

## General construction technique permit

Public-law institution jointly founded by the  
federal states and the Federation

Technical authority granting approvals  
and permits for construction products  
and construction techniques

Date: 30 Aug 2022      Reference number:  
II 71-1.74.8-76/20

**Number:**  
**Z-74.8-211**

**Applicant:**  
**fischerwerke GmbH & Co. KG**  
Otto-Hahn-Straße 15  
79211 Denzlingen, Germany

**Validity**  
from: **30 August 2022**  
to: **30 August 2027**

**Subject of decision:**  
**Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in  
SFH facilities**

The subject named above is herewith granted a general construction technique permit (*allgemeine  
Bauartgenehmigung*).  
This decision contains eight pages and eight annexes.

**Translation authorised by DIBt**

DIBt

## I GENERAL PROVISIONS

- 1 The general construction technique permit confirms the fitness for application of the subject concerned within the meaning of the Building Codes of the federal states (*Landesbauordnungen*).
- 2 This decision does not replace the permits, approvals and certificates required by law for carrying out construction projects.
- 3 This decision is granted without prejudice to the rights of third parties, in particular private property rights.
- 4 Notwithstanding further provisions in the 'Special Provisions', copies of this decision shall be made available to the installer of the subject concerned. Furthermore, the installer of the subject concerned shall be made aware of the fact that this decision must be made available at the place of application. Upon request, copies of the decision shall be provided to the authorities involved.
- 5 This decision shall be reproduced in full only. Partial publication requires the consent of DIBt. Texts and drawings in promotional material shall not contradict this decision. In the event of a discrepancy between the German original and this authorised translation, the German version shall prevail.
- 6 This decision may be revoked. The provisions contained herein may subsequently be supplemented and amended, in particular if this is required by new technical findings.
- 7 This decision is based on the information and documents provided by the applicant on the subject concerned during the permit procedure. Alterations to the information on which this general construction technique permit was based are not covered by this decision and shall be notified to DIBt without delay.

## II SPECIAL PROVISIONS

### 1 Subject concerned and field of application

(1) The subject of this general construction technique permit is the fastening system 'fischer injection system FIS EM Plus' (hereinafter referred to as the fastening system) for use in coated concrete collecting trays, collecting rooms and concrete surfaces in storage, filling and handling facilities for substances hazardous to water (SFH facilities) as described below.

(2) The fastening system may only be used on concrete surfaces in accordance with Section 1 (1) that are coated exclusively with the 'StoCretec WHG System 2' coating system in accordance with decision no. Z-59.12-311<sup>1</sup>.

(3) The fastening system, installed in coated concrete surfaces in accordance with Section 1 (2), shall be deemed to be impermeable to the substances hazardous to water specified in Annex 1.

(4) The fastening system is covered by European Technical Assessment ETA-17/0979<sup>2</sup>. The fastening system is a bonded fastener / injection system for use in concrete. It consists of a mortar cartridge filled with FIS EM Plus and a steel element (fastener).

The following fasteners may be used:

- 'fischer anchor rods' with variable embedment depths (Annex 2),
- 'fischer internal threaded anchor RG MI' (Annex 3) or
- 'rebar anchor FRA' (Annex 3).

Only fasteners made of stainless steel or high corrosion-resistant steel in accordance with Annex 4 may be used. Section 2.1(6) shall be taken into account.

(5) The fastening system may be used for pre-positioned and push-through installation with or without a subsequently injected filling disc.

(6) The formulation of the injection mortar is deposited with DIBt. Any changes require the consent of DIBt.

(7) The fastening system shall be installed in a defined base material in accordance with ETA-17/0979<sup>2</sup>, taking into account the provisions of this decision and the installation and processing instructions of the applicant.

(8) The in-service temperature shall correspond to temperature range I given in Annex B1, Table B1.1 of ETA-17/0979<sup>2</sup>. In case of media contact, the temperature of the substances hazardous to water shall not exceed +30 °C.

(9) The application of the fastening system on uncoated FD/FDE concrete surfaces is laid down in decision no. Z-74.8-199. The application of the fastening system on lined concrete surfaces shall not be permitted.

(10) This general construction technique permit also takes into account the water-law requirements applicable to the subject concerned when applied in SFH facilities. In accordance with Section 63(4)(3) of the German Water Resources Act<sup>3</sup> (*WHG*), the subject concerned is deemed to be fit for application.

(11) This general construction technique permit is granted without prejudice to testing and approval requirements resulting from other legal areas.

1	Z-59.12-311	National technical approval/general construction technique permit no. Z-59.12-311 of 11 February 2022 for StoCretec WHG System 2
2	ETA-17/0979	European Technical Assessment ETA-17/0979 of 17 June 2020 for fischer injection system FIS EM PLUS
3	WHG	Act on Managing Water Resources (German Water Resources Act ( <i>WHG</i> ) – <i>Wasserhaushaltsgesetz</i> ) of 31 July 2009 ( <i>BGBI.</i> I p. 2585), as last amended by Article 12 of the Act of 20 July 2022 ( <i>BGBI.</i> I p. 1237)

## 2 Provisions for planning, design and execution

### 2.1 Planning and design

(1) Planning and design shall only be carried out by qualified designers. The water law provisions and regulations as well as the design situation shall be taken into account. The designer responsible for the design and planning shall also be experienced in the field of anchoring and reinforced concrete construction.

(2) The fastening system may only be used on concrete surfaces coated with the 'StoCretec WHG System 2' coating system if the facility concerned is an existing one. Use in newly built facilities shall not be permitted. In such a case, a different design solution shall be provided in the planning process.

(3) Reference is made to the planning and design provisions set out in ETA-17/0979<sup>2</sup>, e.g., with regard to the qualification of the person responsible for the design, the loads to be transferred, compliance with edge distances and the position of the fastener relative to the reinforcement. ETA-17/0979<sup>2</sup>, Annex B1, Table B1.1, contains an overview of the performance and use parameters to be considered in planning and design.

(4) The position of the fasteners shall be specified in the planning and/or design drawings.

(5) The fasteners may also be subjected to transverse tension.

(6) In the planning stage, steel grades which are resistant to the substances hazardous to water handled in the relevant SFH facilities shall be selected for the fasteners (steel elements). The fasteners shall be selected on a case-by-case basis in light of the specific project, taking into account the BAM list<sup>4</sup> or DIN EN 12285-1<sup>5</sup>. The choice of materials shall be documented by the designer and included in the construction project files.

### 2.2 Execution

#### 2.2.1 General

(1) The executing company (in accordance with the AwSV provisions<sup>6</sup>) and its specialised personnel shall be trained and authorised by the applicant to carry out the tasks specified in this decision as well as in the installation and processing instructions.

(2) The fastening system shall be installed in accordance with the provisions of this decision, ETA-17/0979<sup>2</sup> and the installation and processing instructions of the applicant. The processing instructions specified in the installation and processing manual shall be followed.

(3) In order to ensure that the fastening system can be properly installed, the applicant shall draw up installation and processing instructions which shall supplement the provisions of this decision and ETA-17/0979<sup>2</sup> by providing detailed descriptions in particular with regard to the following points:

- a) storage, transport and packaging for all components,
- b) preparation and condition of the concrete base material (impurities, evenness, moisture and surface strength),
- c) pre-treatment of the concrete base material, e.g., cleaning,

4	BAM list	Resistance assessments of metallic tank materials and polymeric sealing, coating and lining materials ( <i>Beständigkeitsbewertungen von metallischen Behälterwerkstoffen und polymeren Dichtungs-, Beschichtungs- und Auskleidungswerkstoffen</i> ), BAM, 21 June 2021
5	DIN EN 12285-1:2018-12	Workshop fabricated steel tanks - Part 1: Horizontal cylindrical single skin and double skin tanks for the underground storage of flammable and nonflammable water polluting liquids other than for heating and cooling of buildings; German version EN 12285-1:2018
6	AwSV	Ordinance on Facilities for Handling Substances Hazardous to Water ( <i>Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen</i> ) of 18 April 2017 (BGBl. I p. 905), as last amended by Article 256 of the Ordinance of 19 June 2020 (BGBl. I p. 1328)

- d) mandatory reference to the execution requirements of the fastening system in accordance with ETA-17/0979<sup>2</sup>,
- e) processing conditions, such as material and surface temperatures,
- f) precautions to be taken during processing,
- g) additional information on preparation of boreholes. Drilling shall be permitted
  - using the hammer drilling method with a standard drill, followed by cleaning twice with oil-free compressed air, twice with brushes and twice with oil-free compressed air
  - using the hammer drilling method with a hollow drill or
  - using the diamond drilling method as wet drilling with a diamond core bit, followed by flushing of the drill hole, blowing out twice with oil-free compressed air, brushing out twice with the drilling machine and finally blowing out twice with oil-free compressed air, see also Section 2.2.2 (4) and 2.2.2 (5). The drill hole depth shall correspond to the calculated effective embedment depth. It shall be ensured that the minimum member thickness (embedment depth plus 5 cm or embedment depth plus  $2d_0$ ) is reached (see Annexes 5 to 7).
- h) information on the mixing of components,
- i) work steps required for installing the fastening system,
- j) information on the steel elements to be installed,
- k) time until fitness for use is reached (full mechanical and chemical resistance),
- l) test of the proper installation of the fastening system.

(4) Installation of the fastening system requires several work steps. The information contained in the installation and processing instructions of the applicant shall be observed. The fastening system shall be installed properly and with due diligence in accordance with the specifications provided by the applicant.

### 2.2.2 Special instructions for execution

- (1) Before starting the work, the executing company (in accordance with Section 2.2.1(1)) shall verify that the structural requirements for installing the fastening system in accordance with the provisions of this decision, ETA-17/0979<sup>2</sup> and the installation and processing instructions drawn up by the applicant are met.
- (2) The concrete base material for the installation of the fastening system shall be assessed by the executing company in accordance with Section 2.2.1 before the borehole is drilled and shall be greenlighted for the installation of the fastening system. Greenlighting for installation shall be documented and included in the construction project files.
- (3) The effective embedment depth required for the specific case shall be marked and adhered to. It shall also be ensured that the depth of the borehole is at least 5 cm less than the thickness of the concrete member in which the fastening system is installed. Drilling through the concrete member shall not be permitted. Drilling shall only be permitted with a drill depth stop!
- (4) The hole shall only be drilled in accordance with the provisions given in Section 2.2.1(3)(g). The diameter of the drill shall be determined in accordance with Annexes 5 to 7 by the diameter of the fastener, taking into account the applicant's specifications.
- (5) No fasteners may be used for fastening the drill to the substrate.
- (6) The installation temperature shall be between -5 °C and 40 °C, with a minimum cartridge temperature of +5 °C.
- (7) The excess mortar shall be removed from all fastening points. It shall be wiped off in the non-hardened state.

(8) Incorrect drilling shall be avoided. Any holes drilled incorrectly shall be sealed with injection mortar FIS EM Plus. The surface around the incorrectly drilled hole shall then be coated with the 'StoCretec WHG System 2' coating system in accordance with the specifications of decision no. Z-59.12-311.

### 2.2.3 Checks performed by the executing company

The company in accordance with Section 2.2.1(1) shall perform the following checks prior to, during and/or after the installation of the fastening system:

- check that the facility is an existing one, that the concrete substrate is coated with the 'StoCretec WHG System 2' coating system, approved by decision no. Z-59.12-311, and that the concrete substrate fulfils the requirements in accordance with Section 1(7),
- check that the fasteners are of the appropriate steel grade,
- check that the fasteners are placed as specified in the design and planning documentation,
- check that the fasteners are oil-free and clean and that the setting depth has been marked,
- check that when hammer drills and diamond drills are used, the borehole has been properly cleaned in accordance with Section 2.2.1 (3),
- check that the specifications given in Sections 2.2.2 (4) and 2.2.2 (5) have been fulfilled,
- measurement of the temperatures and comparison with the specifications,
- check that the borehole has been filled with a sufficient quantity of mortar and that the excess mortar has been wiped off in the non-hardened state.

### 2.2.4 Declaration of conformity for the construction technique

(1) The confirmation of conformity of the construction technique for the installed fastening system with the provisions of this decision shall be provided by the executing company in accordance with Section 2.2.1(1) by means of a declaration of conformity based on Annex 8.

(2) The declaration of conformity shall be submitted on the basis of the provisions set out in this general construction technique permit, in particular Section 2.1, and the checks in accordance with Section 2.2.3.

(3) The records shall document clearly which materials were used for the fastening system. In particular, the batch numbers of the cartridge with the injection mortar and of the steel element used shall be documented.

(4) The declaration of conformity shall be handed to the operator of the facility together with a copy of this decision, of ETA-17/0979<sup>2</sup> as well as of the installation and processing instructions of the applicant for this general construction technique permit.

(5) The records shall be kept at the construction site during the construction period. They shall be kept by the executing company for a minimum of five years after completion of the project. Copies of records shall be handed over to the operator for inclusion in the construction project files and presented, upon request, to DIBt, the competent supreme building authority and the expert (in accordance with the AwSV provisions).

### **3 Provisions for use, maintenance and repair**

#### **3.1 General**

(1) This construction technique permit only covers the verification of the properties and utilisation of the fastening system for use and application in SFH facilities for the subject concerned and the field of application described in Section 1 with the configuration described in Section 2.1 and Annexes 2 and 3.

(2) The requirements for regular monitoring of the facility by the operator or continuous surveillance of the leak-tightness and the functionality of the facility set out in the AwSV provisions shall be noted. The criteria given in Section 3.2 in conjunction with Section 3.3 shall apply in this regard.

(3) The specifications of the applicant for proper cleaning of the subject concerned shall be taken into account by the facility operator.

(4) The operator shall organise the inspection intervals in the operating instructions for the given facility based on the permitted exposure time in accordance with this decision. The results of inspections as well as any irregularities with regard to the operating instructions shall be documented. These records shall be presented to the expert (in accordance with the AwSV provisions) upon request.

(5) Handling and filling processes shall be regularly checked for leakages by visual inspection in accordance with the AwSV provisions. Where leakages are detected, action shall be taken to remedy the situation without delay.

(6) In storage facilities for substances hazardous to water, it shall be ensured that, in case of a leakage, the escaping liquids in accordance with Annex 1 are removed as quickly as possible and within the maximum exposure time.

(7) After each exposure to liquids hazardous to water, the fastening system shall be visually inspected for proper functioning. If necessary, further action shall be taken.

#### **3.2 Inspections by experts in accordance with the AwSV provisions**

##### **3.2.1 Commissioning inspection**

(1) The expert shall be kept continually informed of the progress of work. The expert shall be given the possibility of participating in the checks carried out before, during and after the installation of the fastening system in accordance with Section 2.2.1 and of evaluating the results of the checks.

(2) The checks prior to commissioning or recommissioning shall be carried out in the presence of an expert from the company in accordance with Section 2.2.1(1) and the operator of the facility.

(3) The final check of the condition of the fastening system shall be carried out through a visual inspection of the surfaces of all areas.

(4) It shall be checked whether the provisions of this general construction technique permit, the documents in accordance with Section 2.2.4 and the confirmation of the executing company (see Annex 8) are available. These shall be presented to the expert upon request.

(5) The expert shall verify the inspection intervals defined in the operating instructions by the operator.

##### **3.2.2 Recurring inspections**

(1) The fastening system shall be checked at regular intervals to see whether the conditions for its use are still met.

(2) The check of the fastening system shall consist of a visual inspection.

(3) Within the framework of these recurring inspections, the fastening system shall be checked and evaluated as follows.

The fastening system and the area around the fastening system shall continue to be considered impermeable to liquids within the meaning of the special provisions set out in Section 2.1 as long as, in particular, none of the deficiencies listed below have been detected:

- mechanical damage / spalling on the surface,
- cracks starting from the installed fastening system or
- cracks / splitting around the installed fastening system.

(4) If damage to the fastening system or the area around the fastening system starting from the fastening system is detected during recurring inspections, appropriate action in accordance with Sections 3.3 and 3.4 shall be taken to eliminate the defects.

### 3.3 Elimination of defects

(1) In accordance with the AwSV provisions, defects identified in tests and checks shall be eliminated.

The defects shall be eliminated taking into account the provisions of this decision and the applicant's installation and processing instructions for the fastening system pertaining to repair work.

(2) The defects shall be eliminated by a company in accordance with Section 2.2.1(1) which is qualified in accordance with the requirements set out in Section 2.2.1. The company shall only use the materials listed in this decision in accordance with the installation and processing instructions of the applicant.

(3) Any holes drilled incorrectly shall be sealed with injection mortar FIS EM Plus. The surface around the incorrectly drilled borehole shall then be coated with the 'StoCretec WHG System 2' coating system in accordance with the specifications of decision no. Z-59.12-311.

(4) If the coating system is damaged when the fastening system is installed, the impermeability to liquids shall be restored in accordance with the provisions of the general technical approval/general construction technique permit Z-59.12-311.

### 3.4 Restoration of impermeability to liquids in existing facilities

(1) When repairing fastening systems (restoration of impermeability to liquids) in existing facilities, the operator shall, in accordance with the AwSV provisions, arrange for

- an assessment of the condition of the damaged area and development of a corresponding repair concept by a qualified planner and
- a verification of the proper condition of the restored area

by an appropriate expert.

The expert shall have the opportunity to peruse the condition assessment and the repair concept.

(2) Damaged fastening systems or areas around them with damage starting from the fastening system shall be restored in accordance with Sections 2 and 3 so that they are impermeable to liquids.

(3) Only companies in accordance with Section 2.2.1 (1) shall be commissioned to restore the impermeability to liquids.

Dr.-Ing. Ullrich Kluge  
Head of Section

Drawn up by  
Dr.-Ing. Westphal-Kay



List of liquids hazardous to water to which the installed fastening system is impermeable and chemically resistant

Group no.	Liquids permitted for the facility operating modes <sup>1)</sup> storage (L), filling (A) and handling (U) in accordance with the exposure levels <sup>1)</sup> low (1), medium (2) and high (3)	Operating mode and level <sup>1)</sup>
1 <sup>2)</sup>	Petrol in accordance with DIN EN 228 with a (bio)ethanol content of max. 5 vol% in accordance with DIN EN 15376	L2 A2 U2
1a <sup>2)</sup>	Petrol in accordance with DIN EN 228 with the addition of biofuel components in accordance with Directive 2009/28/EC up to a total content of max. 20 vol%	
2 <sup>2)</sup>	Aviation fuels	
3	<ul style="list-style-type: none"> <li>- fuel oils EL in accordance with DIN 51603-1</li> <li>- unused combustion engine oils</li> <li>- unused vehicle gear oils</li> <li>- mixtures of saturated and aromatic hydrocarbons with an aromatic content of ≤ 20 wt% and a flash point of &gt; 60 °C</li> </ul>	
3b <sup>2)</sup>	Diesel fuels in accordance with DIN EN 590 with an addition of fatty acid methyl esters (FAME) in accordance with DIN EN 14214 up to a total content of max. 20 vol%	
4	Hydrocarbons and mixtures containing benzene with max. 5 vol% benzene, except automotive fuels	
4a	Aliphatic and cycloaliphatic hydrocarbons	
4b	Aromatic hydrocarbons	
4c	<ul style="list-style-type: none"> <li>- used combustion engine oils and</li> <li>- used vehicle gear oils</li> </ul> with a flash point > 60 °C	
5	Alcohols and glycol ethers	
5a	Alcohols and glycol ethers, except methanol and mixtures containing methanol	
6b	Aromatic halogenated hydrocarbons	
7	Organic esters, except biodiesel	L2 A2 U2
7a <sup>2)</sup>	Fatty acid methyl ethers (FAME) in accordance with DIN EN 14214, vegetable oil fuel – rapeseed in accordance with DIN 51605 and vegetable oil fuel in accordance with DIN 51623	
8	Organic ketones	
9	Aqueous aliphatic aldehyde solutions up to 40%	

<sup>1)</sup> Worksheet DWA-A-786:2020-10, Technical rules for substances hazardous to water (*Technische Regeln wassergefährdender Stoffe, TRwS*), Execution of sealing surfaces (*Ausführung von Dichtflächen*)

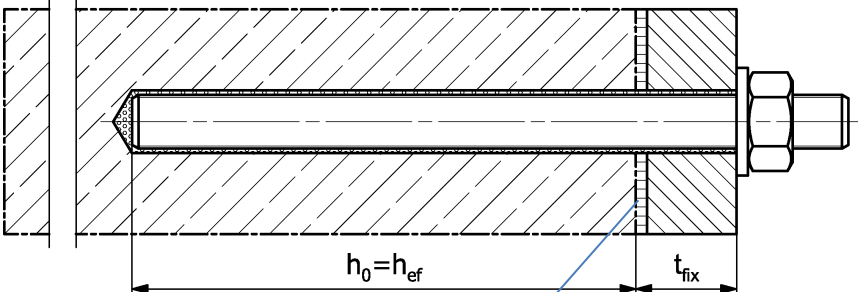
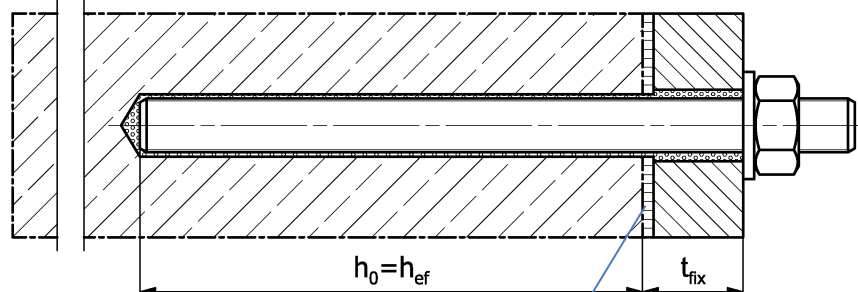
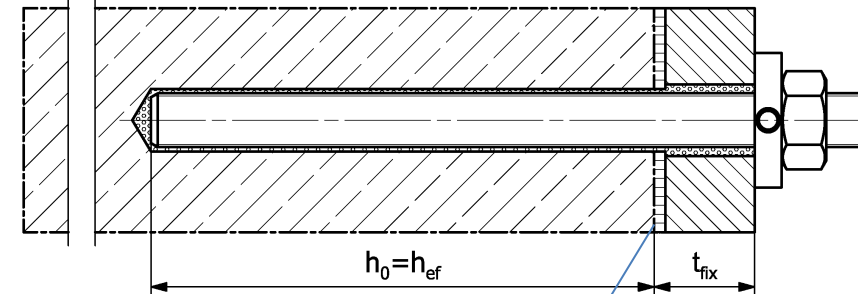
<sup>2)</sup> Fit for use at filling stations in accordance with TRwS 781 to TRwS 784 (worksheets DWA-A 781:2018-12, with corrections of May 2019, DWA-A 782:2006-05, DWA-A 783:2005-12 and DWA-A 784:2006-04, Technical rules for substances hazardous to water – Filling stations for motor vehicles, rail vehicles, watercraft and aircraft (*Technische Regeln wassergefährdender Stoffe (TRwS), Tankstellen für Kraft-, Schienen-, Wasser- und Luftfahrzeuge*))

Unless otherwise stated for the liquids listed, the substances concerned are technically pure substances or mixtures of technically pure substances of the relevant group, but not mixed with water unless otherwise stated.

Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities

List of liquids hazardous to water to which the installed fastening system is impermeable and chemically resistant

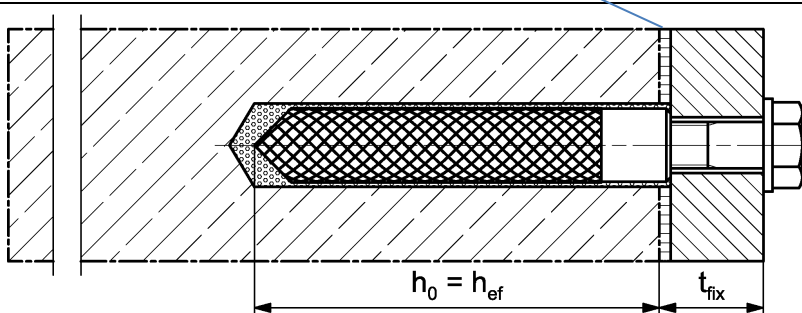
Annex 1

<b>fischer anchor rod</b>	
<b>Pre-positioned installation</b>	 <p>'StoCretec WHG System 2' in accordance with decision no. Z-59.12-311</p>
<b>Push-through installation</b> (annular gap filled with mortar)	 <p>'StoCretec WHG System 2' in accordance with decision no. Z-59.12-311</p>
<b>Pre-positioned and push-through installation with a subsequently injected filling disc</b> (annular gap filled with mortar)	 <p>'StoCretec WHG System 2' in accordance with decision no. Z-59.12-311</p>
Figures not to scale	
$h_0$ = drill hole depth $t_{fix}$ = thickness of fixture	$h_{ef}$ = effective embedment depth
Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities	Annex 2
fischer anchor rod – installed condition	

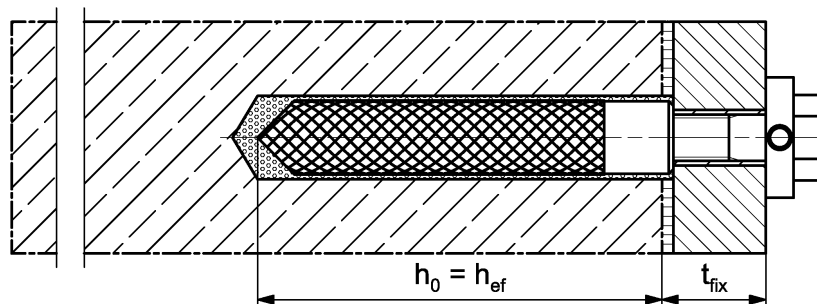
'StoCretec WHG System 2' in accordance with decision no. Z-59.12-311

**fischer internal threaded anchor RG MI**

**Pre-positioned installation**

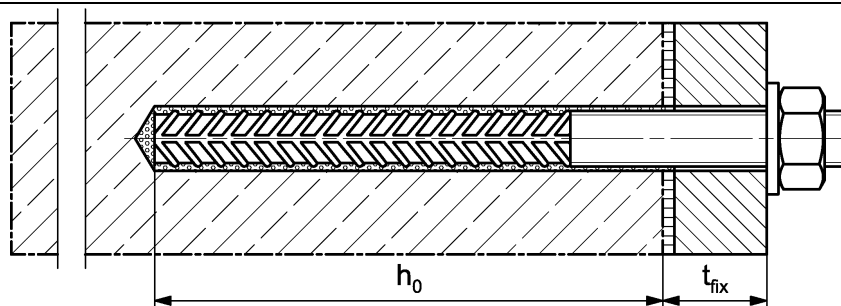


**Pre-positioned installation with a subsequently injected filling disc**  
(annular gap filled with mortar)

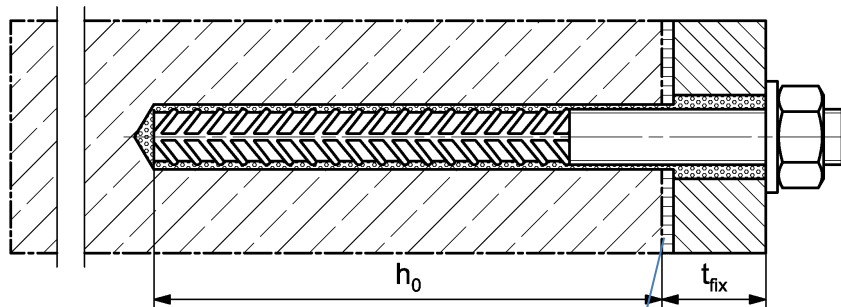


**fischer rebar anchor FRA**

**Pre-positioned installation**



**Push-through installation**  
(annular gap filled with mortar)



Figures not to scale

'StoCretec WHG System 2' in accordance with decision no. Z-59.12-311

$h_0$  = drill hole depth

$h_{ef}$  = effective embedment depth

$t_{fix}$  = thickness of fixture

Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities

fischer internal threaded anchor RG MI and fischer rebar anchor FRA – installed condition

Annex 3

**Permitted materials** based on ETA-17/0979 of 17 June 2020, Table A6.1

Name	Material	
Injection cartridge	Mortar, hardener, filler	
Steel grade	Stainless steel R in accordance with DIN EN 10088-1:2014 of corrosion resistance class CRC III in accordance with DIN EN 1993-1-4:2015	High corrosion-resistant steel HCR in accordance with DIN EN 10088-1:2014 of corrosion resistance class CRC V in accordance with DIN EN 1993-1-4:2015
	Property class 50, 70 or 80 DIN EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062, 1.4662, 1.4462; DIN EN 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 12\%$ fracture elongation	Property class 50 or 80 DIN EN ISO 3506-1:2009 or property class 70 with $f_{yk} = 560 \text{ N/mm}^2$ 1.4565; 1.4529; DIN EN 10088-1:2014 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 12\%$ fracture elongation
Anchor rod	Fracture elongation $A_5 > 8\%$ , for applications without requirements for seismic performance category C2 <sup>1)</sup>	
Washer ISO 7089:2000	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; DIN EN 10088-1:2014	1.4565; 1.4529; DIN EN 10088-1:2014
Hexagon nut	Property class 50, 70 or 80 DIN EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; DIN EN 10088-1:2014	Property class 50, 70 or 80 DIN EN ISO 3506-1:2009 1.4565; 1.4529 DIN EN 10088-1:2014
fischer internal threaded anchor RG MI	Property class 70 DIN EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; DIN EN 10088-1:2014	Property class 70 DIN EN ISO 3506-1:2009 1.4565; 1.4529; DIN EN 10088-1:2014
Commercial standard screw or threaded rod for fischer internal threaded anchor RG MI	Property class 70 DIN EN ISO 3506-1:2009 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; DIN EN 10088-1:2014 $A_5 > 8\%$ fracture elongation	Property class 70 DIN EN ISO 3506-1:2009 1.4565; 1.4529; DIN EN 10088-1:2014 $A_5 > 8\%$ fracture elongation
fischer filling disc similar to DIN 6319-G	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; DIN EN 10088-1:2014	1.4565; 1.4529; DIN EN 10088-1:2014
fischer rebar anchor FRA	Rebar part: Bars and de-coiled rods class B or C with $f_{yk}$ and $k$ in accordance with NDP or NCL of DIN EN 1992-1-1:2004 + AC:2010 $f_{uk} = f_{tk} = k \cdot f_{yk}$	Threaded part: Property class 70 or 80 DIN EN ISO 3506-1:2009 1.4401, 1.4404, 1.4571, 1.4578, 1.4439, 1.4362, 1.4062 in accordance with DIN EN 10088-1:2014 of corrosion resistance class CRC III in accordance with DIN EN 1993-1-4:2015 1.4565; 1.4529, in accordance with DIN EN 10088-1:2014 of corrosion resistance class CRC V in accordance with DIN EN 1993-1-4:2015
Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities		
Permitted materials based on ETA-17/0979 of 17 June 2020, Table A6.	Annex 4	

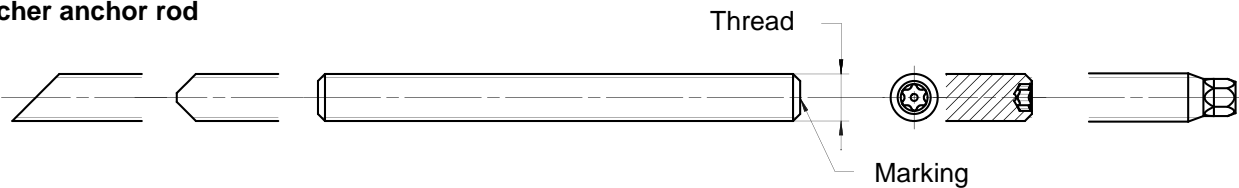
<sup>1)</sup> see ETA-17/0979; use and performance categories are subject to the provisions of ETA-17/0979, issued on 17 June 2020.

Installation parameters for **fischer anchor rods** based on ETA-17/0979 of 17 June 2020, Table B3.1

Anchor rods		Thread	M8	M10	M12	M14	M16	M20	M22	M24	M27	M30	
Width across flats	SW	mm	13	17	19	22	24	30	32	36	41	46	
Nominal drill hole diameter	$d_0$		10	12	14	16	18	22 24 <sup>1)</sup>	25	28	30	35	
Drill hole depth	$h_0$		$h_0 = h_{ef}$										
Effective embedment depth	$h_{ef, min}$		60	60	70	75	80	90	93	96	108	120	
	$h_{ef, max}$		160	200	240	280	320	400	440	480	540	600	
Diameter of clearance hole in the fixture	pre-positioned installation $d_f$		9	12	14	16	18	22	24	26	30	33	
	push-through installation $d_f$		12	14	16	18	20	26	28	30	33	40	
Minimum thickness of concrete member	$h_{min}$		$h_{ef} + 50$							$h_{ef} + 2d_0$			
Maximum installation torque	$\max T_{inst}$		Nm	10	20	40	50	60	120	135	150	200	300

<sup>1)</sup> Both nominal drill hole diameters are possible

**fischer anchor rod**



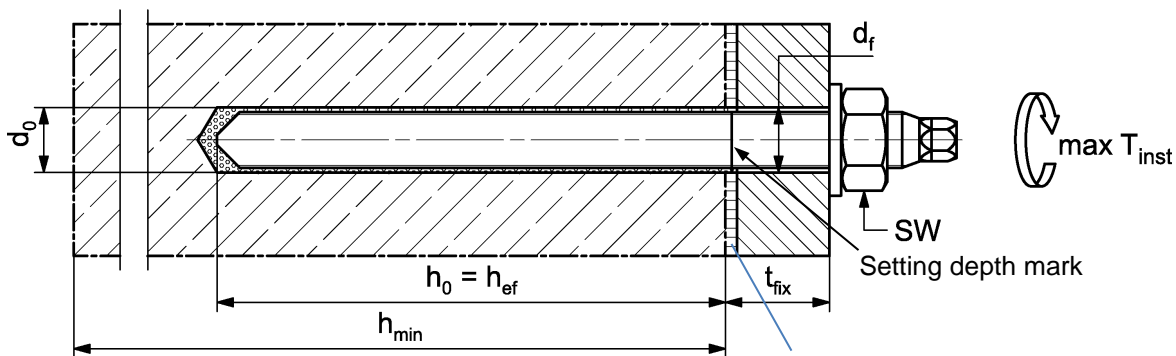
**Marking (any place) fischer anchor rod:**

High corrosion-resistant steel HCR PC <sup>1)</sup> 50	•	High corrosion-resistant steel HCR	-
High corrosion-resistant steel HCR PC 80	(	Stainless steel R PC 50	~
Stainless steel R PC 80	*		

Alternatively: Colour coding in accordance with DIN 976-1:2016

<sup>1)</sup> PC = property class

**Installation conditions:**



'StoCretec WHG System 2' in accordance with decision no. Z-59.12-311

Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities

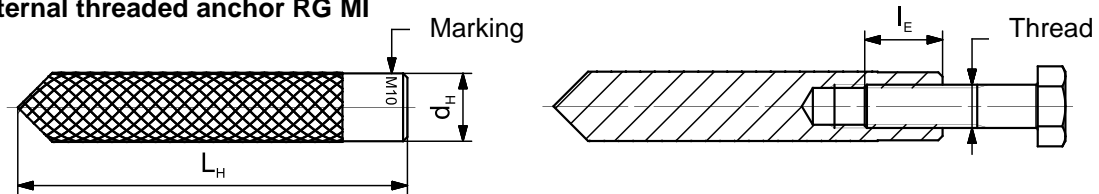
Installation parameters for **fischer anchor rods** based on ETA-17/0979 of 17 June 2020, Table B3.1

Annex 5

Installation parameters for **fischer internal threaded anchor RG MI** based on ETA-17/0979 of 17 June 2020, Table B6.1

Internal threaded anchor RG MI		Thread	M8	M10	M12	M16	M20
Diameter of anchor	$d_{nom} = d_H$	mm	12	16	18	22	28
Nominal drill hole diameter	$d_0$		14	18	20	24	32
Drill hole depth	$h_0$		$h_0 = h_{ef} = L_H$				
Effective embedment depth ( $h_{ef} = L_H$ )	$h_{ef}$		90	90	125	160	200
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$		55	65	75	95	125
Diameter of clearance hole in the fixture	$d_f$		9	12	14	18	22
Minimum thickness of concrete member	$h_{min}$		140	140	175	210	260
Maximum screw-in depth	$l_{E,max}$		18	23	26	35	45
Minimum screw-in depth	$l_{E,min}$	8	10	12	16	20	
Maximum installation torque	$\max T_{inst}$	Nm	10	20	40	80	120

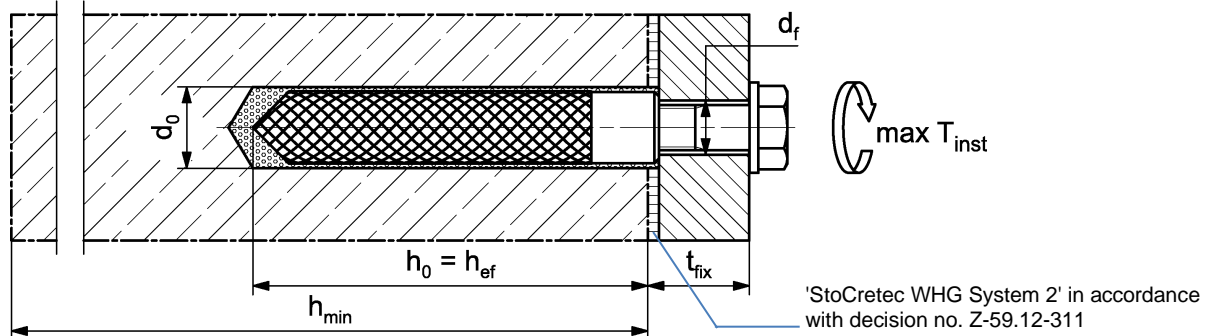
**fischer internal threaded anchor RG MI**



**Marking:** Anchor size, e.g.: **M10**  
Stainless steel → in addition **R**; e.g.: **M10 R**  
High corrosion-resistant steel → in addition **HCR**; e.g.: **M10 HCR**

Retaining bolt or threaded rods (including nut and washer) shall comply with the associated materials and property classes in accordance with **Annex 4**

**Installation conditions:**



Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities

Installation parameters for **fischer internal threaded anchor RG MI** based on ETA-17/0979 of 17 June 2020, Table B6.1

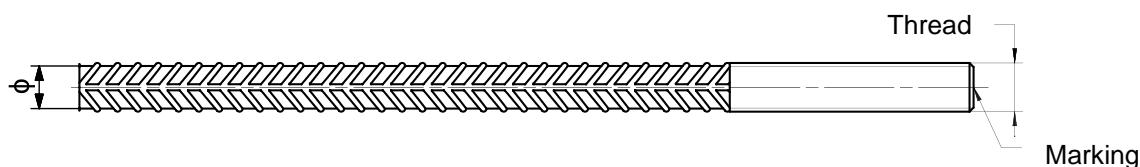
Annex 6

Installation parameters for **fischer rebar anchor FRA** based on ETA-17/0979 of 17 June 2020, Table B8.1

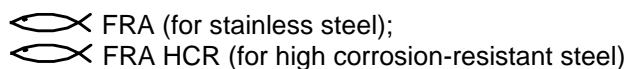
Rebar anchor FRA		Thread	M12 <sup>1)</sup>	M16	M20	M24	
Nominal diameter of the bar	$\phi$	mm	12	16	20	25	
Width across flats	SW		19	24	30	36	
Nominal drill hole diameter	$d_0$		14	16	20	25	30
Drill hole depth	$h_0$		$h_{ef} + l_e$				
Effective embedment depth	$h_{ef,min}$		70	80	90	96	
	$h_{ef,max}$		140	220	300	380	
Distance concrete surface to welded joint	$l_e$		100				
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$		55	65	85	105	
Diameter of clearance hole in the fixture	pre-positioned installation $\leq d_f$		14	18	22	26	
	push-through installation $\leq d_f$		18	22	26	32	
Minimum thickness of concrete member	$h_{min}$	$h_0 + 50$		$h_0 + 2d_0$			
Maximum installation torque	$\max T_{inst}$	Nm	40	60	120	150	

<sup>1)</sup> Both drill hole diameters can be used.

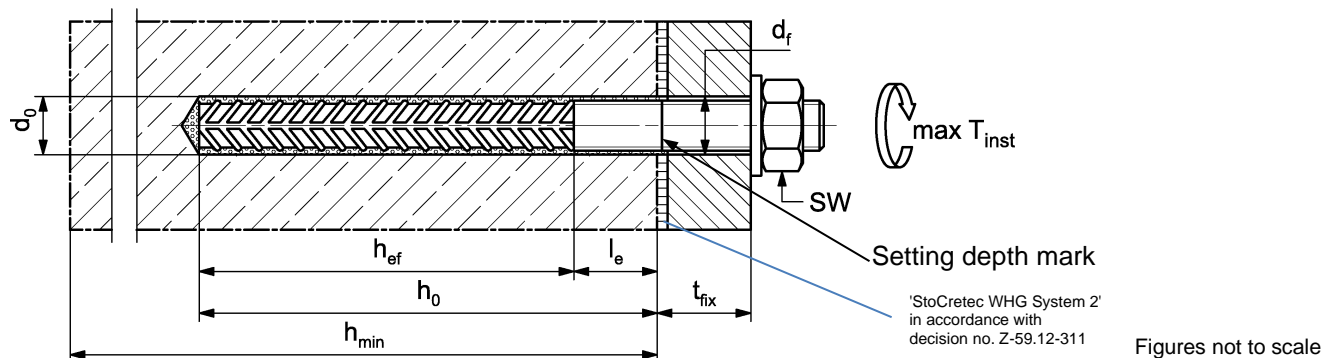
**fischer rebar anchor FRA**



Marking front e.g.:



**Installation conditions:**



Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities

Installation parameters for **fischer rebar anchor FRA** based on ETA-17/0979 of 17 June 2020, Table B8.1

Annex 7

Seq. no.	<b>Confirmation of the executing company</b>			
1	Project - Name:..... - Size: .....			
2	Stored substance(s): .....			
3	Fastening system	Fastening system <b>"fischer Injection system FIS EM Plus"</b> for use on concrete surfaces coated with StoCretec WHG System 2 (Z-59.12-311) in SFH facilities		
4a	Decision:	Z-74.8-211 of <b>30 August 2022</b>		
4b	Batch number and expiration date:			
5a	Applicant:	fischerwerke GmbH & Co. KG Otto-Hahn-Straße 15, 79211 Denzlingen, Germany Telephone: +49 (0) 7443 12-0		
5b	Executing company (in accordance with AwSV provisions) .....			
5c	Construction period: .....			
6	The specialised staff of the executing company have received training by the applicant of the above-mentioned decision on proper processing.	Confirmation provided yes / no		
7	<b>Assessments and checks to be carried out before and during installation of the fastening system</b>			
	a) Before installation ( <i>cross out response that does not apply</i> )			
	- Is this an existing facility?	yes / no		
	- Substrate, coated with 'StoCretec WHG System 2' in accordance with Z-59.12-311, complies with requirements and has been greenlighted?	yes / no		
	- What fasteners were used?	(Anchor rod / internal threaded anchor / rebar anchor)		
	- Specify steel grade (material number):	.....		
	- Borehole produced with hollow drill (HO) / hammer drill (HA) / diamond drill (DD)?	HO / HA / DD		
	- Pre-positioned installation (V) / push-through installation (D)	V / D		
	- Are the fasteners oil-free and clean?	yes / no		
	- Surface temperature / material temperature in °C:	...../.....		
	- System components in accordance with decision?	yes / no		
	- All components marked in accordance with decision?	yes / no		
	b) During and after installation:			
	- Have boreholes been cleaned in accordance with Section 2.2.2(4)?	yes / no		
	- Has excess mortar been wiped off at all fastening points in the non-hardened state?	yes / no		
	- Were there any aborted holes?	yes / no		
	- If so, were they sealed properly?	yes / no		
	- Visual inspection (cross out response that does not apply)	<table border="1" style="display: inline-table; margin-right: 20px;"> <tr> <td style="padding: 5px;">Nothing to report</td> </tr> </table> <table border="1" style="display: inline-table;"> <tr> <td style="padding: 5px;">Irregularities to report (see remarks)</td> </tr> </table>	Nothing to report	Irregularities to report (see remarks)
Nothing to report				
Irregularities to report (see remarks)				
Remarks:				
Date: .....	Signature / Company stamp			
Fastening system 'fischer injection system FIS EM Plus' for use in coated concrete surfaces in SFH facilities		Annex 8		
Confirmation of the executing company – TEMPLATE				