High Security Locks for Secure Storage Units

Requirements and Test Methods

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VdS Guidelines for Physical Security Devices

High Security Locks for Secure Storage Units

Requirements and Test Methods

These product guidelines are binding only if their application has been agreed between VdS and the applicant on an individual basis. Otherwise, an application of these product guidelines is non-binding; an agreement on the application of these product guidelines is purely optional. In individual cases, third parties may also accept other safety precautions or installation or maintenance companies under conditions that are defined at their sole discretion and that do not comply with these technical specifications.

Content

1 General

1.1 Scope

These rules are valid in connection with the European standard EN 1300 : 2011-09 Secure Storage Units – Classification for high security locks according to their resistance against unauthorised opening (EN 1300 : 2011-09 Wertbehältnisse – Klassifizierung von Hochsicherheitsschlössern nach ihrem Widerstandswert gegen unbefugtes Öffnen), which are installed in doors of secure storage units (safes and strongrooms). The rules apply to mechanical and electronic locks which may have timing functions where appropriate e.g. for off-times.

The Guidelines for Alarm Systems, Software Controlled System Components, Requirements and Test Methods, VdS 2203 (VdS-Richtlinien für die Brandschutz- und Sicherungstechnik, Software, Anforderungen und Prüfmethoden), also apply for system components controlled by software.

Further to locks for the use as ancillary control equipment for intruder alarm systems (IAS) and/or as blocking elements, the Guidelines for Intruder Alarm Systems, Ancillary Control Equipment, VdS 2119 (VdS-Richtlinien für Einbruchmeldeanlagen, Schalteinrichtungen, Anforderungen) apply in addition. For locks were hold-up alarms can be triggered, the Guidelines for Intruder Alarm Systems, Hold-up Trigger Devices, VdS 2271 (VdS-Richtlinien für Einbruchmeldeanlagen, Überfallmelder, Anforderungen) apply in addition.

1.2 Validity

These rules are valid from 01.07.2014; they replace the edition 2012-03 (3).

Note: This is a translation of the German guidelines; if there are any discrepancies, the German version shall be binding.

2 Normative references

These rules contain dated and undated references to other publications. The normative references are cited at the appropriate places in the clauses, the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to these rules only when announced by a change of these rules. For undated references the latest edition of the publication referred will be applied.

EN 61000-4-3 Elektromagnetische Verträglichkeit (EMV) – Teil 4-3: Prüf- und Messverfahren – Prüfung der Störfestigkeit gegen hochfrequente elektromagnetische Felder
(topic: electromagnetic compatibility; test procedures and measurement processes)

EN 1300 : 2013-11 Wertbehältnisse, Klassifizierung von Hochsicherheitsschlössern nach ihrem Widerstandswert gegen unbefugtes Öffnen
(topic: secure storage units – classification for high security locks according to their resistance to unauthorised opening)

VdS 2110 VdS-Richtlinien für Gefahrenmeldeanlagen, Schutz gegen Umwelteinflüsse, Anforderungen und Prüfmethoden
(English version: VdS Guidelines for Alarm Systems, Protection against environmental influences, Requirements and test methods, VdS 2110en)

VdS 2119 VdS-Richtlinien für Einbruchmeldeanlagen, Schalteinrichtungen, Anforderungen
(English version: Rules for Intruder alarm systems, Ancillary control equipment (ACE), Requirements, VdS 2119en)

VdS 2203 VdS-Richtlinien für die Brandschutz- und Sicherungstechnik, Software, Anforderungen und Prüfmethoden
(English version: Rules for Fire Prevention and Security Technology, Software, Requirements and Test Methods, VdS 2203en)

VdS 2271 VdS-Richtlinien für Einbruchmeldeanlagen, Überfallmelder, Anforderungen
(English version: VdS Guidelines for Intruder Alarm Systems, Hold-up Triggering Devices, Requirements, VdS 2271en)

VdS 2344 Verfahren für die Prüfung Verfahren für die Prüfung, Anerkennung und Konformitätsbewertung von Geräten, Bauteilen und Systemen der Brandschutz- und Sicherungstechnik
(English version: Procedure for the testing, approval, certification and conformity assessment of products and systems for fire protection an dsecurity technologies, VdS 2344en)

3 Terms and definitions

For general terms and definitions refer to EN 1300. In addition the following definitions apply:

Bolt throw: Difference between the completely thrown and totally drawn back position of the bolt.

Redundancy: Multiple given construction features of systems.
Here: Multiple given assemblies for increasing operational reliability.

4 Classification

Deviating from EN 1300, clause 4, high security locks in accordance to their performances are graded into the following classes:

Class regarding VdS 2396	Comparison to class of EN 1300
1	A
2	B
3	C
4	D
Table 4-1: Classification	

Class 1 represents the lowest and class 4 the highest security level.

5 Protection against environmental influences

Deviating from EN 1300, testing of the resistance against radio frequency (room) (E2a) is carried out according to EN 61000-4-3 according to VdS 2110 up to 2000 MHz.

6 Requirements

The requirements of EN 1300 are valid with the following deviations and/or additions.

6.1 Installation and operating manuals

For locks which are distributed in German-speaking areas installation and operation manuals (written in German language) must be available that with regard to content meet the requirements of EN 1300, appendix A. For manufacturers of secure storage units the access to the installation manual shall be possible, e.g. in printed form or as a possibility to download it. The operation manual has to be attached to each lock.

Alternatively, the responsibility of making the manuals available may be conferred to the manufacturer of the secure storage units in which the locks are going to be used. In this case the manufacturer of the secure stoarage units must be informed which information at least shall be contained by the operation manual.

6.2 Marking

In addition to the information required in EN 1300, clause 10 high security locks shall be provided with the VdS marking in accordance to VdS 2344. The VdS marking must include the approval number as well as the lock class, be permanently fixed and visible in the built-in state of the lock without the necessity of disassembling the lock.

6.3 Bolt throw

In addition to EN 1300, the bolt throw must be 8 mm at least.

6.4 Redundancy

In addition to EN 1300, electronic high security locks may be designed in a way that one failure or failing component does not degrade the locking function or the operational security.

In this case, all construction components which are not accessible from the outside but necessary for opening the lock must be constructed redundant. The occurrence of one failure must be recognised by the lock electronic and be indicated to the user in an adequate manner.

Note: It is intended, to design high security locks of class C and D redundant because these locks are used predominantly with high grade strongroom doors at which an opening after a failing of the lock leads to high operating expenses.

6.5 Bolt strength

Additionally to EN 1300, the thrown bolt of the lock shall resist the following loads.

On locks were extended bolts shall be used for the blockade of a boltwork, the bolt shall resist forces of at least 1 kN applied to the bolt sides in a 4 mm distance to the lock case against the blocking directions. Further the bolt shall resist a force of at least 1 kN performed towards the locking direction. In this case, it shall not be possible to press back the bolt for more than 2 mm.

If the permissible bolt strengths indicated by the manufacturer in the installation instruction exceed 1 kN, the bolt mechanism shall be able to resist the indicated strengths plus a 20 % security addition.

7 Options

Options shall not negatively influence the required functions of high security locks. The options and their performances shall be specified by the manufacturer.

8 Tests

8.1 Conditions

8.1.1 Test samples

For the technical tests in a laboratory at least five originally packed test samples from series production with the relevant accessories shall be provided by the manufacturer (four test samples, one proof model). Accessories which are not directly supplied but can be used optionally with the lock, shall also be submitted for the examination. If a manual test is required to determine the manipulation resistance, seven locks in total are required (cf. test matrix in clause 8.2).

If the product is not yet manufactured in series, the examination can be carried out on preproduction models. In this case, a revision is necessary for the final evaluation at products from series production.

8.1.2 Tolerances

If not specified otherwise, the tolerance for strength, rotation speed and torque information is ± 5 %.

8.2 Test matrix

The individual tests are carried out in the order as defined in the following test matrix (Table 8-1). If one sample fails ore becomes damaged during the tests it shall be decided on an individual basis, where appropriate in agreement with the manufacturer (applicant according to VdS 2344), whether and with which test the test program can be continued.

Test	Requirements Clause of VdS 2396 resp. EN 1300	Tests Clause of VdS 2396 resp. EN 1300	Test sample 1	2	3	4 [1]	5 [2]	6 [2]	7 [2]
Receiving controls									
Completeness, documentation Identity	EN 7	VdS 8.3.1 / 8.3.2	X	X	X	X	X	X	X
General tests									
Test of documentation	EN 6 and Annex A	EN 8.1.2	X						
Installation and operating manual	VdS 6.1	VdS 8.4.1/ EN Annex A	X	X	X				
Manufacturers declaration	EN Annex C	EN 8.1.2	X	X	X				
Marking	VdS 6.2	VdS 8.4.2/ EN 10	X	X	X				
Design requirements									
Construction	EN 5.1 – 5.1.6	EN 8.1.2	X						
Manipulation resistance (constructive measures)	EN 5.21 and 5.2.2	EN 8.2.1	X						
Usable codes	VdS 6.3	VdS 8.4.3	X						
Throw of the bolt	EN 5.2.3 and Annex B	EN Annex B	X	X	X				
Spying	EN 5.2.5	EN 8.2.4	X						
Redundancy	VdS 6.4	VdS 8.4.4	X						
Remote opening/remote locking	EN 5.1.7	EN 8.1.2							
Electromagnetic influences									
Securing after power failure	EN 5.2.6.1	EN 8.2.5.4	X						
Failure of mains supply			X						
Mains supply voltage variations			X						
Static discharges	EN 5.2.6.2	EN 8.2.5.6	X						
High frequency radiation	EN 5.2.6.3	EN 8.2.5.9	X						
Induced high frequency	EN 5.2.6.3	EN 8.2.5.9	X						
Conducted disturbances (burst)	EN 5.2.6.4	EN 8.2.5.7	X						
Conducted disturbances (surge)	EN 5.2.6.5	EN 8.2.5.8	X						
Physical influences									
Cold	EN 5.2.8.1	EN 8.2.7.1	X						
Dry heat	EN 5.2.8.2	EN 8.2.7.2	X						
Corrosion	EN 5.2.7	EN 8.2.6.4			X				
Immersion	EN 5.2.7	EN 8.2.6.3	X						
Vibration	EN 5.2.7	EN 8.2.6.1	X						
Shock	EN 5.2.7	EN 8.2.6.2	X						
Reliability									
Durability test	EN 5.3.1	EN 8.3.1		X			X	X	X
Dynamic code input	EN 5.3.2	EN 8.3.3		X					
Code change	EN 5.3.3	EN 8.3.2		X			X	X	X
Strength									
Bolt strength	VdS 6.5	VdS 8.4.5			X				
Key strength	EN 5.1.3.5	EN 8.2.1.4			X				
Resistance against unauthorised opening									
Manipulation resistance (manual test)	EN 5.2.3	EN 8.2.2					X	X	X
Destructive attacks (manual test)	EN 5.2.4	EN 8.2.3				X			
Miscellaneous									
Others	VdS 7	VdS 8.4.6 and 8.5	X	X	X				

1) Sealed test sample
2) Sealed test sample, only required if a manual manipulation test is done.

Table 8-1: Test matrix

8.3 Incoming inspection

8.3.1 Completeness

It is tested whether the test samples are available complete, including the required documents and accessories.

8.3.2 Identity

It is tested by means of visual check and measurements whether the test samples correspond to the information of the manufacturer. The subsequent examinations will be started only if no deviations are found during identity test.

8.4 Individual tests

8.4.1 Installation and operating manuals

It is tested whether the installation and operating manuals are available in accordance with the requirements (cf. clause 6.1) and whether the required references are included.

8.4.2 Marking

It is tested whether every lock is marked with the required information (cf. clause 6.2).

With multiple wiping with a moist cloth it is tested whether the marking does not become unreadable or can be removed by simple scraping.

8.4.3 Bolt throw

By means of suitable measuring instruments (requirements cf. clause 6.3) is tested, whether the bolt movement is at least 8 mm during locking while the bolt is loaded by 2.5 N against the locking direction.

8.4.4 Redundancy

On redundant locks it is tested (requirements cf. clause 6.4) if failures or failing component do not degrade the locking function or the operational security and if the user is informed regarding the occurance of failures. Further it is tested if all construction components not being accessible from the outside but necessary for opening the lock are constructed redundantly.

8.4.5 Bolt strength

The test is carried out in a test rig of steel following Figure 8-1 (requirements cf. clause 6.5). The lock is mounted in accordance to the installation instructions.

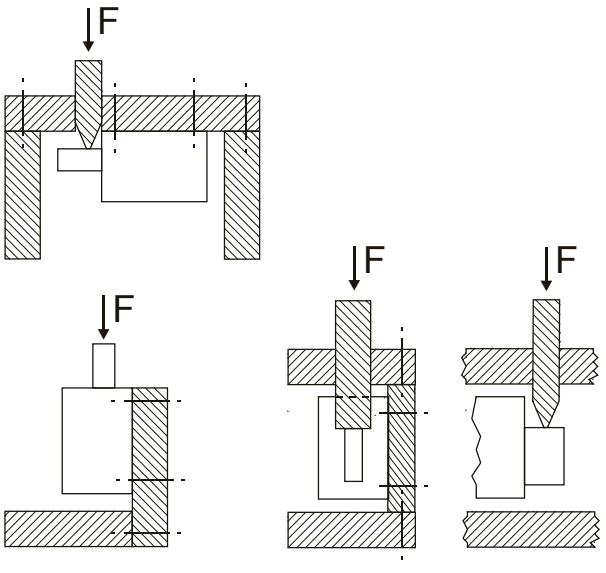

Figure 8-1: Test rig

The edge of the testing stamp shall be approx. 1.5 mm broad and operates over the entire width of the bolt. The loading point of the burden during the test with lateral force is located in a 4 mm distance to the case. The load directions result from the information of the installation instruction. The bolt is to be extended completely before the test. The burdening rise shall not exceed 100 N/s during the examination.

Load is increased to the maximum value (120 % of the manufacturer's specifications, of a minimum of 1 kN), approx. 10 s held and taken back. The lock's function is examined after this. During the test with load against the locking direction, it is determined whether the bar with maximal burden becomes pressed back not more than 2 mm.

8.5 Options

It is tested (requirements cf. clause 7), whether options do not negatively influence the required functions of the high security locks.

Further, it is tested whether the features of options of the manufacturer were specified.

8.6 Other tests

As far as special designs or new manufacturing processes require this, additional tests may be carried out in agreement with the manufacturer.

9 Changes

Compared with version VdS 2396en : 2013-03 (03) the following changes were made on these guidelines:

- Translation of the normative references althow the German versions are in use for the testing procedure and while not for every document an English version is given (clause 2).
- Reference to the EN 1300 currently valid; herewith deletion of cross references on the former prEN 1300 and deletion of the term remote opening/locking (clause 3).
- Deletion of statements to remote opening/locking (former clause 6.6), due to these are handled in the EN 1300 currently valid.
- Modification of the test matrix (Table 8-1) to ensure an optimised test process.