

Allgemeine bauaufsichtliche Zulassung

Zulassungsstelle für Bauprodukte und Bauarten

Bautechnisches Prüfamt

Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des öffentlichen Rechts
Mitglied der EOTA, der UEAtc und der WFTAO

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Applicant:

fischerwerke GmbH & Co. KG
Klaus-Fischer-Straße 1
72178 Waldachtal

Subject of approval:

fischer hollow ceiling anchor FH Y

The subject of approval named above is herewith granted a national technical approval (*allgemeine bauaufsichtliche Zulassung*).

This national technical approval (*allgemeine bauaufsichtliche Zulassung*) contains seven pages and six annexes.

This national technical approval (*allgemeine bauaufsichtliche Zulassung*) replaces national technical approval (*allgemeine bauaufsichtliche Zulassung*) no. Z-21.1-1711 of 25 November 2011. The subject of approval was first granted a national technical approval (*allgemeine bauaufsichtliche Zulassung*) on 26 November 2001.

Translation authorised by DIBt

DIBt

I General Provisions

- 1 With the national technical approval (*allgemeine bauaufsichtliche Zulassung*) the fitness for use and the applicability of the subject of approval in accordance with the Building Codes of the federal states (*Landesbauordnungen*) have been verified.
- 2 If in the national technical approval (*allgemeine bauaufsichtliche Zulassung*) requirements are made concerning the special expertise and experience of persons entrusted with the manufacture of construction products and types of construction in accordance with the provisions of the relevant federal state following Section 17 Sub-Section 5 of the Model Building Code (*Musterbauordnung*), it shall be noted that this expertise and experience can also be proven by equivalent verifications from other Member States of the European Union. If necessary, this also applies to verifications presented within the framework of the Agreement on the European Economic Area (EEA) or other bilateral agreements.
- 3 The national technical approval (*allgemeine bauaufsichtliche Zulassung*) does not replace the permits, approvals and certificates prescribed by law for carrying out building projects.
- 4 The national technical approval (*allgemeine bauaufsichtliche Zulassung*) will be granted without prejudice to the rights of third parties, in particular private property rights.
- 5 Notwithstanding further provisions in the 'Special Provisions', manufacturers and distributors of the subject of approval shall make copies of the national technical approval (*allgemeine bauaufsichtliche Zulassung*) available to the user and point out that the national technical approval (*allgemeine bauaufsichtliche Zulassung*) shall be available at the place of use. Upon request, copies of the national technical approval (*allgemeine bauaufsichtliche Zulassung*) shall be placed at the disposal of the authorities involved.
- 6 The national technical approval (*allgemeine bauaufsichtliche Zulassung*) may be reproduced in full only. Partial publication requires the consent of Deutsches Institut für Bautechnik. Texts and drawings contained in advertising literature may not be in contradiction to the national technical approval (*allgemeine bauaufsichtliche Zulassung*). In the event of a discrepancy between the German original of the national technical approval (*allgemeine bauaufsichtliche Zulassung*) and this authorised translation, the German version shall prevail.
- 7 The national technical approval (*allgemeine bauaufsichtliche Zulassung*) is granted until revoked. The provisions of the national technical approval (*allgemeine bauaufsichtliche Zulassung*) can subsequently be supplemented and amended, in particular if this is required by new technical findings.

II SPECIAL PROVISIONS

1 Subject of approval and field of application

1.1 Subject of approval

The Fischer hollow ceiling anchor FHY is a torque-controlled expansion anchor made of galvanised steel. It consists of an expansion sleeve and a cone with an internal thread and a hexagonal screw with a washer or a threaded bolt with a washer and a hexagonal screw.

By tightening the screw/nut, the cone is pulled into the expansion sleeve expanding it. Annex 1 shows the anchor when installed.

1.2 Field of application

The anchor may be used under static and quasi-static load in prestressed hollow core slabs made of concrete of a strength class of at least C45/55 in accordance with DIN EN 206-1:2001-07 or B 55 in accordance with DIN 1045:1988-0 for which a national technical approval (*allgemeine bauaufsichtliche Zulassung*) has been granted.

The hollow ceiling anchor may only be used in prestressed concrete hollow core slabs where the cavity width does not exceed 4.2 times the web width (see Annex 1).

The anchor may be used, without further verification, for the multiple fixing¹⁾ of suspended ceilings in accordance with DIN 18168-1:2007-04 as well as for statically comparable anchorings up to 1.0 kN/m² if fire resistance duration requirements for light ceilings or suspended ceilings apply. This does not apply if there are fire resistance duration requirements for ventilation lines (and comparable components) including the anchor or a possible fire load in the intermediate ceiling area.

The anchor may only be used in dry internal conditions.

2 Provisions for the construction product

2.1 Properties and composition

The dimensions and material properties of the anchor shall correspond to the data given in the annexes.

The material properties, dimensions and tolerances of the anchor not specified in this national technical approval (*allgemeine bauaufsichtliche Zulassung*) shall correspond to the data deposited with Deutsches Institut für Bautechnik, the certification body and the external surveillance body.

The anchor consists of a non-flammable class A building material in accordance with DIN 4102-01:1998-05 'Fire behaviour of building materials and building components - Part 1: Building materials; concepts, requirements and tests'.

¹⁾ The building components shall be fixed such that two neighbouring fixing points bear the load in case of failure of one fixing point. A fixing point is an anchorage which consists of one or more anchors.

2.2 Packaging, storage and marking

The anchor may only be packed and delivered as a complete unit. For the design version including the hexagonal screw, the screw and the related washer may be supplied separately in compliance with Section 3.4.

The packaging, accompanying leaflet or delivery note of the anchor shall be marked by the manufacturer with the national conformity mark (Ü-Zeichen) in accordance with the Conformity Marking Ordinances (Übereinstimmungszeichen-Verordnungen) of the federal states. The identifying mark, the approval number and the complete designation of the anchor shall also be specified. The mark shall only be applied if the requirements set out in Section 2.3 are met.

The anchor shall be designated according to its identifying mark, anchor type and the thread diameter, e.g. fischer FH Y M 8.

The identifying mark, the anchor type and the thread diameter as stated in Annex 3 shall be imprinted on the anchor.

For anchorings using a threaded bolt, the strength class of the thread shall be marked in compliance with Annex 2.

2.3 Attestation of conformity

2.3.1 General

The attestation of conformity of the anchor with the provisions of this national technical approval (*allgemeine bauaufsichtliche Zulassung*) shall be issued for every manufacturing plant in the form of a certificate of conformity based on factory production control and regular external surveillance, including initial type-testing of the anchor, in accordance with the following provisions.

To issue the certificate of conformity and for external surveillance, including the associated product testing to be carried out in the process, the manufacturer of the anchor shall use an appropriately recognised certification body and an appropriately recognised inspection body.

The declaration that a certificate of conformity has been granted shall be given by the manufacturer through marking of the construction products with the national conformity mark (Ü-Zeichen) including statement of the intended use.

The certification body shall send a copy of the certificate of conformity issued by the same to Deutsches Institut für Bautechnik.

If the hexagonal screw in accordance with DIN EN 24017 is supplied by a third party, an inspection certificate 'type 3.1.' issued by an external surveillance body in accordance with DIN EN ISO 10204:2005-01 shall certify that the tests specified in Section 3.4 have been carried out.

2.3.2 Factory production control

A factory production control system shall be set up and implemented in each manufacturing plant. Factory production control is understood to be continuous surveillance of production by the manufacturer to ensure that the manufactured construction products satisfy the provisions of this national technical approval (*allgemeine bauaufsichtliche Zulassung*).

The test plan deposited with Deutsches Institut für Bautechnik and the external surveillance body is decisive for the scope, type and frequency of factory production control.

The results of factory production control shall be recorded and evaluated. The records shall include at least the following information:

- Designation of the construction product or the starting material and the components
- Type of check or test
- Date of manufacture and testing of the construction product or the starting material or the components,
- Results of check and tests and, where applicable, comparison with requirements
- Signature of the person responsible for factory production control

The records shall be kept for at least five years and be submitted to the inspection body used for external surveillance. They shall be presented to Deutsches Institut für Bautechnik and the competent supreme building authority upon request.

If the test result is unsatisfactory, the manufacturer shall immediately take the necessary measures to resolve the defect. Construction products which do not meet the requirements shall be handled such that they cannot be mixed up with compliant products. After the defect has been remedied, the relevant test shall be repeated immediately - where technically feasible and necessary for demonstration that the defect has been eliminated.

2.3.3 External surveillance

The factory production control system at each manufacturing plant shall be inspected regularly, at least once a year, by means of external surveillance.

Initial type-testing of the anchors shall be carried out within the scope of external surveillance and samples for random testing shall be taken. Sampling and testing shall be the responsibility of the recognised inspection body.

The test plan deposited with Deutsches Institut für Bautechnik and the external surveillance body is decisive for the scope, type and frequency of external surveillance. The certification and external surveillance results shall be kept for at least five years. They shall be presented by the certification body or inspection body to Deutsches Institut für Bautechnik and the competent supreme building authority upon request.

3 Provisions for design and dimensioning

3.1 General

The anchors shall be planned and calculated in line with good engineering practice. Verifiable calculation notes and design drawings shall be prepared taking into account the loads to be anchored.

Proof shall be provided that the cavity width of the pre-stressed hollow board ceilings does not exceed 4.2 times the web width ($b_H \leq 4.2 \leq b_{St}$; see Annex 1). The proof of the immediate local force transmission into the concrete member has been provided. The transmission of the loads to be anchored into the building component shall be proven.

Bending stress acting on the anchor may only be disregarded if all of the following conditions are met:

- The fixture to be attached consists of metal and is braced flat against the concrete without any intermediate layer in the anchorage zone.
- The fixture is in contact with the thread bolt and/or the spacer sleeve over its entire thickness.
- The clearance hole in the fixture to be attached does not exceed the values specified in Annex 4.

If the specified clearance hole diameter in the fixture to be attached cannot be maintained, special measures shall be taken (e.g. stronger washers) due to the risk of pull-through failure.

Additional loading due to forces of constraint (e.g. from temperature changes) within the anchor, the fixture to be attached or the building component in which the anchor is set shall be taken into account.

3.2 Load-bearing capacity

The design resistance acting on the anchors set in prestressed hollow core slabs shall apply to the following stress directions: axial tension, shear and oblique tension at any angle. The design loads are stated in Annex 5 depending on the lower web thickness d_u of the pre-stressed hollow board ceiling.

In the ultimate limit state, it shall be verified that the following equations are observed:

Tension and shear load	$F_{Sd} \leq F_{Rd}$
Bending	$M_{Sd} \leq M_{Rd}$
Bending and tension	$\frac{F_{Sd}}{F_{Rd}} + \frac{M_{Sd}}{M_{Rd}} \leq 1.0$

F_{Sd} = Design value for the action (tension and shear)

F_{Rd} = Design value for the resistance, see Annex 5

M_{Sd} = Design value for the action (bending)

The theoretical fixing point is located under the concrete surface by the nominal diameter of the bolt.

M_{Rd} = Design resistance bending stress, see Annex 4

3.3 Displacement behaviour

Under a tension load of $\frac{F_{Rd}}{1.4}$, a displacement of the anchors of 0.1 mm is to be expected for anchor sizes M6 and M8 and a displacement of up to 0.4 mm for anchor size M10. Under permanent load, larger displacements are to be expected.

In case of a shear load of $\frac{F_{Rd}}{1.4}$, a displacement of the anchors of 0.9mm is to be expected for anchor sizes M6 and M8 and a displacement of up to 1.4 mm for anchor size M10. In addition to this, the gap between the anchor and the fixture shall be taken into account. The displacement under oblique tension shall arise out of the displacements under tension and shear load. The displacements result from the given guide values by means of linear interpolation.

3.4 Anchoring using a hexagonal screw

If the manufacturer does not deliver the hexagonal screw needed for the anchor in the relevant application case, the planning engineer shall choose the screw with the correct screw length, taking into account the thickness of the fixture to be attached, the necessary minimum screw-in depth and possible tolerances in accordance with Annex 4.

The hexagonal screw shall correspond to the strength classes and the surface treatment given in Annex 2.

4 Provisions for execution

4.1 General

The anchor may only be used as a standard anchorage unit. It is possible to use a separately delivered hexagonal screw and a corresponding washer in accordance with Section 3.4.

The anchor shall be installed in accordance with the design drawings in accordance with Section 3.1 and the installation guide provided by the company. Prior to setting the anchor, the exact position of the stressing tendons shall be determined using a suitable metal detecting device. Their position shall be marked on the bottom surface of the ceiling. If the anchor is not set centrally in the cavity axis, the spacing between the anchor axis and the axis of the tensioning strands shall be at least 50 mm (cf. Annex 6).

4.2 Setting of the drill hole

The drill hole shall be drilled perpendicular to the concrete surface using a hard metal hammer drill bit. The hard metal hammer drill bit shall comply with the specifications listed in the leaflet 'Characteristic values, requirements and tests of masonry drills with carbide metal cutting elements used for setting drill holes for anchor installations' (*Kennwerte, Anforderungen und Prüfungen von Mauerbohrern mit Schneidkörpern aus Hartmetall, die zur Herstellung der Bohrlöcher von Dübelverankerungen verwendet werden*) (version January 2002). Compliance with the drill bit parameters in accordance with Section 5 of the leaflet shall be proven.

The nominal drill bit diameter and the cutting diameter shall correspond to the values given in Annex 4.

4.3 Installation of the anchor

The lower web thickness shall be measured before the anchor is installed.

The anchor shall be inserted into the drill hole such that the expansion sleeve lies flush with the surface of the concrete.

The anchor shall be installed with a calibrated torque wrench. The torque moments are specified in Annex 4. They shall be applied to the hexagonal nut of the threaded bolt or to the hexagonal screw. The anchor is properly installed and may only be loaded if the prescribed torque can be applied.

Installed anchors may be rechecked at any time. It must always be possible to reapply the prescribed anchoring torque.

4.4 Inspection of execution

During installation of the anchors, the contractor responsible for installing them or the construction supervisor assigned by him or a competent representative of the construction supervisor shall be present at the job site. He shall ensure the proper execution of the anchors.

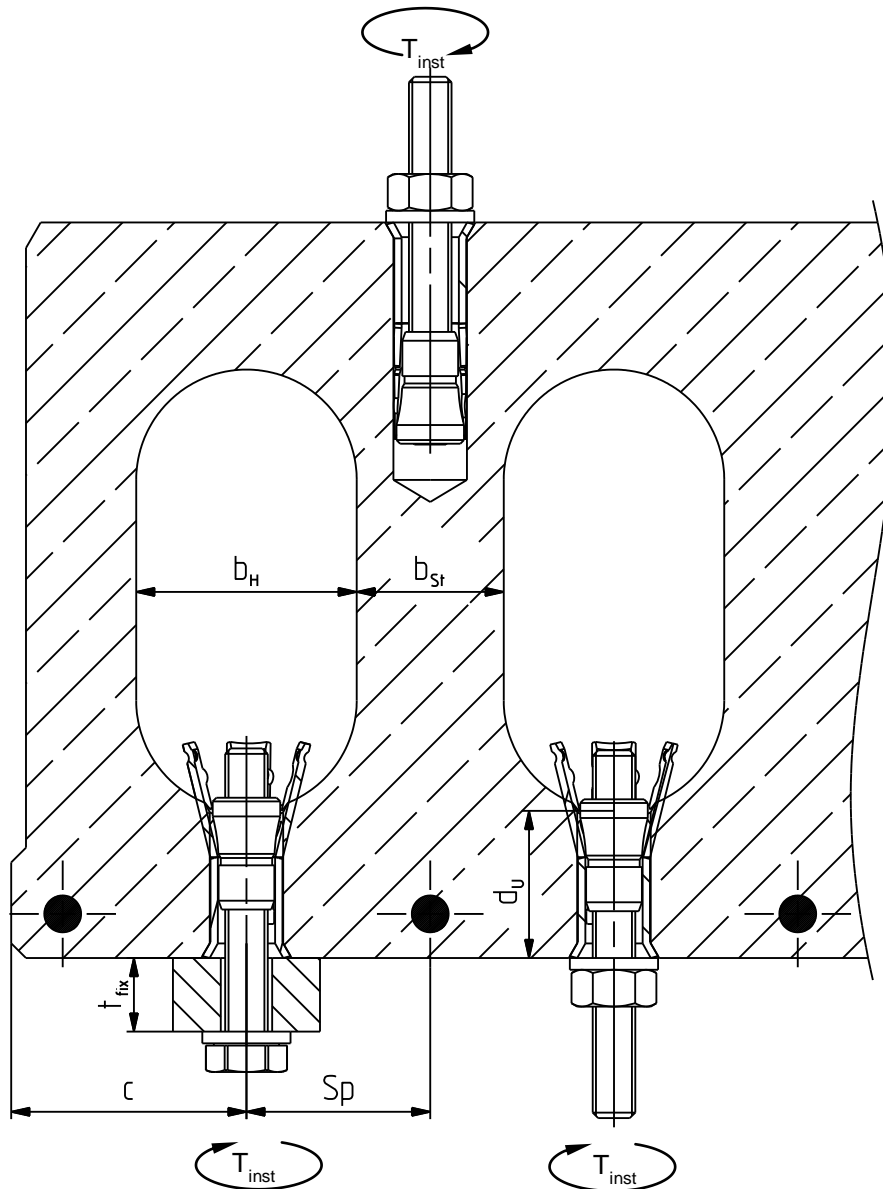
During installation of the anchors, records on the verification of the existing concrete strength class and the proper installation of the anchors shall be maintained by the construction supervisor or his competent representative. The records shall be available at the job site during the construction period and shall be presented to the person carrying out the inspection upon request. These records as well as the delivery notes shall be kept by the company for at least five years after completion of the work.

Andreas Kummerow
Head of Section

Beglaubigt

Anchoring in prestressed concrete hollow core slabs

Cavity anchors permitted only in prestressed concrete hollow core slabs the cavity width of which does not exceed 4.2 times the web width ($b_H \leq 4.2 \cdot b_{St}$). The anchor may be installed in the concrete member if the web thickness in Annex 5 and the spacing to the tensioning strands in Annex 6 are observed (also in the area of solid material).



Key:	S_p = Axial spacing to the tensioning strands
	t_{fix} = Thickness of the fixture
	d_u = Web thickness
	T_{inst} = Installation torque
	c = Edge distance

fischer hollow ceiling anchor FHY

Installed anchor

Annex 1

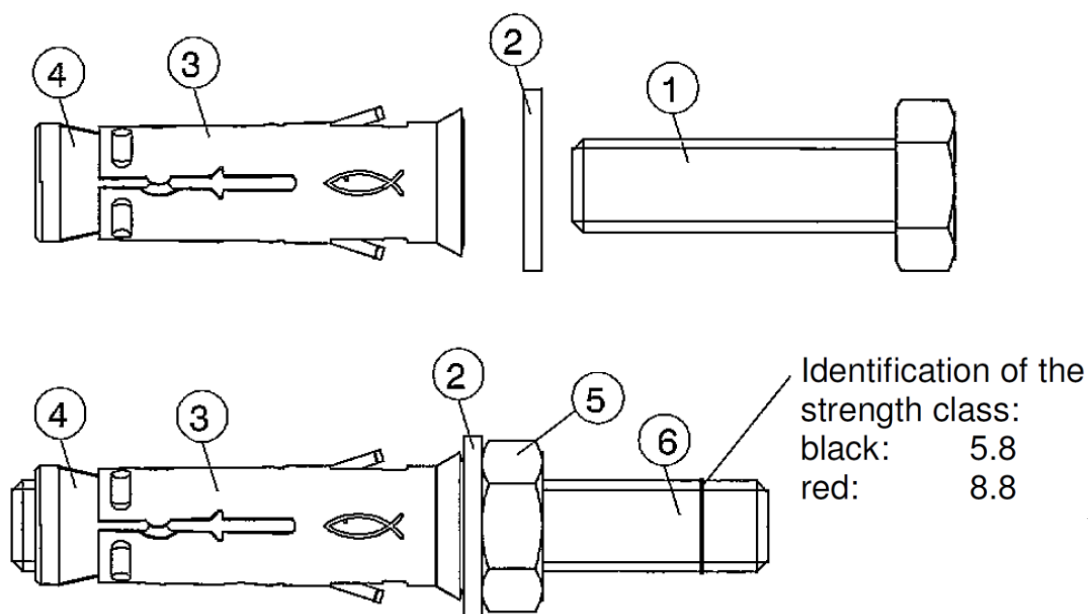


Table 1: Designations and materials

Part	Designation	Materials / Surface treatment
1	Hexagonal screw	Steel, DIN EN ISO 898-1:2013 strength class 5.8 or 8.8 (M6); strength class 4.6, 5.8 or 8.8 (M8 and M10) ¹⁾
2	Washer	Cold strip DIN EN 10139:2016 ¹⁾
3	Expansion sleeve	Cold strip DIN EN 10 139:2016 ¹⁾
4	Cone	Steel DIN EN 10277-3:2008 ¹⁾
5	Hexagonal nut	Steel DIN EN ISO 898-2:2012; strength class 5 or 8 (M6) or 4, 5 or 8 (M8 and M10) ¹⁾
6	Threaded bolt	Steel DIN EN ISO 898-1:2013, strength class 5.8, 8.8 (M6) or 4.6, 5.8 or 8.8 (M8 and M10) ¹⁾

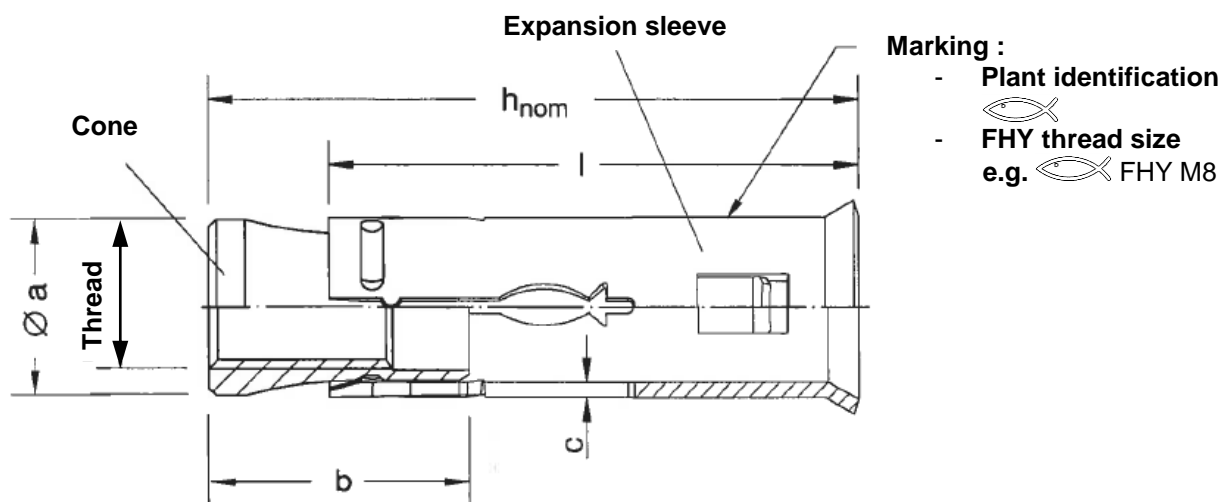
¹⁾ Galvanised in accordance with DIN EN ISO 4042:2001; $\geq 5\mu\text{m}$

The strength class of the threaded parts in accordance with DIN EN ISO 898-1 shall be determined by the planning engineer in compliance with Annex 4.

fischer hollow ceiling anchor FH Y

Anchor types
Designations
Materials

Annex 2





Marking :
 - Plant identification

 - FHY thread size
 e.g.  FHY M8

Table 2: Dimensions

Type	h_{nom} [mm]	Thread	Cone			
			$\varnothing a$ [mm]	b [mm]	c [mm]	l [mm]
FHY M6	37	M6	9.2	15.2	1.0	30
FHY M8	43	M8	11.5	17.0	1.0	35
FHY M10	52	M10	15.0	23.5	1.5	40

fischer hollow ceiling anchor FHY

Dimensions

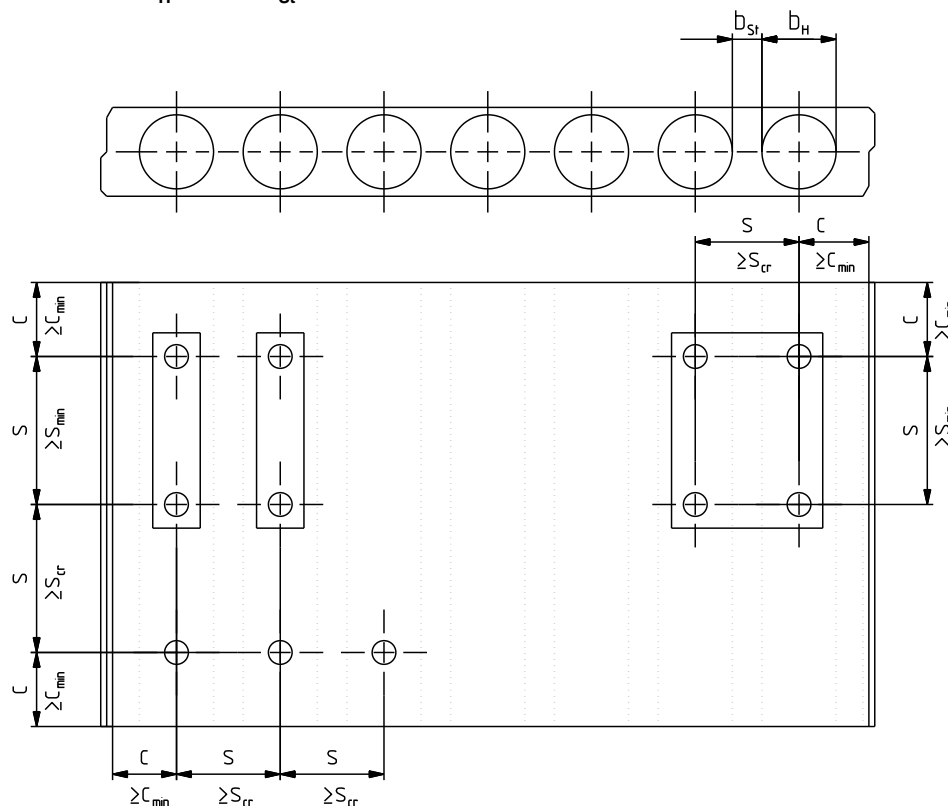
Annex 3

Table 3: Installation parameters / Design resistance bending stress

Type		FHY M6	FHY M8	FHY M10
Nominal drill diameter	[mm]	10	12	16
Drill bit diameter	\leq [mm]	10.45	12.50	16.50
Drill hole depth	$h_1 \geq$ [mm]	50	60	65
Length of hexagonal screw ¹⁾	min. $l_s \geq$ [mm]	$39 + t_{fix}$	$45 + t_{fix}$	$54 + t_{fix}$
Length of threaded bolt	min. $l_B \geq$ [mm]	$62 + t_{fix}$	$68 + t_{fix}$	$77 + t_{fix}$
Clearance hole in the fixture	$d_f \leq$ [mm]	7	9	12
Installation torque	$T_{inst}=[Nm]$	10	10	20
Design resistance bending stress M_{Rd}	strength class 4.6	-	9.0	17.9
	strength class 5.8 ²⁾	6.2	15.0	30.0
	strength class 8.8 ²⁾	9.8	23.9	47.9

1) For hexagonal screws with a shaft in accordance with DIN EN ISO 4017:2015, the shaft length shall be $\leq t_{fix}$.
 2) For identification, see Annex 2

Arrangement of anchors
 Condition: $b_H \leq 4.2 \cdot b_{St}$



For permissible position of the drill holes, see Annex 6

fischer hollow ceiling anchor FHY

Installation parameters
Design resistance bending stress

Annex 4

Table 4: Design resistance, spacings and edge distances of the anchors for all load directions in pre-stressed concrete hollow board ceilings with a concrete strength class \geq C45/55 res. B55

Anchor size	FHY M6			FHY M8			FHY M10		
	≥ 25 < 30	≥ 30 < 40	≥ 40	≥ 25 < 30	≥ 30 < 40	≥ 40	≥ 30 < 40	≥ 40	
Web thickness d_u [mm]	≥ 25 < 30	≥ 30 < 40	≥ 40	≥ 25 < 30	≥ 30 < 40	≥ 40	≥ 30 < 40	≥ 40	
Single anchor									
$F_{Rd}^{1)}$ with s_{cr} and c_{cr}	[kN]	1.0	1.3	2.8	1.0	1.3	2.8	1.7	4.2
Edge distance $c_{cr} \geq$ [mm]		150							
$F_{Rd}^{1)}$ with s_{cr} and c_{min}	[kN]	0.5	1.1	2.5	0.5	1.1	2.5	1.4	3.8
Minimum edge distance $c_{min} =$ [mm]		100							
Spacing s_{cr} [mm]		300							
Anchor pairs ²⁾									
$F_{Rd}^{1)}$ / anchor pair with s_{min} and c_{cr}	[kN]	1.0	2.0	3.6	1.0	2.0	3.6	2.8	6.7
Minimum spacing $s_{min} =$ [mm]		70	80	100	70	80	100	80	100
Edge distance $c_{cr} \geq$ [mm]		150							
$F_{Rd}^{1)}$ / anchor pair with s_{min} and c_{min}	[kN]	0.5	1.8	3.3	0.5	1.8	3.3	2.5	6.0
Minimum spacing $s_{min} =$ [mm]		70	80	100	70	80	100	80	100
Minimum edge distance $c_{min} =$ [mm]		100							

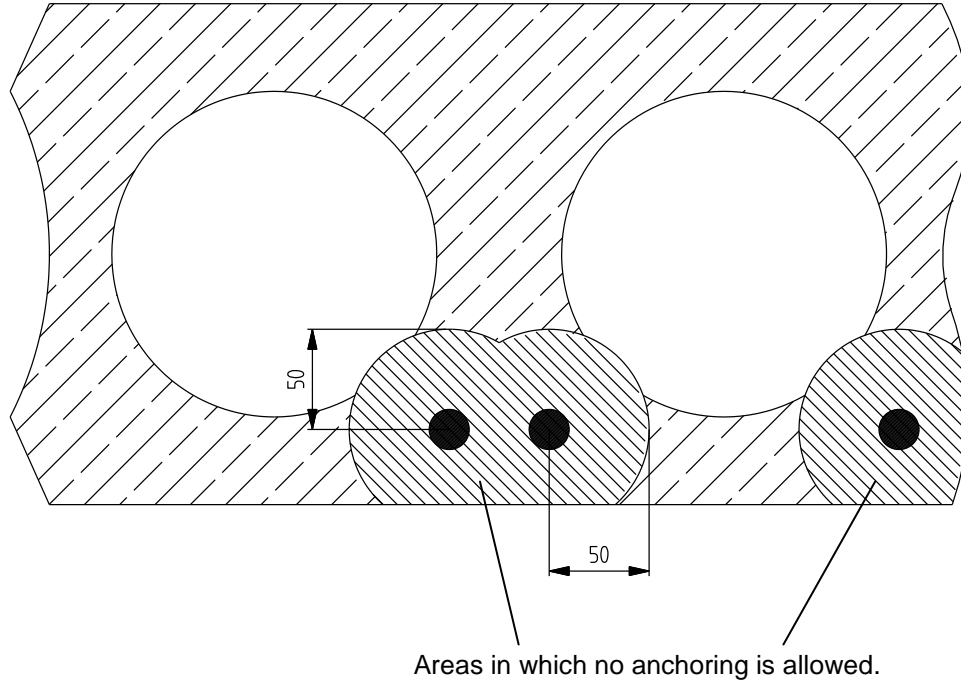
¹⁾ For edge distances $c_{min} < c \leq c_{cr}$ the design resistance values may be determined by linear interpolation.

²⁾ The design resistance values apply to the anchor pair. The design resistance for the anchor exposed to the highest load must not exceed the values specified for single anchors. In case of anchor pairs with an axial spacing of $s_{min} < s \leq s_{cr}$, the design resistance values may be determined by linear interpolation, with twice the design resistance for single anchors allowed for the limit $s = s_{cr}$ for the anchor pair under centric load introduction.

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Design values
Spacing and edge distances

Annex 5



The distance between the anchor axis and the tensioning strands shall be at least 50mm.

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Minimum distance to the tensioning strands

Annex 6