determined according to 6.1.3 exceed the minimum resistance value(s) required for this resistance grade according to Table 3 and;
- b) satisfying the strength of anchoring requirements (5.4.1) and;
- c) the required number and quality of locks according to Table 3.

Table 3: Minimum requirements for the determination of the resistance grade – resistance values in RU for partial and complete access.

Resistance Grade	Minimum Resistance Values (RU)	
	Partial Access	Complete Access
0	30	30
I	30	50
II	50	80
III	80	120
IV	120	180
V	180	270
VI	270	400
VII	400	600
VIII	550	825
IX	700	1050
X	900	1350
XI	-	2000
XII	-	3000
XIII	-	4500

Issue 4.3	LOSS PREVENTION STANDARD	LPS 1183 Part 1
Date: Jan. 2014	Requirements and testing procedures for the LPCB approval and listing of safe storage units	Page 29 of 29

Amendments Issued Since Publication

DOCUMENT NO.	AMENDMENT DETAILS	SIGNATURE	DATE
LPS 1183-4.1	Reformatting standard template	CJA	14/01/04
LPS 1183-4.2	Changes to copyright information	CJA	19/09/05
LPS 1183-4.3	<ol style="list-style-type: none"> 1. New front cover 2. Title added to header 3. Contents page moved to Page 1 and updated 4. Participating Organisations & Revision of Loss Prevention Standards added to Contents page 5. Web address updated on Page 2 6. Notes added on Page 3 7. Repagination 8. Update to copyright information 	DC	Jan. 2014