Locking Cylinders with Individual Locking Function

Requirements and test methods

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Heruntergeladen von IP 216.73.217.130 am 17.11.2026 - 21:35

Publisher: VdS Schadenverhütung GmbH
Publishing house: VdS Schadenverhütung GmbH

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VdS-Guidelines for Physical Security Devices

Locking Cylinders with Individual Locking Function

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.

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1 General

1.1 Scope

These guidelines are applicable for locking cylinders with individual locking function and locking cylinders used in ancillary control equipment of intruder alarm systems as well as associated test methods. The guidelines are valid in connection with the German standards E DIN 18252 and EN 1303.

Deviating from E DIN 18252, these guidelines can also be used in connection with other models (e.g. round or oval cylinders), as far as requirements and test methods can be applied logically.

The guidelines are not valid for locking cylinders and master key systems or for electronic locking systems. The requirements and test methods for these are shown in:

- VdS 2156-2 VdS-Guidelines for Physical Security Devices, Locking Cylinders with Individual Locking Function, Part 2: Electronic Locking Cylinders
- VdS 2215 VdS-Guidelines for Physical Security Devices, Locking Systems, Requirements and Test Methods
- VdS 2386 VdS-Guidelines for Physical Security Devices, Master Key Systems, Requirements and Test Methods

1.2 Validity

These guidelines are valid starting from 01.09.2017 and replace version VdS 2156 : 2016-01 (09).

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 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 guidelines only when announced by a change of these guidelines. For undated references the latest edition of the publication referred will be applied.

- **E DIN 18252** : 2017-08 Profilzylinder für Türschlösser: Begriffe, Maße, Anforderungen, Kennzeichnung (Profil cylinders for door locks, terms and conditions, measurements, requirements and labeling)
- **EN 1303** : 2015-06 Schlösser und Baubeschläge, Schließzylinder für Schlösser; Anforderungen und Prüfverfahren (Locks and hardware, locking cylinders for locks, requirements and test methods)
- **VdS 2110** Richtlinien für Einbruchmeldeanlagen; Schutz gegen Umwelteinflüsse; Anforderungen und Prüfmethoden (Guidelines for intruder alarm systems, protection against environmental influences, requirements and test methods)
- **VdS 2119** Richtlinien für Einbruchmeldeanlagen; Schalteinrichtungen, Anforderungen (Guidelines for intruder alarm systems; ancillary control equipment (ACE), requirements)
- **VdS 2156-2** Richtlinien für mechanische Sicherungseinrichtungen; Schließzylinder mit Einzelsperrschließung, Anforderungen und Prüfmethoden, Teil 2, Elektronische

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Schließzylinder (Guidelines for physical security devices; locking cylinder with individual locking function, part 2: electronic locking cylinders)

- **VdS 2215** Richtlinien für mechanische Sicherungseinrichtungen; Richtlinien für Schließsysteme; Anforderungen und Prüfmethoden (Guidelines for physical security devices; locking systems, requirements and test methods)
- **VdS 2344** Verfahren für die Prüfung und Anerkennung von Geräten, Bauteilen und Systemen der Brandschutz- und Sicherungstechnik (Procedures for testing and the approval of equipment, components and systems used in fire protection and security technology)
- **VdS 2386** Richtlinien für mechanische Sicherungseinrichtungen; Schließanlagen; Anforderungen und Prüfmethoden (Guidelines for physical security devices; master key systems; requirements and test methods)

3 Terms and Definitions

For general terms and definitions refer to E DIN 18252 and EN 1303, clause 3. In addition the following definitions apply:

Attack side: side of a façade element (e.g. door, window), which needs to be protected against an attack of any trespasser (e.g. the outside front of an apartment door)

Individual locking function: individual locking of a cylinder, which is not a part of a master key system

Copy of key: key which is provided independently of the locking cylinder by the manufacturer or a third party on base of the known code or a presented key sample

Original key: key which is provided together with the locking cylinder by the manufacturer

Ancillary control equipment (ACE) : operating device for setting/unsetting of IAS

Key, next closest: keys for which in the middle area of the bolt keepers the cut (resp. drilling hutch) differs each by on step, positive or negatively from the original key

Note: This may be the third or fourth bolt keeper for example for six bolt keepers.

Special profile: profile of a key for which a legal protection against unauthorised copying of keys is given

Note: This may be a patent protection or mark protection.

Technical copying protection: measures that renders the unauthorised manufacture of copied keys significantly by special function elements or constructional features (e.g. by magnets, balls, sliders).

Pulling protection (in the sense of these guidelines)**:** features at the locking cylinder which are to prevent extracting the cylinder off the lock or the cylinder core off the cylinder body

Note: Pulling protection may be realised also by the use of a burglar-resistant door plate.

Depending and double active detainers: blocking elements that only open if getting confirmed and sorted accurately; if they are sorted too high or too low the cylinder keeps in blocked position

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4 Classification

Deviating from E DIN 18252 resp. EN 1303 locking cylinders in accordance to their performances are graded into the following classes:

Class A

- basic burglary protection

All locking cylinders with **classification A** fulfill the high requirements of these guidelines.

The requirements according to EN 1303 in respect of

- the locking security according to class A
- the durability according to class 6
- the attack resistance according to class A

are also fulfilled.

Class AZ

- basic burglary protection
- integrated pulling protection

All locking cylinders with **classification AZ** fulfill the high requirements of these guidelines.

The requirements according to EN 1303 in respect of

- the locking security according to class 4
- the durability according to class 6
- the attack resistance according to class C

are also fulfilled.

Class B

- medium burglary protection

All locking cylinders with **classification B** fulfill the high requirements of these guidelines.

The requirements according to EN 1303 in respect of

- the locking security according to class 6
- the durability according to class 6
- the attack resistance according to class B

are also fulfilled.

Class BZ

- medium burglary protection with pulling protection
- integrated pulling protection

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All locking cylinders with **classification BZ** fulfill the high requirements of these guidelines.

The requirements according to EN 1303 in respect of

- the locking security according to class 6
- the durability according to class 6
- the attack resistance according to class D

are also fulfilled.

Class B+

- medium burglary protection
- high resistance against environmental influences
- very high resistance against attacks with unbarring tools.

All locking cylinders of **classification B+** fulfil in addition the high requirements of classification B.

These cylinders are suited for use in ACE of intruder alarm systems.

Class BZ+

- medium burglary protection
- integrated pulling protection
- high resistance against environmental influences
- very high resistance against attacks with picking tools.

All locking cylinders of **classification BZ+** fulfil in addition the high requirements of classification BZ.

These cylinders are suited for use in ACE of intruder alarm systems.

5 Requirements

5.1 General

5.1.1 Completeness

Before start of the testing and certification procedure, all required documentation, specimen and accociated fittings are to be handed in.

5.1.2 Identity

Test samples and associated fittings handed in shall correspond with the technical documentation of the product.

5.1.3 Requirements of the Standard

The requirements of E DIN 18252 and EN 1303 with the deviations resp. amendments cited in these guidelines are applicable.

Exclusively according to the standard the following requirements are applicable:

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- function at extreme temperatures
- inter-passing security (security against next closest key)
- key stability
- resistance against attack by turning-off
- resistance against attack by chiseling
- corrosion protection (salt spray test)
- torsion stability of the locking cylinder/cylinder core relating to the locking security

5.1.4 Test Samples

For the technical test in a laboratory test samples taken of the series production with the corresponding keys shall be provided by the manufacturer:

- 10 double cylinders (if possible same closure) with associated keys
- at least three samples for each type of cylinder are to be handed in (e.g. half cylinder, knob cylinder)
- for testing of the inter-passing security two next closest keys (positive and negative) are to be provided by the manufacturer
- if different detainer systems exist, which are used for the calculation of the effective varieties, the next closest keys (positive and negative) are required for each type of detainer system
- for special detainer systems or design variations further test samples may be required; this is agreed before testing with the test laboratory

5.2 Technical Documentation

The technical documentation to be handed in shall comprise the documents following the underneath mentioned list:

- parts list for all cylinder types and design options
- assembly sketch of all cylinder types
- drawings of keys with steps, key profiles with description of the respective profile protection (patent, brand) and their expiry dates
- if a technical copy protection is required, its design is to be described
- mounting instruction according to these guidelines
- assembly instruction (alignment of core and housing pin)
- presentation of the block length compression according to E DIN 18252, clause 6.2.2. relating to the lowest closing from the list of effective codes (worst-case-code) including the underlying calculations
- packaging layout with user marking according to layout and specification of the product marking based on these guidelines

Also to be handed in:

- all versions of packagings to be sold to end-consumers which are marked with the VdS end-consumer marking according to clause 5.5.4

The technical documentation may – deviating from VdS 2344 – be handed in in form of computer files. The formats pdf, docx, dwg, dxf can be read. Other formats may normally be accepted in agreement with VdS if a respective reader is available.

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5.3 Dimensions

Deviating from E DIN 18252 locking cylinders as well as profile cylinders may be desined as round or oval cylinder. If the cylinder is designed as profile cylinder, the dimension requirements of the standard are applicable.

Note: A test and certification ability of alternative designs is possible and at the point of need be agreed before testing with VdS.

5.4 Instructions, Declarations, Markings

5.4.1 Mounting Instruction

Amending to E DIN 18252 a mounting instruction and – if given – care and handling notes are to be annexed to each delivery of one or severel locking cylinders in German language.

Note: If products are sold exclusively in non-German speaking markets, an instruction in English language is sufficient.

The mounting instruction shall contain an overview of the mounting process as well as all security measures and conditions of use (e.g. indication of attack side if only one side of the locking cylinder is equipped with drilling protection).

Especially, a note shall be included that the cylinder is to be protected with a burglar-resistant door plate (with or without pulling protection) of the respective class as well as a note that the cylinder may stick out after assembly 3 mm at maximum from the door plate.

Note: Besides the note on the maximum deviation of the external cylinder surface (cylinder surface higher than door plate surface, acceptable up to 3 mm at maximum) also a note on the maximum deviation of the internal cylinder surface (cylinder surface deeper than the door plate surface; acceptable up to 2 mm at maximum) shall be provided.

5.4.2 Manufacturers Declaration

In amendment to the required technical documentation, the manufacturer shall hand in a declaration according to form in Annex A. Among other, this form shall confirm that the requirements regarding number and design of the lockings as well as repetition of the lockings are considered at manufacture and that the requirements on the keys according to clause 5.5.1 of these guidelines are taken into consideration.

5.4.3 Marking

Deviation from E DIN 18252 each locking cylinder shall be durably markied with name/mark of the manufacturer or approval owner, approval number, type designation and the class. The type designation shall be identical to that one indicated in the technical documentation and the sales documents and shall be used only for the approved locking cylinder.

If a protection of only one side against physical attacks is given the attack side is to be marked durably.

In the assembled state of the locking cylinder no hints on the locking or drilling protection shall be visible.

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A visible marking of the profile cylinder being mounted or a marking of the keys as VdS-approved is admitted.

A marking at the locking cylinder or key of the locking variations shall be coded. It must not be possible to be determined without knowledge of the encryption.

Note: The marking as VdS-approved product shall fulfill the requirements of VdS 2344.

5.4.4 VdS-End-user Marking

Sales packagings of VdS-approved locking cylinders shall be marked for a better understanding for the end-user with the markings according to table 5-1. These markings should also be affixed to the products themselvers.

Class	Markings of packagings[1)]	Markings of products[1)]
A	 with remark[1)]	
AZ		
B	 with remark[2)]	
BZ		

[1)] The logos may be obtained from VdS by the approval owner (as file in pixel or vector graphics). For the use of VdS-end-user marking the requirements of VdS 2344 for the use of the VdS logo ar valid in analogy.

[2)] For locking cylinders of class A and B, besides the end-user marking, it shall be clearly pointed out that the locking cylinder is to be used in combination with VdS-approved burglar resistant door plates only. The following phrases are recommended for this purpose: „Protection plate with cylinder cover necessary“

Table 5-1: End-user marking

5.5 Construction

5.5.1 Keys

In addition to E DIN 18252 for cylinders with individual locking function, key profiles or patterns of drillings which are used in master key systems shall not be used.

Keys shall consist of nickel silver or material of higher quality regarding the stability and corrosion features and shall dispose of a special profile.

Keys for locking cylinders of **class A and AZ** shall have a special profile with protection or shall be protected by a technical copying protections against unauthorised copying of keys (special keys).

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Keys for **classes B, BZ, B+ and BZ+** locking cylinders shall have additional constructional features (e.g. protected key profile), that increase the difficulty of getting unauthorized copies of keys.

The copying of keys and/or locking cylinders for **classes B and BZ** shall be restricted to the manufacturer or to dealers only which are authorised by the manufacturer, considering the following circumstances:

- The dealer shall be obliged to produce a copy of the key only if a security card is being presented.
- **Every** blank key that a dealer receives from the manufacturer has to be marked, so the dealer can be identified at any time.
- If the dealer's proceeding with the blank keys does not fulfill the requirements mentioned, he shall no longer be supplied with blank keys by the manufacturer.

Keys for profile cylinder for **classes B+ and BZ+**, intended for the use in ancillary control equipment (ACE) of intruder alarm systems (IAS), the following requirements are applicable:

- Keys shall only
  - be delivered by the manufacturer himself and
  - only against an authorisation identification.
- The manufacturer shall document all deliveries of these blank keys.

The validity period of the protection of the key profile has to be in line with the validity period of the VdS certificate at least.

5.5.2 Effective Varieties

Deviating from EN 1303, clause 4.8.1 only those moving detainers are considered for calculation of the effective varieties, that are variable, depend on each other and are double active.

In addition to EN 1303, clause 4.8.1 and table 2 the locking codes may repeat in production for cylinders with individual locking function after 30,000 (**class A, AZ**) resp. 100,000 (**class B, BZ, B+, BZ+**) at the earliest.

5.5.3 Protection Against Picking Methods

Locking cylinders in **classes A, AZ** shall have a basic and in **classes B, BZ** an increased protection against picking methods.

A basic protection in **classes A, AZ** may be given if the following features are available, if technically realisable:

- profile cylinder without dimples fulfill the requirements of DIN 18252
- a minimum of two different body pin lengths are used and the difference of the length shall be two steps at the least
- for locking cylinders for keys with dimples, a minimum of two core pins shall be set in the front part (first 2/3, measured from the exterior side of the cylidner) of the locking cylinders, which are long enough to be pushed into the housing in case of a picking attack at the pins behind them.

The cylinder shall not be overcome in case of a picking attack within 10 minutes.

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An increased protection in **classes B, BZ** may be given if the following features are available:

- all features of **classes A, AZ** as before mentioned
- for locking cylinders driven by keys with cuts the keyway as well as the key profile shall be designed such that both profile lines overlap or touch the mid-line of the profile three times at the least and twice of that within the pin reading area of the core pins.

Additional locking features are permitted, if the forced opening (picking) of the cylinder such way becomes effectively more difficult.

The cylinder shall not be overcome in case of a picking attack within 30 minutes.

An increased protection in **classes B, BZ+** may be given if the following features are available, if technically realisable:

- all features of **classes B, BZ** as before mentioned
- the detainers are aligned in several rows
- besides the main detainer system further variable, depending and double active blocking elements are existing

Alternatively to the pre-mentioned constructional requirements on physically coded locking cylinder, it is admitted that

- locking constructions are used which may not be attacked with manipulation tools (e.g. magnet locking systems).

The cylinder shall not be overcome in case of a picking attack within 90 minutes.

5.5.4 Resistance Against Attacks With Metal-cutting Tools

Deviating from DIN EN 1303, clause 4.9.2 locking cylinders tested according to clause 6.5.4 of these guidelines shall resist a minimum time as shown in table 5-2 in case of attacks with metal-cutting tools.

Class	**Minimum resistance time**	**Total test time**
A, AZ	3 min	10 min
B, BZ, B+, BZ+	6 min	15 min
Table 5-2: Resistance to attacks with metal-cutting tool		

5.5.5 Resistance Against Attacks With Pulling Tools

Deviating from EN 1303, clause 4.9.5 locking cylinders shall resist a minimum time as shown in table 5-3 in case of attacks with pulling tools.

Class	**max. extraction force**	**Minimum resistance time**
AZ	15 kN	3 min
BZ, BZ+	15 kN	6 min
Table 5-3: Resistance to attacks with extraction tools		

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For **class A, B** and **B+** cylinder it is required that the technical documentation of the manufacturer contains the information that the locking cylinder shall be used only in connection with a VdS approved burglar-resistant door plate of the corresponding class with pulling protection.

The resistance time is calculated by the sum of the time which is used for drilling the pulling screw as well as the time during which the screw is applied (efforts for installing the machine a. s. are not added to the resistance time).

5.5.6 Protection Against Corrosion

Locking cylinders of classes B+, BZ+ shall dispose of a sufficient resistance capability against corrosion in analogy to the guidelines VdS 2110.

After finalisation of the conditioning with corrosive material the cylinder shall be operable with a maximum torque of 2.5 Nm.

5.5.7 Registration of Delivered Keys

The manufacturer shall operate a documentation system for the delivery of keys for locking cylinders of **classes B+, BZ+**.

5.5.8 Durability

In addition to EN 1303, clause 4.3 locking cylinders equipped with a cam to operate the lock shall resist the force acting upon the cam during the locking procedure as in the determinations of table 5-4.

A grease as recommended for the locking cylinder according to the maintenance instructions is to be provided for testing.

Class	**Number of locking cycles**
A, AZ	100.000
B, BZ, B+, BZ+	200.000
Table 5-4: Durability	

5.6 Additional Requirements

Due to new constructions or manufacturing processes resp. new opening tools or methods, additional requirements may become necessary in short-time and without previously being described.

These requirements are discussed with the applicant from case to case.

6 Test Methods

6.1 General

6.1.1 Completeness

It is tested if the test samples are complete and handed in together with the associated keys and if all necessary documentation is available.

The tests are continued only if no deviations are determined.

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6.1.2 Identity

By visual test and measuring control it is checked if the test samples correspond with the manufacturers indications.

The tests are continued only if no deviations are determined.

6.1.3 Requirements of the Standard

It is tested by the methods as described in E DIN 18252 and EN 1303 if the test samples correspond with the requirements as described in the respective standard.

6.1.4 Test Samples

It is tested if the test samples handed in fulfil the requirements as mentioned in clause 5.1.4.

If the product is not yet in series production the test can be done on prototypes. In this case a verification with products coming out of the series production is necessary to get the final result.

6.1.5 Tolerances

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

6.1.6 Documentation

The test steps are – if not otherwise noted – documented in the frame of a test report.

6.1.7 Test Matrix

The individual tests are carried out according to the sequence as in the following test matrix, table 6-1. If one sample fails during the test it shall be decided on an individual basis, according to consultation with the manufacturer where appropriate, whether and with which step the test program will be continued.

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Test N°	Test	EN 1303 clause	E DIN 18252 clause	VdS 2156-1 clause	Test sample									
					1	2	3	4	5	6	7	8	9	10
1	Completeness			6.1.1	x	x	x	x	x	x	x	x	x	x
2	Identity			6.1.2	x	x	x	x	x	x	x	x	x	x
3	Mounting instructions			6.4.1	x	x	x	x	x	x	x	x	x	x
4	Declaration of manufacturer			6.4.2	x	x	x	x	x	x	x	x	x	x
5	Regristration of delivered keys			6.5.7	x	x	x	x	x	x	x	x	x	x
6	Marking	8	10	6.4.3	x	x	x	x	x	x	x	x	x	x
7	Dimensions		7.4	6.3	x	x	x							
8	Construction	6.8.1 6.8.2 6.8.3 6.8.4	6.2.1 6.2.2 6.2.3 6.2.4 6.2.5 6.2.6	6.5.1 6.5.2	x	x	x							
9	Resistance against unbarring			6.5.3	x	x	x							
10	Function at extreme temperatures	6.7.2			x	x	x							
11	Protection against next closest key	6.8.5			x	x	x							
12	Durability	6.3		6.5.8	x	x	x							
13	Stability of keys	6.2			x	x	x							
14	Stability against turning off	6.9.3			x	x	x							
15	Resistance against attack with chisel	6.9.2			x	x	x							
16	Corrosion stability (salt spray test)	6.7.1						x	x	x				
17	Protection against corrosion (SO_2)*			6.5.6				x	x	x				
18	Resistance against attack with metal-cutting tools	6.9.1		6.5.4				x	x	x				
19	Resistance against attack with pulling tools	6.9.4		6.5.5							x	x	x	
20	Resistance against torsion of the cylinder and/or the cylinder core regarding the locking security	6.8.6									x	x	x	
21	Additional tests			6.6										x

* Tests only for locking cylinders of classes B+ and BZ+.

Table 6-1: Test matrix

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6.2 Technical Documentation

It is tested if the documentation is complete and fufils the requirements of clause 5.2.

Especially, it is tested if the calculations of the block lengths are feasible.

6.3 Dimensions

It is tested if the test samples – if profile cylinders – fulfil the dimensions requirements as indicated in E DIN 18252, clause 7.4.

For deviating constructions (e.g. round or oval cylinders) the test is made by considering the respective regulations.

6.4 Instructions, Explanations, Markings

6.4.1 Mounting Instructions

It is tested whether a mounting instruction is attached to each locking cylinder according to the requirements (cf. clause 5.4.1) and if it contains the required notes.

6.4.2 Declaration of the Manufacturer

It is tested whether the declaration of the manufacturer (cf. annex A) was submitted according to the requirements according to clause 5.4.2, especially if these contain the requested confirmation.

6.4.3 Marking

It is tested whether every locking cylinder is marked with the required information (cf. clause 5.4.3) and if any references to the locking secret on the cylinder or the keys are coded.

Furthermore it is tested, whether each marking is sufficiently steady, e.g. by peeling, wiping with a moist cloth or by simple scraping.

6.4.4 VdS end-user Marking

It is tested if the sales packagings resp. the specimen are marked with the VdS end-user marking and if this fulfils the requirements as in clause 5.4.4.

6.5 Construction

6.5.1 Keys

It is tested if the test sample is marked according to the requirements as in clause 5.5.1 and if possible indications of the locking on the cylinder or the key are coded. In addition, the manufacturers declaration (cf. Annex A) on the indications of the keys is controlled.

6.5.2 Effective Varieties

It is tested if the test samples fulfil the requirements as in clause 5.5.2. The test is done on base of the manufacturers documentation. Especially, an evaluation is made, if the basic calculation for determination of the number of effective varieties is feasible by taking into consideration the construction of the cylinder.

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6.5.3 Resistance Against Picking Attacks

It is tested it the test sample fulfil the requirements as in clause 5.5.3.

In addition, it is determined by manual attempts if the required resistance against picking attacks is given.

6.5.4 Resistance Against Attacks with Metal-Cutting Tools

It is tested if the test samples fulfil the requirements as in clause 5.5.4.

For testing of the resistance against mechanical attacks the sample will be mounted in a door replication made of steel including a mortise lock and a burglary-resistant door shield.

The attack starts on the front end of the profile cylinder with an electric drill machine.

- Nominal capacity of the machine is 1000 W at maximum.
- adjustable speed up to 3000 rpm.
- The drilling may be done with
  - carbide drills with a diameter of 2 to 7 mm or
  - HSS-drills with diameter of 2 to 12 mm.
- The drills may be especially cut.
- The number of drills is not limited.
- The electric drill can be equipped with a depth stop.

The points of attack will be specified by the tester on base of the construction documents and noted in the test protocol.

Exclusively the net drilling time will be count as resistance time. Exchanging of drill bits is counted as 10 s working time. The total test time consists of the resistance time and the time for e.g. cleaning of drilling hole, removal of swarfs or pins, locking attempts a. o. Times for test documentation (recording, photo shooting) are not counted to the total test time.

For activities being performed besides the test (e.g. cleaning) any further common small tools (pliers, tweezers, keys, ect.) up to a length of 200 mm and a screw driver up to a blade width of 12 mm may be used.

The profile cylinder fails if within the minimum resistance time according to the class (cf. clause 5.5.4) and within the total test time the blocking elements were remouved or weakened in a way that the locking cylinder can be operated at least one time.

The test will be executed at 3 profile cylinders. The worst result will be considered for the evaluation.

6.5.5 Resistance Against Attacks with Pulling Tools

For testing the pulling prevention the sample will be mounted in a door replication made of steel including a mortise lock and a burglary-resistant door plate.

Within the minimum resistance time for the relevant class (cf. clause 5.5.5) different screws will be turned into the cylinder (either directly or by use of drilling tools). The torque at screwing is not measured, but is limited by the used material.

For the pulling attempt self-cutting screws are applied to the construction of the cylinder.

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By means of a test rig the maximum possible pulling force will be determined.

The profile cylinder fails if at a force of up to 15 kN the core can be pulled out of the housing or the whole cylinder will be pulled out of the lock so that an operating of the lock can be done.

If it is not possible to turn in a screw within the minimum resistance time or the force of the turned screw cannot be transferred to the locking cylinder, the requirements are fulfilled.

6.5.6 Protection Against Corrosion (SO_2)

A K3-test is performed according to VdS 2110 with 15 cycles and 0.2 l SO_2 at locking cylinders of classes B+ and BZ+.

Once after each test cycle the cylinder has to be operated.

After the test it shall be possible to operate the cylinder with a maximum torque of 2.5 Nm.

6.5.7 Registration of Delivered Keys

It is tested whether the manufacturer disposes of a documentation system for the delivery of keys for locking cylinders of classes B+ and BZ+.

6.5.8 Durability

The durability of the test sample is tested as described in EN 1303, clause 6.3.

For locking cylinders with a cam, the cam shall be subjected to a force during the turn of the key in an angle range from 315° to 45° with a vertical force of 15 N (for example a weight of 1.5 kg; cf. figure 6-1).

During the test the sample is greased according to the maintenance instruction of the manufacturer with the provided grease material.

It is tested if the test samples fulfil the requirements as in clause 5.5.8 (number of locking cycles).

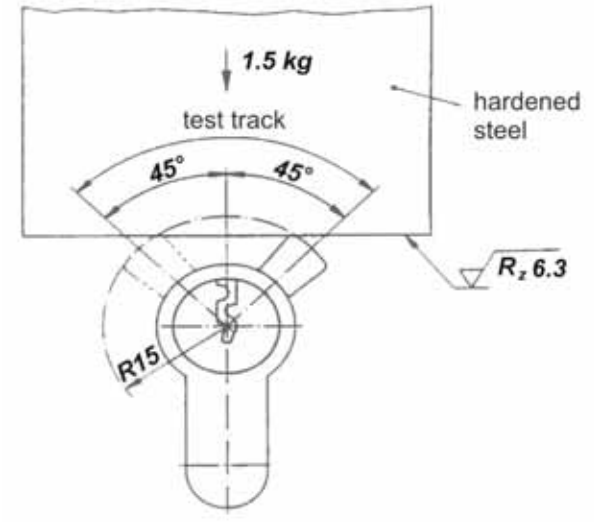


Figure 6-1: Conditioned angle range

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6.6 Additional Tests

If according to clause 5.6 additional requirements are to be described, the fulfilment of the requirements is verified by suitable test methods.

7 Changes

Compared with version VdS 2156 : 2016-01 (09) the following changes were made:

- adaption of current DIN standards (E DIN 18252:2017-08)
- adaption of the requirements to the prescriptions of E DIN 18252 (a.o. regarding the indications of class conformity of VdS and standard, clause 4)
- concretisation of test description “resistance against attacks with pulling tools” (clause 6.5.5).
- definition of next closest key (clause 3)
- editorial changes

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Annex A Declaration of the Manufacturer (normative)

Declaration of the Manufacturer

With this we declare, that for manufacturing of the locking cylinder
model _____
in our factory _____
the following organizational measures were taken:

Code variations

A permutation table was created, according to which at random _____._____ code variations can be produced. The requirements regarding EN 1303, clause 4.8.1 and E DIN 18252, clauses 6.2.1 to 6.2.6 are being considered. It is guaranteed, that a code is repeated at the earliest after _____._____ produced variations.

Keys

For locking cylinders with coded individual locking functions only key profiles are being used, that are not in use for master key systems.

For cylinders in classes B, B+, BZ and BZ+ only protected profiles are being used.

Blank keys will be delivered through authorised dealers only.

The delivery of copies of keys or cylinders with the same code requires the presentation of an identification approval.

Every delivered key and locking cylinder for ancillary control equipment of intruder alarm systems are being registered by us.

The key profile protection is valid until _____month/year.

_____, the _____

_____

Stamp/signature

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