



Locking Systems

Requirements and Test Methods

Publisher and publishing house: VdS Schadenverhütung GmbH

Amsterdamer Str. 172-174

50735 Köln, Germany

Phone: +49 221 77 66 0; Fax: +49 221 77 66 341

Copyright by VdS Schadenverhütung GmbH. All rights reserved.

VdS Guidelines for Physical Security Devices

Locking Systems

Requirements and Test Methods

Content

1	General	4
1.1	Scope.....	4
1.2	Validity	4
2	Normative references	4
3	Terms and definitions	5
4	Classification	6
5	Requirements	7
5.1	Locking cylinders	7
5.2	Locking system	8
6	Test methods	9
6.1	Test matrix	9
6.2	Locking cylinders	10
6.3	Locking system	10
6.4	Additional tests	10
Annex A – Declaration of the manufacturer (normative)		11

1 General

1.1 Scope

These guidelines contain minimum requirements for locking systems as well as for locking cylinders used in locking systems. These guidelines are valid together with VdS 2156 und VdS 2156-2.

These guidelines are not valid for locking cylinders with individual locking function or for electronic locking assembly as specified in VdS 2215.

The applicability of locking cylinders for the use in locking systems is reported exclusively in the certificate of the cylinders VdS-approval. So the manufacturer of these cylinders has the right to compose and to attest VdS-approved locking systems.

When developing a locking system it has to be considered which areas are rated security-relevant on the customer's part. If necessary the manufacturer should be of help with rating the security-relevant areas because typically not all areas of a locking system need to meet high security requirements.

The VdS-approval is valid for the hole locking system (similarly for security-relevant and the not security-relevant areas), as far as the developing and composing of the system is attested by the manufacturer regarding these guidelines.

Note: Locking cylinders being part of a locking system shall be used in ancillary control equipment (ACE) of intruder alarm systems (IAS) only if for the authorization of unsetting the IAS an additional identification feature is being evaluated (cp. VdS-certificate of ACE as well as VdS 2311, Guidelines for Intruder Alarm Systems, Planning and Installation) or if the cylinders explicitly are approved for this application.

1.2 Validity

These guidelines are valid from 2007, November 1st; they replace the guidelines VdS 2386 : 2004-11.

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.

- **DIN EN 1303** : 2005-04 Baubeschläge, Schließzylinder für Schlösser; Anforderungen und Prüfverfahren
(Hardware, locking cylinder for locks requirements and test methods)

- **DIN 18252** : 2006-12 Schließzylinder für Türschlösser: Begriffe, Maße, Anforderungen, Kennzeichnung (Locking cylinder for door locks, terms and conditions, measurements, requirements and labelling)
- **VdS 2156en** Guidelines for Physical Security Devices, Locking Cylinder with Individual Locking Function, Requirements and Test Methods
- **VdS 2156-2en** Guidelines for Physical Security Devices, Locking Cylinders with Individual Locking Function, Requirements and Test Methods, Part 2: Electronic Locking Cylinders
- **VdS 2215** Richtlinien für mechanische Sicherungseinrichtungen, Schließsysteme, Anforderungen und Prüfmethode (Guidelines for mechanical security devices, locking systems, requirements and test methods)
- **VdS 2311en** Guidelines for Intruder Alarm Systems, Planning and Installation
- **VdS 2344en** Procedures for Testing and the Approval of Equipment, Components and Systems Used in Fire Protection and Security Technology

3 Terms and definitions

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

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

Ancillary control equipment (ACE): Operating device for setting/unsetting of intruder alarm systems (IAS), e.g. ACE with physical identification feature.

Locking system: Any quantity of individual locking cylinders which are combined to a functional unit. Regarding the design central locking systems, master key systems and general master key systems are differentiated.

Central locking system: Locking systems in which a multiple of different keys can control one or more central locking cylinder.

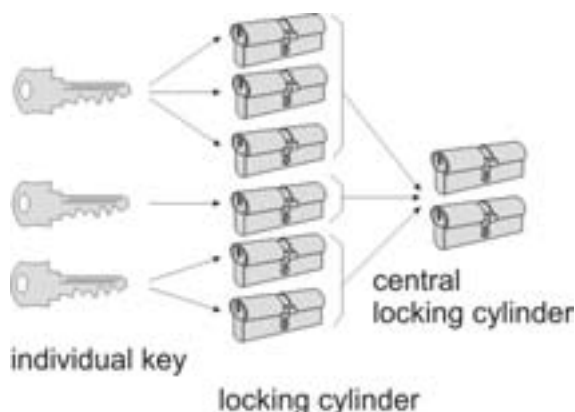


Figure 3.01: Central locking system

Master key system: Locking system implying a master key that is able to control every locking cylinder in the system.

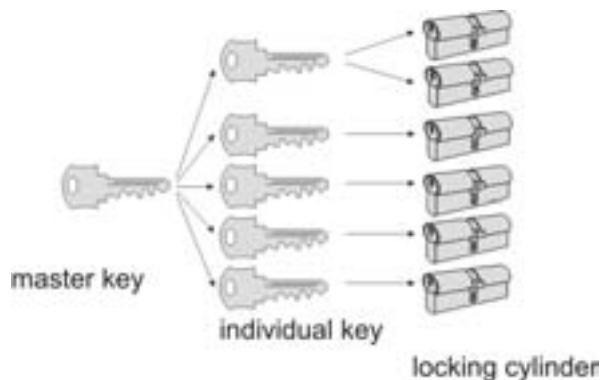


Figure 3.02: Master key system

General master key system: Locking system which organisational functionality is extended compared with master key systems by the aid of general master keys, main group keys and/or group keys.

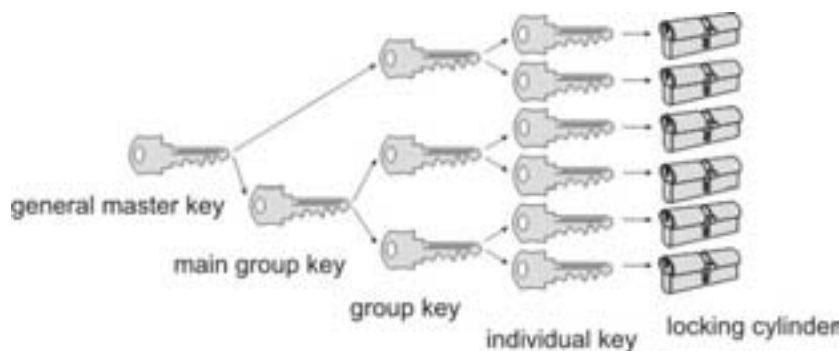


Figure 3.03: General master key system

Security relevant area: Area of a locking system being secured by locking cylinders for which regarding the burglary protection the same requirements are valid as for VdS-approved locking cylinders with individual locking function.

4 Classification

According to their design locking systems are differentiated as follows:

- **Model type central locking system (Z¹⁾)**

In security relevant areas of locking systems of model type Z locking cylinders of VdS class A respectively AZ are used. These locking cylinders besides the higher requirements of the guidelines VdS 2156 respectively 2156-2 meet the requirements according to DIN 18252, class 21, 31 or 71.

Locking cylinders of class A respectively AZ provide a basic burglary protection.

¹⁾ German term: "Zentralschließanlage"

– **Model type master key/general master key system (HS/GHS¹⁾)**

In security relevant areas of locking systems of model type HS/GHS locking cylinders of VdS class B, BZ, C respectively CZ are used. Locking cylinders of class B respectively BZ besides the higher requirements of the guidelines VdS 2156 respectively 2156-2 meet the requirements according to DIN 18252, class 42 or 82.

An equivalent of class C locking cylinders regarding the security against unauthorized opening according to DIN 18252 is not given.

Locking cylinders of class B respectively BZ provide a medium burglary protection. Locking cylinders of class C respectively CZ provide a high burglary protection.

5 Requirements

The requirements VdS 2156 respectively VdS 2156-2 are valid with the following deviations and/or additions.

5.1 Locking cylinders

In addition to VdS 2156 respectively VdS 2156-2 locking cylinders used in security relevant areas of locking systems shall fulfil the following requirements.

5.1.1 Detainers

For the number of pins as shown in table 5.01 no split pins or comparable multiple partitions shall be used in locking systems for security relevant areas.

Locking cylinders for locking systems of model type	Detainers without split pins
Z	at least 4
HS/GHS	at least 5

Table 5.01: Detainers

If the detainers are arranged in multiple rows the required number of detainers without split pins shall be realized in at least one row.

5.1.2 Effective varieties

Locking cylinders for security relevant areas shall provide the same security against unauthorized keys as locking cylinders with individual locking function. Varieties needed for the locking systems objectives shall be given additionally.

For one key profile the number of effective varieties shown in table 5.01 shall not be used within the respective locking system.

¹⁾ German term: "Hauptschlüsselanlage; Generalhauptschlüsselanlage"

Locking cylinders for locking systems of model type	Effective varieties not to be used
Z	at least 29,999
HS/GHS	at least 99,999

Table 5.02: Effective varieties

Deviating from DIN EN 1303, clause 3.2, only those moving retainers are considered for the calculation of the effective varieties, that are depending and double active.

5.1.3 Dimensions of locking systems

Regarding the a.m. restrictions a locking system (model type HS/GHS) shall allow at the least 30 locking cylinders for servicing security relevant areas.

The separation of security relevant areas shall be realized neither only by variation of the key profile nor by using of retainers not being depending and double active.

5.1.4 Keys

No key profiles of locking cylinders with coded individual locking functions shall be used in locking systems.

Keys for locking systems of model type HS/GHS shall additionally dispose of features, as e.g. industrial property right (protection by patent, registration of design), specific construction features, impeding the illegal purchase of duplicate keys significantly.

The subsequent delivery of keys and/or locking cylinders for locking systems of model type HS/GHS shall only be carried out by the manufacturer himself against presentation of the legitimation (e.g. security card).

The validity period of the industrial key profile protection shall at least meet the validity period of the VdS approval according to VdS 2344, clause 2.3.

5.2 Locking system

5.2.1 Declaration of the manufacturer

In addition to the technical documentation according to DIN 18252, clause 8.3, the manufacturer shall deliver a declaration according to annex A.

5.2.2 Documentation of the system

When handing over the locking system to the system user the conformity of the system with these guidelines shall be confirmed in writing.

The locking plan shall show the positions of the locking cylinders for security relevant areas.

The system user is to be informed about the documentation of the locking system as well as about the necessity of a precise administration of the locking system. In particular the risk by losing keys and by keys that can not be related to an individual user shall be named. Furthermore the system user shall receive information that changes of the system structure with effects to the locking plan have to be agreed upon with the manufacturer.

5.2.3 Administration of the locking system

The manufacturer shall provide a software to the system user to enable an EDP-based administration of the locking system

The software shall at least include the following features:

- EDP-controlled administration program for locking systems based on an up-to-date operating system.
- Interface for importing data regarding the locking system that are stored by the manufacturer by data medium or file transfer.
- Possibility for importing data regarding the locking system as well as delivery of part of these data according to customers request (upgrading, reorder).
- Keyword protection for guaranteeing the data security.
- Printing of standard forms for delivering and retraction of keys, ordering keys and locking cylinders, of locking plans and the like.
- Administrating the keys on their status, e.g. “delivered”, “placed in storage”, “lost”.
- Administrating the locking cylinders on their status, e.g. “mounted”, “damaged”, “ordered”
- Display of access authorisations regarding keys respectively persons
- Evaluating and printing of stock of keys and locking cylinders
- Planning of possible upgradings of the locking system.

6 Test methods

6.1 Test matrix

The tests of the requirements shown in clause 5 are carried out on basis of the technical documentation.

Step	Test	Clause VdS 2386
1	Constructive features	6.1.2
2	Key profile	6.2.2
3	Declaration of the manufacturer	6.3.1
4	Documentation of the locking system	6.3.2
5	Administration software	6.3.3
6	Additional tests	6.4

Table 6.01: Test matrix

6.2 Locking cylinders

6.2.1 Constructive features

On basis of the technical documentation it is tested if a locking system with the minimum number of locking cylinders for security relevant areas as named in the declaration of the manufacturer can be realized technically considering the given cylinder construction and the requirements according to clauses 5.1.1 to 5.1.3.

6.2.2 Key profile

It is tested whether for locking cylinders of locking systems no key profiles of cylinders with coded individual locking function are used and if key profiles for locking cylinders of class B (use in locking systems of model type HS/GHS) dispose of features that impede the providing of duplicate keys significantly (cp. clause 5.1.4).

Furthermore it is tested if the subsequent delivery of keys and/or locking cylinders for locking systems of class B is only carried out by the manufacturer himself against presentation of the security card (legitimation).

6.3 Locking system

6.3.1 Declaration of the manufacturer

It is tested if the declaration of the manufacturer according to annex A is handed in.

6.3.2 Documentation of the system

It is tested if the documentation of the locking system contains the essential information for the user regarding clause 5.2.2 and if the positions of the locking cylinders for the security relevant areas are shown in the locking plan.

6.3.3 Administration software for locking systems

With the data of a locking system sample it is tested if the requirements regarding the administration software for locking systems according to clause 5.2.3 are fulfilled.

6.4 Additional tests

New constructions or production methods as well as new opening tools or methods may require additional tests.

Changes

Compared with version VdS 2386 : 2004-11 the following changes were made:

- Editorial changes
- Adaption of locking cylinder grading regarding the revised form of VdS 2156 and VdS 2156-2
- Cancellation of requirements already mentioned in VdS 2156.

Annex A – Declaration of the manufacturer (normative)

Declaration

With this we declare, that for manufacturing of the locking system on basis 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 DIN EN 1303, clause 4.7.3 and DIN 18252, clauses 7.1.1 to 7.1.6 are considered.

Keys

For locking cylinders with individual locking function and locking cylinders for locking systems differing key profiles are use. For locking cylinders for locking systems only protected key profiles are being used; we will not deliver blank keys.

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

The key profile protection is valid for the next years to come.

Planning and realization of locking systems

Security relevant areas are identified and considered when planning locking systems.

Criteria as shown in the following are considered when creating locking systems:

When using locking cylinders of class A for security relevant areas of model type Z locking systems in **four** detainers and when using locking cylinders of class B for security relevant areas of model type HS/GHS locking systems in **five** detainers no split pins are applied.

The locking system will be constructed in a way that for cylinders of class A **for every single key profile** at the least 29,999 of possible varieties are not used in the system. For cylinders of class B at the least 99,999 of the possible varieties are not used in the system.

Considering the a.m. restrictions a master key system with differing locking cylinders for security relevant areas can be created.

Locking cylinders of a system which do not fulfil the requirements for cylinders for security relevant areas (e.g. more detainers with split pins), will not be signed with the mark of VdS compliant cylinders.

.....
Date

.....
Stamp and signature of authorized representative
of manufacturing site