

## ДЕКЛАРАЦИЯ ЗА ЕКСПЛОАТАЦИОННИ ПОКАЗАТЕЛИ

### DoP 0417

за fischer HybridPower (Пластмасови анкери за употреба в бетон и мазилки)

BG

- |                                                                                                                                                         |                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <u>Уникален идентификационен код на типа продукт:</u>                                                                                                | <b>DoP 0417</b>                                                                                                                                                                 |
| 2. <u>Предвидена употреба/употреби:</u>                                                                                                                 | Пластмасов дюбел за многократна употреба в бетон и зидарии, за не-структурни приложения (основна група материали a b, c, d), виж Приложението, по-специално Приложения B1 - B5. |
| 3. <u>Производител:</u>                                                                                                                                 | fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Германия                                                                                                    |
| 4. <u>Упълномощен представител:</u>                                                                                                                     | —                                                                                                                                                                               |
| 5. <u>Система/системи за оценяване и проверка на постоянството на експлоатационните показатели:</u>                                                     | <b>2+</b>                                                                                                                                                                       |
| 6. <u>Европейски документ за оценяване:</u>                                                                                                             | <b>EAD 330284-00-0604-v01</b>                                                                                                                                                   |
| Европейска техническа оценка:                                                                                                                           | <b>ETA-26/0168; 2026-06-23</b>                                                                                                                                                  |
| Орган за техническа оценка:                                                                                                                             | <b>ETA-Danmark A/S</b>                                                                                                                                                          |
| Нотифициран орган/органи:                                                                                                                               | <b>2873 TU Darmstadt</b>                                                                                                                                                        |
| 7. <u>Декларираните експлоатационни показатели:</u>                                                                                                     |                                                                                                                                                                                 |
| <b>Пожарна безопасност (BWR 2)</b>                                                                                                                      |                                                                                                                                                                                 |
| 1) Реакция на огън: Клас A1                                                                                                                             |                                                                                                                                                                                 |
| 2) Пожароустойчивост (група основни материали a): Приложение C14                                                                                        |                                                                                                                                                                                 |
| 3) Пожароустойчивост (група основни материали b, c и d): Приложение C15                                                                                 |                                                                                                                                                                                 |
| <b>Механична устойчивост и здравина (BWR 4)</b>                                                                                                         |                                                                                                                                                                                 |
| 4) Устойчивост на разрушаване на стоманата при натоварване на опън: Приложение C1                                                                       |                                                                                                                                                                                 |
| 5) Устойчивост на разрушаване на стоманата или полимера при натоварване на срез: Приложение C1                                                          |                                                                                                                                                                                 |
| 6) Устойчивост на издърпване или разрушаване на бетон или разрушаване на полимер при натоварване при опън (основна група материали a): Приложение C1    |                                                                                                                                                                                 |
| 7) Съпротивление във всяка посока на натоварване без лостово рамо (група основни материали b, c, d): виж Приложението, по-специално Приложения C7 - C13 |                                                                                                                                                                                 |
| 8) Разстояние от ръба и междусови разстояния (група основни материали a): Приложение B2                                                                 |                                                                                                                                                                                 |
| 9) Разстояние от ръба и междусови разстояния (група основни материали b, c, d): Приложения B3, B4                                                       |                                                                                                                                                                                 |
| 10) Размествания при краткосрочно и дългосрочно натоварване: Приложение C1                                                                              |                                                                                                                                                                                 |
| <b>трайност:</b>                                                                                                                                        |                                                                                                                                                                                 |
| 11) трайност: Приложение B1                                                                                                                             |                                                                                                                                                                                 |
| 8. <u>Подходяща техническа документация и/или специфична техническа документация:</u>                                                                   | —                                                                                                                                                                               |

Експлоатационните показатели на продукта, посочени по-горе, са в съответствие с декларираните експлоатационни показатели. Настоящата декларация за експлоатационни показатели се издава в съответствие с Регламент (ЕС) № 305/2011, като отговорността за нея се носи изцяло от посочения по-горе производител.

Подписано за и от името на производителя от:



Dr. Christian Weber, Ръководител „Развойна дейност“  
Tumlingen, 2026-08-01



Dieter Pfaff, Ръководител на Международната федерация по производство и управление на ка

Тази Декларация за съответствие е изготвена на различни езици. В случай, че възникне спор, относно интерпретирането, трябва да се вземе предвид английската версия.

Приложението съдържа доброволна и допълнителна информация на английски език в обем и съдържание, надхвърлящи (независимо от езика) законовите изисквания.

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Насоки за превод Основни характеристики и експлоатационни параметри на приложенията

Safety in case of fire (BWR 2)

Пожарна безопасност (BWR 2)

|   |                                                                                                               |                                                                                                                                                        |
|---|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Reaction to fire:<br><b>Реакция на огън:</b>                                                                  | -                                                                                                                                                      |
| 2 | Resistance to fire (base material group a):<br><b>Пожароустойчивост (група основни материали а):</b>          | $N_{Rk,s,fi}$ [kN]; $N_{Rk,s,fi}$ [kN],<br>$F_{Rk,fi,90}$ [kN]; $F_{Rk,fi}$ ( $\alpha$ ) [kN];<br>$M_{Rk,s,fi}$ [Nm]; $c_{min,fi}$ ; $s_{min,fi}$ [mm] |
| 3 | Resistance to fire (base material group b, c and d):<br><b>Пожароустойчивост (група основни материали а):</b> | $F_{Rk,fi}$ ( $\alpha$ ) [kN]; $M_{Rk,s,fi}$ [Nm]; $c_{min,fi}$ [mm]<br>$s_{min,fi}$ [mm]                                                              |

Mechanical resistance and stability (BWR 4)

Механична устойчивост и здравина (BWR 4)

|   |                                                                                                                                                                                                                                                           |                                                                    |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| 3 | Resistance to steel failure under tension loading:<br><b>Устойчивост на разрушаване на стоманата при натоварване на опън:</b>                                                                                                                             | $N_{Rk,s}$ [kN]                                                    |
| 4 | Resistance to steel or polymer failure under shear loading:<br><b>Устойчивост на разрушаване на стоманата или полимера при натоварване на срез:</b>                                                                                                       | $V_{Rk,s}$ [kN]; $M_{Rk,s}$ [Nm]; $V_{Rk,pol}$ [kN]                |
| 5 | Resistance to pull-out or concrete failure or polymer failure under tension loading (base material group a)<br><b>Устойчивост на издърпване или разрушаване на бетон или разрушаване на полимер при натоварване при опън (основна група материали а):</b> | $N_{Rk,p}$ [kN] / $N_{Rk,pol}$ [kN]                                |
| 6 | Resistance in any load direction without lever arm (base material group b,c,d):<br><b>Съпротивление във всяка посока на натоварване без лостово рамо (група основни материали b, c, d):</b>                                                               | $F_{Rk}$ [kN]                                                      |
| 7 | Edge distance and spacing (base material group a)<br><b>Разстояние от ръба и междусови разстояния (група основни материали а):</b>                                                                                                                        | $c_{cr}$ ; $s_{cr}$ ; $c_{min}$ ; $s_{min}$ ; $a$ ; $h_{min}$ [mm] |
| 8 | Edge distance and spacing (base material group b,c,d):<br><b>Разстояние от ръба и междусови разстояния (група основни материали b, c, d):</b>                                                                                                             | $c_{min}$ ; $s_{min}$ ; $h_{min}$ [mm]                             |
| 9 | Displacements under short-term and long-term loading:<br><b>Размествания при краткосрочно и дългосрочно натоварване:</b>                                                                                                                                  | $\delta_0$ ; $\delta_{\infty}$ [mm]                                |

Aspects of durability

трайност:

|    |                                 |   |
|----|---------------------------------|---|
| 10 | Durability:<br><b>трайност:</b> | - |
|----|---------------------------------|---|

## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product**

The fischer HybridPower is a plastic anchor consisting of a plug sleeve made of polyamide combined with a metal skeleton (power wedge), and a special screw made of either galvanized steel with an additional organic coating or stainless steel according to Annex A3. The anchor is available with two different head types; a hexagon head (type FUS) and a countersunk head (type T).

The anchors are intended for use in several base materials; cracked and uncracked concrete of strength classes ranging from C12/15 to C50/60, masonry units (solid and hollow or perforated) and unreinforced or reinforced auto aerated concrete.

The following service temperature ranges are applied for:

- T1: -20°C/50°C
- T2: -20°C/80°C

The anchor is screwed into a predrilled cylindrical drill hole, and the power wedges interlock with the base material ensuring a secure anchorage.

The product description is given in Annex A and the intended use specifications of the product are detailed in Annex B.

### **2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)**

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

### 3 Performance of the product and references to the methods used for its assessment

| Characteristic | Assessment of characteristic |
|----------------|------------------------------|
|----------------|------------------------------|

#### 3.1 Safety in case of fire (BWR2)

|                                                     |           |
|-----------------------------------------------------|-----------|
| Reaction to fire                                    | Class A1  |
| Resistance to fire (base material group a)          | Annex C14 |
| Resistance to fire (base material group b, c and d) | Annex C15 |

#### 3.2 Mechanical resistance and stability (BWR4)

|                                                                                                             |                 |
|-------------------------------------------------------------------------------------------------------------|-----------------|
| Resistance to steel failure under tension loading                                                           | Annex C1        |
| Resistance to steel failure under shear loading                                                             | Annex C1        |
| Resistance to pull-out or concrete failure or polymer failure under tension loading (base material group a) | Annex C1        |
| Resistance in any load direction without lever arm (base material group b, c and d)                         | Annex C7 to C13 |
| Edge distance and spacing (base material group a)                                                           | Annex B2        |
| Edge distance and spacing (base material group b, c and d)                                                  | Annex B3 and B4 |
| Displacements under short-term and long-term loading                                                        | Annex C1        |

#### 3.3 Aspects of durability

|            |          |
|------------|----------|
| Durability | Annex B1 |
|------------|----------|

See additional information in section 3.4

### **3.4 General aspects related to the performance of the product**

The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

## **4 Assessment and verification of constancy of performance (hereinafter AVCP) system applied, with reference to its legal base.**

### **4.1 AVCP system**

According to the decision 1997/463/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) is 2+.

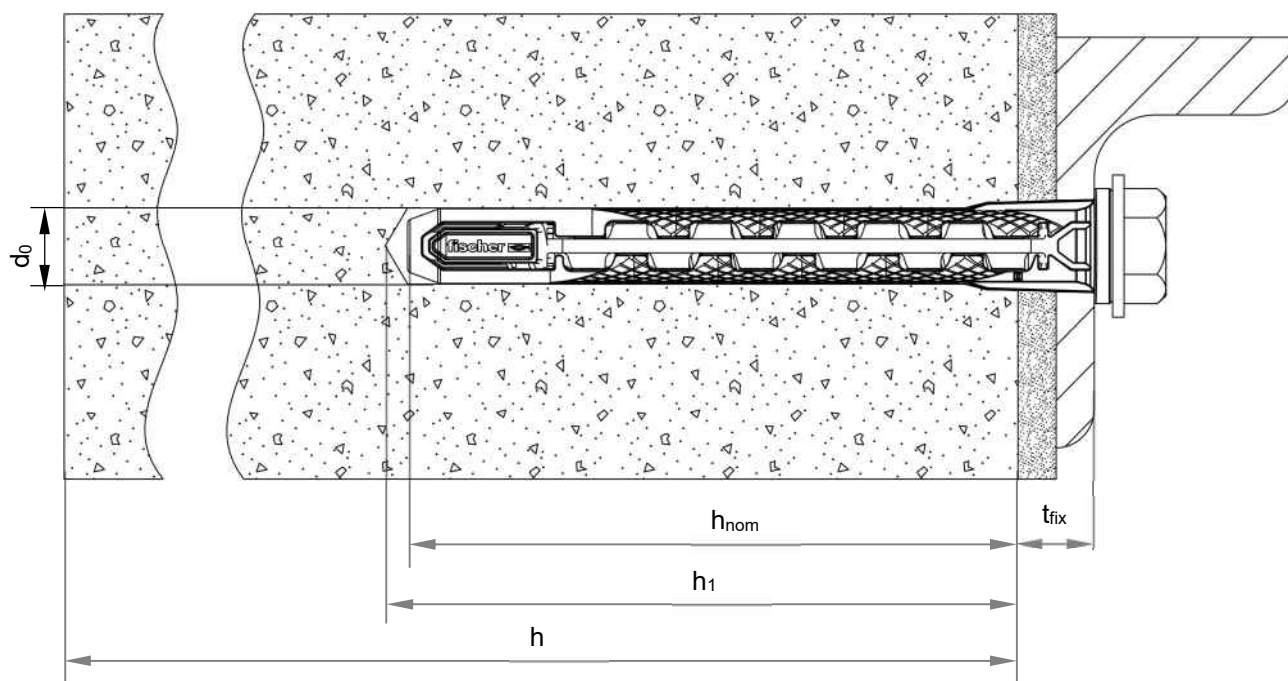
## **5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

The following standards and documents are referred to in this European Technical Assessment:

- EOTA European Assessment Document EAD 330284-00-0604-v01: Plastic anchors for redundant non-structural systems for use in concrete and masonry under fire exposure
- EOTA Technical Report TR 051, 2018-04: Recommendations for job site tests of plastic anchors and screws
- EOTA Technical Report TR 064, 2018-05, amended 01/2023: Design of plastic anchors in concrete and masonry
- EN 206:2013+A1:2016: Concrete – Specification, performance, production and conformity
- EN 771-1:2011+A1:2015: Specification for masonry units – Part 1: Clay masonry units
- EN 771-2:2011+A1:2015: Specification for masonry units – Part 2: Calcium silicate
- EN 771-3:2011+A1:2015: Specification for masonry units – Part 3: Aggregate concrete masonry units (dense and lightweight aggregates)
- EN 771-4:2011+A1:2015: Specification for masonry units – Part 4: autoclaved aerated concrete masonry units
- EN 998-2:2010: Specification for mortar for masonry - Part 2: Masonry mortar
- EN 12602:2016: Prefabricated reinforced components of autoclaved aerated concrete
- EN 1993-1-4:2025: Design of steel structures - Part 1-4: General rules -
- EN ISO 4042:2022: Fasteners – Electroplated coating systems

## fischer HybridPower



### Legend

- $d_0$  = Nominal drill hole diameter
- $h_{nom}$  = Overall plastic anchor embedment depth in the base material
- $h_1$  = Depth of drill hole to deepest point
- $h$  = Thickness of member (wall)
- $t_{fix}$  = Thickness of fixture and / or non-load bearing layer

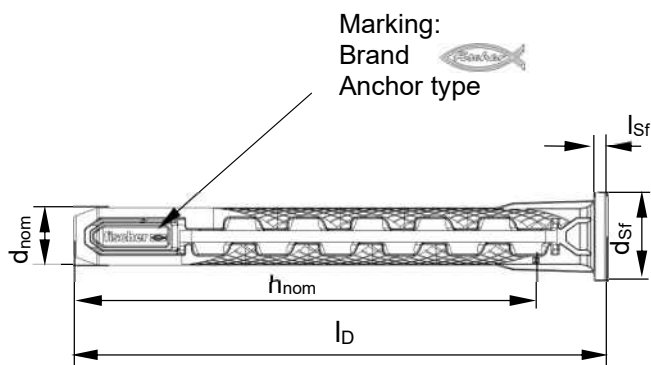
*Figure not to scale*

## fischer HybridPower

**Product description**  
Installed anchor

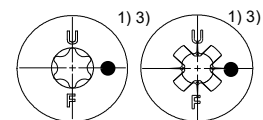
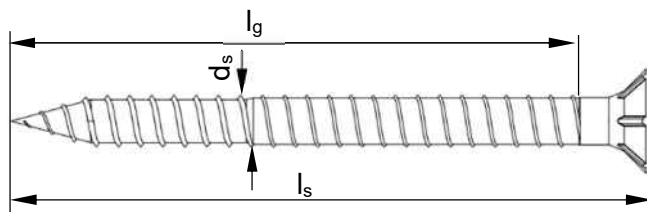
**Annex A1**  
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## Anchor sleeve – HybridPower

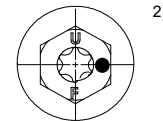
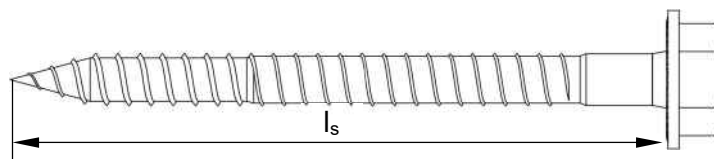


## Special screws

### Countersunk screw



### Hexagonal screw with washer



- 1) Additional marking for the special screw, stainless steel version: e.g. "A4" resp. "R" or "A2".
- 2) Internal driving feature for Torx bit is optional for hexagonal head.
- 3) Optional additional version with underhead ribs.

**Table A2.1: Dimensions**

| Anchor type     | Anchor sleeve     |                   |                   |               |                  |                  | Special screw |               |               |
|-----------------|-------------------|-------------------|-------------------|---------------|------------------|------------------|---------------|---------------|---------------|
|                 | $h_{nom}$<br>[mm] | $d_{nom}$<br>[mm] | $t_{fix}$<br>[mm] | $l_D$<br>[mm] | $l_{sf}$<br>[mm] | $d_{sf}$<br>[mm] | $d_s$<br>[mm] | $l_g$<br>[mm] | $l_s$<br>[mm] |
| HybridPower FUS | 80                | 10                | $\geq 1$          | 90-230        | 2,5              | 15               | 7,0           | 77            | $l_D$         |
| HybridPower T   | 80                | 10                | $\geq 1$          | 90-230        | 2,5              | 15               | 7,0           | 77            | $l_D$         |

### Legend

- $h_{nom}$  = Overall plastic anchor embedment depth in the base material  
 $d_{nom}$  = Nominal diameter of the anchor sleeve  
 $t_{fix}$  = Thickness of fixture and / or non-load bearing layer  
 $l_D$  = Length of the anchor sleeve  
 $l_{sf}$  = Thickness of the anchor sleeve collar  
 $d_{sf}$  = Diameter of the anchor sleeve collar  
 $d_s$  = Diameter of the screw  
 $l_g$  = Thread length of the screw  
 $l_s$  = Length of the screw

*Figures not to scale*

## fischer HybridPower

**Product description**  
 Anchor type, special screws  
 Marking and dimensions

**Annex A2**  
 Appendix 6 / 27

**Table A3.1: Materials**

| Name                             | Material                                                                                                                                                                              |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hybrid anchor sleeve             | - Polyamide, PA6, colour: red                                                                                                                                                         |
| Skeleton                         | - Ferritic stainless steel                                                                                                                                                            |
| Special screw                    | - Galvanised steel gvz with Zn5/Ag or Zn5/An in accordance with EN ISO 4042 with additional organic layer (Zn5/Ag/T7 or Zn5/An/T7, resp. total layer thickness $\geq 6 \mu\text{m}$ ) |
|                                  | <u>or</u>                                                                                                                                                                             |
|                                  | - Stainless steel "A2" of corrosion resistance class CRC II in accordance with EN 1993-1-4                                                                                            |
|                                  |                                                                                                                                                                                       |
| fischer HybridPower              |                                                                                                                                                                                       |
| Product description<br>Materials |                                                                                                                                                                                       |
| Annex A3<br>Appendix 7 / 27      |                                                                                                                                                                                       |

## Specifications of intended use

### Anchorage subject to:

- Static and quasi-static loads.
- Redundant non-structural systems.
- Fire exposure in reinforced or unreinforced compacted normal weight concrete without fibres, strength classes  $\geq C20/25$  as per EN 206 and solid brick masonry with mean compressive strength  $\geq 5 \text{ N/mm}^2$  as per EN 771, see Annex C14 and Annex C15.

### Base materials:

- Reinforced or unreinforced compacted normal weight concrete without fibres, strength classes  $\geq C12/15$  (base material group "a"), in accordance with EN 206-1, see Annex C1 and C2.
- Solid brick masonry (base material group "b") as per EN 771-1, EN 771-2 or EN 771-3, see Annex C2, C7 and C8.  
Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow or perforated brick masonry (base material group "c"), as per EN 771-1, EN 771-2 or EN 771-3, see Annex C3 – C6 and C8 – C12.
- Unreinforced autoclaved aerated concrete (base material group "d") as per EN 771-4 and reinforced autoclaved aerated concrete (base material group "d") as per EN 12602, see Annex C2 and C13.
- Mortar strength class of the masonry  $\geq M2,5$  in accordance with EN 998-2.
- For other comparable base materials of the base material group "a", "b", "c" and "d" the characteristic resistance of the anchor may be determined by job site tests in accordance with TR 051.

### Temperature Range:

- c:  $-20^\circ\text{C}$  to  $50^\circ\text{C}$  (max. short term temperature  $+50^\circ\text{C}$  and max. long term temperature  $+30^\circ\text{C}$ )
- b:  $-20^\circ\text{C}$  to  $80^\circ\text{C}$  (max. short term temperature  $+80^\circ\text{C}$  and max. long term temperature  $+50^\circ\text{C}$ )

### Use conditions (Environmental conditions):

- Structures subject to dry internal conditions: Special screw made of zinc coated steel or stainless steel.
- The specific screw made of galvanised steel or galvanised steel with an additional organic layer may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore, there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e.g. undercoating or body cavity protection for cars).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist: Special screw made of stainless steel of corrosion resistance class CRC III.  
Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

### Design:

- The anchorages are to be designed in accordance with TR 064 under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.

### Installation:

- Hole drilling by the drilling method in accordance with Annex C1 for base material group "a", and in accordance with Annexes C7 – C13 for base material group "b", "c" and "d".
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation temperature:  $-20^\circ\text{C}$  to  $+40^\circ\text{C}$ .
- Exposure to UV due to solar radiation of the anchor not protected by rendering  $\leq 6$  weeks.
- No ingress of water in the borehole at temperatures  $< 0^\circ\text{C}$ .

**fischer HybridPower**

**Intended use**  
Specifications

**Annex B1**  
Appendix 8 / 27

**Table B2.1: Installation parameters**

| Anchor type                                                 |           |        | HybridPower, HybridPower A2, HybridPower A4, HybridPower R |
|-------------------------------------------------------------|-----------|--------|------------------------------------------------------------|
| Nominal drill hole diameter                                 | $d_0$     | = [mm] | 10                                                         |
| Cutting diameter of drill bit                               | $d_{cut}$ | ≤ [mm] | 10,45                                                      |
| Overall plastic anchor embedment depth in the base material | $h_{nom}$ | ≥ [mm] | 80                                                         |
| Depth of drill hole to deepest point                        | $h_1$     | ≥ [mm] | 90                                                         |
| Diameter of clearance hole in the fixture                   | $d_f$     | ≤ [mm] | 10,50 <sup>1)</sup>                                        |

<sup>1)</sup> In combination of hexagon screw with washer and anchor sleeve, use in elongated hole under tensile load is allowed.

**Table B2.2: Minimum thickness of member, spacing and edge distances in concrete – base material group “a”**

| Anchor Type                                                | Embedment depth<br>$h_{nom}$<br>[mm] | Strength class | Minimum thickness of member<br>$h_{min}$<br>[mm] | Characteristic edge distance<br>$c_{cr, N}$<br>[mm] | Characteristic spacing<br>$s_{cr, N}$<br>[mm] | Minimum spacing and edge distances <sup>1)</sup><br>$s_{min}, c_{min}$<br>[mm] |
|------------------------------------------------------------|--------------------------------------|----------------|--------------------------------------------------|-----------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------|
| [-]                                                        | [-]                                  | [-]            | [-]                                              | [-]                                                 | [-]                                           | [-]                                                                            |
| HybridPower, HybridPower A2, HybridPower A4, HybridPower R | 80                                   | C12/15         | 100                                              | 70                                                  | 105                                           | $s_{min} = 70$ for $c \geq 70$<br>$c_{min} = 70$ for $s \geq 70$               |
|                                                            |                                      | ≥ C16/20       |                                                  | 50                                                  | 75                                            | $s_{min} = 50$ for $c \geq 50$<br>$c_{min} = 50$ for $s \geq 50$               |

<sup>1)</sup> Intermediate values by linear interpolation.

Fixing points with spacing  $a \leq s_{cr, N}$  are considered as a group with a maximum characteristic resistance  $N_{Rk, p}$  as per Table C1.2. For a spacing  $a > s_{cr, N}$  the anchors are considered as single anchors, each with characteristic resistance  $N_{Rk, p}$  as per Table C1.2.

**Scheme of spacing and edge distances in concrete, base material group “a”**

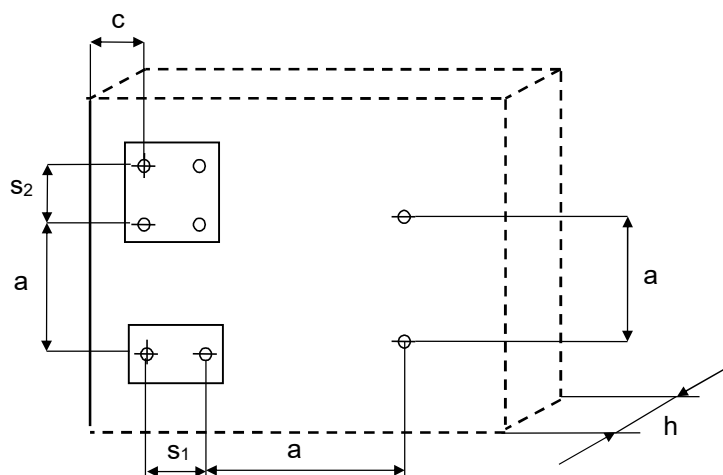


Figure not to scale

**fischer HybridPower**

**Intended use**

Installation parameters

Minimum thickness of member, spacing and edge distances for use in concrete

**Annex B2**  
Appendix 9 / 27

**Table B3.1: Minimum thickness of member, spacing and edge distances in solid and hollow or perforated masonry – base material group “b” and “c”**

| Anchor Type                                                   |             |      | HybridPower, HybridPower A2, HybridPower A4, HybridPower R |
|---------------------------------------------------------------|-------------|------|------------------------------------------------------------|
| Minimum thickness of member <sup>1)</sup>                     | $h_{min}$   | [mm] | 115                                                        |
| Minimum spacing between anchor groups and / or single anchors | $a_{min}$   | [mm] | 250                                                        |
| <b>Single anchor</b>                                          |             |      |                                                            |
| Minimum edge distance                                         | $c_{min}$   | [mm] | 100                                                        |
| <b>Anchor group</b>                                           |             |      |                                                            |
| Minimum spacing perpendicular to free edge                    | $s_{1,min}$ | [mm] | 100                                                        |
| Minimum spacing parallel to free edge                         | $s_{2,min}$ | [mm] | 100                                                        |
| Minimum edge distance                                         | $c_{min}$   | [mm] | 100                                                        |

<sup>1)</sup> Member thickness according to Annex C2 – C6.

**Scheme of spacing and edge distances in solid and hollow or perforated masonry – base material group “b” and “c”**

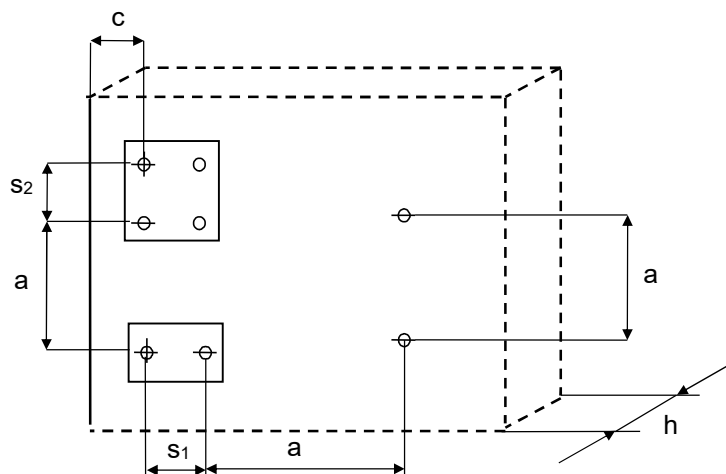


*Figure not to scale*

**fischer HybridPower**

**Intended use**

Minimum thickness of member, spacing and edge distances for use in solid, hollow or perforated masonry

**Annex B3**  
Appendix 10 / 27

**Table B4.1: Minimum thickness of member, spacing and edge distances in unreinforced and reinforced autoclaved aerated concrete – base material group “d”**

| Anchor type                                                   |                           |                      | HybridPower, HybridPower A2, HybridPower A4, HybridPower R |       |
|---------------------------------------------------------------|---------------------------|----------------------|------------------------------------------------------------|-------|
| Compressive strength <sup>1)</sup>                            | $f_{cm,decl}$<br>$f_{ck}$ | [N/mm <sup>2</sup> ] | $\geq 2$                                                   | $> 3$ |
| Minimum thickness of member                                   | $h_{min}$                 | [mm]                 | 115                                                        | 175   |
| Minimum spacing between anchor groups and / or single anchors | $a_{min}$                 | [mm]                 | 250                                                        | 250   |
| <b>Single anchor</b>                                          |                           |                      |                                                            |       |
| Minimum edge distance                                         | $c_{min}$                 | [mm]                 | 100                                                        | 100   |
| <b>Anchor group</b>                                           |                           |                      |                                                            |       |
| Minimum spacing perpendicular to free edge                    | $s_{1,min}$               | [mm]                 | 100                                                        | 100   |
| Minimum spacing parallel to free edge                         | $s_{2,min}$               | [mm]                 | 100                                                        | 100   |
| Minimum edge distance                                         | $c_{min}$                 | [mm]                 | 100                                                        | 100   |

<sup>1)</sup> See Table C13.1 and C13.2.

**Scheme of spacing and edge distances in unreinforced and reinforced autoclaved aerated concrete – base material group “d”**

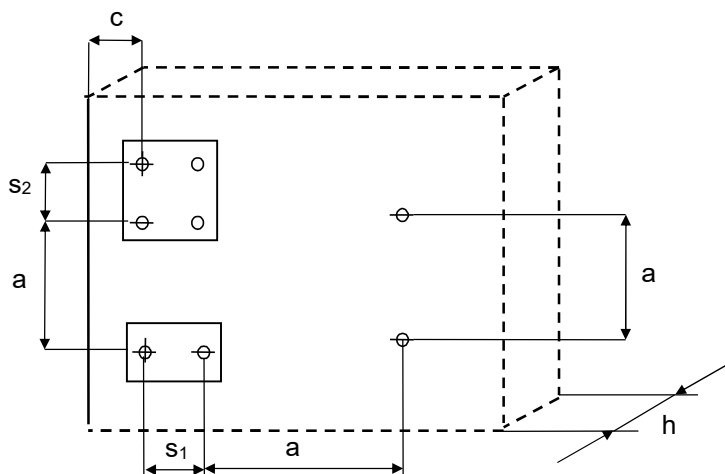


*Figure not to scale*

**fischer HybridPower**

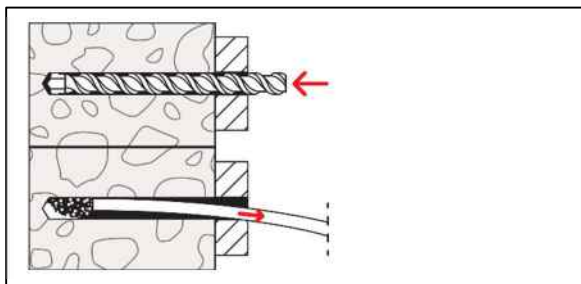
**Intended use**

Minimum thickness of member, spacing and edge distances for use in autoclaved aerated concrete

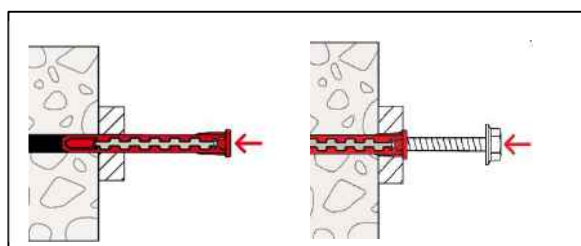
**Annex B4**  
Appendix 11 / 27

## Installation instructions

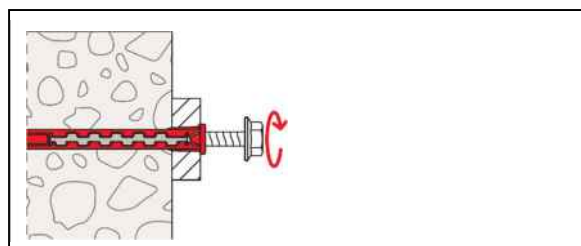
The following pictures show fixing through timber in concrete.  
Summary of all kind of masonry bricks see Annex C2 – C6.



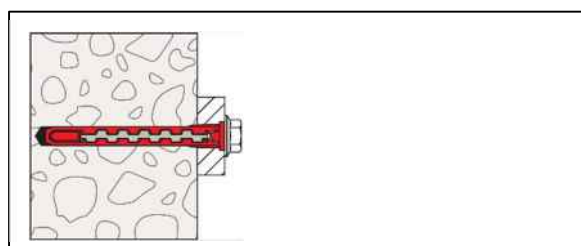
1. Drill the bore hole as per Table B2.1 using the drilling method described in the corresponding Annex C1 and C7 to C13.
2. For use in base material group "a" (concrete), "b" (solid bricks), "d" (autoclaved aerated concrete): Remove dust from borehole. Not necessary for base material group "c".



3. Insert anchor (screw and sleeve) by using a hammer until the collar of the plastic sleeve is flush with the surface of the fixture.



4. The screw is screwed-in until the head of the screw touches the sleeve. The anchor is correctly installed, if the head of the screw fits tight on the surface and nor the anchor sleeve neither the screw cannot be turned-in any further.



5. Correctly installed anchor, shown in concrete.

*Figures not to scale*

**fischer HybridPower**

**Intended use**  
Installation instructions

**Annex B5**  
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**Table C1.1: Characteristic resistance of the screws**

| Failure of expansion element<br>(special screw)       |                    |      | HybridPower, HybridPower A2,<br>HybridPower A4, HybridPower R |                 |
|-------------------------------------------------------|--------------------|------|---------------------------------------------------------------|-----------------|
|                                                       |                    |      | galvanised steel                                              | stainless steel |
| Characteristic tension resistance                     | $N_{Rk,s}$         | [kN] | 21,70                                                         | 21,70           |
| Partial safety factor                                 | $\gamma_{Ms}^{1)}$ | [-]  | 1,55                                                          | 1,55            |
| Characteristic shear resistance                       | $V_{Rk,s}$         | [kN] | 10,80                                                         | 10,80           |
| Partial safety factor                                 | $\gamma_{Ms}^{1)}$ | [-]  | 1,29                                                          | 1,29            |
| <b>Characteristic bending resistance of the screw</b> |                    |      |                                                               |                 |
| Characteristic bending resistance                     | $M_{Rk,s}$         | [Nm] | 20,60                                                         | 20,60           |
| Partial safety factor                                 | $\gamma_{Ms}^{1)}$ | [-]  | 1,29                                                          | 1,29            |

<sup>1)</sup> In absence of other national regulations.

**Table C1.2: Characteristic resistance due to pullout-failure for use in cracked and uncracked concrete base material group “a”<sup>1)</sup>**

| Pull-out failure (plastic sleeve)            |                             |      | HybridPower, HybridPower A2,<br>HybridPower A4, HybridPower R |
|----------------------------------------------|-----------------------------|------|---------------------------------------------------------------|
| Embedment depth $h_{nom}$                    | $\geq$                      | [mm] | 80                                                            |
| Concrete $\geq$ C16/20                       |                             |      |                                                               |
| Characteristic tension resistance (30/50 °C) | $N_{Rk,p}$                  | [kN] | 4,50 / 3,00 <sup>2)</sup>                                     |
| Characteristic tension resistance (50/80 °C) | $N_{Rk,p}$                  | [kN] | 4,00 / 3,00 <sup>2)</sup>                                     |
| Partial safety factor                        | $\gamma_{Mc}$ <sup>3)</sup> | [-]  | 1,80                                                          |

<sup>1)</sup> Drilling method: hammer drilling.

<sup>2)</sup> Valid for concrete C12/15.

<sup>3)</sup> In absence of other national regulations.

**Table C1.3: Displacements<sup>1)</sup> under tension and shear loading in cracked and uncracked concrete, base material group “a” and in masonry, base material group “b” and “c”**

| Displacements under                                           |                   |           | Tension load <sup>2)</sup> |                            | Shear load <sup>2)</sup> |                            |
|---------------------------------------------------------------|-------------------|-----------|----------------------------|----------------------------|--------------------------|----------------------------|
| Anchor type                                                   | $h_{nom}$<br>[mm] | F<br>[kN] | $\delta_{NO}$<br>[mm]      | $\delta_{N\infty}$<br>[mm] | $\delta_{vo}$<br>[mm]    | $\delta_{v\infty}$<br>[mm] |
| HybridPower, HybridPower A2,<br>HybridPower A4, HybridPower R | 80                | 2,50      | 0,90                       | 0,90                       | 4,90                     | 1,35                       |

<sup>1)</sup> Valid for all ranges of temperatures.

<sup>2)</sup> Intermediate values by linear interpolation.

**Table C1.4 Displacements<sup>1)</sup> under tension and shear loading in unreinforced and reinforced autoclaved aerated concrete, base material group “d”**

| Displacements under                                                 |                                                |                   |           | Tension load <sup>2)</sup> |                            | Shear load <sup>2)</sup> |                            |
|---------------------------------------------------------------------|------------------------------------------------|-------------------|-----------|----------------------------|----------------------------|--------------------------|----------------------------|
| Anchor type                                                         | $f_{cm,decl} / f_{ck}$<br>[N/mm <sup>2</sup> ] | $h_{nom}$<br>[mm] | F<br>[kN] | $\delta_{NO}$<br>[mm]      | $\delta_{N\infty}$<br>[mm] | $\delta_{vo}$<br>[mm]    | $\delta_{v\infty}$<br>[mm] |
| HybridPower,<br>HybridPower A2,<br>HybridPower A4,<br>HybridPower R | $\geq 2$                                       | 80                | 0,14      | 0,20                       | 0,39                       | 0,29                     | 0,43                       |
|                                                                     | $\geq 6$                                       | 80                | 0,57      | 0,11                       | 0,21                       | 1,14                     | 1,71                       |

<sup>1)</sup> Valid for all ranges of temperatures.

<sup>2)</sup> Intermediate values by linear interpolation.

## fischer HybridPower

### Performances

Characteristic resistance and bending resistance of the screw

Characteristic resistance for use in concrete, displacements under tension and shear load

**Table C2.1: Summary of concrete - base material group “a”, solid bricks – base material group “b”<sup>1)</sup> and autoclaved aerated concrete – base material group “d”**

| Base material                                                                                    | Format       | Dimensions<br>[mm] | Mean compressive<br>strength as per<br>EN 771<br>[N/mm <sup>2</sup> ] | Bulk<br>density $\rho$<br>[kg/dm <sup>3</sup> ] | See<br>Annex |
|--------------------------------------------------------------------------------------------------|--------------|--------------------|-----------------------------------------------------------------------|-------------------------------------------------|--------------|
| <b>Concrete <math>\geq</math> C12/15</b> as per EN 206                                           |              |                    |                                                                       |                                                 | C1           |
| <b>Autoclaved aerated concrete, AAC</b> as per EN 771-4                                          |              |                    |                                                                       |                                                 | C13          |
| <b>Reinforced autoclaved aerated concrete, AAC</b> as per EN 12602                               |              |                    |                                                                       |                                                 | C13          |
| <b>Clay brick Mz</b> ,<br>as per EN 771-1<br><i>e.g. Ziegelwerk<br/>Nordhausen, DE</i>           | $\geq$ NF    | $\geq$ 240x115x71  | $\geq$ 7,5                                                            | $\geq$ 2,0                                      | C7           |
| <b>Clay brick Mz</b> ,<br>as per EN 771-1<br><i>e.g. Wienerberger DE</i>                         | $\geq$ 2 DF  | $\geq$ 240x115x113 | $\geq$ 10,0                                                           | $\geq$ 1,8                                      | C7           |
| <b>Calcium silicate solid<br/>brick KS</b> ,<br>as per EN 771-2<br><i>e.g. KS Wemding, DE</i>    | $\geq$ NF    | $\geq$ 240x115x71  | $\geq$ 7,5                                                            | $\geq$ 2,0                                      | C7           |
| <b>Calcium silicate solid<br/>brick KS</b> ,<br>as per EN 771-2<br><i>e.g. Hermann Peter, DE</i> | $\geq$ 2 DF  | $\geq$ 240x115x113 | $\geq$ 7,5                                                            | $\geq$ 2,0                                      | C7           |
| <b>Calcium silicate solid<br/>brick KS</b> ,<br>as per EN 771-2<br><i>e.g. Hermann Peter, DE</i> | $\geq$ 12 DF | $\geq$ 498x175x248 | $\geq$ 7,5                                                            | $\geq$ 2,0                                      | C8           |
| <b>Lightweight solid brick<br/>Vbl</b> ,<br>as per EN 771-3<br><i>e.g. KLB, DE</i>               | $\geq$ 2 DF  | $\geq$ 240x115x113 | $\geq$ 2,5                                                            | $\geq$ 1,2                                      | C8           |

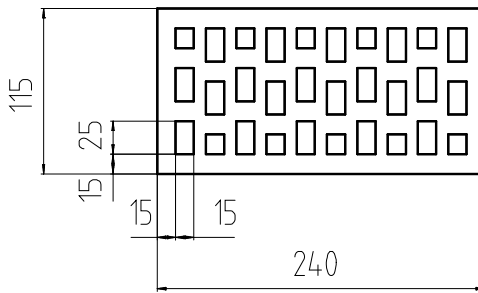
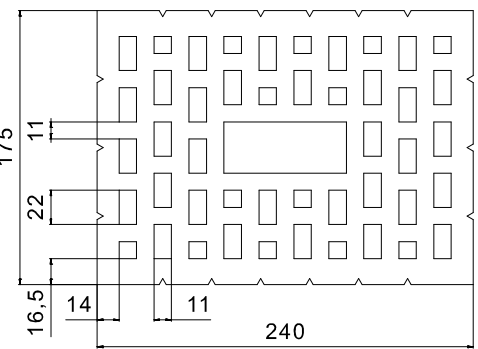
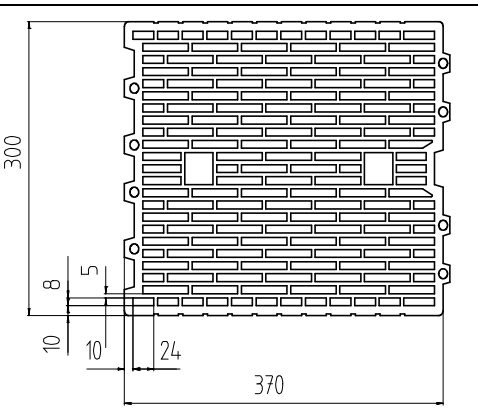
<sup>1)</sup> Vertically perforation  $\leq$  15%; cross section reduced by perforation vertically to the resting area.

**fischer HybridPower**

**Performances**  
Summary of concrete, solid bricks and autoclaved aerated concrete

**Annex C2**  
Appendix 14 / 27

**Table C3.1: Summary of hollow or perforated bricks – base material group “c”<sup>1)</sup>**

| Base material                                                                                                   | Format/<br>Dimensions<br>[mm] | Brick drawing<br>[mm]                                                                | Mean<br>compressive<br>strength<br>as per EN 771<br>[N/mm <sup>2</sup> ] /<br>bulk density $\rho$<br>[kg/dm <sup>3</sup> ] | See<br>Annex |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Perforated clay<br/>brick Hlz,</b><br>as per EN 771-1<br>e.g. <i>Wienerberger, DE</i>                        | 2 DF<br>240x115x113           |    | $\geq 7,5 / \geq 0,9$                                                                                                      | C8           |
| <b>Perforated clay<br/>brick Hlz,</b><br>as per EN 771-1<br>e.g. <i>Schlagmann, DE</i>                          | 3 DF<br>240x175x113           |   | $\geq 7,5 / \geq 1,2$                                                                                                      | C9           |
| <b>Perforated clay<br/>brick Hlz,</b><br>as per EN 771-1<br>e.g. <i>Wienerberger<br/>Porotherm 30 R,<br/>FR</i> | 370x300x250                   |  | $\geq 5,0 / \geq 0,8$                                                                                                      | C9           |

<sup>1)</sup> Vertically perforation > 15% and ≤ 50%; cross section reduced by perforation vertically to the resting area.

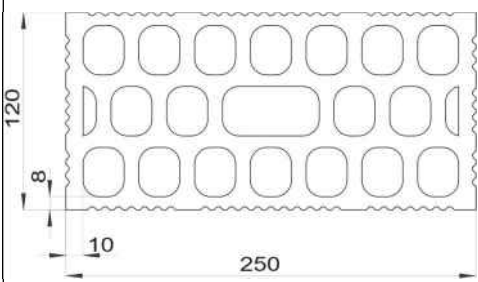
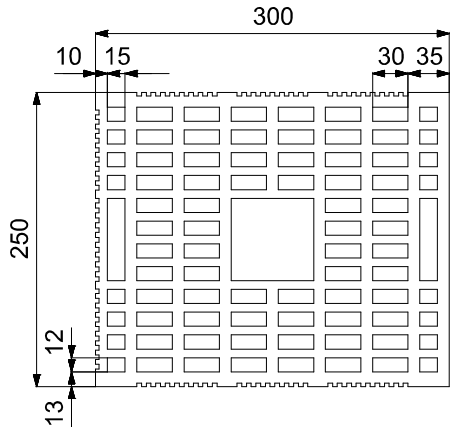
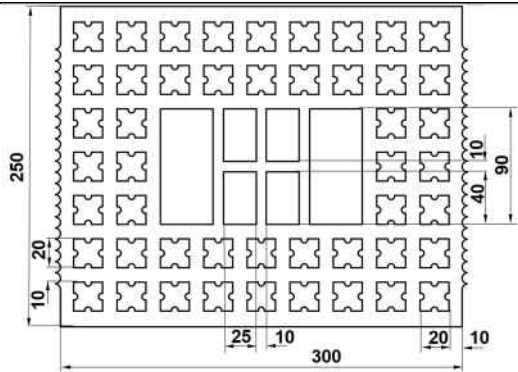
*Figures not to scale*

**fischer HybridPower**

**Performances**  
Summary of hollow or perforated bricks

**Annex C3**  
Appendix 15 / 27

**Table C4.1: Summary of hollow or perforated bricks – base material group “c”<sup>1)</sup>**

| Base material                                                                                                     | Format/<br>Dimensions<br>[mm] | Brick drawing<br>[mm]                                                                | Mean<br>compressive<br>strength<br>as per EN 771<br>[N/mm <sup>2</sup> ] /<br>bulk density $\rho$<br>[kg/dm <sup>3</sup> ] | See<br>Annex |
|-------------------------------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Perforated clay<br/>brick Hlz,</b><br>as per EN 771-1<br><i>e.g. Doppio Uni<br/>Wienerberger,<br/>IT</i>       | 250x120x190                   |    | $\geq 7,5 / \geq 0,8$                                                                                                      | C9           |
| <b>Perforated clay<br/>brick Hlz,</b><br>as per EN 771-1<br><i>e.g. Wienerberger<br/>Pth Bio Modulare,<br/>IT</i> | 300x250x190                   |   | $\geq 7,5 / \geq 1,0$                                                                                                      | C10          |
| <b>Perforated clay<br/>brick Hlz,</b><br>as per EN 771-1<br><i>e.g. Danesi<br/>Poroton P700, IT</i>               | 300x250x190                   |  | $\geq 5,0 / \geq 0,9$                                                                                                      | C10          |

<sup>1)</sup> Vertically perforation > 15% and ≤ 50%; cross section reduced by perforation vertically to the resting area.

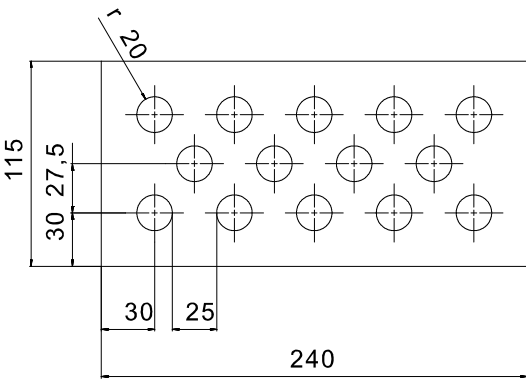
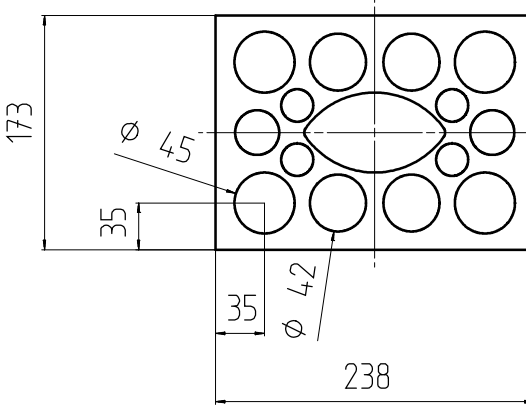
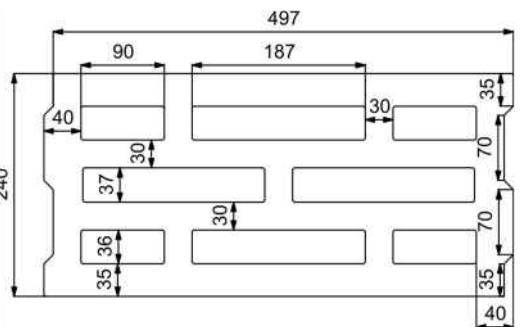
*Figures not to scale*

**fischer HybridPower**

**Performances**  
Summary of hollow or perforated bricks

**Annex C4**  
Appendix 16 / 27

**Table C5.1: Summary of hollow or perforated bricks – base material group “c”<sup>(1)</sup>**

| Base material                                                                                | Format/<br>Dimensions<br>[mm] | Brick drawing<br>[mm]                                                                | Mean<br>compressive<br>strength<br>as per EN 771<br>[N/mm <sup>2</sup> ] /<br>bulk density $\rho$<br>[kg/dm <sup>3</sup> ] | See<br>Annex |
|----------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Calcium silicate<br/>hollow brick KSL</b> ,<br>as per EN 771-1<br>e.g. Bösel, DE          | 2 DF<br>240x115x113           |    | $\geq 7,5 / \geq 1,6$                                                                                                      | C11          |
| <b>Calcium silicate<br/>hollow brick KSL</b> ,<br>as per EN 771-1<br>e.g. KS Wemding,<br>DE  | 3 DF<br>240x175x113           |   | $\geq 7,5 / \geq 1,4$                                                                                                      | C11          |
| <b>Hollow brick<br/>lightweight<br/>concrete Hbl</b> ,<br>as per EN 771-3<br>e.g. Knobel, DE | 16 DF<br>495x240x248          |  | $\geq 2,5 / \geq 0,7$                                                                                                      | C12          |

<sup>1)</sup> Vertically perforation > 15% and ≤ 50%; cross section reduced by perforation vertically to the resting area.

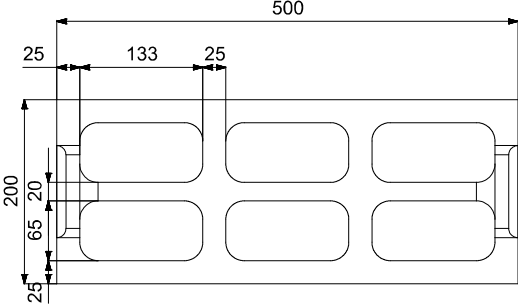
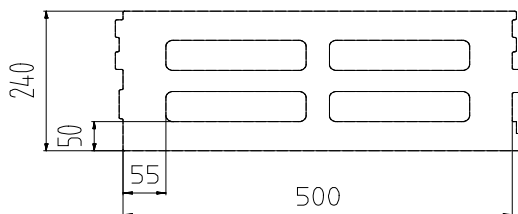
Figures not to scale

**fischer HybridPower**

**Performances**  
Summary of hollow or perforated bricks

**Annex C5**  
Appendix 17 / 27

**Table C6.1: Summary of hollow or perforated bricks – base material group “c”<sup>1)</sup>**

| Base material                                                                                        | Format/<br>Dimensions<br>[mm] | Brick drawing<br>[mm]                                                               | Mean<br>compressive<br>strength<br>as per EN 771<br>[N/mm <sup>2</sup> ] /<br>bulk density $\rho$<br>[kg/dm <sup>3</sup> ] | See<br>Annex |
|------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|
| <b>Hollow brick<br/>lightweight<br/>concrete Hbl,</b><br>as per EN 771-3<br><i>e.g. Indelasa, ES</i> | 500x200x200                   |   | $\geq 2,5 / \geq 1,0$                                                                                                      | C12          |
| <b>Hollow brick<br/>lightweight<br/>concrete Hbl,</b><br>as per EN 771-3<br><i>e.g. Knobel, DE</i>   | 500x240x240                   |  | $\geq 2,5 / \geq 0,9$                                                                                                      | C12          |

<sup>1)</sup> Vertically perforation > 15% and  $\leq$  50%; cross section reduced by perforation vertically to the resting area.

*Figures not to scale*

**fischer HybridPower**

**Performances**  
Summary of hollow or perforated bricks

**Annex C6**  
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**Table C7.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in solid masonry – base material group “b”**

| Base material<br>[Supplier Title, country]<br>Geometry, DF or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                                 | Mean compressive<br>strength as per EN 771 /<br>Minimum compressive<br>strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance $F_{Rk}$ [kN]             |                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|
|                                                                                                                                                                                    |                                                                                                                                    | Temperature range<br>30/50 °C                       | Temperature range<br>50/80 °C   |
|                                                                                                                                                                                    |                                                                                                                                    | $h_{nom}$ [mm] $\geq$ 80                            |                                 |
| <b>Clay brick Mz; <math>\rho \geq 2,0</math></b><br>as per EN 771-1<br><i>e.g. Mz Ziegelwerk Nordhausen, DE</i><br>$\geq$ NF ( $\geq$ 240x115x71)<br>Hammer drilling               | $\geq 7,5 / 6,0$                                                                                                                   | <b>1,50</b>                                         | <b>1,50</b>                     |
|                                                                                                                                                                                    | $\geq 10,0 / 8,0$                                                                                                                  | <b>2,00</b>                                         | <b>2,00</b>                     |
|                                                                                                                                                                                    | $\geq 12,5 / 10,0$                                                                                                                 | <b>2,50</b>                                         | <b>2,50</b>                     |
|                                                                                                                                                                                    | $\geq 15,0 / 12,0$                                                                                                                 | <b>3,00</b>                                         | <b>3,00</b>                     |
|                                                                                                                                                                                    | $\geq 20,0 / 16,0$                                                                                                                 | <b>3,50 / 4,00<sup>3)</sup></b>                     | <b>3,50 / 4,00<sup>3)</sup></b> |
|                                                                                                                                                                                    | $\geq 25,0 / 20,0$                                                                                                                 | <b>4,00 / 5,00<sup>3)</sup></b>                     | <b>4,00 / 4,50<sup>3)</sup></b> |
|                                                                                                                                                                                    | $\geq 25,3 / -$                                                                                                                    | <b>4,00 / 5,00<sup>3)</sup></b>                     | <b>4,00 / 5,00<sup>3)</sup></b> |
| <b>Clay brick Mz; <math>\rho \geq 1,8</math></b><br>as per EN 771-1<br><i>e.g. Mz Wienerberger, DE</i><br>$\geq$ 2DF ( $\geq$ 240x115x113)<br>Hammer drilling                      | $\geq 10,0 / 8,0$                                                                                                                  | <b>1,50</b>                                         | <b>1,50</b>                     |
|                                                                                                                                                                                    | $\geq 12,5 / 10,0$                                                                                                                 | <b>2,00</b>                                         | <b>1,50</b>                     |
|                                                                                                                                                                                    | $\geq 15,0 / 12,0$                                                                                                                 | <b>2,50</b>                                         | <b>2,00</b>                     |
|                                                                                                                                                                                    | $\geq 20,0 / 16,0$                                                                                                                 | <b>3,00</b>                                         | <b>3,00</b>                     |
|                                                                                                                                                                                    | $\geq 25,0 / 20,0$                                                                                                                 | <b>4,00</b>                                         | <b>3,50</b>                     |
|                                                                                                                                                                                    | $\geq 35,0 / 28,0$                                                                                                                 | <b>4,50 / 5,50<sup>3)</sup></b>                     | <b>4,50 / 5,00<sup>3)</sup></b> |
| <b>Calcium silicate solid brick KS;<br/><math>\rho \geq 2,0</math></b><br>as per EN 771-2<br><i>e.g. KS Wemding, DE</i><br>$\geq$ NF ( $\geq$ 240x115x71)<br>Hammer drilling       | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,40</b>                                         | <b>0,40</b>                     |
|                                                                                                                                                                                    | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,60</b>                                         | <b>0,60</b>                     |
|                                                                                                                                                                                    | $\geq 12,5 / 10,0$                                                                                                                 | <b>0,75</b>                                         | <b>0,75</b>                     |
|                                                                                                                                                                                    | $\geq 15,0 / 12,0$                                                                                                                 | <b>0,90</b>                                         | <b>0,90</b>                     |
|                                                                                                                                                                                    | $\geq 20,0 / 16,0$                                                                                                                 | <b>1,20</b>                                         | <b>1,20</b>                     |
|                                                                                                                                                                                    | $\geq 25,0 / 20,0$                                                                                                                 | <b>1,50</b>                                         | <b>1,50</b>                     |
| <b>Calcium silicate solid brick KS;<br/><math>\rho \geq 2,0</math></b><br>as per EN 771-2<br><i>e.g. Hermann Peter, DE</i><br>$\geq$ 2 DF ( $\geq$ 240x115x113)<br>Hammer drilling | $\geq 7,5 / 6,0$                                                                                                                   | <b>2,00</b>                                         | <b>1,50</b>                     |
|                                                                                                                                                                                    | $\geq 10,0 / 8,0$                                                                                                                  | <b>2,50</b>                                         | <b>2,00</b>                     |
|                                                                                                                                                                                    | $\geq 12,5 / 10,0$                                                                                                                 | <b>2,50 / 3,00<sup>3)</sup></b>                     | <b>2,50 / 3,00<sup>3)</sup></b> |
|                                                                                                                                                                                    | $\geq 15,0 / 12,0$                                                                                                                 | <b>3,00 / 3,50<sup>3)</sup></b>                     | <b>3,00 / 3,50<sup>3)</sup></b> |
|                                                                                                                                                                                    | $\geq 18,8 / -$                                                                                                                    | <b>3,50 / 4,00<sup>3)</sup> / 4,50<sup>4)</sup></b> | <b>3,50 / 4,00<sup>3)</sup></b> |
| Partial safety factor $\gamma_{Mm}^{2)}$ [-]                                                                                                                                       |                                                                                                                                    | <b>2,50</b>                                         |                                 |

<sup>1)</sup> The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> In absence of other national regulations.

<sup>3)</sup> Only valid for  $c \geq 125$  mm.

<sup>4)</sup> Only valid for  $c \geq 150$  mm.

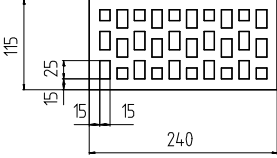
**fischer HybridPower**

**Performances**

Characteristic resistance for use in solid bricks

**Annex C7**  
Appendix 19 / 27

**Table C8.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in solid and in hollow or perforated masonry – base material group “b” and “c”**

| Base material<br>[Supplier Title, country]<br>Geometry, DF or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                                                                                                             | Mean compressive<br>strength as per EN 771 /<br>Minimum compressive<br>strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance $F_{Rk}$ [kN]                                       |                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                |                                                                                                                                    | Temperature range<br>30/50 °C                                                 | Temperature range<br>50/80 °C                                                 |
|                                                                                                                                                                                                                                                                |                                                                                                                                    | $h_{nom}$ [mm] $\geq 80$ <sup>3)</sup>                                        |                                                                               |
| <b>Calcium silicate solid brick KS;</b><br>$\rho \geq 2,0$<br>as per EN 771-2<br>e.g. KS Wemding, DE<br>$\geq 12$ DF ( $\geq 498 \times 175 \times 248$ )<br>Hammer drilling                                                                                   | $\geq 7,5 / 6,0$                                                                                                                   | <b>2,50 / 3,00<sup>4)</sup></b>                                               | <b>2,50</b>                                                                   |
|                                                                                                                                                                                                                                                                | $\geq 10,0 / 8,0$                                                                                                                  | <b>3,00 / 4,00<sup>4)</sup></b>                                               | <b>3,00 / 3,50<sup>4)</sup></b>                                               |
|                                                                                                                                                                                                                                                                | $\geq 12,5 / 10,0$                                                                                                                 | <b>3,00 / 5,00<sup>4)</sup></b>                                               | <b>3,00 / 4,50<sup>4)</sup></b>                                               |
|                                                                                                                                                                                                                                                                | $\geq 15,0 / 12,0$                                                                                                                 | <b>3,50 / 5,50<sup>4)</sup></b>                                               | <b>3,50 / 5,50<sup>4)</sup></b>                                               |
|                                                                                                                                                                                                                                                                | $\geq 20,0 / 16,0$                                                                                                                 | <b>4,00 / 6,50<sup>4)</sup> / 7,50<sup>7)</sup></b>                           | <b>4,00 / 6,50<sup>4)</sup> / 7,00<sup>7)</sup></b>                           |
|                                                                                                                                                                                                                                                                | $\geq 25,0 / 20,0$                                                                                                                 | <b>4,50 / 7,50<sup>4)</sup> / 9,50<sup>7)</sup></b>                           | <b>4,50 / 7,50<sup>4)</sup> / 9,00<sup>7)</sup></b>                           |
|                                                                                                                                                                                                                                                                | $\geq 34,6 / -$                                                                                                                    | <b>5,00 / 8,50<sup>4)</sup> /<br/>11,00<sup>7)</sup> / 12,50<sup>8)</sup></b> | <b>5,00 / 8,50<sup>4)</sup> /<br/>11,00<sup>7)</sup> / 12,00<sup>8)</sup></b> |
| <b>Lightweight solid brick Vbl;</b><br>$\rho \geq 1,2$<br>as per EN 771-3<br>e.g. Vbl KLB, DE<br>$\geq 2$ DF ( $\geq 240 \times 115 \times 113$ )<br>Rotary drilling                                                                                           | $\geq 2,5 / 2,0$                                                                                                                   | <b>1,20 / 1,50<sup>4)</sup></b>                                               | <b>1,20</b>                                                                   |
|                                                                                                                                                                                                                                                                | $\geq 5,0 / 4,0$                                                                                                                   | <b>1,50 / 2,50<sup>4)</sup> / 3,00<sup>5)</sup></b>                           | <b>1,50 / 2,50<sup>4)</sup></b>                                               |
|                                                                                                                                                                                                                                                                | $\geq 6,0 / -$                                                                                                                     | <b>2,00 / 2,50<sup>4)</sup> / 3,00<sup>5)</sup><br/>/ 3,50<sup>6)</sup></b>   | <b>2,00 / 2,50<sup>4)</sup> / 3,00<sup>5)</sup></b>                           |
| <b>Perforated clay brick Hlz; <math>\rho \geq 0,9</math></b><br>as per EN 771-1<br>e.g. Wienerberger, DE<br><br><br>2 DF ( $240 \times 115 \times 113$ )<br>Rotary drilling | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,30</b>                                                                   | <b>0,30</b>                                                                   |
|                                                                                                                                                                                                                                                                | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,40</b>                                                                   | <b>0,40</b>                                                                   |
|                                                                                                                                                                                                                                                                | $\geq 12,5 / 10,0$                                                                                                                 | <b>0,50</b>                                                                   | <b>0,50</b>                                                                   |
|                                                                                                                                                                                                                                                                | $\geq 15,0 / 12,0$                                                                                                                 | <b>0,60</b>                                                                   | <b>0,60</b>                                                                   |
|                                                                                                                                                                                                                                                                | $\geq 16,7 / -$                                                                                                                    | <b>0,75</b>                                                                   | <b>0,75</b>                                                                   |
| Partial safety factor $\gamma_{Mm}$ <sup>2)</sup> [-]                                                                                                                                                                                                          |                                                                                                                                    | <b>2,50</b>                                                                   |                                                                               |

<sup>1)</sup> The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> In absence of other national regulations.

<sup>3)</sup> Exception “Perforated clay brick Hlz;  $\rho \geq 0,9$ ”: only valid  $h_{nom} = 80$  mm.

<sup>4)</sup> Only valid for  $c \geq 150$  mm.

<sup>5)</sup> Only valid for  $c \geq 170$  mm.

<sup>6)</sup> Only valid for  $c \geq 175$  mm.

<sup>7)</sup> Only valid for  $c \geq 200$  mm.

<sup>8)</sup> Only valid for  $c \geq 240$  mm.

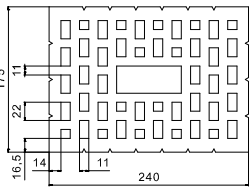
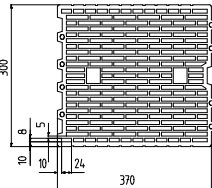
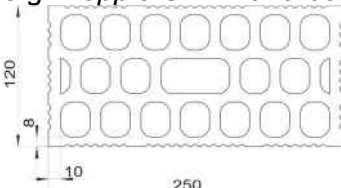
**fischer HybridPower**

**Performances**

Characteristic resistance for use in solid and in hollow or perforated bricks

**Annex C8**  
Appendix 20 / 27

**Table C9.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in hollow or perforated masonry – base material group “c”**

| Base material<br>[Supplier Title, country]<br>Geometry, DF or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                                                                                                   | Mean compressive<br>strength as per EN 771 /<br>Minimum compressive<br>strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance $F_{Rk}$ [kN] |                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------|
|                                                                                                                                                                                                                                                      |                                                                                                                                    | Temperature range<br>30/50 °C           | Temperature range<br>50/80 °C |
|                                                                                                                                                                                                                                                      |                                                                                                                                    | $h_{nom}$ [mm] = 80                     |                               |
| <b>Perforated clay brick Hlz; <math>\rho \geq 1,2</math></b><br>as per EN 771-1<br>e.g. <i>Schlagmann, DE</i> <br>3 DF (240x175x113)<br>Rotary drilling             | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,50</b>                             | <b>0,50</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,75</b>                             | <b>0,75</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 12,5 / 10,0$                                                                                                                 | <b>0,90</b>                             | <b>0,90</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 15,0 / 12,0$                                                                                                                 | <b>0,90</b>                             | <b>0,90</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 19,8 / -$                                                                                                                    | <b>1,20</b>                             | <b>1,20</b>                   |
| <b>Perforated clay brick Hlz; <math>\rho \geq 0,8</math></b><br>as per EN 771-1<br>e.g. <i>Wienerberger Porotherm 30 R, FR</i> <br>370x300x250<br>Rotary drilling | $\geq 5,0 / 4,0$                                                                                                                   | <b>0,40</b>                             | <b>0,40</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,60</b>                             | <b>0,60</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,75</b>                             | <b>0,75</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 12,5 / 10,0$                                                                                                                 | <b>0,90</b>                             | <b>0,90</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 15,0 / 12,0$                                                                                                                 | <b>1,20</b>                             | <b>1,20</b>                   |
| <b>Perforated clay brick Hlz; <math>\rho \geq 0,8</math></b><br>as per EN 771-1<br>e.g. <i>Doppio Uni Wienerberger, IT</i> <br>250x120x190<br>Rotary drilling     | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,40</b>                             | <b>0,40</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,60</b>                             | <b>0,50</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 12,5 / 10,0$                                                                                                                 | <b>0,75</b>                             | <b>0,60</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 15,0 / 12,0$                                                                                                                 | <b>0,90</b>                             | <b>0,75</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 20,0 / 16,0$                                                                                                                 | <b>1,20</b>                             | <b>0,90</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 25,0 / 20,0$                                                                                                                 | <b>1,50</b>                             | <b>1,20</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 26,5 / -$                                                                                                                    | <b>1,50</b>                             | <b>1,50</b>                   |

Partial safety factor

$\gamma_{Mm}$ <sup>2)</sup> [-]

**2,50**

1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

2) In absence of other national regulations.

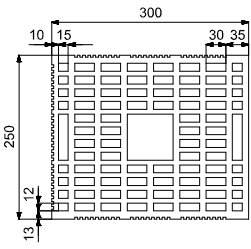
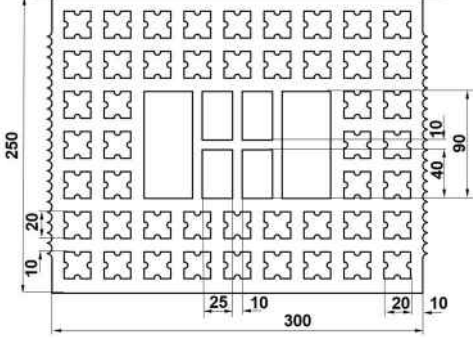
**fischer HybridPower**

**Performances**

Characteristic resistance for use in hollow or perforated bricks

**Annex C9**  
Appendix 21 / 27

**Table C10.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in hollow or perforated masonry – base material group “c”**

| Base material<br>[Supplier Title, country]<br>Geometry, DF or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                                                                                                   | Mean compressive<br>strength as per EN 771 /<br>Minimum compressive<br>strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance $F_{Rk}$ [kN] |                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------|
|                                                                                                                                                                                                                                                      |                                                                                                                                    | Temperature range<br>30/50 °C           | Temperature range<br>50/80 °C |
|                                                                                                                                                                                                                                                      |                                                                                                                                    | $h_{nom}$ [mm] = 80                     |                               |
| <b>Perforated clay brick Hlz; <math>\rho \geq 1,0</math></b><br>as per EN 771-1<br>e.g. <i>Wienerberger Pth Bio Modulare, IT</i> <br>300x250x190<br>Rotary drilling | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,30</b>                             | – <sup>3)</sup>               |
|                                                                                                                                                                                                                                                      | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,50</b>                             | <b>0,30</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 12,5 / 10,0$                                                                                                                 | <b>0,60</b>                             | <b>0,40</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 15,0 / 12,0$                                                                                                                 | <b>0,60</b>                             | <b>0,50</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 20,0 / 16,0$                                                                                                                 | <b>0,90</b>                             | <b>0,60</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 25,0 / 20,0$                                                                                                                 | <b>1,20</b>                             | <b>0,90</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 35,0 / 28,0$                                                                                                                 | <b>1,50</b>                             | <b>1,20</b>                   |
| <b>Perforated clay brick Hlz; <math>\rho \geq 0,9</math></b><br>as per EN 771-1<br>e.g. <i>Danesi Poroton P700, IT</i> <br>300x250x190<br>Rotary drilling         | $\geq 5,0 / 4,0$                                                                                                                   | <b>0,50</b>                             | <b>0,50</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 7,5 / 6,0$                                                                                                                   | <b>0,75</b>                             | <b>0,75</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 10,0 / 8,0$                                                                                                                  | <b>0,90</b>                             | <b>0,90</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 12,5 / 10,0$                                                                                                                 | <b>1,20</b>                             | <b>1,20</b>                   |
|                                                                                                                                                                                                                                                      | $\geq 15,0 / 12,0$                                                                                                                 | <b>1,50</b>                             | <b>1,50</b>                   |
| Partial safety factor $\gamma_{Mm}$ <sup>2)</sup> [-]                                                                                                                                                                                                |                                                                                                                                    | <b>2,50</b>                             |                               |

1) The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

2) In absence of other national regulations.

3) No performance assessed.

**fischer HybridPower**

**Performances**

Characteristic resistance for use in hollow or perforated bricks

**Annex C10**  
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**Table C11.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in hollow or perforated masonry – base material group “c”**

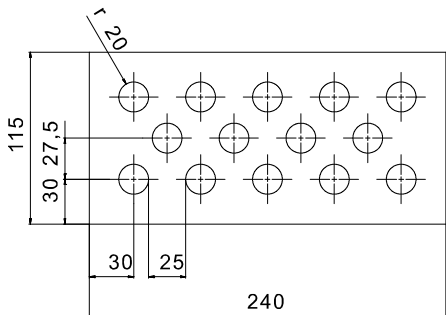
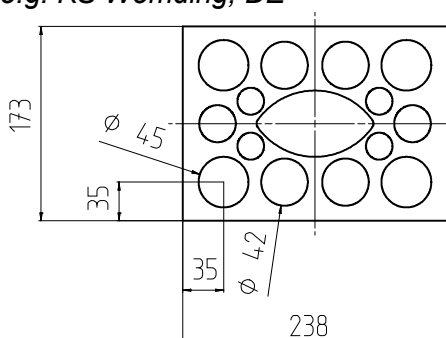
| Base material<br>[Supplier Title, country]<br>Geometry, DF or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                                    | Mean compressive strength as per EN 771 /<br>Minimum compressive strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance F <sub>Rk</sub> [kN] |                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------|
|                                                                                                                                                                                       |                                                                                                                              | Temperature range<br>30/50 °C                  | Temperature range<br>50/80 °C        |
|                                                                                                                                                                                       |                                                                                                                              | h <sub>nom</sub> [mm] = 80                     |                                      |
| <b>Calcium silicate hollow brick KSL;</b><br>ρ ≥ 1,6<br>as per EN 771-1<br>e.g. Bösel, DE<br>       | ≥ 7,5 / 6,0                                                                                                                  | <b>0,90</b>                                    | <b>0,90</b>                          |
|                                                                                                                                                                                       | ≥ 10,0 / 8,0                                                                                                                 | <b>1,20</b>                                    | <b>1,20</b>                          |
|                                                                                                                                                                                       | ≥ 12,5 / 10,0                                                                                                                | <b>1,50</b>                                    | <b>1,50</b>                          |
|                                                                                                                                                                                       | ≥ 15,0 / 12,0                                                                                                                | <b>2,00</b>                                    | <b>2,00</b>                          |
|                                                                                                                                                                                       | ≥ 20,0 / 16,0                                                                                                                | <b>2,50</b>                                    | <b>2,50</b>                          |
|                                                                                                                                                                                       | ≥ 25,0 / 20,0                                                                                                                | <b>3,00</b>                                    | <b>3,00</b>                          |
| <b>Calcium silicate hollow brick KSL;</b><br>ρ ≥ 1,4<br>as per EN 771-1<br>e.g. KS Wemding, DE<br> | ≥ 7,5 / 6,0                                                                                                                  | <b>0,40</b>                                    | <b>0,40</b>                          |
|                                                                                                                                                                                       | ≥ 10,0 / 8,0                                                                                                                 | <b>0,60</b>                                    | <b>0,50</b>                          |
|                                                                                                                                                                                       | ≥ 12,5 / 10,0                                                                                                                | <b>0,75</b>                                    | <b>0,60</b>                          |
|                                                                                                                                                                                       | ≥ 15,0 / 12,0                                                                                                                | <b>0,90</b>                                    | <b>0,75</b>                          |
|                                                                                                                                                                                       | ≥ 20,0 / 16,0                                                                                                                | <b>1,20</b>                                    | <b>0,90</b>                          |
|                                                                                                                                                                                       | ≥ 20,2 / -                                                                                                                   | <b>1,20</b>                                    | <b>1,20</b>                          |
| Partial safety factor γ <sub>Mm</sub> <sup>2)</sup> [-]                                                                                                                               |                                                                                                                              | <b>2,50</b>                                    |                                      |
| <sup>1)</sup> The compressive strength of the single brick must not be less than 80% of the mean compressive strength.<br><sup>2)</sup> In absence of other national regulations.     |                                                                                                                              |                                                |                                      |
| fischer HybridPower                                                                                                                                                                   |                                                                                                                              |                                                | <b>Annex C11</b><br>Appendix 23 / 27 |
| Performances<br>Characteristic resistance for use in hollow or perforated bricks                                                                                                      |                                                                                                                              |                                                |                                      |

**Table C12.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in hollow or perforated masonry – base material group “c”**

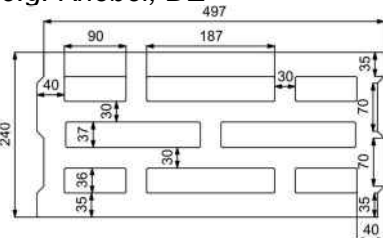
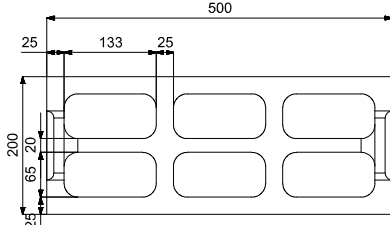
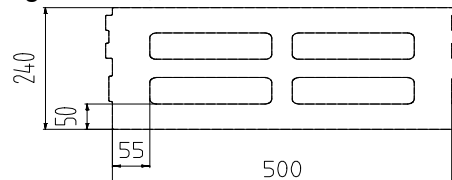
| Base material<br>[Supplier Title, country]<br>Geometry, DF or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                                                                                          | Mean compressive strength as per EN 771 /<br>Minimum compressive strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance F <sub>Rk</sub> [kN] |                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--------------------------------------|
|                                                                                                                                                                                                                                             |                                                                                                                              | Temperature range<br>30/50 °C                  | Temperature range<br>50/80 °C        |
|                                                                                                                                                                                                                                             |                                                                                                                              | h <sub>nom</sub> [mm] = 80                     |                                      |
| <b>Hollow brick lightweight concrete</b><br><b>Hbl; ρ ≥ 0,7</b><br>as per EN 771-3<br>e.g. <i>Knobel, DE</i><br><br>16 DF (495x240x248)<br>Rotary drilling | ≥ 2,5 / 2,0                                                                                                                  | <b>1,20</b>                                    | <b>0,90</b>                          |
|                                                                                                                                                                                                                                             | ≥ 5,0 / 4,0                                                                                                                  | <b>2,00</b>                                    | <b>2,00</b>                          |
|                                                                                                                                                                                                                                             | ≥ 5,4 / 2,0                                                                                                                  | <b>2,50</b>                                    | <b>2,00</b>                          |
| <b>Hollow brick lightweight concrete</b><br><b>Hbl; ρ ≥ 1,0</b><br>as per EN 771-3<br>e.g. <i>Indelasa, ES</i><br><br>500x200x200<br>Rotary drilling     | ≥ 2,5 / 2,0                                                                                                                  | <b>0,30</b>                                    | <b>0,30</b>                          |
|                                                                                                                                                                                                                                             | ≥ 5,0 / 4,0                                                                                                                  | <b>0,60</b>                                    | <b>0,60</b>                          |
| <b>Hollow brick lightweight concrete</b><br><b>Hbl; ρ ≥ 0,9</b><br>as per EN 771-3<br>e.g. <i>Knobel, DE</i><br><br>500x240x240<br>Rotary drilling       | ≥ 2,5 / 2,0                                                                                                                  | <b>0,90</b>                                    | <b>0,90</b>                          |
|                                                                                                                                                                                                                                             | ≥ 5,0 / 4,0                                                                                                                  | <b>2,00</b>                                    | <b>1,50</b>                          |
| Partial safety factor γ <sub>Mm</sub> <sup>2)</sup> [-]                                                                                                                                                                                     |                                                                                                                              | <b>2,50</b>                                    |                                      |
| <sup>1)</sup> The compressive strength of the single brick must not be less than 80% of the mean compressive strength.<br><sup>2)</sup> In absence of other national regulations.                                                           |                                                                                                                              |                                                |                                      |
| fischer HybridPower                                                                                                                                                                                                                         |                                                                                                                              |                                                | <b>Annex C12</b><br>Appendix 24 / 27 |
| Performances<br>Characteristic resistance for use in hollow or perforated bricks                                                                                                                                                            |                                                                                                                              |                                                |                                      |

**Table C13.1: Characteristic resistance  $F_{Rk}$  in [kN] for use in unreinforced autoclaved aerated concrete – base material group “d”**

| Base material<br>[Supplier Title, country]<br>Geometry, DF<br>or nom. Size<br>(L x W x H) [mm]<br>and drilling method                                                      | Mean compressive<br>strength as per<br>EN 771-4 $f_{cm,decl}$ /<br>Minimum compressive<br>strength single brick <sup>1)</sup><br>[N/mm <sup>2</sup> ] | Characteristic resistance $F_{Rk}$ [kN]<br>Temperature range 30/50 °C and 50/80 °C |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                                                                                                                                            |                                                                                                                                                       | $h_{nom}$ [mm] $\geq$ 80                                                           |
| <b>Unreinforced<br/>autoclaved aerated<br/>concrete, AAC</b><br>as per EN 771-4<br>e.g. (500x120x300) <sup>2)</sup><br>e.g. (500x250x300) <sup>2)</sup><br>Hammer drilling | $\geq 2,90$ / 2,32                                                                                                                                    | <b>0,50</b>                                                                        |
|                                                                                                                                                                            | $\geq 3,75$ / 3,00                                                                                                                                    | <b>0,90</b>                                                                        |
|                                                                                                                                                                            | $\geq 4,00$ / 3,20                                                                                                                                    | <b>0,90</b>                                                                        |
|                                                                                                                                                                            | $\geq 5,00$ / 4,0                                                                                                                                     | <b>1,20</b>                                                                        |
|                                                                                                                                                                            | $\geq 6,00$ / 4,80                                                                                                                                    | <b>1,50</b>                                                                        |
|                                                                                                                                                                            | $\geq 7,50$ / 6,00                                                                                                                                    | <b>2,00</b>                                                                        |
| Partial safety factor $\gamma_{MAAC}$ <sup>3)</sup> [-]                                                                                                                    |                                                                                                                                                       | <b>2,00</b>                                                                        |

<sup>1)</sup> The compressive strength of the single brick must not be less than 80% of the mean compressive strength.

<sup>2)</sup> For  $f_{cm,decl} > 3$  N/mm<sup>2</sup>:  $h_{min} = 175$  mm.

<sup>3)</sup> In absence of other national regulations.

**Table C13.2: Characteristic resistance  $F_{Rk}$  in [kN] for use in reinforced autoclaved aerated concrete – base material group “d”**

| Base material<br>[Supplier Title, country]<br>minimum member<br>thickness $h_{min}$<br>and drilling method                       | Compressive strength<br>$f_{ck}$<br>(compressive strength<br>class) as per<br>EN 12602<br>[N/mm <sup>2</sup> ] | Characteristic resistance $F_{Rk}$ [kN]<br>Temperature range 30/50 °C and 50/80 °C |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
|                                                                                                                                  |                                                                                                                | $h_{nom}$ [mm] $\geq$ 80                                                           |
| <b>Reinforced autoclaved<br/>aerated concrete, AAC</b><br>as per EN 12602<br>$h_{min} = 115$ mm <sup>1)</sup><br>Hammer drilling | $\geq 2,0$ (AAC2)                                                                                              | <b>0,40</b>                                                                        |
|                                                                                                                                  | $\geq 2,5$ (AAC2,5)                                                                                            | <b>0,60</b>                                                                        |
|                                                                                                                                  | $\geq 3,0$ (AAC3)                                                                                              | <b>0,75</b>                                                                        |
|                                                                                                                                  | $\geq 3,5$ (AAC3,5)                                                                                            | <b>0,90</b>                                                                        |
|                                                                                                                                  | $\geq 4,0$ (AAC4)                                                                                              | <b>1,20</b>                                                                        |
|                                                                                                                                  | $\geq 4,5$ (AAC4,5)                                                                                            | <b>1,50</b>                                                                        |
|                                                                                                                                  | $\geq 5,0$ (AAC5)                                                                                              | <b>1,50</b>                                                                        |
|                                                                                                                                  | $\geq 6,0$ (AAC6)                                                                                              | <b>2,00</b>                                                                        |
| Partial safety factor $\gamma_{MAAC}$ <sup>2)</sup> [-]                                                                          |                                                                                                                | <b>2,00</b>                                                                        |

<sup>1)</sup> For  $> AAC3$ :  $h_{min} = 175$  mm.

<sup>2)</sup> In absence of other national regulations.

**fischer HybridPower**

**Performances**

Characteristic resistance for use in unreinforced autoclaved aerated concrete and in reinforced autoclaved aerated concrete

**Annex C13**  
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**Figure C14.1: Characteristic fire resistance under inclined loading, load direction  $\alpha$ , in concrete – base material group “a” and solid brick masonry – base material group “b”**

The characteristic fire resistance for each fire resistance class shall be interpolated for load direction  $\alpha$  between 45° and 90° according to following equation:

**Equation C14.1:**

$$F_{Rk,fi}(\alpha) = \frac{0,71 \cdot F_{Rk,fi}(45^\circ)}{\cos \alpha} \leq F_{Rk,fi}(90^\circ)$$

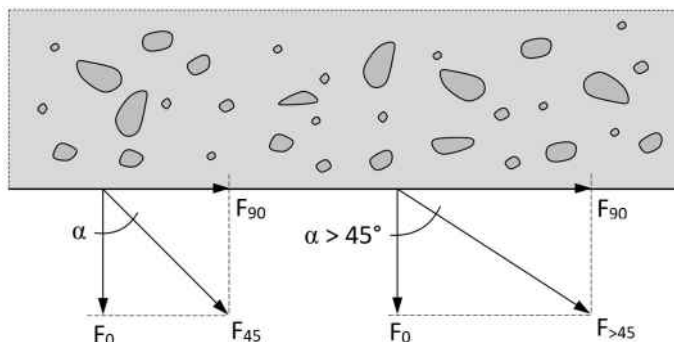


Figure not to scale

**Table C14.1: Characteristic fire resistance in concrete – base material group “a”**

| Anchor type                                                                                 |                            | HybridPower, HybridPower A2, HybridPower A4, HybridPower R |      |      |      |
|---------------------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------|------|------|------|
|                                                                                             |                            | R30                                                        | R60  | R90  | R120 |
| Embedment depth $h_{nom} \geq$ [mm]                                                         |                            | 80                                                         |      |      |      |
| Characteristic fire resistance under inclined loading for selected load directions $\alpha$ |                            |                                                            |      |      |      |
| Characteristic resistance under 45°                                                         | $F_{Rk,fi(45^\circ)}$ [kN] | 1,58                                                       | 1,10 | 0,62 | 0,37 |
| Characteristic resistance under 60°                                                         | $F_{Rk,fi(60^\circ)}$ [kN] | 1,99                                                       | 1,54 | 0,88 | 0,53 |
| Characteristic resistance under 75°                                                         | $F_{Rk,fi(75^\circ)}$ [kN] | 1,99                                                       | 1,54 | 1,02 | 0,76 |
| Partial factor                                                                              | $\gamma_{Mm,fi}^{1)}$ [-]  | 1,00                                                       |      |      |      |
| Characteristic fire resistance for shear load without lever arm                             |                            |                                                            |      |      |      |
| Characteristic shear resistance                                                             | $F_{Rk,fi(90^\circ)}$ [kN] | 1,99                                                       | 1,54 | 1,02 | 0,76 |
| Partial factor                                                                              | $\gamma_{Mm,fi}^{1)}$ [-]  | 1,00                                                       |      |      |      |
| Characteristic fire resistance for shear load with lever arm                                |                            |                                                            |      |      |      |
| Characteristic bending resistance                                                           | $M_{Rk,s,fi}$ [Nm]         | 0,47                                                       | 0,37 | 0,26 | 0,21 |
| Partial factor                                                                              | $\gamma_{Mm,fi}^{1)}$ [-]  | 1,00                                                       |      |      |      |
| Minimum edge distances under fire exposure $c_{min,fi}$ [mm]                                |                            | $2 \times h_{nom}$                                         |      |      |      |
| Minimum spacing under fire exposure $s_{min,fi}$ [mm]                                       |                            | $4 \times h_{nom}$                                         |      |      |      |

<sup>1)</sup> In absence of other national regulations.

**Table C14.2: Values under fire exposure in concrete C20/25 to C50/60 in load direction  $\alpha$  (no permanent centric tension load, only for shear load without lever arm)  
Fastening of façade systems**

| Anchor type                                                | Fire resistance class | Load direction $\alpha$ | $F_{Rk,fi,90}$ | $\gamma_{M,fi}^{1)}$ |
|------------------------------------------------------------|-----------------------|-------------------------|----------------|----------------------|
| HybridPower, HybridPower A2, HybridPower A4, HybridPower R | R90                   | $\geq 57^\circ$         | 0,8 kN         | 1,00                 |

<sup>1)</sup> In absence of other national regulations.

**fischer HybridPower**

**Performances**

Characteristic fire resistance for use in concrete

**Annex C14**  
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**Table C15.1: Characteristic fire resistance in solid brick masonry – base material group “b”**

| Anchor type                                                                                                                                                                          |                                                                                                                                                                    |                                                                                        | HybridPower, HybridPower A2, HybridPower A4, HybridPower R |                                      |      |      |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------|------|------|------|
| Base material; bulk density [kg/dm³] / mean compressive strength as per EN 771 [N/mm²]<br>[Supplier Title, country]<br>Geometry, DF or nominal size (L x W x H) [mm] drilling method |                                                                                                                                                                    |                                                                                        | R30                                                        | R60                                  | R90  | R120 |      |
| Embedment depth $h_{nom} \geq$ [mm]                                                                                                                                                  |                                                                                                                                                                    |                                                                                        | 80                                                         |                                      |      |      |      |
| Characteristic fire resistance under inclined loading for selected load directions $\alpha$                                                                                          |                                                                                                                                                                    |                                                                                        |                                                            |                                      |      |      |      |
| <b>Calcium silicate solid brick KS;</b><br>$\rho \geq 2,0 / 25$<br>as per EN 771-2<br>e.g. KS Wemding, DE;<br>NF ( $\geq 240 \times 115 \times 71$ )<br>Hammer drilling              | Characteristic resistance under 45° $F_{Rk,fi(45^\circ)}$ [kN]                                                                                                     |                                                                                        | 0,62                                                       | 0,62                                 | 0,62 | 0,37 |      |
|                                                                                                                                                                                      | Characteristic resistance under 60° $F_{Rk,fi(60^\circ)}$ [kN]                                                                                                     |                                                                                        | 0,88                                                       | 0,88                                 | 0,88 | 0,53 |      |
|                                                                                                                                                                                      | Characteristic resistance under 75° $F_{Rk,fi(75^\circ)}$ [kN]                                                                                                     |                                                                                        | 1,54                                                       | 1,54                                 | 1,02 | 0,76 |      |
|                                                                                                                                                                                      | Characteristic shear load fire resistance without lever arm $F_{Rk,fi(90^\circ)}$ [kN]                                                                             |                                                                                        | 1,54                                                       | 1,54                                 | 1,02 | 0,76 |      |
| Partial factor $\gamma_{Mm,fi}^{1)}$ [-]                                                                                                                                             |                                                                                                                                                                    |                                                                                        | 1,00                                                       |                                      |      |      |      |
| Characteristic fire resistance under inclined loading for selected load directions $\alpha$                                                                                          |                                                                                                                                                                    |                                                                                        |                                                            |                                      |      |      |      |
| <b>Calcium silicate solid brick KS;</b><br>$\rho \geq 2,0 / 15$<br>as per EN 771-2<br>e.g. KS Wemding, DE; 2 DF<br>( $\geq 240 \times 115 \times 113$ )<br>Hammer drilling           | <b>Lightweight solid brick Vbl;</b><br>$\rho \geq 1,2 / 5$<br>as per EN 771-3<br>e.g. Vbl KLB, DE; 2 DF<br>( $\geq 240 \times 115 \times 113$ )<br>Rotary drilling | Characteristic resistance under 45° $F_{Rk,fi(45^\circ)}$ [kN]                         |                                                            | 1,10                                 | 1,10 | 0,62 | 0,37 |
|                                                                                                                                                                                      |                                                                                                                                                                    | Characteristic resistance under 60° $F_{Rk,fi(60^\circ)}$ [kN]                         |                                                            | 1,02                                 | 1,02 | 0,88 | 0,53 |
|                                                                                                                                                                                      |                                                                                                                                                                    | Characteristic resistance under 75° $F_{Rk,fi(75^\circ)}$ [kN]                         |                                                            | 1,02                                 | 1,02 | 1,02 | 0,76 |
|                                                                                                                                                                                      |                                                                                                                                                                    | Characteristic shear load fire resistance without lever arm $F_{Rk,fi(90^\circ)}$ [kN] |                                                            | 1,02                                 | 1,02 | 1,02 | 0,76 |
| Partial factor $\gamma_{Mm,fi}^{1)}$ [-]                                                                                                                                             |                                                                                                                                                                    |                                                                                        | 1,00                                                       |                                      |      |      |      |
| Characteristic fire resistance for shear load with lever arm, valid for all above mentioned base materials                                                                           |                                                                                                                                                                    |                                                                                        |                                                            |                                      |      |      |      |
| Characteristic bending resistance $M_{Rk,s,fi}$ [Nm]                                                                                                                                 |                                                                                                                                                                    |                                                                                        | 0,47                                                       | 0,37                                 | 0,26 | 0,21 |      |
| Partial factor $\gamma_{Mm,fi}^{1)}$ [-]                                                                                                                                             |                                                                                                                                                                    |                                                                                        | 1,00                                                       |                                      |      |      |      |
| Minimum edge distances under fire exposure $c_{min,fi}$ [mm]                                                                                                                         |                                                                                                                                                                    |                                                                                        | $2 \times h_{nom}$                                         |                                      |      |      |      |
| Minimum spacing under fire exposure $s_{min,fi}$ [mm]                                                                                                                                |                                                                                                                                                                    |                                                                                        | $4 \times h_{nom}$                                         |                                      |      |      |      |
| <sup>1)</sup> In absence of other national regulations.                                                                                                                              |                                                                                                                                                                    |                                                                                        |                                                            |                                      |      |      |      |
| fischer HybridPower                                                                                                                                                                  |                                                                                                                                                                    |                                                                                        |                                                            | <b>Annex C15</b><br>Appendix 27 / 27 |      |      |      |
| <b>Performances</b><br>Characteristic fire resistance for use in solid brick masonry                                                                                                 |                                                                                                                                                                    |                                                                                        |                                                            |                                      |      |      |      |