

GUIDELINE

Categorization of Locks

ECB-S R15

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1 Scope

Even though the general design of different high security locks (HSL) seems now similar, until now an interchangeability between them is not possible.

The certification body must check for each secure storage units (SSU) individually, if for security reasons an HSL may be installed in the SSU.

Through this for the manufacturers partly long (although mostly justified) delays arise.

In addition, for locks which are exchanged after production, the list of the approved locks (lock list) of the manufacturer is not always available for service companies.

The aim of this guideline is to simplify the lock interchangeability in the future. For this the guideline sets requirements, by which HSL can be categorized. If an HSL falls into a certain category, it can – if the SSU specific construction is maintained – be exchanged with another lock of the same category.

Note: All dimensions shown in the figures of this guideline are shown as millimetres (mm).

2 Normative References

The following 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.

EN 1300 *Secure storage units - Classification for high security locks according to their resistance to unauthorized opening*

EN 1143-1 *Secure storage units - Requirements, classification and methods of test for resistance to burglary - Part 1: Safes, ATM safes, strongroom doors and strongrooms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in the standards stated above and the following apply:

3.1

Lock

For easier reading the locking device according to EN 1300 is called “lock” in this guideline. The input units are not looked at in this guideline.

3.2

Lock list

List of approved locks of a specific SSU.

4 Principles

In addition, to the criteria for choosing a lock category according to this guideline the requirements of EN 1300 and the lock class for the relevant resistance grade of the SSU in which the lock shall be installed must be fulfilled. The additions specified in this guideline serve only to facilitate an easier exchange between different locks. It does not disable any underlying standards or requirements on the market.

4.1 Lock type

The lock type is chosen by a combination of the lock dimensions (4.1.1) and the protection necessary to prevent attacks (4.1.2).

4.1.1 Lock dimensions

4.1.1.1 Principles

The standard mounting dimension of a lock is defined in EN 1300 Annex D. Not only the size of the lock is important, but also the amount and position of the mounting holes.

Generally, the locks on the market have either three or four mounting holes. In the first case either hole A or B is non-existent (see figure 1).

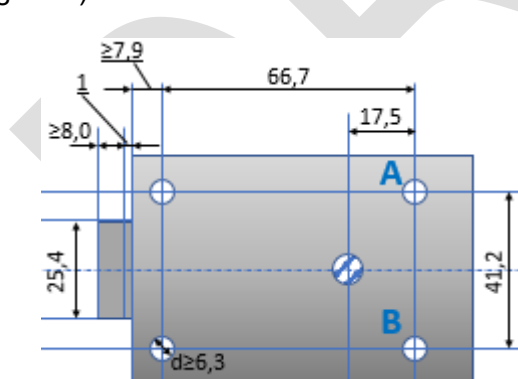


Figure 1: Standard lock mounting positions

This guideline does **not** differentiate between locks with four or three mounting holes. Nevertheless, locks with less than three mounting holes are categorized as lock type 9.

4.1.1.2 Lock size

The background for this category is the minimum dimension of the armour in front of the lock.

According to this guideline there is a differentiation between four different lock sizes.

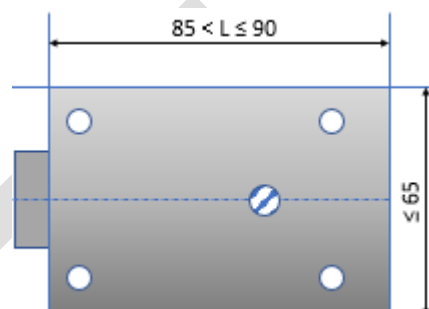


Figure 2: Lock size 1

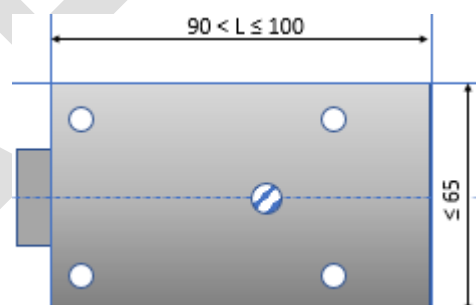


Figure 3: Lock size 2

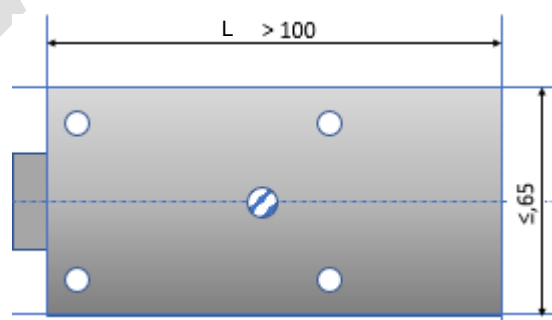


Figure 4: Lock size 3

If the lock differentiates in its length and width from the above mentioned dimensions or if the mounting dimensions are different from the standard foot print according to 4.1.1.1 (66.7 mm horizontal and 41.2 mm vertical), the lock is automatically classified as lock type 9. In addition, locks according to EN 1300, Annex E, are also categorized as lock type 9.

4.1.2 Protection from attacks

The burglary attacks performed in EN 1300 have the following restrictions:

- It is not permitted to damage the lock case;
- It is not allowed to use tools of category B, C, D and S according to EN 1143-1.

Due to these restrictions, additional attacks on the locks, for instance according to EN 1143-1 are permitted.

For these locks, measures shall be taken by the SSU manufacturer, to prevent attacks which damage the lock case. Measures can for instance look as follows:

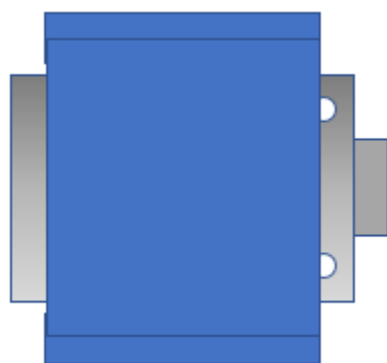


Figure 5: Protection with a cover

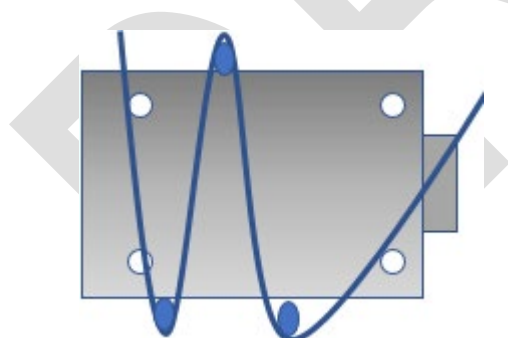


Figure 6: Protection with a relocker wire

The measure is dependent on the SSU construction and shall for instance be checked during the type test of the SSU.

4.1.3 Lock type

The category lock type is classified by checking the lock size (see 4.1.1.2) in

conjunction with the question of whether additional protection for the lock must be used in the SSU (see table 1).

Table 1: Lock type category

| Lock size of 4.1.1.2 | An additional protection acc. to 4.1.2 is necessary | |
|----------------------|---|-----------------|
| | No | Yes |
| 1 | Type category 1 | Type category 6 |
| 2 | Type category 2 | Type category 7 |
| 3 | Type category 3 | Type category 8 |
| 9 | Type category 9 | |

4.2 Bolt type

Generally, the minimum requirements of the bolt through of ≥ 8.0 mm and the bolt width of 25.4 mm (± 2 mm) shall be fulfilled. Otherwise the construction is classified as category 9.

4.2.1 Square bolt

Rectangular bolts are most commonly used (also known as square bolts, dead bolts etc.).

Generally, two types of square bolts are differentiated: those with (see figure 7) and those without (see figure 8) mounting holes.

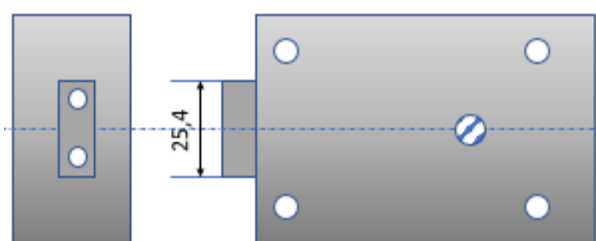


Figure 7: Bolt type 1

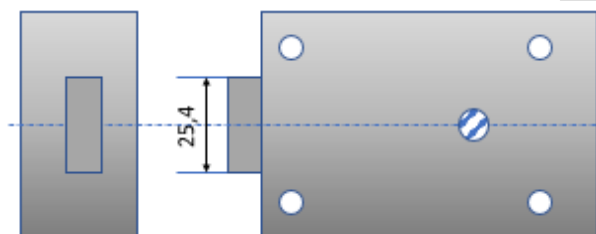


Figure 8: Bolt type 2

Boltworks using lock extension blocks can for instance not be used with bolt type 2. If certain locks are available in two variants (bolt type 1 and 2), the variant, which is suitable for the boltwork, shall be ordered.

4.2.2 Swing bolts

Swing bolts (also known as rotobolts etc.) are used in some electronic locks, if no separate actuation of the locks bolt is wished, but instead the lock bolt shall be moved into the opening position directly by the boltwork.

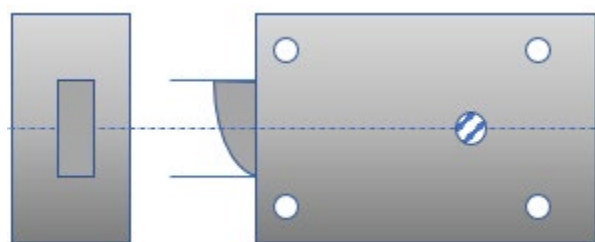


Figure 9: Bolt type 3

4.2.3 Flat bolts

Flat bolts are used for boltworks in lower resistance grades for which additional connections (doubling, blocks, bolt bars etc.) between the lock and the boltwork is needed. The interchangeability between these locks is only partly given.

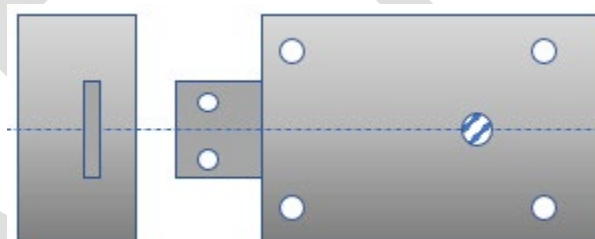


Figure 10: Bolt type 4

4.2.4 Other bolt types

Many more bolt types exist, which are not described in this guideline. These are often designed for specific boltworks or for deposit lockers. These bolts are categorized as bolt type 9 in this guideline.

4.2.5 Boltwork locks

For boltwork lock the lock directly executes the boltwork function of the SSU. These locks are used in low resistance grades and their usage must be evaluated individually by the certification body. As in 4.2.4 these locks are classified as bolt type 9.

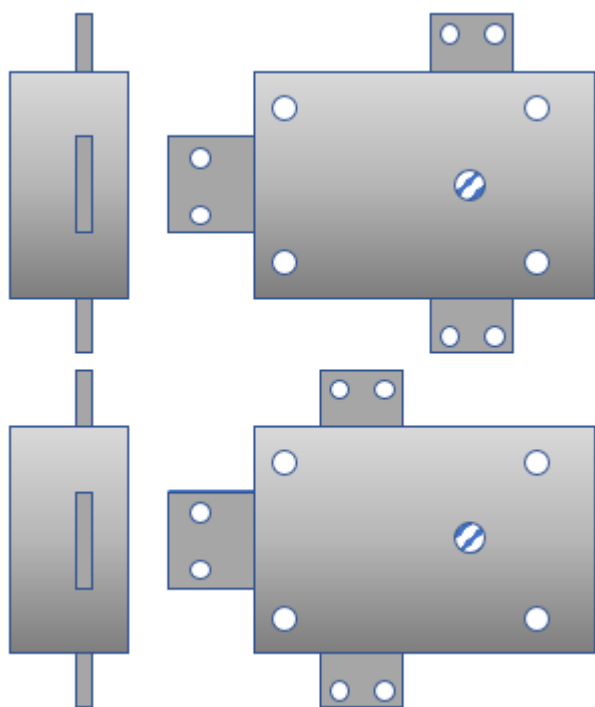


Figure 11: Boltwork locks (exemplary)

4.3 Opening type

4.3.1 General

To mount and use most of the locks at least one opening for keys, spindles and/or cables is necessary. In this guideline exclusively openings in front of the lock body are specified. Further openings outside of the lock body area are not described. The positioning of the opening according to this guideline shall be according to figure 12. If the opening is positioned differently in front of the lock body, the lock automatically is defined as category 9.

The size, amount and shape of the opening shall be specified by the HSL manufacturer in the mounting instructions.

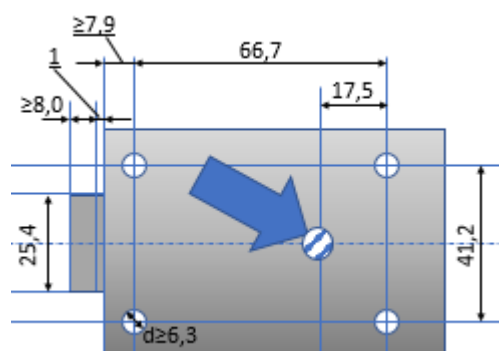


Figure 12: Standard position of the opening

4.3.2 Type of opening

To categorize the locks according to their specific requirements the size and shape of the needed opening is of importance.

4.3.2.1 Round openings

A lot of electronic locks need a round opening in front of the locks.

The HSL manufacturer defines in his mounting instructions, how big

- the **minimum** diameter must be, for instance to be able to use a spindle;
- the **maximum** diameter must be, which is permitted for the opening for burglary resistance reasons.

The **maximum** diameter is relevant for categorizing the lock. These are categorized from 0 to 3 and as 9 (see table 2).

Table 2: Round openings

| Category | Maximum diameter |
|----------|------------------|
| 0 | ≤ 10 mm |
| 1 | ≤ 11 mm |
| 2 | ≤ 12 mm |
| 3 | ≤ 13 mm |
| 9 | ≥ 14 mm |

The diameter shall be rounded down to the next lower integer.

Example: If the maximum permitted diameter is 11,5 mm the lock is categorized into the opening category 1.

If when rounding down the maximum diameter, the result is lower than the minimum diameter, then the lock is categorized as opening type 9.

The interchangeability of locks of the opening category 9 is not given (see 4.3.2.4).

4.3.2.2 Key opening

Most of the key locks, but also some electronic locks need an opening in the form of a key. Key locks have different shapes and sizes, which leads to the fact that an interchangeability between them is often **not** given.

An opening in the shape of a key is categorized as type 8. The exchange between them without an additional evaluation of the certification body is not permitted.

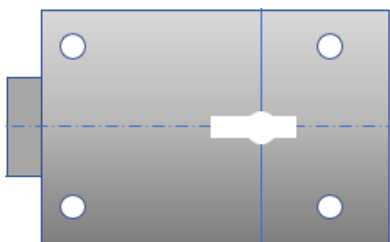


Figure 13: Exemplary key shape

4.3.2.3 No openings

According to their mount instruction some electronic locks do not allow any opening directly in front of their lock **body**. These locks are categorized as opening type 4.

Even if directly in front of the lock body no opening is permitted, but outside of the lock body area an opening is needed, the opening type 4 is applicable.

4.3.2.4 Other openings

Openings, which cannot be categorized under the clauses 4.3.2.1, 4.3.2.2 or 4.3.2.3 are categorized like openings with a diameter of equal or more than 14 mm as category 9.

5 HSL categorization

The HSL categorization is set with a three digit system:

- **Digit 1:** Shows the lock type (combination of size and protection requirements of the lock) [1, 2, 3, 6, 7, 8 or 9].
- **Digit 2:** Shows the bolt type (1, 2, 3, 4 or 9).
- **Digit 3** Shows the opening type (0, 1, 2, 3, 4, 8 or 9).

More information can be seen in table 3.

Table 3: HSL categorization

| Table 6: HSE categorization | | | | |
|---|--|----------------------|--|--|
| Number | Digit 1 | | Digit 2 | Digit 3 |
| | Lock type (clause 4.1) | | Bolt type (clause 4.2) | Opening type (clause 4.3) |
| | Additional protection needed | | | |
| | No | Yes | | |
| 0 | | | | Round, $\varnothing \leq 10$ mm |
| 1 | 75 < L ≤ 90 mm | | Square bolt with connection | Round, $\varnothing \leq 11$ mm |
| 2 | 90 < L ≤ 100 mm | | Square bolt without connection | Round, $\varnothing \leq 12$ mm |
| 3 | <i>L > 100 mm</i> | | Swing bolt | Round, $\varnothing \leq 13$ mm |
| 4 | | | <i>Flat bolt</i> | No opening |
| 5 | | | | |
| 6 | | 75 ≤ L ≤ 90 mm | | |
| 7 | | 90 < L ≤ 100 mm | | |
| 8 | | <i>L > 100 mm</i> | | <i>Key (see explanation in 4.3.2.2)</i> |
| 9 | <i>others: deviations in lock size of mounting position or amount of mounting holes.</i> | | <i>others: other bolts or boltwork locks</i> | <i>others: Opening not in standard position or with $\varnothing \geq 14$ mm or other not defined shape</i> |
| <i>Note: For the categories listed in italics and blue, an interchangeability between the locks is not permitted without an evaluation of the certification body.</i> | | | | |

6 Examples

6.1 Category examples

Example 1

Electronic lock with standard dimensions with a permitted opening of 13 mm. The lock could for instance be a motor lock or an electronic lock with a spindle („Direct Drive“).

113

Example 2

Swingbolt lock with standard dimensions and a 12 mm opening, which needs an additional protection.

632

Example 3

Key lock in standard dimensions with mounting holes in a square bolt and an additional protection needed.

618

6.2 Examples of lock lists

A lock list of a specific SSU could for instance be designed as follows:

Example 4

| Locks to be used | Mounted according to drawing |
|--|------------------------------|
| 110 610 | AB463-02 |
| 210 710 | AB463-03 |
| 112 612 | AB463-04 |
| 212 712 | AB463-05 |
| 114 614 | AB463-06 |
| 214 714 | AB463-07 |
| In addition, the following specific locks: | |
| XYZ of manufacturer A | CB463-01 |
| UVW of manufacturer B | CB463-02 |

Each lock is as a minimum of category B of EN 1300 and is mounted according to its mounting instruction.

Example 5

| Locks to be used | Mounted according to drawing |
|--|------------------------------|
| 110 210 120 220 130 230 610 710 620 720 630 730 | AB463-02, Detail A |
| 111 211 121 221 131 231 611 711 621 721 631 731 | AB463-02, Detail B |
| 112 212 122 222 132 232 612 712 622 722 632 732 | AB463-02, Detail C |
| 114 214 124 224 134 234 614 714 624 724 634 734 | AB463-05 |
| In addition, the following specific locks: | |
| XYZ of manufacturer A | CB463-01 |
| UVW of manufacturer B | CB463-02 |

Each lock is as a minimum of category B of EN 1300 and is mounted according to its mounting instruction.