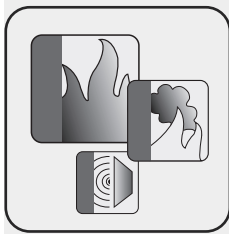


## Multiple functions Contents

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# Multiple functions

## Combination of door functions

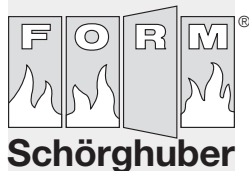
Performance overview, 1-leaf door

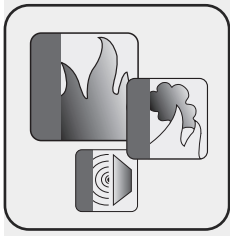
Wooden special doors

Main function	Multiple functions																						
	T 30	T 60	T 90	T 120	RS	Rw,P 32	Rw,P 37	Rw,P 42	Rw,P 45	Rw,P 48	Rw,P 50	WK 2	WK 3	WK 4	PB	DT	NT	VT	KL II	KL III	KL IV	BG,S	BG,E
T 30	☐				☐	☐	☐	☐	■	■	■	☐	☐	■	■	☐	☐		■	■	■	■	■
T 60		☐			☐	☐	☐	☐				☐			■				■				■
T 90			☐		☐	☐	☐	■				■	■		■				■	■			■
T 120				■	■	■	■					■			■				■	■			■
RS					☐	☐	☐	☐	■	■	■	☐	☐	■	☐	☐			■	■	■	■	■
SD 32						☐						☐	☐	■	☐	☐			■	■	■	■	■
SD 37							☐					☐	☐		☐				■	■	■	■	■
SD 42								☐				☐	☐		☐				■	■	■	■	■
SD 45									☐			☐	☐		☐				■	■			■
SD 48										■		■	■		■				■	■			■
SD 50											■	■	■		■				■	■			■
WK 2												☐			■	■			■	■	■	■	■
WK 3													☐		■	■			■	■	■	■	■
WK 4														■	■				■	■			■
PB															☐		☐		■	■			■
DT																☐			■	■			■
NT																	☐		■	■			■
VT																		☐	■	■			■

- = Solid door
- ☐ = Solid door and door with glazing
- ☐ = Solid door and door with glazing and top panel (counter-rebated)
- ☐ = Solid door and door with glazing and fanlight
- ☐ = Solid door and door with glazing and top panel/fanlight
- = Solid door with top panel

- T 30 = T 30 Fire-Protection
- T 60 = T 60 Fire-Protection
- T 90 = T 90 Fire-Protection
- RS = Smoke-Protection
- SD 32 = Sound-Insulation Rw,P 32 dB
- SD 37 = Sound-Insulation Rw,P 37 dB
- SD 42 = Sound-Insulation Rw,P 42 dB
- SD 45 = Sound-Insulation Rw,P 45 dB
- SD 48 = Sound-Insulation Rw,P 48 dB
- SD 50 = Sound-Insulation Rw,P 50 dB
- WK 2 = Burglar-Protection WK 2
- WK 3 = Burglar-Protection WK 3
- WK 4 = Burglar-Protection WK 4
- PB = Radiation-Protection
- DT = Bullet-Resistant M 3
- NT = Wet Room
- VT = Solid Core
- KL II = Climate category II
- KL III = Climate category III
- KL IV = Climate category IV
- BG,S = Stress group S
- BG,E = Stress group E





## Multiple functions

2.1

# Combination of door functions

Performance overview, 2-leaf door

Wooden special doors

2-leaf door		Multiple functions																				
		T 30	T 60	T 90	RS	Rw,P 32	Rw,P 37	Rw,P 42	Rw,P 45	Rw,P 48	Rw,P 50	WK 2	WK 3	PB	DT	NT	VT	KL II	KL III	KL IV	BG,S	
Main function	T 30	▣			▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣
	T 60		▣		▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣
	T 90			▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣
	RS				▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣	▣
	SD 32					▣							▣	▣	▣		▣		▣	▣		▣
	SD 37						▣						▣	▣	▣				▣	▣		▣
	SD 42							▣					▣	▣	▣				▣	▣		▣
	SD 45								▣				▣	▣	▣				▣	▣		▣
	SD 48									▣			▣	▣	▣				▣	▣		▣
	SD 50										▣		▣	▣	▣				▣	▣		▣
	WK 2											▣		▣	▣				▣	▣		▣
	WK 3												▣	▣	▣				▣	▣		▣
	PB													▣	▣		▣		▣	▣		▣
	NT															▣			▣	▣		▣
	VT																▣		▣	▣		▣

▣ = Solid door

▣ = Solid door and door with glazing

▣ = Solid door and door with glazing and top panel (counter-rebated)

▣ = Solid door and door with glazing and fanlight

▣ = Solid door and door with glazing and top panel/fanlight

▣ = Solid door with top panel

**T 30** = T 30 Fire-Protection

**T 60** = T 60 Fire-Protection

**T 90** = T 90 Fire-Protection

**RS** = Smoke-Protection

**SD 32** = Sound-Insulation Rw,P 32 dB

**SD 37** = Sound-Insulation Rw,P 37 dB

**SD 42** = Sound-Insulation Rw,P 42 dB

**SD 45** = Sound-Insulation Rw,P 45 dB

**SD 48** = Sound-Insulation Rw,P 48 dB

**SD 50** = Sound-Insulation Rw,P 50 dB

**WK 2** = Burglar-Protection WK 2

**WK 3** = Burglar-Protection WK 3

**PB** = Radiation-Protection

**DT** = Bullet-Resistant M 3

**NT** = Wet Room

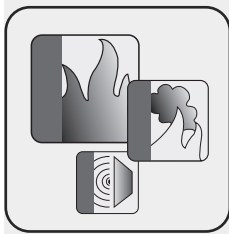
**VT** = Solid Core

**KL II** = Climate category II

**KL III** = Climate category III

**KL IV** = Climate category IV

**BG,S** = Stress group S



# Multiple functions

## Combination of door functions

### Multiple functions with Sound-Insulation

Wooden special doors

	1-leaf door	Door type	Door leaf thickness	Multiple functions with Sound-Insulation					
				SD 32	SD 37	SD 42	SD 45	SD 48	SD 50
Main function	T 30 / RS	1 N	42 mm	●					
		3 N	50 mm	●					
		3 N-NT	50 mm	●					
		13 N	50 mm		●	●			
		16 N	70 mm	●					
		5 N	70 mm		●	●	●		
		35 N	70 mm		●	●			
		50-1	91 mm					●	●
		25 N	73 mm	●	●	●			
		25 N Slimline	50 mm	●	●				
		10 N	110 mm	●	●	●	●		
	T 60	3-60	50 mm	●					
		21 N	70 mm	●					
		5-60	70 mm	●	●	●			
	T 90	8 N	70 mm	●	●				
		3-90	50 mm	●					
		80-1	91 mm			●			
	T 120	120-1	70 mm	●	●				

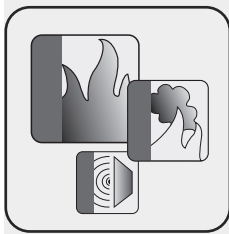
	2-leaf door	Door type	Door leaf thickness	Multiple functions with Sound-Insulation					
				SD 32	SD 37	SD 42	SD 45	SD 48	SD 50
Main function	T 30 / RS	4 N	50 mm	●					
		4 N-NT	50 mm	●					
		14 N	50 mm		●				
		26 N	70 mm	●					
		6 N	70 mm		●	●	●		
		50-2	91 mm					●	●
		27 N	73 mm	●	●	●			
		27 N Slimline	73 mm	●	●				
		20 N	110 mm	●	●	●			
	T 60	4-60	50 mm	●					
		6-60	70 mm	●	●	●			
	T 90	24 N	70 mm	●	●				
		80-2	91 mm			●			
		92 N	110 mm		●	●			

**T 30** = T 30 Fire-Protection  
**T 60** = T 60 Fire-Protection  
**T 90** = T 90 Fire-Protection  
**T 120** = T 120 Fire-Protection  
**RS** = Smoke-Protection

**SD 32** = Sound-Insulation Rw,P 32 dB  
**SD 37** = Sound-Insulation Rw,P 37 dB  
**SD 42** = Sound-Insulation Rw,P 42 dB  
**SD 45** = Sound-Insulation Rw,P 45 dB  
**SD 48** = Sound-Insulation Rw,P 48 dB  
**SD 50** = Sound-Insulation Rw,P 50 dB







## Multiple functions

# Fire-Protection in Europe

### DIN EN 1634

2.2

Wooden special doors

#### Fit for Europe!

In the course of the European harmonisation and the creation of a huge European Single Market, the adaptation of planning laws (standards and structural regulations) in order to meet the new requirements is realised as well.

New standards for the approval of fire protection closures in the field of fire protection have already been set.

- **DIN EN 1634-1 Fire resistance approvals for doors and closures, part 1: Fire protection closures**
- **DIN EN 1364-1 Fire resistance approvals for non-load-bearing structural elements, part 1: Walls**

The requirements to meet these new European standards have been raised drastically, a good example of these measures are the modified temperature sensors within the DIN EN 1634-1 and the increased pressure conditions in the test station. Due to these changes the intensity of the fire impact and therefore the strain on the fire protection closure have considerably increased compared to the DIN 4102-5.

**Since the appearance of the new EN standards Schörghuber develops and tests solely according to the new defined requirements. Therefore it is possible for Schörghuber to offer its customers state-of-the-art products, which certainly also meet future requirements!**

Besides the new approval regulations new classification standards (DIN EN 13501-1 to -3), dividing fire protection closures into new categories, have been set.

#### Examples

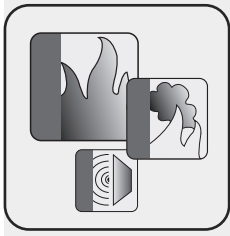
Doors	
DIN 4102	DIN EN 13501-2
T 30	EI <sub>2</sub> 30-C5
T 30 / RS	EI <sub>2</sub> 30-C5S <sub>200</sub>
T 90	EI <sub>2</sub> 90-C5
T 90 / RS	EI <sub>2</sub> 90-C5S <sub>200</sub>

Glazings	
DIN 4102	DIN EN 13501-2
F 30	REI <sub>2</sub> 30
F 90	REI <sub>2</sub> 90

Until the complete adoption and integration of the new EN standards within the existing national building laws, it is necessary for all persons involved on the construction site to inform themselves in terms of the current development.

In the field of Fire-Protection-Doors and -Glazings Schörghuber is your professional partner concerning the new EN standards!

**If you have any questions, please contact our agencies. We are glad to help and inform!**



## Multiple functions

2.3

# Fire-Protection according to DIN 4102

## Definition and application areas

### Requirements for buildings and structures

According to the building standard buildings and structures have to be constructed to prevent the spreading of fire and smoke. Structural elements which have to meet fire protection requirements such as walls, ceilings or fire protection closures can be found in any building project.

The DIN 4102 is a German building law which nationwide regulates the preventive fire protection. The DIN 4102 defines Fire-Protection-Doors as fire protection closures.

In section 5 and respectively section 13 (glazings) of DIN 4102, terms, requirements and testings for fire protection closures are described.

### Definition of fire protection closures

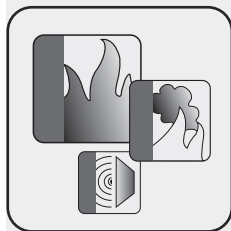
Fire protection closures are self-closing doors and closures such as flaps and gates which, correctly installed, are designed to prevent fire from passing through openings in walls and ceilings.

### Application areas

In certain areas, such as long hallways, stairways, firewalls, emergency exits as well as the sealing-off of escape routes, doors have to either fire protective or smoke protective. The planning and construction of buildings each underlie different building regulations and legal terms. Especially in buildings with a high visitor frequency as well as buildings which are inhabited by elderly, sick or handicapped people concern the the safety precautions of the preventive fire protection. Examples are:

- Schools and universities
- Kindergartens
- Hospitals
- Retirement homes
- Hotels
- Administrations
- Banks
- Offices

Fire protection closures reliably seal the critical gap of escape and rescue routes within buildings and structures and therefore guarantee the safety of the inhabitants.



## Multiple functions

2.3

# Fire-Protection according to DIN 4102

## Planning law fundamentals

### Regulations and guidelines

The DIN 4102 (fire behaviour of building materials and structural elements) substantiates the terms of the state regulations, the related executive orders as well as additional administrative regulations, which concern structural fire protection. Planning law fundamentals are:

- State regulations with their additional clauses, e.g. execution specifications
- Executive orders such as workplace regulations, restaurant regulations, regulations for places of public assembly, warehousing regulations or hospital regulations
- Administrative regulations and guidelines concerning the usage of combustible construction materials, multistorey building guidelines, school building guidelines, guidelines for sports facilities

The introduction of regulations and guidelines is business of the states, therefore the validity is **state-specific** as well.

### Objectives of the structural fire protection

- Reduction of the occurrence of fires to a minimum
- Guarantee of structural stability in case of fire
- Prevention or repression of the spreading of fire within buildings or to other parts of the building
- Guarantee of the rescue of people in case of fire
- Enabling or assistance of the firefighting by the fire brigade
- Protection of material assets

### Classification of construction materials

The classification of construction materials is regulated in DIN 4102, part 1. The type of fire is an important factor for the classification. Construction materials are divided in:

#### non-combustible

(construction material class A)

**A1** non-combustible and also flameproof

**A2** non-combustible

#### combustible

(construction material class B)

**B1** hardly inflammable

**B2** normally inflammable

**B3** easily inflammable

### Classification of structural elements

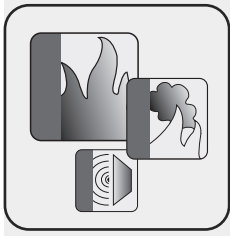
An additional categorisation, of structural elements, is regulated in DIN 4102, part 2. The structural elements are assigned a letter for identification. Due to their ability to withstand fire for a defined time span, they are classified by the **fire resistance period**.

The resistance period is the classifying factor for the fire behaviour of structural elements. The following fire resistance classes are defined:

**T 30, F 30, G 30** ≥ 30 minutes fire resistance period

**T 60, F 60** ≥ 60 minutes fire resistance period

**T 90, F 90** ≥ 90 minutes fire resistance period



## Multiple functions

2.3

# Fire-Protection according to DIN 4102

## Building materials

### Building materials

Building materials are construction materials, structural elements and equipment designed to be permanently installed in buildings and structures.

### Building code

The applicability of building materials for a certain building project is defined by the state regulations, which relate to the building code. The German institute for building technology (DIBt) publishes the building code. Building materials listed in part A are considered **regulated building materials**. Non-regulated building materials (no generally approved technical rules or technical building clauses) have to be confirmed by either:

- An official technical approval
- An official certificate
- An approval for the individual case

### Official technical approval

Fire-Protection-Doors and Glazings need to be officially technical approved. The manufacturer has to provide evidence of the approval by attaching an **official label** on the edge of the door leaf and by handing out a copy of the official technical approval.

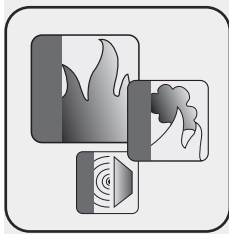
Furthermore the manufacturer has to provide contractual evidence and proof that the production of its Fire-Protection-Doors is **monitored** by a certification authority in terms of constant quality and compliance with approval regulations. In case of Fire-Protection-Glazings these documents are substituted by the manufacturers declaration of compliance.

### Official certificate

If building materials have no relevant safety or health requirements or if they are judged by officially accredited test procedures, an official certificate is adequate.

### Approval for the individual case

In case of a structural situation demanding unapproved models of a Fire-Protection-Door, a so-called approval for the individual case is necessary. This approval can only be issued by the responsible **building supervisory board** under the condition of bringing forward the necessary verifications of suitability. The approval **for the individual case** is construction project specific and can not be applied elsewhere.



## Multiple functions

## 2.3

# Fire-Protection according to DIN 4102

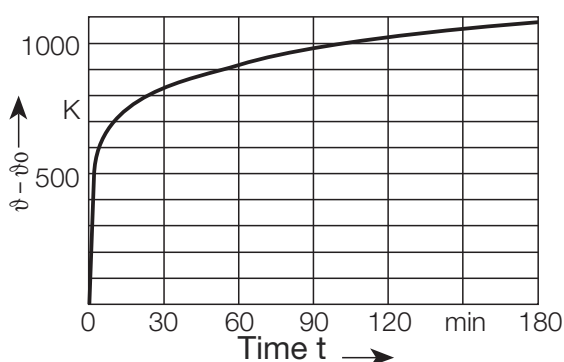
## Officially accredited test procedures and test criteria

### Fire resistance test

Every fire is different regarding its origin, the ignition sources, the flammability of the burning materials or the oxygen saturation, just to cover some of the most important components.

To accommodate all these different components and fire behaviours in a fire resistance test for structural elements, it was internationally agreed on to assume **a general course during the burning process**.

That is how the so called **uniform-temperature-time-curve** (UTTC) originated, which is also internationally recognised as ISO-curve. This curve predetermines the fire and temperature course during a classifying fire resistance test for structural elements. The test for Fire-Protection-Doors and -Glazings takes place in a burning installation, where the test item is flame impinged on one side while the temperature rises according to the UTTC.



### Test criteria

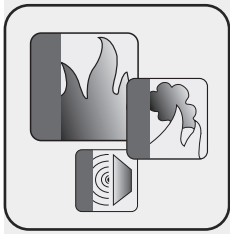
The **significant criteria** for the preventive fire protection according to DIN 4102 concerning the **testing of fire protection closures** can be summed up in the following points:

- Fire resistance test according to UTTC and DIN 4102, part 5
- Granting of the space enclosing effect of the fire protection closure
- Prevention of fire passing through
- Structural stability of the fire protection closure
- The increase of temperature on the flame impinged side: at an average of up to 140 K; short-term on selective areas up to 180 K.

After 30 minutes the temperature in the burning installation is about 850° C according to UTTC, after 90 minutes about 1000° C.

### Long-term durability test

Regarding a service life of 20 years Fire-Protection-Doors undergo a long-term durability test according to DIN 4102 part 18. The test requires 200.000 opening cycles, during which, door leaf, frame and fittings are tested as a set.



## Multiple functions

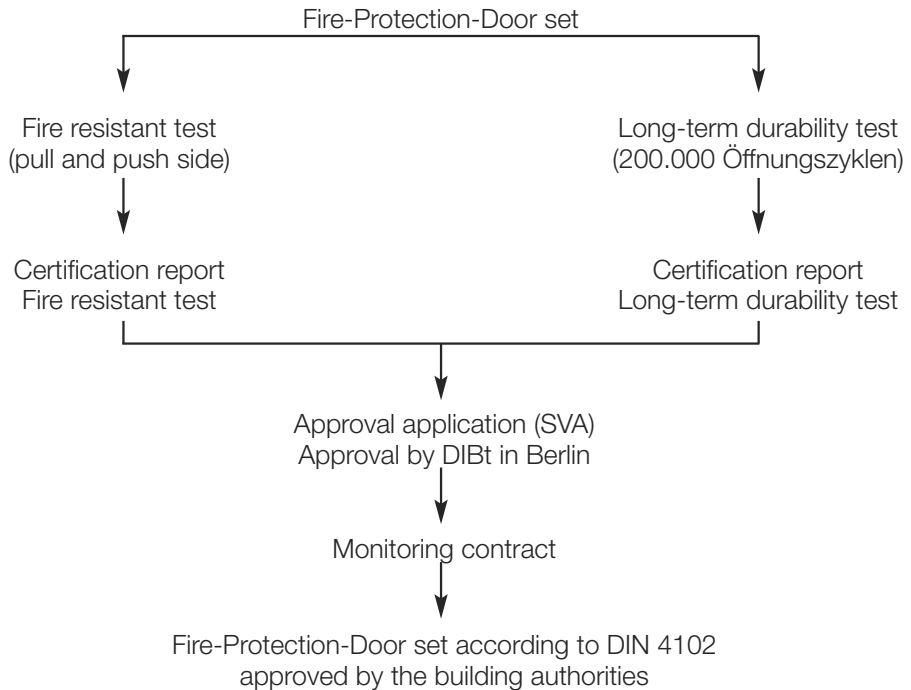
2.3

# Fire-Protection according to DIN 4102

## Test procedures and guidelines

### Testing procedure

The testing of Fire-Protection-Door sets is carried out according to DIN 4102 part 5 including a long-term durability test according to part 18. Fire-Protection-Glazings are approved by accredited institutes for material testing according to DIN 4102 part 13. With the approval of the German institute for building technology in Berlin (DiBt) the door set is certified for all states.



### Delivery set

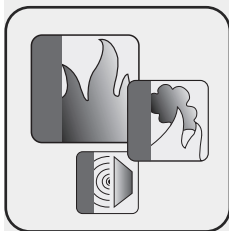
As an approved set, door leaf, door frame and the necessary fittings, form the **complete delivery set**. In regard of the requirements for the self closing function, only approved door closers and hold-open devices (see index door closers), as well as the usage of FS-proven locks and handles (see index locks, handles) are allowed.

### Labeling and monitoring

The fire protection function has to be verified by the manufacturer by attaching an official label on the edge of the door leaf and by handing out a copy of the official technical approval. The manufacturer certifies the appropriate configuration of the door set by self- and third party-monitoring with the German Mark of Conformity ('Ü')

### Approved installation

While mounting the door set, the compliance of the approved installation as well as the correct combination with wall types and/or Fire-Protection-Glazings, is inevitable. According to part 13 of DIN 4102 official approvals are only issued for combinations of Fire-Protection-Doors and Fire-Protection-Glazings which meet the same fire resistance requirements.



## Multiple functions

2.3

# Fire-Protection according to DIN 4102

## Permitted modifications for fire protection closures

### On site modifications

Besides the option to shorten the door leaf of T 30 Fire-Protection-Doors according to the approval, respectively the **metal shortening label** on the door leaf edge also the current version of the DIBt approval have to be followed if a **Fire-Protection-Door is modified**.

The following on site modifications on already fabricated fire resistant closures are, according to a notification of the DIBt from the 1. of February 1996, allowed:

- **Mounting of contacts**

For example Reed-contacts and strike plate contacts (bolt contacts) for breach control, provided that they are attached or mounted in factory-made cut-outs.

- **Lock replacement**

A lock replacement is only possible if the lock is replaced by an adequate self-locking or motor-powered lock with latch. Furthermore the replacement is only permitted if the lock can be fitted into the existing lock body and as long as the strike plate does not have to be modified. A later installation of an electrical strike is not permitted; except the door frame has been prepared by the manufacturer.

- **Attaching of cables on the door leaf**

- **Installation of optical door viewers**

- **Adhesive label**

The screwing, riveting or gluing of adhesive labels onto the door leaf.

- **Kick plates**

The screwing or gluing of metal sheet stripes (up to a height and width of up to 250 mm) onto the door leaf, for example kick or edge protection.

- **Ram protection bar**

The attaching or ram protection bars and tube handle bars where required using reinforcements (for the attachment of troughout thread rods the drilling must not be more than 12 mm in diameter).

- **Pushbar**

The attaching of befitting pushbars, if, according to the manufacturer's information, adequate mounting points are present.

- **Complementing of z- and steel corner frames**

With counter-frame for steel wrap-around frames.

- **Complementing of wooden frames**

By the attaching of wall junction mouldings.

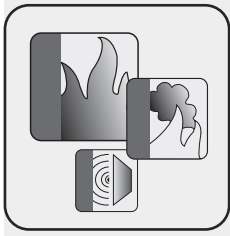
- **Affixing of bars (decorative beads)**

Possible in any shape and position on the glazing, either made of wood, plastic material, aluminium or steel.

- **Nailig and gluing of wooden bars on woodens**

Dimensions of up to 60 mm x 30 mm, but with a maximum of 12 dm<sup>3</sup> on each side, there is no restriction for the affixing of decorative beads on wooden frames.

**In general, the modifications and complementings must not affect the functional capability of the fire protection closure (for example the self-closing function).**



## Multiple functions

2.3

# Fire-Protection according to DIN 4102

## Combination with additional door functions

### Sound-Insulation

T 30, T 60, T 90 and T 120 doors with factory-equipped effective bottom seal or a 4-sided frame, by default meet  $R_{w,P}$  32 dB sound insulation requirements. With Fire- and Smoke-Protection-Doors, even higher sound insulation values are possible. For the possible performance range see the table multiple functions with Sound-Insulation. ➔ Chapter 2.1

### Burglar-Protection

1- and 2-leaf Schörghuber Fire-Protection-Doors meet, with special factory-equipment, the requirements for resistance classes WK 2, WK 3 and WK 4. The attack side can be chosen from either the pull or push side. Configurations such as vision panels, fanlights, counter-rebated top panels or the installation in lightweight partition walls or respectively Schörghuber F 30 Fire-Protection-Glazings Type 25 V are possible. Different frame variations, made of either steel, wood or wooden materials, can be applied. For extensive possibilities see the table multiple functions with Burglar-Protection. ➔ Chapter 2.1

### Smoke-Protection

All T 30, T 60, T 90 and T 120 Schörghuber Fire-Protection-Doors can be, due to a factory-equipment with an effective bottom seal, fitted with an additional smoke protection function.

T 30, T 60, T 90 and T 120 Fire-Protection-Door sets with 4-sided frame as well as T 30 flaps already meet, due to a circumferential sealing level, the smoke protection requirements. As a general rule, Fire-Protection-Doors with an additional bottom seal for smoke protection function must not be shortened on site.

Schörghuber F 30 and F 90 Fire-Protection-Glazings are by default considered smoketight, if installed, according to regulations, with elastic sealed joints.

The 2-leaf doors, models 4.01 and 4.11, with fire and smoke protection function by default feature a rabbet ledge on the top panel. ➔ Chapter 2.4

### Radiation-Protection

Solid 1- or 2-leaf doors without top panel are available with an additional radiation protection function (lead equivalent value of up to 4 mm). If the lead equivalent value is 2 mm or more a lock with shifted follower and cylinder drilling is used. The bolting of the inactive leaf for 2-leaf door sets is realised with a concealed shot-bolt lock. ➔ Chapter 2.7

### Bullet-Resistant M 3

The solid door T 30 (model 3.00) in special design with steel frame meets the requirements for a Bullet-Resistant-Door. ➔ Chapter 2.8

### Wet Room

T 30 doors, types 3 N and 4 N, in special design can be constructed as Wet Room Doors with the adequate materials. ➔ Chapter 2.9

### Climate category II

The whole range of Schörghuber Fire-Protection-Doors meets the requirements for Climate category II. Due to constructive actions all doors, except the solid wood framed door, are available in Climate category III.

### Climate category III

The T 30 door types 16 N and 26 N by default meet the requirements for Climate category III. ➔ Chapter 2.11

### Climate category IV

This high standard can be reached with the door type 35 N. ➔ Chapter 2.11

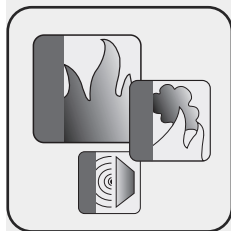
### Thermal insulation

In combination with the T 30 fire protection function the door type 35 N meets high thermal insulation requirements. ➔ Chapter 2.12

### Mechanical stress group

All solid doors in the range of Schörghuber Fire-Protection-Program by default meet the requirements of the Stress group S, therefore they resist static and dynamic deformation as well as hard and soft impact.

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 16 N and 26 N in special design also meet the requirements of the Stress group E. On request also other door types can be upgraded to this standard. ➔ Chapter 2.13



## Multiple functions

## 2.4

# Smoke-Protection acc. to DIN 18095

## Planning laws and test procedures

### The effect of Smoke-Protection-Doors

In case of fire, the smoke emission is an often underestimated danger. Within seconds smoke can spread throughout the entire building.

Smoke and fumes are therefore life-threatening and the cause of effects such as panic, line-of-sight obstruction, oxygen deficiency and toxicity. The nontransparent smoke and the toxic fumes decrease the oxygen content and can lead to death within seconds.

The function of installed and **closed** Smoke-Protection-Doors is to hinder the smoke and fumes from passing through.

### Smoke-Protection-Doors according to DIN 18095

The DIN 18095, as **technical building regulation** has been introduced in all German states. With the introduction of this DIN it became mandatory to install a so-called smoketight door, officially approved according to DIN 18095, whenever a smoke protection function is required.

### Impermeability test

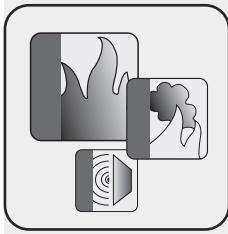
The mandatory impermeability test allows a certain leakage rate for the passage of smoke in a closed door set. Under a pressure of 5 to 50 Pa and an ambient temperature of 200° C the leakage rate must not exceed the following values:

- 20 m<sup>3</sup>/h for 1-leaf RS doors
- 30 m<sup>3</sup>/h for 2-leaf RS doors

Smoke-Protection-Doors and fittings must not deform, nor open during the impermeability test. The 2-leaf doors, models 4.01 and 4.11, with counter-rebated door leaf/top panel by default feature a rabbet ledge on the top panel.

### Long-term durability test

The DIN 18095 demands that Smoke-Protection-Doors undergo a long-term durability test according to DIN 4102 part 18. The test requires 200.000 opening cycles, during which, door leaf, frame and fittings are tested as a set.



## Multiple functions

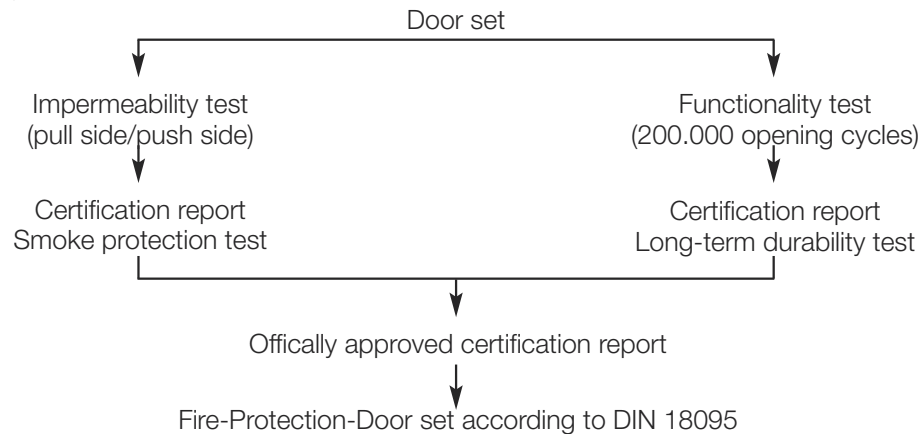
2.4

# Smoke-Protection acc. to DIN 18095

## Test procedures and guidelines

### Test procedures

Due to the introduction of the Smoke-Protection-Door as regulated building material, a testing according to DIN 18095 in an officially accredited Institute for Material Testing has become mandatory.



### Labeling and monitoring

The fire protection function has to be verified by the manufacturer by attaching an official label on the edge of the door leaf and by handing out a copy of the official technical approval.

- Door DIN 18095-RS 1 (1-leaf door)
- Door DIN 18095-RS 2 (2-leaf door)

The manufacturer has to make sure and certify that the production of the Smoke-Protection-Doors is monitored regarding constant quality and performance.

In regard of the requirements for the self closing function, only approved door closers and hold-open devices are allowed. Smoke-Protection-Doors just like Fire-Protection-Doors can only fulfil their function when closed.

### Delivery set

As an approved set, door leaf, door frame and the necessary fittings, form the **complete delivery set**.

### Permitted modifications for smoke protection closures

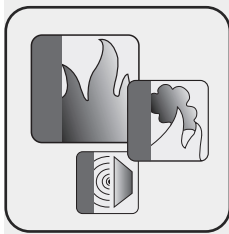
If necessary Smoke-Protection-Doors without fire protection function can be shortened, as long as the groove for the bottom seal is remilled according to the certification report, respectively the metal shortening label on the door leaf edge.

If additional security fittings, such as security bolts, magnetic contacts, etc. or other additional equipment components such as protective plates or ram protection bars are installed, they must not interfere with the self-closing and smoke-hindering functions of the door set.

The installation of warded locks is not permitted for Smoke-Protection-Doors. In addition to that helical hinges are not permitted in combination with Smoke-Protection-Doors, because the norm requires door closers with hydraulic absorbability.

### Approved installation

While mounting the Smoke-Protection-Door set follow the certification report as well as the installation manual. Particular care is inevitable while sealing the joint between frame and wall with a permanent elastic material (e.g. silicone), to prevent any leakage of smoke. The impermeability of the door set is primarily based on the frame sealing and the bottom seal. Therefore their maintenance and, if damaged, their replacement is inevitable.



## Multiple functions

2.4

# Smoke-Protection acc. to DIN 18095

## Combination with additional door functions

### Sound-Insulation

RS doors with factory-equipped effective bottom seal or a 4-sided frame, by default meet  $R_{w,P}$  32 dB sound insulation requirements. Smoke-Protection-Doors can reach even higher sound insulation values. For the possible performance range see the table multiple functions with Sound-Insulation. ➔ Chapter 2.1

### Burglar-Protection

1- and 2-leaf Schörghuber RS doors meet, with special factory-equipment, the requirements for resistance classes WK 2, WK 3 and WK 4. The attack side can be chosen from either the pull or push side. Configurations such as vision panels, fanlights, counter-rebated top panels or the installation in lightweight partition walls or respectively Schörghuber Smoke-Protection-Glazings Type 25 V-RS are possible. Different frame variations, made of either steel, wood or wooden materials, can be applied. For extensive possibilities see the table multiple functions with Burglar-Protection. ➔ Chapter 2.1

### Radiation-Protection

RS doors with vision panel and/or top panel are available with an additional radiation protection function (lead equivalent value of up to 4 mm). If the lead equivalent value is 2 mm or more a lock with shifted follower and cylinder drilling is used. The bolting of the inactive leaf for 2-leaf door sets is realised with a conseald shot-bolt lock. ➔ Chapter 2.7

### Bullet-Resistant M 3

The solid Smoke-Protection-Door (model 3.00) in special design with steel frame meets the requirements for a Bullet-Resistant-Door. ➔ Chapter 2.8

### Wet Room

Smoke-Protection-Doors, types 3 N and 4 N, in special design can be constructed as Wet Room Doors with the adequate materials. ➔ Chapter 2.9

### Climate category II

The whole range of Schörghuber Smoke-Protection-Doors meets the requirements for Climate category II. Due to constructive actions all doors, except the solid wood framed door, are available in Climate category III.

### Climate category III

The door types 16 N and 26 N by default meet the requirements for Climate category III. ➔ Chapter 2.11

### Climate category IV

This high standard can be reached with the door type 35 N. ➔ Chapter 2.11

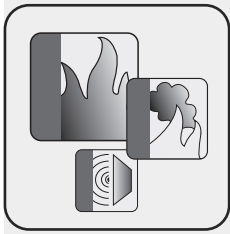
### Thermal insulation

In combination with the smoke protection function the door type 35 N meets high thermal insulation requirements. ➔ Chapter 2.12

### Mechanical stress group

All solid doors in the range of Schörghuber Smoke-Protection-Program by default meet the requirements of the Stress group S, therefore they resist static and dynamic deformation as well as hard and soft impact.

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 16 N and 26 N in special design also meet the requirements of the Stress group E. On request also other door types can be upgraded to this standard. ➔ Chapter 2.13



## Multiple functions

2.5

# Sound-Insulation acc. to DIN 4109

## Planning laws

### Minimum requirements of the airborne sound insulation for doors

Due to the fact that the DIN 4109 has been introduced as technical building regulation in all German states, the **minimum requirements** for the sound insulation between certain rooms and areas are mandatory .

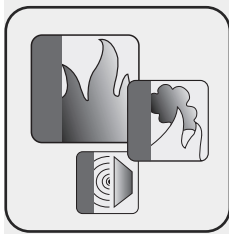
The DIN 4109 allows three different standards for the airborne sound insulation in order to prevent sound propagation from external living and work spaces. These are according to application area organised in **sound insulation values**  $R_{w,P}$  32 dB,  $R_{w,P}$  37 dB and  $R_{w,P}$  42 dB.

If necessary it may be appropriate to determine the sound insulation values in the tender specifications according to the increased recommendations of DIN 4109 (see bracket values).

Wooden special doors

Building type	Areas and rooms, in-between which doors are installed	$R_{w,R}$ in dB	$R_{w,P}$ in dB
Multistorey buildings with apartments and offices	Corridors and stairways ↔ Hallways, lobbies	27 (37)	32 (42)
	Corridors and stairways ↔ Common rooms in apartments	37	42
Schools – tutorial buildings	Hallways ↔ Classrooms and alike rooms	32	37
Accommodations	Hallways ↔ over night accommodations	32 (37)	37 (42)
Hospitals/ nursing homes	Examination respectively consulting rooms ↔ Examination respectively consulting rooms	37	42
	Hallways ↔ Examination respectively consulting rooms	37	42
	Hallways ↔ sick rooms	32 (37)	37 (42)
	Operating/ sick rooms ↔ Operating/ sick rooms	32	37
	Hallways ↔ Operating rooms/ surgery	32	37

Table: Minimum requirements of the airborne sound insulation for doors (excerpt from DIN 4109)



## Multiple functions

2.5

# Sound-Insulation acc. to DIN 4109

## Significant values

### Sound insulation values of doors

According to DIN 4109 sound insulation tests of installed, ready-for-use door sets have to be made in order to assure a perfect coaction of door leaf and gasket.

Term used by Schörghuber	Rw,R value according to DIN 4109	Test stand value Rw,P value
Sound-Insulation SD 32	27 dB	32 dB
Sound-Insulation SD 37	32 dB	37 dB
High Sound-Insulation SD 42	37 dB	42 dB
High Sound-Insulation SD 45	40 dB	45 dB*
Extreme Sound-Insulation SD 48	43 dB	48 dB*
Extreme Sound-Insulation SD 50	45 dB	50 dB*

\* Tested stand value exceeds requirements of DIN 4109 (max. demanded value Rw,P 42 dB).

### Rated sound insulation value

Significant parameters for the requirements of airborne sound insulation and subsonic noise insulation of structural elements are:

**Rw** Rated sound insulation value in dB **without sound propagation** of flanked structural elements.

Rw is the in the tender specification demanded and the on site expected sound insulation value of the structural element. For the calculations of the edificial acoustician this value is defined as Rw,R.

**R'w** Rated sound insulation value in dB **with sound propagation** of flanked structural elements.

According to DIN 4109 (issue Nov. '89) the **rated sound insulation value Rw** is differentiated in:

**Rw,P** Value determined during the suitability test of the structural element - in this case of the complete door set, consisting of door leaf, frame, fittings and sealing agent - in the sonic laboratory, according to DIN EN ISO 140.

**Rw,R** Calculation value which must be identical with the on site requested value.

### Allowance of tolerances

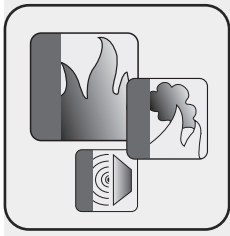
The on the test stand determined sound insulation value (Rw,P) for **doors** has to exceed the on site requested minimum requirements (Rw,R) by an **allowance of tolerances** of at least 5 dB. The following applies:

**$Rw,R = Rw,P - 5 \text{ dB}$**

**Fixed glazings** have to exceed the on site requested minimum requirements (Rw,R) by an **allowance of tolerances** of at least 2 dB. The following applies:

**$Rw,R = Rw,P - 2 \text{ dB}$**

The allowance of tolerances is supposed to account for possible differences of the sound insulation between the test stand and the requested requirements, due to the on site characteristics and the potential dispersion of the characteristics of the tested door set.



## Multiple functions

2.5

# Sound-Insulation acc. to DIN 4109

## Regulations for Sound-Insulation-Doors

**Rw,P = 32 dB** value is met with an effective bottom seal in the door leaf and a 3-side circumferential sealing agent in the frame or with a 4-sided frame with a circumferential sealing agent. This sound insulation value is met by the following door types 1 N, 3 N/4 N, 16 N/26 N, 3 N-NT/4 N-NT, 3-60, 4-60, 3-90 and 25 N/27 N respectively 25 N Slimline/27 N Slimline.

**Rw,P = 37 dB** value is met with one sealing level, by the following door types 1 N/13 N/14 N, 25 N/27 N, 5 N/6 N, 35 N, 5-60 / 6-60, 120-1, 25 N Slimline / 27 N Slimline respectively 8 N. The door types 10 N/20 N and 24 N reach this value with a second sealing on the double rebate.

**Rw,P = 42 dB** value is met with an additional rebate gasket, respectively with a second sealing level in the frame jamb (unrebated door leaf with jamb rebate), as well as a second effective bottom seal for the door types 13 N / 5 N / 6 N respectively 5-60 / 6-60. The T 90 doors type 80-1 / 80-2 reaches the value with a combination of fire-resistant inlays and highly sound-insulating materials, for the T 90 doors type 91 N/92 N an additional sealing level is necessary.

**Rw,P = 48 dB** value is met with the door types 17 N and 50-1/50-2 by using highly sound-insulating materials and three sealing levels as well as two bottom seals. The door leaf of door type 17 N has to be rebated with double jamb rebate and an additional rebate gasket. For the door types 50-1/50-2 the edge configuration unrebated with triple jamb rebate is possible as well.

**Rw,P = 50 dB** value is met with the door types 50-1/50-2 by using highly sound-insulating materials and three sealing levels as well as three bottom seals. The edge configurations unrebated with triple jamb rebate as well as rebated with double jamb rebate and an additional rebate gasket are possible.

For possible combinations see ➔ Chapter 2.1

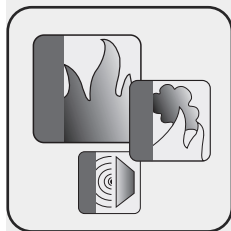
### Configuration

The above listed sound insulation values (Rw,P) have been approved for 1- and 2-leaf doors with top panel (top panel/fanlight) up to Rw,P 50 dB. The Schörghuber program comprises rebated and unrebated doors (partly unrebated with jamb rebate) with vision panel and an extensive range of steel and wooden frames.

A complete door set consists of **the door leaf, the door frame and the sealing agent**, as stated in the certification report in order to reach the specified sound insulation value during a possible on site sound measurement.

Rebated doors with  $R_{w,P} \geq 42$  dB require hinges which support a rebate gasket.

If a floor-mounted door closer with cover panel is installed, a decrease of the sound insulation value has to be expected. For the installation of concealed door closers (ITS 96) the tested sound insulation value is met without any limitation.



## Multiple functions

2.5

# Sound-Insulation acc. to DIN 4109

## Installation and mounting

### Installation instructions

Precondition for the achievement of the warranted sound insulation value is the correct installation of the door set. The provided Schörghuber installation manuals and the mounting regulations need to be followed.

Term used by Schörghuber	Requirements $R_{w,P}$ acco. to DIN 4109	Steel door frame Solid wall	Steel door frame Gypsum plasterboard
SD 32	32 dB	Mortar Mineral wool 2-K-PU-foam	Mineral wool 2-K-PU-foam Mortar
SD 37	37 dB	Mortar Mineral wool 2-K-PU-foam	Mineral wool 2-K-PU-foam Mortar
SD 42	42 dB	Mortar Mineral wool	Mortar Mineral wool
SD 45 / SD 48 / SD 50	45 dB / 48 dB / 50 dB	Mortar	Mortar

Term used by Schörghuber	Requirements $R_{w,P}$ acc. to DIN 4109	Wooden door frame Solid wall	Wooden door frame Gypsum plasterboard
SD 32	32 dB	2-K-PU-foam	Mineral wool 2-K-PU-foam
SD 37	37 dB	Mineral wool 2-K-PU-foam	Mineral wool 2-K-PU-foam
SD 42 / SD 45	42 dB / 45 dB	Mineral wool 2-K-PU-foam	Mineral wool 2-K-PU-foam
SD 48 / SD 50	48 dB / 50 dB	Mineral wool	Mineral wool

The following installation instructions should be seen as an addition to the installation manual. Generally the correct filling of the cavities is essential. A complete filling with mortar or the tight stuffing with mineral wool is as important as the gapless filling with 2-K-PU-foam.

According to DIN 18111 the cavities of steel frames in solid walls have to be completely filled with mortar. In order to reach the sound insulation value steel frames without filling have to be sealed with a permanent elastic material (e.g. silicone).

Wooden door frames have to be sealed on at least one side, from  $R_{w,P}$  37 dB on both sides have to be sealed.

The predetermined ground clearance of Sound-Insulation-Doors is 7 mm, if the ground clearance is more than 7 mm a decrease of the sound insulation function has to be expected. Starting with an on site sound insulation value of  $R_w$  32 dB ( $R_{w,P}$  37 dB) an effective disjunction of the screed has to be planned, in order to prevent subsonic sound insulation. If carpet is used, the carpet needs to be divided and a ground sill must be installed. The bottom seal has to be adjusted with great care. Thereby it is important that the contact pressure is applied evenly on the whole door leaf width.

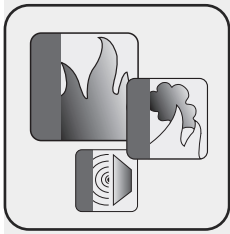
If the frame is not correctly installed in the wall opening, a decrease of the sound insulation function has to be expected.

### Adjacent sound transmission ways

Even if the sound insulating door set was correctly installed, the sound transmission through walls, the floor or the ceiling is possible (adjacent sound transmission ways). Primarily these are:

- Walls (airborne and impact sound)
- Cable ducts and channels (airborne and impact sound)
- Door closures (airborne sound)
- Ceilings (impact sound/subsonic noise)
- Heating installation (impact sound)
- Air ventilation ducts (airborne and impact sound)
- Electrical installations, such as outlets or switches (airborne sound)

Wooden special doors



## Multiple functions

2.5

# Sound-Insulation acc. to DIN 4109

## Combination with additional door functions

### Burglar-Protection

1- and 2-leaf Schörghuber Sound-Insulation-Doors doors meet, with special factory-equipment, the requirements for resistance classes WK 2, WK 3 and WK 4. The attack side can be chosen from either the pull or push side. Configurations such as vision panels, fanlights, counter-rebated top panels or the installation in lightweight partition walls or respectively Schörghuber glazings Type 25 V are possible. Different frame variations, made of either steel, wood or wooden materials, can be applied. For extensive possibilities see the table multiple functions with Burglar-Protection. ➔ Chapter 2.1

### Radiation-Protection

Sound-Insulation-Doors with vision panel and/or top panel are available with an additional radiation protection function (lead equivalent value of up to 4 mm). If the lead equivalent value is 2 mm or more a lock with shifted follower and cylinder drilling is used. The bolting of the inactive leaf for 2-leaf door sets is realised with a conseald shot-bolt lock. ➔ Chapter 2.7

### Bullet-Resistant M 3

The solid Sound-Insulation-Door (model 3.00) in special design with steel frame meets the requirements for a Bullet-Resistant-Door. ➔ Chapter 2.8

### Wet Room

Sound-Insulation-Doors, types 3 N and 4 N, in special design can be constructed as Wet Room Doors with the adequate materials. ➔ Chapter 2.9

### Climate category II

The whole range of Schörghuber Sound-Insulation-Doors meets the requirements for Climate category II. Due to constructive actions all doors, except the solid wood framed door, are available in Climate category III.

### Climate category III

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 50-1, 50-2 and 17 N in special design meet the requirements for Climate category III. ➔ Chapter 2.11

### Climate category IV

This high standard can be reached with the door type 35 N. ➔ Chapter 2.11

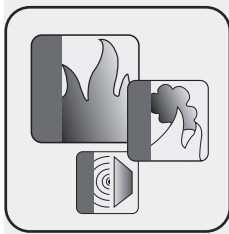
### Thermal insulation

In combination with the smoke protection function the door type 35 N meets high thermal insulation requirements. ➔ Chapter 2.12

### Mechanical stress group

All solid doors in the range of Schörghuber Sound-Insulation-Program by default meet the requirements of the Stress group S, therefore they resist static and dynamic deformation as well as hard and soft impact.

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 16 N and 26 N in special design also meet the requirements of the Stress group E. On request also other door types can be upgraded to this standard. ➔ Chapter 2.13



# Multiple functions 2.6

## Burglar-Protection acc. to DIN V ENV 1627

### Classification and test procedures

#### Terms and test regulations

Burglar-Protection-Doors are suitable for protective areas or rooms where the unauthorised and forceful entering should be hindered or constrained.

Since April 1999 the DIN V ENV 1627 has replaced the previous DIN V 18103. Burglar-Protection-Door sets are now graded class 6:

While the prestandard exists the certification reports and the test reports according to DIN V 18103 are valid as proof of the Burglar-Protection according to the **correlation chart NA.3** of DIN V ENV 1627. Irrespective of that all Schörghuber Burglar-Protection-Doors are approved according to DIN V ENV 1627.

Resistance class		Resistance time	Type of criminal Assumed approach
DIN V ENV 1627	DIN V 18103		
WK 1	–	no manual test	Structural elements of the resistance class 1 feature a basic protection against break-in attempts with physical force, such as kicking against, jumping against, shoulder ramming, pushing up and ripping out (prevalent vandalism)
WK 2	ET 1	3 minutes	The occasional criminal uses simple tools such as a screwdriver, a gripper and cotters in order to open the locked and bolted structural element.
WK 3	ET 2	5 minutes	The criminal tries to open the locked and bolted structural element with an additional screwdriver and a crowbar.
WK 4	ET 3	10 minutes	The experienced criminal uses additional cutting tools and hitting tools such as an axe, a prybar, a hammer and a chisel as well as a power drill.
WK 5	–	15 minutes	The experienced criminal uses additional electronic tools, such as a power drill, a jigsaw, a sabre saw and an angle grinder with a maximum disc diameter of 125 mm.
WK 6	–	20 minutes	The experienced criminal uses additional powerful electronic tools, such as a power drill, a jigsaw, a sabre saw and an angle grinder.

A Burglar-Protection-Door is a door which can, **if closed, locked and bolted**, withstand break-in attempts with physical force (without tools as well as with tools) for a certain period of time (resistance time).

The tests performed by a DIN CERTCO accredited testing laboratory. The certified structural elements are permanently marked with an official label.

#### Static test

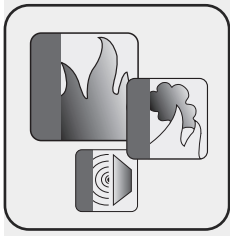
During the test of the door statics, the door set is being stressed perpendicular to the door leaf level with a test cylinder over a defined period of time in the areas of hinges and bolting spots. The door leaf's maximum deflexion out of the frame must not exceed the determined maximum permissible value.

#### Shock loading

The tup consists of a sand filled leather ball ( $d \approx 350$  mm) with a mass of 30 kg. It is dropped on the door leaf from a height of 0,8 respectively 1,2 m with a deflexion of 1,5 m. During that the door leaf must not open or deform.

#### Manual resistance test

The manual resistance test is divided in to the pretest and the main test. During the pretest the weakspots of the door set are analysed. Afterwards in the main test an inspector tries to open the door or clear a passageway, using the defined tools within the resistance time.



## Multiple functions

2.6

# Burglar-Protection acc. to DIN V ENV 1627

## Configuration WK 1, WK 2, WK 3 and WK 4

### Resistance class WK 1

All Schörghuber solid door sets in combination with the current frame versions can be delivered as Burglar-Protection-Door sets according to the resistance class WK 1, using the proper security fittings.

### Resistance class WK 2

All solid 1-leaf doors with 50 mm door leaf thickness out of the Schörghuber delivery range can be delivered as Burglar-Protection-Door sets according to the resistance class WK 2. A combination with various frame versions, such as steel frames, wooden wrap-around frames, wooden block frames as well as solid wooden frames, is possible. Type 3N and 13 N door sets with counter rebated top panel and fanlight are available in all steel and wooden frame versions. Models with 70/91 mm door leaf thickness are available with vision panel and as 2-leaf door sets approved according to the resistance class WK 2.

The solid T 90 Fire-Protection-Doors types 8 N/24 N and 80-1/80-2 are available with wooden and steel frames, also with counter rebated top panel in resistance class WK 2.

For the resistance class WK 2 (**attack side = push side**)

the following equipment is necessary:

- Lock according to DIN 18251 respectively 18250 with special security equipment
- For 2-leaf doors, lock with 3-way bolting
- For 1-leaf doors, optionally with 3-way bolting
- ES 1 or ES 2 approved security knob-lever-set
- 2 mm sheet thickness for steel frames
- Optionally up to 5 additional security bolts on the pull side edge

For the resistance class WK 2 (**attack side = pull side**)

the following additional equipment is necessary:

- Hinges with security pin and welded hinge roll
- Joint clearance limiter
- Special core frame material for wooden frames

### Resistance class WK 3

The 1-leaf doors (70/91 mm door leaf thickness) types 16 N, 5 N, 35 N and 50-1 are available with various frame versions, such as steel as well as wooden wrap-around frames, block frames as well as solid wooden frames, with vision panel, fanlight type 25 V or counter rebated top panel.

The 2-leaf doors types 6 N and 26 N are available as lintel-high door sets in resistance class WK 3 with attack side on push side.

The solid T 90 Fire-Protection-Doors types 8 N and 80-1 are available with steel frames, also with counter rebated top panel in resistance class WK 3.

For the resistance class WK 3 (**attack side = push side**)

the following equipment is necessary:

- Lock with 3-way bolting
- ES 2 approved security knob-lever-set
- 2 mm sheet thickness for steel frames
- Special core frame material for wooden frames
- 5 additional security bolts on the pull side edge
- Joint clearance limiter

For the resistance class WK 3 (**attack side = pull side**)

the following additional equipment is necessary:

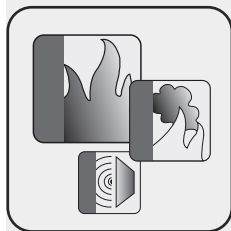
- Hinges with security pin and welded hinge roll

### Resistance class WK 4

The door type 16 N is available with various steel and wooden frame versions for the attack side on push side. The rebate width is hereby 30 mm.

For resistance class WK 4 the following equipment is necessary:

- Special door leaf construction
- ES 3 approved security knob-lever-set
- Reinforced wooden frames
- 2 mm sheet thickness for steel frames
- 3-way bolting with hook lock
- Reinforced strike plate
- 5 additional security bolts on the pull side edge
- Joint clearance limiter



## Multiple functions

2.6

# Burglar-Protection acc. to DIN V ENV 1627

Configuration WK 1, WK 2, WK 3 and WK 4

### Requirements for connecting walls

If Burglar-Protection-Door sets are installed, certain standards have to be regarded while planning the wall type and thickness:

#### Solid wall

Resistance class of the Burglar-Protection-Door	Masonry according to DIN 1053 part 1			Steel concrete according to DIN 1045	
	Minimum width in mm	Pressure resistance class of the stones	Mortar group at least	Minimum width in mm	Material strength class at least
WK 1	≥ 115 mm	≥ 12	II	≥ 100 mm	B 15
WK 2	≥ 115 mm	≥ 12	II	≥ 100 mm	B 15
WK 3	≥ 115 mm	≥ 12	II	≥ 120 mm	B 15
WK 4	≥ 240 mm	≥ 12	II	≥ 140 mm	B 15
WK 5	–	–	–	≥ 140 mm	B 15
WK 6	–	–	–	≥ 140 mm	B 15

(Excerpt of the DIN V ENV1627)

#### Gypsum plasterboard wall

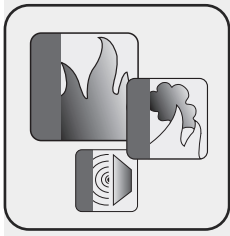
Schörghuber Burglar-Protection-Door sets are also approved for the installation in gypsum plasterboard walls. The walls need to be reinforced on the steel pipes minimum dimensions 50/50 /4 mm (matching the dimensions of the wall system and the required static values) fastened on the unfinished floor and ceiling in the area of the door opening. A horizontal pipe across the lintel connects the two perpendicular pipes.

Adequate breakthrough resistant gypsum plasterboard walls need to meet one of the following requirements:

Resistance class of the Burglar-Protection-Door	DIN 52 290 (old)	DIN EN 356 (new)	VdS 2534	DIN ENV 1627
WK 2	A 3	P4 A	N	WK 2
WK 3	B 1	P6 B	A	WK 3

e.g.:

- Rigips System 6.50.00 fire wall TB
- Knauf security wall W 118
- Lafarge fire wall L 18



## Multiple functions

2.6

# Burglar-Protection acc. to DIN V ENV 1627

## Combination with additional door functions

### Sound-Insulation

In principle, Burglar-Protection-Doors with factory-equipped effective bottom seal or a 4-sided frame, by default meet  $R_{w,P}$  32 dB sound insulation requirements. Burglar-Protection-Doors can reach even higher sound insulation values, if equipped with multiple bottom seals, the sound insulation function then is the eponymous function. For the possible performance range see the table multiple functions with Sound-Insulation. ➔ Chapter 2.5

### Radiation-Protection

Burglar-Protection-Doors with vision panel and/or top panel are available with an additional radiation protection function (lead equivalent value of up to 4 mm). If the lead equivalent value is 2 mm or more a lock with shifted follower and cylinder drilling is used. The bolting of the inactive leaf for 2-leaf door sets is realised with a conseald shot-bolt lock. ➔ Chapter 2.7

### Bullet-Resistant M 3

The solid door (model 3.00) in special design with steel frame meets the requirements for a Bullet-Resistant-Door. ➔ Chapter 2.8

### Climate category II

The whole range of Schörghuber Burglar-Protection-Doors meets the requirements for Climate category II. Due to constructive actions all doors, except the solid wood framed door, are available in Climate category III.

### Climate category III

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 50-1, 50-2 and 17 N in special design meet the requirements for Climate category III. ➔ Chapter 2.11

### Climate category IV

This high standard can be reached with the door type 35 N. ➔ Chapter 2.11

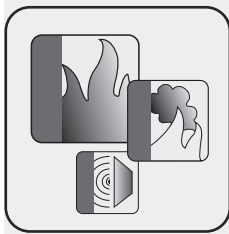
### Thermal insulation

In combination with the burglar protection function the door type 35 N meets high thermal insulation requirements. ➔ Chapter 2.12

### Mechanical stress group

All solid doors in the range of Schörghuber Burglar-Protection-Program by default meet the requirements of the Stress group S, therefore they resist static and dynamic deformation as well as hard and soft impact.

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 16 N and 26 N in special design also meet the requirements of the Stress group E. On request also other door types can be upgraded to this standard. ➔ Chapter 2.13



## Multiple functions

2.7

# Radiation-Protection acc. to DIN 6834

## Regulations and requirements

### DIN 6834 Radiation-Protection-Doors

Radiation-Protection-Door sets, types 3 N and 16 N, are available with lead (Pb) inlay in the configuration as solid door, door with vision panel and door with top panel. They are mostly used in order to block x-rays, gamma rays and thermionic rays, preferably in medically used rooms, e.g. rooms for diagnostics and therapies.

The Radiation-Protection is achieved by including a lead inlay in the door leaf structure. The thickness of the lead inlay (in mm) is defined by the so called lead equivalent value according to DIN 6845. The lead equivalent value of a door is determined by the sum of the thickness of the two lead inlays in the door leaf.

The required lead equivalent value of a Radiation-Protection-Door is determined by the radiation protection plan according to DIN 6812, 6846 or 6847 for the construction of an according complex. The Radiation-Protection value of the door has to match the required lead equivalent value required to shield the radiation.

### Function

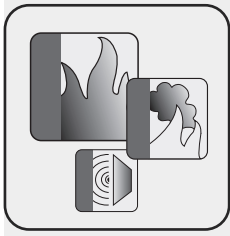
Neither the fittings nor the special equipment must interfere with the doors function or lower the lead equivalent value. The use of lead glazings as vision panel and intercommunication glazing is according to DIN 6841 possible. According to DIN 6834 surface defects of the lead inlay, in the area of the handles and the keyhole drilling, are allowed as long as they are less than 2 mm of the lead equivalent. If the lead equivalent value is 2 mm or more every Radiation-Protection-Door must be equipped with a special lock with shifted follower and cylinder drilling. In general Radiation-Protection-Doors can be ordered with a lead equivalent value of up to 4 mm.

The radiation barrier of the door must not be disrupted by any angular radiation in the area of the door rebate and the wall connection.

The radiation protection function of the door has to be verified by the manufacturer by attaching an official label on the edge of the door leaf.

### Installation

The cavities between the steel frame and the wall has to be done either dry, by padding the cavities with wooden bars and lead strips or by filling the cavities with radiation protection mortar.



## Multiple functions

2.7

# Radiation-Protection acc. to DIN 6834

## Combination with additional door functions

### Sound-Insulation and Burglar-Protection

Radiation-Protection-Doors can be equipped with sound insulation and burglar protection function, but then these are the eponymous functions. For the possible performance range see the tables multiple functions. ➔ Chapter 2.5 and 2.6

### Climate category II

The Schörghuber Radiation-Protection-Door type 3 N meets the requirements for Climate category II. Due to constructive actions this door type is also available in Climate category III.

### Climate category III

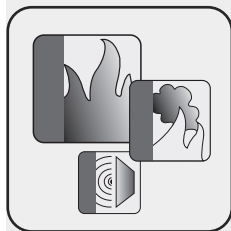
The Schörghuber Radiation-Protection-Door type 16 N in special design meet the requirements for Climate category III. ➔ Chapter 2.11

### Mechanical stress group

All solid doors in the range of Schörghuber Bullet-Resistant-Program by default meet the requirements of the Stress group S, therefore they resist static and dynamic deformation as well as hard and soft impact.

The door types 3 N, 13 N, 4 N, 14 N, 5 N, 6 N, 16 N and 26 N in special design also meet the requirements of the Stress group E. On request also other door types can be upgraded to this standard. ➔ Chapter 2.13

Wooden special doors



## Multiple functions

# Bullet-Resistant M 3

### Regulations and requirements

2.8

#### Resistance class M 3

The requirements of the “bullet resistance class M 3” are met, on the basis of the tests of the resistance class C 3 according to DIN 52290, part 2 (attack-blocking glazings), with the door model 3.00.

Depending on the type of the operational demands (bore, bullet type) the bullet resistance class is determined. In order to confirm the resistance class M 3 a heavy handgun, bore “44 Magnum” (revolver, pan headed full metal jacket with a soft core) is fired off from a 3 meter distance.

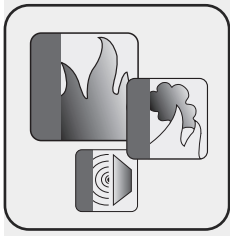
#### Function

Bullet-Resistant-Doors are used in areas with increased security requirements against invasions raids. Examples are banks, savings banks, airports, police stations, ministries and embassies.

The door’s bullet resistant function has to be verified by the manufacturer by attaching an official label on the edge of the door leaf.

#### Installation

The installation of Bullet-Resistant-Doors is only possible with steel frame in solid walls.



## Multiple functions

2.8

# Bullet-Resistant M 3

## Combination with additional door functions

### Sound-Insulation and Burglar-Protection

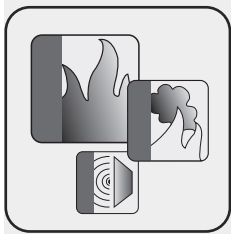
The Bullet-Resistant-Door type 3 N can be equipped with sound insulation function up to  $R_{w,P}$  32 dB and burglar protection function up to WK 3, but then these are the eponymous functions. For the possible performance range see the tables multiple functions. ➔ Chapter 2.5 and 2.6

### Climate category III

The Schörghuber Bullet-Resistant-Door type 3 N by default meets the requirements for Climate category III.

### Mechanical stress group

The Bullet-Resistant-Door type 3 N by default meets the requirements of the Stress group S, therefore they resist static and dynamic deformation as well as hard and soft impact. In special design this door type also meets the requirements of the Stress group E. ➔ Chapter 2.13



## Multiple functions

2.9

# Wet Room qualities

## Regulations and requirements

### Wet Room Doors

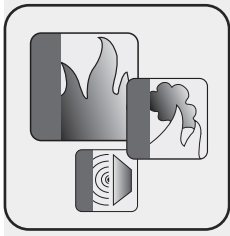
The test for Wet Room Doors consists of a cyclic sprinkling of the opening surface of the door leaf takes place in a special test stand. Each of the 48 test cycles consist of 4 minutes spraying with "warm" water and 26 minutes of drying. After the test the door leaf is examined for effects on the general planarity, the water absorption and the moisture expansion as well as any visually detectable damages.

The usage of Wet Room Door sets type 3 N / 4 N is recommended for internal rooms and areas with an extremely high humidity. Examples for damp and wet rooms are for example in sanitary facilities, shower rooms, sauna areas and indoor swimming pools, sports halls, hospitals and hotels.

The door leaf construction (filling, edges and top layer) of Wet Room Doors does not consist of wood or wooden materials, but unexceptionally of moisture-resistant materials. As top layer only HPL sheets are used, because veneer would due to hygroscopicity (its characteristic to soak up water) macerate and therefore rip open the finish.

### Function and installation

The Wet Room Door as well as the fittings must have wet room qualities, therefore a stainless steel frame, stainless steel hinges as well as a special lock with corrosion protection are recommended. A vision panel with plastic material glazing beads is of course possible as well.



## Multiple functions

# Heavy-duty Solid Core Doors

### Regulations and requirements

#### Doors for internal areas

The minimum requirements for rebated and unrebated doors (flush doors) for internal areas are regulated by DIN 68 706.

Exceptions are functional doors for special requirements e.g. Fire- and Smoke-Protection-Doors. According to DIN 68 706 a door for internal areas is a plane door leaf, which is mostly made of wood or wooden materials. The door leaf consists of a special plywood frame, intermediate layer, cover plate and the top layer.

Configuration and construction (Standard dimensions, vision panel size and position, material quality and range) concerning requirements and functions of interior doors are described in this norm. Door leaf dimensions, hinge and lock positions as well as their dimensional dependence on each other according to DIN 18 101 (doors for domestic buildings).

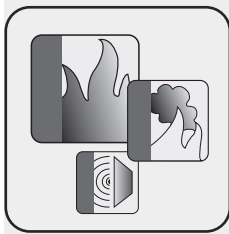
According to their ability to resist diverse climates (differences in temperature and/or humidity on either side of the door), interior doors, made of wood or wooden materials, are divided into three climate categories.

#### Function

The Schörghuber heavy-duty interior doors types 3 N and 4 N with solid core are approved for climate category II (Temperature differences up to 10 °C, humidity differences of up to 35 %), to assure perfect functionality even under difficult climate conditions.

Due to a door leaf thickness of 50 mm the climate sturdiness as well as the Sound-Insulation characteristic are improved and drastically increased. Additionally the doors meet the requirements for the stress group S classification, respectively E. In contrast to the standard rebate depth of 25,5 mm, the rebate depth of 35 mm provided by Schörghuber allows a better lock position.

Veneered door leaf surfaces are being transparently coated by Schörghuber. The herefore used acrylic lacquers result in a very durable surface, required for heavy-duty doors. ➔ Chapter 6.1



## Multiple functions

2.11

# Climate categories acc. to DIN EN 1121

## Requirements and test procedures

### Climate categories

According to their ability to resist divers climates, wooden or wooden material interior doors are divided into different climate categories, in order to match the the door leaf and the demanded requirements.

The ability to resist divers climates means that the door leaf withstands the strains of **different climates** on either side. (temperature/humidity).

The Schörghuber test norm is based on the current norms DIN EN 1121 respectively DIN EN 12219. Three door leaves with the dimensions of approximately 1000 x 2000 mm are exposed to an exactly defined test climate (according to DIN EN 1121) over the period of up to 28 days. In accordance with DIN EN 12219, class 2, the door leaf must not exceed a deformation level of 4,0 mm. A deformation in this range does not interfere with the door's function or usability.

Climate categories according to Schörghuber	Test climate	DIN EN 1121			
		Temperature differences (C°)	Humidity differences (%)		
<b>I</b>	a	18 ±2	23 ±2	50 ±5	30 ±5
<b>II</b>	b	13 ±2	23 ±2	65 ±5	30 ±5
<b>III</b>	c	3 ±2	23 ±2	85 ±5	30 ±5
<b>IV</b>	d	- 15 ±2	23 ±2	no requirements	30 ±5

### Climate category II

In general climate category II is recommended for rooms with high humidity over a long period of time, for example:

- Heated apartment
- Rooms across from heated hallways respectively stairways.

**All Schörghuber doors are by default approved for climate category II.**

### Climate category III

Door sets with climate category III are recommended for rooms with high humidity and temperature changes and differences, for example:

- Apartment doors to not heated hallways respectively stairways
- Doors in public buildings
- Interior doors to garages
- Interior doors to not insulated attics
- Basement doors

The door types 16 N/26 N are by default approved for climate category III.

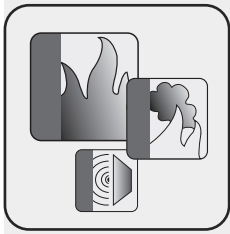
By optional measures all door types, except the T 30 solid wood framed door and the Radiation-Protection-Door, meet the requirements of the climate category III.

### Climate category IV

The climate category IV is especially designed for doors under extrem climate conditions.

- Doors for external use, for not directly weather exposed locations
- External doors

The door type 35 N fulfils these very high requirements.



## Multiple functions

2.12

# Thermal insulation

## Regulations and requirements

Doors for external areas are supposed to contribute actively to the thermal insulation. Besides the u-value (formerly k-value: the heat transmission coefficient), the significant air permeability  $Q_{100}$  is an important criteria to classify structural elements for external use.

### U-Wert: heat transmission coefficient

The u-value shows how much heat energy emits to the outside during a certain time unit, if a temperature difference of one degree (1 K) compared to the ambient air prevails. This is based on one square meter of the structural element. The lower the u-value, the better the thermal insulation quality of the material.

The energy saving regulation (ENEV) demands a u-value of  $\leq 2,9 \text{ W} / (\text{m}^2 \text{ K})$  for the renewal of exterior doors. There are no requirements for the structural element door leaf if installed in new buildings. According to the calculation standard EN ISO 10077-1 the u-value for doors is labeled with the index "D".

The Schörghuber door element type 35 N for external use (not for directly weather exposed locations) features according to the Sound-Insulation value different  $u_D$ -values.

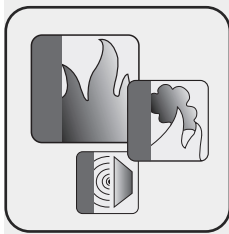
### Door type 35 N

Sound-Insulation value	$u_D$ -value
Rw,P 37 dB	1,31 W / (m <sup>2</sup> K)
Rw,P 42 dB	1,38 W / (m <sup>2</sup> K)

### Significant air permeability $Q_{100}$

The significant air permeability  $Q_{100}$  replaces the term of joint impermeability coefficient (a-value). According to DIN EN 12207, the  $Q_{100}$  value shows the air permeability of the door set at 100 PA the air pressure difference (significant pressure) per our, based on the the door set surface or the joint length. It is categorised in the classes 1 - 4, whereas class 1 means no joint impermeability requirements at all.

The Schörghuber door type 35 N achieves a value of  $3,9 \text{ m}^3 / \text{hm}^2$  based on the surface of the whole the door set, respectively  $1,0 \text{ m}^3 / \text{hm}^2$  for the joint length. Both values allow the categorisation in class 3.



## Multiple functions

## 2.13

### Stress groups

#### Application area

The mechanical stress of interior doors results from external influences, such as soft impact, hard impact, static deformations and vertical stress. According to the Schörghuber standard (on the basis of DIN EN 1192) and the type of stress, Schörghuber door sets are divided in four mechanical stress groups™:

Stress group according to Schörghuber	DIN EN 1192				
	DIN EN 1192	Vertical stress	Static deformation	Soft impact	Hard impact
<b>N</b>	1	400 N	200 N	25 J	1,5 J
<b>M</b>	2	600 N	250 N	50 J	3,0 J
<b>S</b>	3	800 N	300 N	100 J	5,0 J
<b>E</b>	4	1000 N	350 N	150 J	8,0 J

#### Stress group N

Normal stress e.g.

- Interior apartment doors

#### Stress group M

Medium stress e.g.

- Office rooms
- Other commercially used rooms

#### Stress group S

High stress, same as group N and M, but with higher stress e.g.

- Barracks
- Hotels
- Kindergartens
- Schools
- Hospitals

#### Stress group E

Extreme stress, same as group S, but with abrasive use.

#### Test criteria

Interior doors are being tested in order to determine their mechanical durability

- Static deformation according to DIN EN 947
- Dynamic deformation according to DIN EN 948
- Soft impact according to DIN EN 949
- Hard impact according to DIN EN 950

**Schörghuber special doors by default** meet the requirements for the **stress group S**, with the exception of the solid wood framed door, which is due to its large glass share not intended for this test.