



Locking Cylinders



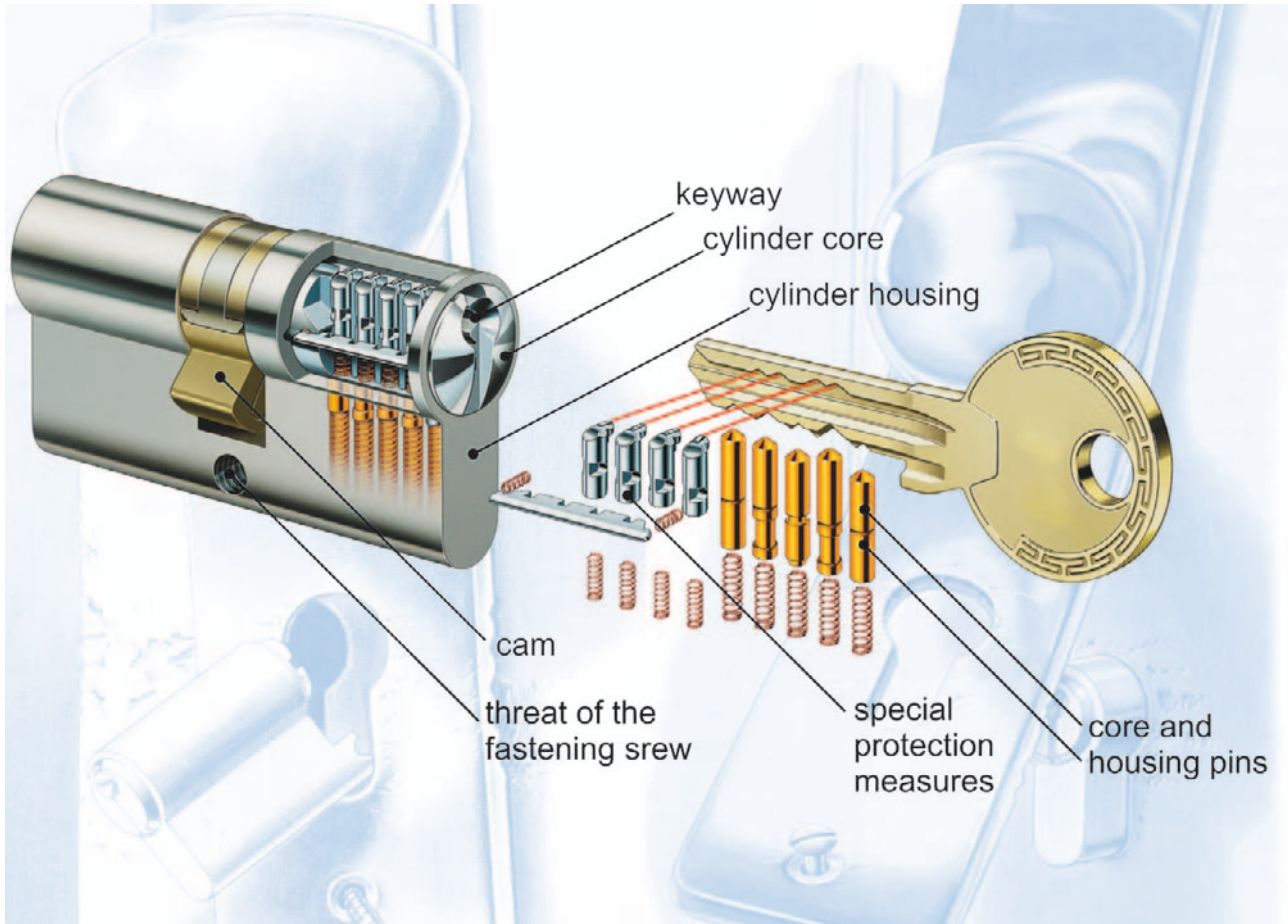


We wish to thank the Police, in particular the “Kommission Polizeiliche Kriminalprävention der Länder und des Bundes - KPK” (German Police committee for crime prevention) for the good and constructive cooperation in producing this brochure.



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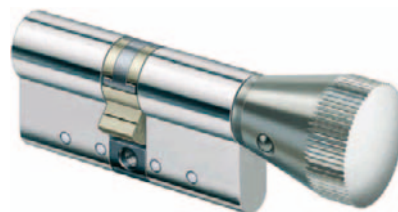
Profile cylinders

The profile cylinder is almost always used where doors are to be locked and secured to prevent unauthorised access. It can be used to lock house and apartment doors, but also office and other intermediate doors.

As the heart of a lock system, particular attention should be paid to the profile cylinder.

Types of cylinders

Apart from the profile cylinder, there are also a number of other types of cylinders. Of particular note here are round and oval cylinders. The market significance of these variants that also used to be very widespread is now steadily declining, at least in the German-speaking market.



Profile cylinders are used not only in house and apartment doors, garage doors and gates, but also in window handles and furniture locks. It is very convenient if the locking cylinders of an area are designed with simultaneous locking. Then all the locks from the house outside door through to the inside door can then be opened and closed with one and the same key.

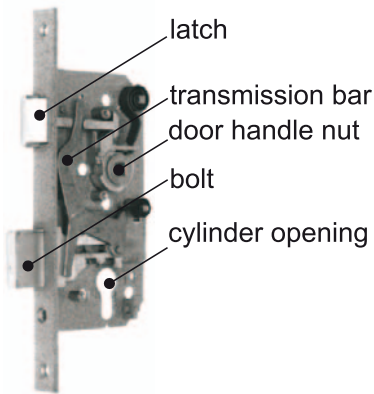
Special locking cylinders are also available for installation in house and apartment doors that have a turn knob "on the inside". The user can thus open and close the door or lock comfortably from the inside without having to use a key. Such cylinders with knob should not be used, however, in doors with glass inserts. If the glass insert is smashed, the knob may be accessible from the outside and the door could be opened.

Function

It is only the locking cylinder that allows the lock to be locked/unlocked using the matching key.

When the locking cylinder is turned, a lever (the "cam") actuates the mechanism of the lock, whereas bolt and latch are pulled back.

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The most common type of locking cylinder consists of a body or housing, a core, several locking pins and a lever to actuate the lock.



When the lock is closed, the cylinder core is blocked by the pins. When the key is inserted, the pins are moved to a position in which the cylinder core and hence the cam driving the mechanism of the lock can be turned.



So-called electronic locking cylinders differ fundamentally from the mechanical solutions described above. In conventional locking cylinders, the form of the key contains the code. The code is “read” by scanning the key. In electronic locking cylinders, both encryption and scanning are per-

formed either exclusively or in addition to the mechanical encryption by electronic means.

In doors with particularly high security levels, for example, electronic encoding or combinations of electronic and mechanical solutions could be employed. For doors that are essentially locked only for organisational reasons, on the other hand, the simpler mechanical solutions are generally sufficient.

Security features

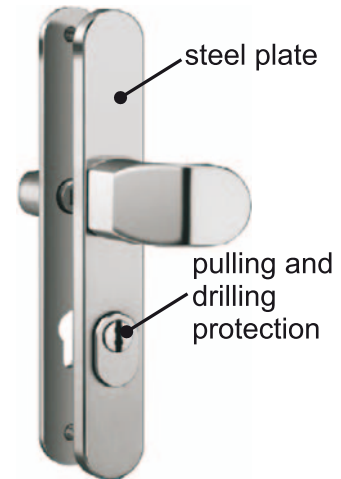
Locking cylinders as central components in a locking system have to be protected against both forcible and “intelligent” attacks.

One example of a forcible attack is the use of a drill. Locking cylinders without special drilling protection are relatively easy to destroy. The precision mechanics of the product are either destroyed or manipulated in such a way that secure locking is no longer possible.



A further forcible technique is to break-off the locking cylinder. If the cylinder protrudes out of the door by more than 3 mm on the outside, it can be easily broken off simply using pliers.

A further method of overcoming the lock is pulling. In this case the cylinder core is pulled forcibly out of the housing.



A burglar-resistant door plate can offer effective resistance to these and other burglary techniques.

A door plate this kind is generally made of solid steel and offers comprehensive protection for lock and locking cylinder.

But a profile cylinder also has to be able to withstand “intelligent” attacks. In the case of an intelligent attack, the burglar tries to overcome the locking cylinder without the use of destructive tools. The cylinder manufacturers incorporate special protective devices into their products to prevent opening with picking tools. During testing, a great deal of experience and time is invested in examining whether a locking cylinder is adequately protected

Electronic locking cylinders often solve the problem of unauthorised opening through the enormous number of possible codes. Furthermore, the electronic locking cylinder is inhibited for a certain length of time if the code is entered incorrectly several times.

An electronic key can easily have well in excess of 100 million codes. By comparison: Mechanical keys of the highest security class have to be able to incorporate 1 million codes.



Not least due to the large number of possible codes, electronic solutions have the advantage that individual codes can be marked in many cases as unauthorised. Lost keys or keys whose owners are no longer to be permitted access to certain areas can be barred or their access authorisations can be changed using a simple computer program. These keys are then recognised as no longer “fitting”. With mechanical solutions, this method is almost impossible in practice.

Approval classes

Mechanical locking cylinders are approved in the classes A and B. Electronic locking cylinders can be additionally assigned the highest class C (according to VdS 2156,

part 2). VdS-approved profile cylinders are marked with the VdS logo and the approval number.



The locks are classified on the basis of tests that cover not only the general functions but also and more importantly the security of the locking cylinders against unauthorised opening. Standard specifications, such as the dimensions of the products, are contained in the relevant standards (DIN 18252, EN 1303) that

are also taken into consideration. But none of these standards contain any demands with regard to lock picking.

For the customer or the user, the use of a VdS-approved locking cylinder thus means that apart from the basic functions, they can rely on a high level of burglary-resistant features, including protection against intelligent burglary methods.

The classes 1 to 3 of the standard should not be referred to as burglary-resistant; they serve predominantly for organisational functions, e.g. the locking of ancillary rooms with no demands on security. The VdS classes round out the upper end of the profile of burglary-resistant locking cylinders.

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VdS 2156	EN 1303	DIN 18252
-/-	1 ¹⁾	-/-
-/-	2 ¹⁾	-/-
-/-	3 ¹⁾	-/-
-/-	-/-	P1 ¹⁾
-/-	4	P2
A	-/-	-/-
AZ ²⁾	-/-	-/-
-/-	5	P3
B	-/-	-/-
BZ ²⁾	-/-	-/-
B+	-/-	-/-
BZ+ ²⁾	-/-	-/-
C	-/-	-/-
C+	-/-	-/-
CZ ²⁾	-/-	-/-
CZ+ ²⁾	-/-	-/-

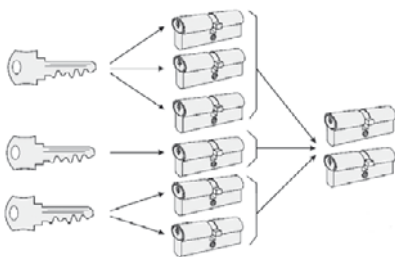
-/- A direct comparison is not possible

1) Designation "burglary-resistant" is not correct for this level; use expedient only for organisational functions.

2) Z = Cylinder dispose of a proved pulling protection; Cylinders which are marked with "+" are suitable for the use in ancillary control equipment.

Master key systems

Master key systems combine demands on security and ease of operation. The objective is to grant different persons different access authorisations with the issue of just one key per person. It is generally the case that both different locking cylinders can be actuated with differently encoded keys, but also that one and the same key can be used to lock different locking cylinders.



Both electronic and mechanical locking cylinders can be used when planning and manufacturing master key systems.

Electronic master key systems offer options that can only be achieved to a limited extent with mechanical locking cylinders. For example, functional authorisations can be

- tied to time windows,
- extended/modified or
- barred.

The skill of planning master key systems is lying in achieving the locking combinations requested by the customer and at the same time ensuring the demanded security standard. At the same time, the possibility of modifying or extending high-security master key systems even after completion shall not be overlooked.

The designations "MK" ("master-key") (in German "HS" = "Hauptschlüssel") or "GMK" (general master key" (in German "GHS" = "Generalhauptschlüssel") are frequently encountered in conjunction with master key systems. Depending on the configuration of the master key system, these keys can actuate large numbers or all the profile cylinders in the system.

Function

Master key systems with mechanical locking cylinders generally function on the following principles:

Variability of the key profile

The operability of a locking cylinder can be controlled fairly easily via the key profile. The profile in the locking cylinder is special-

ly formed so that unauthorised keys cannot be inserted into the key way. The security against key copying is limited, however, if only the key profile is used.

Pin pitch

Pin cylinders normally can only be locked with only one key. They can be designed in such a way, however, that keys with different codes fit. For this, the pins in the locking cylinder are arranged with different pitches.

Key management

In view of the complexity of master key systems, management of the keys has to be taken very seriously. If a key from a master key system is lost, it is generally not sufficient to simply replace one profile cylinder. In the worst case scenario, the whole system loses its security value. A system shall therefore be established to ensure that the person responsible for the system knows at all times who is in possession of which key and how many keys are in circulation.

The manufacturers of VdS-approved master key systems are obliged to provide their customers with a special PC program for key management.

Using this program it is easy to monitor which employee has been issued with which key and what lock authorisations the respective employee has. The check of whether all the keys have been correctly returned – in the event of changes in lock authorisations or of an employee leaving the company – is also simplified.

This tool provides optimum support for the whole management of the master key system.



Notes

Keys should generally be kept where they are safe from access by third parties. Although a high-quality security key can only be copied with a great deal of work and/or a high level of specialist knowledge, this possibility can never be totally ruled out. Furthermore there is naturally the danger that your key could be stolen if a third party has access to it.

Security guidelines

The balance and coordination of the individual security elements is a crucial aspect in a functioning security concept. In order to ensure comprehensive protection against theft or vandalism, secu-

urity measures for certain objects, e.g. through the use of safes & strongrooms or intruder alarm systems (IAS), can be employed in addition to the safeguarding of the building. Special security guidelines that VdS Schadenverhütung offers for both business premises and households contain appropriate practical tips.

Listings

All VdS-certified products are itemised in lists by VdS Schadenverhütung. These lists are available in printed form or on the Internet. Here a potential user can check whether, for example, a lock or locking cylinder has undergone VdS testing and in which class the approval was granted.

VdS publications

Brochures

- VdS 5473** Video Surveillance Systems (CCTV)
- VdS 5477en** Key Deposit Boxes
- VdS 5478en** Windows
- VdS 5479en** Doors
- VdS 5480en** Intruder Alarm Systems
- VdS 5483en** Safe Storage Units and Strongrooms

Listings of VdS-approved products and services

- VdS 2190** Schlösser (Locks)
- VdS 2183** Profilzylinder (Profile cylinders)
- VdS 2829** Einbruchhemmende Fassadenelemente (Burglary-resistant façade elements)
- VdS 2523** Errichterfirmen für mechanische Sicherungseinrich-

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tungen (Installation companies for physical security systems)
VdS 2137 Errichterfirmen für Einbruchmeldeanlagen (Installation companies for intruder alarm systems)

VdS 2136 Wach- und Sicherheitsunternehmen (Security companies)

Other publications

VdS 271en Protect Yourself Against Intrusion, Leaflet

VdS 691en Security Guidelines for Households

VdS 2333en Security Guidelines for Shops and Businesses

VdS 2570 Publikationen zur Sicherungstechnik auf CD-ROM (Publications on security technology on CD-ROM)

All listings and other information are also available on the Internet under **www.vds.de**.



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