VdS	VdS Guidelines for Physical Security Devices	VdS 2396en

High Security Locks for Secure Storage Units

Requirements and Test Methods

VdS 2396en : 2022-09 (05)

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Heruntergeladen von IP 216.73.216.140 am 12.11.2026 - 17:51

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VdS Guidelines for for Physical Security Devices

High Security Locks for Secure Storage Units

Requirements and Test Methods

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1 General

1.1 Scope

These guidelines are valid in connection with the European standard EN 1300, Secure Storage Units – Classification for high security locks according to their resistance against unauthorised opening and contain minimum requirements and test methods for high security locks, which are installed in doors of secure storage units (safes and strongrooms). The guidelines apply to mechanical and electronic locks.

The Guidelines for Alarm Systems, Software Controlled System Components, Requirements and Test Methods“, VdS 2203, 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 apply in addition. For locks were hold-up alarms can be triggered the Guidelines for Intruder Alarm Systems, Hold-up Trigger Devices, VdS 2271 apply in addition.

For high security locks, distributed systems the guidelines VdS 3841 : 2021-01 (01) apply in conjunction with these guidelines.

For high security locks, biometric recognition procedures the guidelines VdS 3112 : 2009-07 (draft) apply in connection with these guidelines.

1.2 Validity

The guidelines are valid from 01.09.2022; they replace the edition 2014-07 (04).

For certain tests, a transitional period until 30.06.2026 applies; the specifications in Annex B apply to this.

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

2 Normative references

These guidelines contain dated and undated references to other standards. 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 1300 : 2013[1] Wertbehältnisse, Klassifizierung von Hochsicherheitsschlössern nach ihrem Widerstandswert gegen unbefugtes Öffnen (Secure storage units – Classification for high security locks according to their resistance to unauthorised opening), without Distributed Systems (i.e. excluding chapter 5.1.7, where VdS 3841 resp. prEN 17646 is used instead of)

[1] Note: Annex B describes the possibilities of the different procedures resulting from the transition period set out in section 1.2.

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EN 1300 : 2018[1] Wertbehältnisse, Klassifizierung von Hochsicherheitsschlössern nach ihrem Widerstandswert gegen unbefugtes Öffnen, (Secure storage units – Classification for high security locks according to their resistance to unauthorised opening to the exclusion of distributed systems), without Distributed Systems (i.e. excluding chapter 5.1.8, where VdS 3841 resp. prEN 17646 is used instead of) and without manipulations tests[1)] on electronic locks according to table 4, chapter 8.2.2 (=> manipulation tests on electronic locks are performed according to prEN 1300 : 2021)

VdS 2119 VdS-Richtlinien für Einbruchmeldeanlagen, Schalteinrichtungen, Anforderungen (VdS-Guidelines for Intruder Alarm Systems, Ancillary Control Equipment, Requirements)

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

VdS 2271 VdS-Richtlinien für Einbruchmeldeanlagen, Überfallmelder, Anforderungen (VdS-Guidelines for Intruder Alarm Systems, Hold-up Detectors, Requirements and Test Methods)

VdS 2344 Verfahren für die Prüfung Verfahren für die Prüfung, Anerkennung und Zertifizierung von Produkten und Systemen der Brandschutz- und Sicherungstechnik (Procedure for the Testing, Approval and Certification of Products and Systems of Fire Protection and Security Technology)

3 Terms and Terms and abbreviations

3.1 Terms and definitions

The general terms and definitions as per EN 1300 shall apply. In addition, the following definitions apply:

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

Redundancy: Multiple system design

Here: Multiple given assemblies for increasing operational reliability.

3.2 Abbreviations

HSL high security lock

MKL mechanical key lock

MCL mechanical code lock

EL electronic lock

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4 Classification

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

Class according to 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 Boundary conditions

Unless otherwise stated, the tolerance for force and displacement data is ± 5 %.

6 Requirements

6.1 General requirements

6.1.1 Requirements of EN 1300 and deviations

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

The corresponding requirements and tests are listed in Table 7-1 with reference to the corresponding section of the standard or the guidelines.

6.1.2 Additional requirements for electronic HSL

Deviating from EN 1300 : 2013, Annex E of EN 1300 : 2018 shall apply to electronic HSL designed in accordance with EN 1300 : 2018 Annex E.2.1.

6.1.3 Test samples

Deviating from EN 1300, a total of eight functional/configured test samples from series production with the associated accessories including opening and master codes must be provided by the manufacturer for the laboratory test (seven test samples, one proof model). One of these test samples shall be mounted in the sheet steel housing in accordance with EN 1300, figure 1. Accessories, which are not directly supplied but can be used optionally with the lock, shall also be submitted for the tests. If a manual test is required to determine the manipulation resistance, ten test samples in total are required (cf. test matrix in clause 7.1). A higher number of test samples may be required in individual cases and will then be agreed separately between the laboratory and the applicant, e.g. in the case of variants of the lock type or its additional components.

If the product is not yet manufactured in series, the tests can be carried out on prototypes. If a test report on the testing of prototypes is submitted, VdS-Zert reserves the right to subsequently request the testing of a product from series production.

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6.1.4 Mounting and operating instructions

Mounting and operating instructions shall be available in German or English language, 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 shall be attached to each lock. This can alternatively be enclosed as a short manual, but it shall show and offer the operator the possibility of obtaining the complete version in printed form or by download in an uncomplicated and cost-free manner.

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 storage units shall be informed which information at least shall be contained in the operation manual.

6.1.5 Marking

In addition to the information required in EN 1300, high security locks shall be provided with the VdS marking in accordance to VdS 2344. The VdS marking shall include the approval number as well as the lock class, be permanently fixed i.e. difficult to erase or change, and be visible in the built-in state of the lock (locking device) without the necessary disassembling the lock (locking device).

6.2 Environmental protection

6.2.1 Resistance to radiated high frequency

Deviating from EN 1300 : 2013, the test on electromagnetic radiation is carried out according to EN 1300 : 2018 in the frequency range from 80 MHz to 2700 MHz with a field strength of 30 V/m.

6.2.2 Resistance against immersion

Deviating from EN 1300 : 2013, the test for resistance to immersion in salt water shall be carried out in accordance with EN 1300 : 2018 clause 8.2.6.3.

6.3 Electronic tokens

Deviating from EN 1300 : 2013, clause 5.1.6 or EN 1300 : 2018, clause 5.1.7 "Electronic tokens", active communication devices, such as smart devices, are not permitted as contactless tokens.

Note: If active communication devices, such as smart devices, are used as electronic tokens as contactless code carriers/identification feature carriers, the technical information required according to section 6 of EN 1300 is usually not available, so that a test cannot be carried out completely.

Deviating from EN 1300 : 2013 and EN 1300 : 2018, contactless tokens in which data transmission takes place at a distance of more than 15 cm between the token and the input unit are used, or the electronic tokens are used for HSL of class D, shall meet the requirements of VdS 3841.

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6.4 Firmware updates

Deviating from EN 1300 : 2013, firmware updates shall be transmitted to the processing unit and/or input unit in encrypted form according to EN 1300 : 2018, section 5.1.8. Firmware updates shall be initiated by an authorisation code. The number of installation attempts of a firmware update per hour shall meet the requirements of EN 1300 : 2018, Table 1 (column 'Maximum number of opening attempts per hour for each coding type'). If firmware updates change, add or delete an opening code, this shall be documented in the operating instructions. Each firmware update shall be confirmed at the HSL by an authorised person.

The firmware change protocol, procedure and encryption shall be entered in a manufacturer's declaration (see Annex A).

Components between the input and the evaluation unit shall not generate any safety-relevant information in relation to the HSL. The manufacturer shall mention this requirement in his operating instructions.

6.5 Bolt throw

Supplementary to EN 1300, the bolt throw of the lock shall be at least 8 mm, whereby the bolt is loaded with a force of 2.5 N against the direction of throw.

6.6 Redundancy

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

In this case, all components which are not accessible from the outside and necessary for opening the lock shall be constructed redundant. The occurrence of a failure shall be detected by the lock electronic and be indicated to the operator in an adequate manner.

Note: It is recommended, to design components of high security locks of class 3 and 4 redundant because these locks are used predominantly with high-grade strongroom doors at which an opening after a failure of the lock leads to high expenses.

6.7 Bolt strength

In addition to EN 1300, the extended bolt of the lock shall resist the following loads.

In the case of locks, which are to be used to block a bolt mechanism, the bolt (blocking feature) shall resist forces of at least 1 kN applied to the bolt sides in a 4 mm distance to the lock case (supporting point) against the intended blocking feature. Further, the bolt shall resist a force of at least 1 kN performed against the locking direction. The bolt shall not be pushed back for more than 2 mm in this case.

6.8 Software documentation

A test of the software documentation in accordance with VdS 2203 VdS-Richtlinien für die Brandschutz- und Sicherungstechnik, Software, Anforderungen und Prüfmethoden (*VdS-Guidelines for Fire Protection and Security Technology, Software, Requirements and Test Methods)* is not required for electronic high security locks.

It is recommended,

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– that the software documentation for an electronic high security lock meets the requirements of VdS 2203 VdS-Richtlinien für die Brandschutz- und Sicherungstechnik, Software, Anforderungen und Prüfmethoden (*VdS Guidelines for Fire Protection and Security Technology, Software, Requirements and Test Methods)*.
– to have the software documentation for an electronic high security lock tested by VdS Schadenverhütung GmbH.

6.9 Options

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

6.10 Additional requirements

Due to new designs or production processes or new opening tools or opening methods, additional requirements may become necessary, possibly at short notice and without being described in these guidelines.

These requirements will be discussed with the applicant in each individual case.

If vulnerabilities arise with regard to the resistance to unauthorized opening during the certificate period of an HSL certified in accordance with the applicable standard listed in clause 2 , the applicant shall eliminate these vulnerabilities within a reasonable period of time.

In such a case of vulnerabilities the certification body is free to suspend or revoke the certificate depending on the severity of the vulnerability.

7 Tests

7.1 General tests

7.1.1 Test of the requirements according to EN 1300 and deviations

The individual tests described in EN or by VdS are preferably carried out according to the sequence specified in the following test plan (Table 7-1).

The following applies in principle: If a test sample fails during the tests, it must be decided on a case-by-case basis, if necessary after consultation with the manufacturer (client in accordance with VdS 2344), whether and with which test step the test is to be continued.

7.1.2 Additional tests on electronic high security locks

It is checked whether Annex E of EN 1300 : 2018 applies to electronic HSL designed according to EN 1300 : 2018 Annex E.2.1; it is checked whether the design requirements according to EN 1300 : 2018 Annex E.2.2 are implemented.

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Test	Requirements Clause of VdS 2396 resp. EN 1300	Tests Clause of VdS 2396 resp. EN 1300	Test sample[5]											
			1	2	3	4	5	6	7[1]	8[2]	9[2]	10[2]	11[4]	12[4]
Incoming inspections														
Completeness, documentation Identity	EN 7	VdS 7.1.3	X	X	X	X	X	X	X	X	X	X	X	X
General tests														
Test of documentation	EN 6 and Annex A VdS 6.8	EN 8.1.2 VdS 7.8	X											
Mounting and operating instructions	VdS 6.1.4	VdS 7.1.4 EN Annex A	X	X	X									
Manufacturers declaration	EN Annex C and Annex F** VdS Annex A	EN 8.1.2	X	X	X									
Marking	VdS 6.1.5	VdS 7.1.5 EN 10	X	X	X									
Design requirements														
Construction	EN 5.1 – 5.1.5* EN 5.1 – 5.1.6**	EN 8.1.2	X											
Additional requirements to electronic HSL	EN 5.1.6.8** VdS 6.1.2	EN Annex E** VdS 7.1.2		X										
Electronic tokens	EN 5.1.6* EN 5.1.7** VdS 6.3	EN 8.1.2 VdS 7.3		X										
Firmware-Updates	EN 5.1.9** VdS 6.4	EEN 8.1.2, Table 1 and Annex A VdS 7.4 VdS Annex A		X[3]										
Usable codes	EN 5.2.1 and 5.2.2	EN 8.2.1	X											
Bolt throw	VdS 6.5	VdS 7.5	X											
Manipulation resistance (constructive measures)	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 6.6	VdS 7.6	X	X										
Distributed System	VdS 3841	prEN 17646											X	X
Electrical and electromagnetic resistance														
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 8.2.5.5				X								
High frequency radiation	EN 5.2.6.3 VdS 6.2.1	EN 8.2.5.7 VdS 7.2.1					X							
Induced high frequency	EN 5.2.6.3*	EN 8.2.5.8*					X							

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Test	Requirements Clause of VdS 2396 resp. EN 1300	Tests Clause of VdS 2396 resp. EN 1300	Test sample[5]											
			1	2	3	4	5	6	7[1]	8[2]	9[2]	10[2]	11[4]	12[4]
Conducted disturbances (bursts)	EN 5.2.6.4*	EN 8.2.5.6*					X							
Conducted disturbances (surges)	EN 5.2.6.5* EN 5.2.6.4**	EN 8.2.5.7* EN 8.2.5.6**					X							
Physical environmental resistance														
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 VdS 6.2.2	EN 8.2.6.3 VdS 7.2.2						X	X					
Vibration	EN 5.2.7	EN 8.2.6.1	X											
Shock	EN 5.2.7	EN 8.2.6.2				X	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 6.7	VdS 7.7						X						
Key strength	EN 5.1.3.5* EN 5.1.4.5**	EN 8.2.1.4						X						
Resistance against unauthorized 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						X					
Miscellaneous tests														
Options 4)	VdS 6.9	VdS 7.9	X	X	X									
Additional requirements 4)	VdS 6.10	VdS 7.10	X	X	X									

* EN1300 : 2013

** EN1300 : 2018

1) Sealed test sample

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

3) Only for EL which have firmware update function; the memory of the test sample shall contain at least two pre-entries by the factory.

4) A higher number of required test samples may be necessary in individual cases and will then be coordinated separately between the laboratory and the applicant.

5) In case of design variants, the number of additional samples is determined by the testing laboratory.

Table 7-1: Test matrix

7.1.3 Test specimen, completeness and identity

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

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It is tested by means of visual check and measurements whether the test samples correspond to the information of the manufacturer.

The subsequent tests will be started only if no deviations are found during identity test.

7.1.4 Mounting and operating instructions

It is tested whether the mounting and operating instructions are available in accordance with the requirements (cf. clause 6.1.4) and whether the required notes are included.

7.1.5 Marking

It is checked whether each lock is marked with the information according to the requirements (see section 6.1.5) and is visible in the assembled state of the lock (locking device).

With multiple wiping with a moist cloth, it is tested for 15 + 1 seconds whether the marking does not become unreadable or is difficult to erase or to modify.

7.2 Environmental protection

7.2.1 Resistance to radiated high frequency

The test of the requirements against electromagnetic radiation according to clause 6.2.1 shall be carried out in accordance with EN 1300 : 2018, clause 8.2.5.7.

7.2.2 Resistance against immersion

The test of the requirements against immersion according to clause 6.2.2 shall be carried out in accordance with EN 1300 : 2018, clause 8.2.6.3.

7.3 Electronic tokens

When testing electronic tokens (requirements according to clause 6.3), it is checked whether lock variants use active communication devices, such as smart devices, as contactless tokens.

It is checked whether, when using contactless tokens, data transmission takes place at a maximum distance of 15 cm between the token and the input unit, or whether the electronic token for HSL of class D are used.

7.4 Firmware updates

It is checked (see chapter 6.4) whether the transmission of the firmware updates to the evaluation and/or input unit is encrypted and whether the initiation is done by an authorisation code.

It is checked whether the number of installation attempts of a firmware update meet the requirements of EN 1300 : 2018, Table 1 (column "Maximum number of opening attempts per hour for each coding type").

It is checked whether firmware updates change, add or delete an opening code; this must be documented in the operating instructions.

It is checked whether each firmware update on the HSL must be confirmed by an authorised person.

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It is checked whether the minimum number of records of firmware updates meet the requirements of EN 1300 : 2018, Table 1 (column "Minimum number of firmware-update records").

It is checked that a firmware change log has been submitted and that the procedure and encryption are entered herein (see Annex A).

It is checked whether components between the input and evaluation unit do not generate any safety-relevant information in relation to the HSL. The manufacturer must mention this requirement in his operating instructions.

7.5 Bolt throw

By means of suitable measuring instruments (requirements cf. clause 6.5) it is tested, whether the bolt throw is at least 8 mm during locking, while the bolt is loaded by 2.5 (+0.15/0) N against the locking direction.

7.6 Redundancy

On redundant designed locks it is tested (requirements cf. clause 6.6) if one single failure or one failing component do not degrade the locking function or the operational security and if the operator is informed regarding the occurrence of a failure.

Further, it is tested if all components not being accessible from the outside but necessary for opening the lock are designed redundantly.

7.7 Bolt strength

The test is carried out in a test rig of steel following Figure 7-1 (requirements cf. clause 6.7). The lock is mounted according to the mounting instructions.

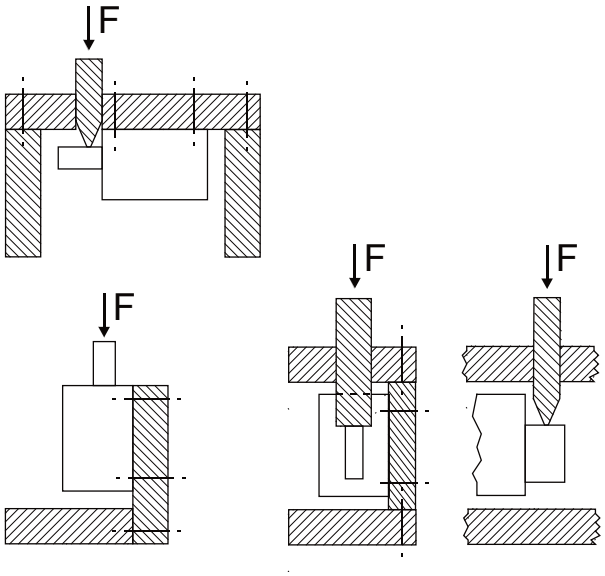


Figure 7-1: Test rig

The cutting edge of the test punch shall be 1.5 ± 0.1 mm broad and operates over the entire width of the bolt. The loading point of the load to the bolt during the test with lateral force is located in a 4 ± 0.1 mm distance to the lock case. The load directions result from the information of the mounting instructions. The bolt is to be extended completely before the test. The loading rise shall not exceed 100 N/s during the test.

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Load is increased to the maximum value of 1 ± 0.05 kN and held for 10 ± 1 s and then taken back. The lock function is examined after this. During the test with load against the locking direction, it is determined whether the bolt with maximum load becomes pushed back for not more than 2 mm.

7.8 Software documentation

Recommendations on the software documentation are described in clause 6.8.

The applicant may commission VdS Schadenverhütung GmbH with the testing. If VdS Schadenverhütung GmbH is commissioned to test the software documentation for an electronic high security lock, the requirements for software documentation shall be tested in accordance with VdS 2203.

7.9 Options

It is tested (requirements cf. clause 6.9), whether options do not negatively influence the required functions of the high security locks.

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

7.10 Additional tests

If special designs or new manufacturing processes or new opening tools or opening methods require this, additional tests are carried out in consultation with the manufacturer.

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Annex A Manufacturers declaration of firmware

(normative)

Name of HSL manufacturer:

Product designation:

VdS approval number *):

Previous firmware version *):

New firmware version:

The following changes have been made in the firmware *):

The firmware is encrypted using the following way:

Name (in block letters): Signature:

Date:

Function in the company:

*) These information are only required if it is a notification of changes to already VdS-approved products.

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Annex B Application by applicant

(informative)

	Case 1	Case 2	Case 3	Case 4
Intention	Applicant wants a modification to an existing approval	Applicant wants a modification or prolongation of an existing approval according to current guidelines/ standards. Alternatively, test and approval (initial certification)	Applicant had developed his EL still according EN1300 : 2013	Applicant has already developed EL according to the requirement tables of prEN1300 : 2021
Formal application	Applicant orders a modification to an existing approval (with testing) according to VdS 2396 : 2022-09 and EN 1300 : 2013	Applicant orders a modification to an existing approval (with testing) according to VdS 2396 : 2022-09 and EN 1300 : 2018 Verification of the fulfilment of the requirements if necessary also retests	Applicant orders testing and approval according to VdS 2396 : 2022-09 and EN 1300 : 2013	Applicant orders testing and approval according to VdS 2396 : 2022-09 and EN 1300 : 2018
Basic of approval	VdS 2396 : 2022-09 EN 1300 : 2013	VdS 2396 : 2022-09 EN 1300 : 2018	VdS 2396 : 2022-09 EN 1300 : 2013	VdS 2396 : 2022-09 EN 1300 : 2018
End of duration	maximum: 30.06.2026	beyond 30.06.2026	maximum: 30.06.2026	beyond 30.06.2026
Valid for	all HSL (MKL, MCL, EL)	MKL und MCL for EL, see Case 4 (Column 5)	EL	EL
HSL for Distributed system			Testing of the HSL as a part of the distributed system according to EN 1300 : 2013	Testing of the HSL as a part of the distributed system according to EN 1300 : 2018

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Annex C Changes

With reference to the version VdS 2396 : 2014-07 (04), the following changes were made to the guidelines:

- References to VdS 3841 and prEN 17646 included
- Validity was changed
- Transition periods were specified
- EN 61000-4-3 was removed, as requirements and test methods are included in EN 1300 since version 2018
- content corrections
- additional requirements and test methods for electronic HSL added
- requirements and test methods for protection against environmental influences, radiated high frequency and immersion have been added
- requirements and test methods for electronic tokens have been added
- requirements and test methods for firmware updates have been added
- clarification on the requirement and test method of the bolt throw
- clarification on the requirement and test method for bolt strength
- requirements and test methods for software documentation have been revised
- requirements and test methods for additional requirements were added
- Table 7-1 was updated
- VdS 2396-S3 was implemented
- Annex A was supplemented
- Annex B was supplemented
- editorial changes

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