



ETA-Danmark A/S
Göteborg Plads 1
DK-21590 Nordhavn
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet www.etadanmark.dk

Authorised and notified according
to Article 29 of the Regulation (EU)
No 305/2011 of the European
Parliament and of the Council of 9
March 2011

MEMBER OF EOTA



European Technical Assessment ETA-15/0255 of 2021/01/05

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:

Chemfix 10 bonded anchor for post-installed rebar connections

Product family to which the above construction product belongs:

Post-installed rebar connections of sizes 8 to 20 mm with Chemfix 10 injection mortar

Manufacturer:

Chemfix Products Ltd
Mill Street East
Dewsbury
West Yorkshire
WF12 9BQ, UK
Tel. +44 (0) 1924 453886
Fax +44 (0) 1924 431658
Internet www.chemfix.co.uk

Manufacturing plant:

Chemfix Products Ltd
Mill Street East
Dewsbury
West Yorkshire
WF12 9BQ, UK

This European Technical Assessment contains:

16 pages including 11 annexes which form an integral part of the document

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:

EAD 330087-00-0601, Systems for post-installed rebar connections with mortar

This version replaces:

The ETA with the same number issued 2016-01-04

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (except the confidential Annexes referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

The subject of this assessment are the post-installed connections, by anchoring or overlap connection joint consisting of steel reinforcing bars (rebars) in existing structures made of normal weight concrete, using injection mortar Chemfix 10 in accordance with the regulations for reinforced concrete construction. The design of the post-installed rebar connections shall be done in accordance with EN 1992-1-1 (Eurocode 2).

Reinforcing bars with diameters from 8 to 20 mm and Chemfix 10 injection mortar according to Annex A3 are used for the post-installed rebar connections covered by this ETA. The steel element is placed into a drilled hole previously injected with a mortar and is anchored by the bond between embedded element, injection mortar and concrete.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation¹ of this European Technical Assessment.

The product description is given in Annex A.

2 Specification of the intended use in accordance with the applicable EAD

The post-installed rebar connections may be used in normal weight concrete of a minimum grade C12/15 and maximum grade C50/60 according to EN 206-1. They may be used in non-carbonated concrete with the allowable chloride content of 0,40 % (Cl 0,40) related to the cement content according to EN 206-1

The rebar connections may be used for predominantly static loads.

Fatigue, dynamic or seismic loading of post-installed rebar connections are not covered by this ETA.

The fire resistance of the post-installed rebar connections is not covered by this ETA.

The rebar connections may only be carried out in the manner, which is also possible with reinforcing bars, e.g. those in the following applications:

- an overlapping joint with existing reinforcement in a building component (Figures 1 and 2, Annex A1),
- anchoring of the reinforcement at a slab or beam support (Figure 3, Annex A1; end support of a slab, designed as simply supported, as well as appropriate reinforcement for restraint forces),
- anchoring of reinforcement of building components stressed primarily in compression (Figure 4, Annex A1),
- anchoring of reinforcement to cover the line of acting tensile force (Figure 5, Annex A1).

The post-installed rebar connections may be used in dry or wet concrete and it must not be installed in flooded holes. The post-installed rebar connections may be used overhead.

The post-installed rebar connections may be used in the temperature range -40°C to +40°C (max short term temperature + 40 °C and max long term temperature + 24 °C).

This ETA covers anchoring in bore holes made with hammer drilling.

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B1 to B7

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.

¹ The technical documentation of this European Technical Assessment is deposited at ETA-Danmark and, as far as relevant for the tasks of the Notified bodies involved in the attestation of conformity procedure, is handed over to the notified bodies.

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

3.1 Characteristics of product

Mechanical resistance and stability (BWR1):

The essential characteristics are detailed in the Annex C1.

Safety in case of fire (BWR2):

Reaction to fire: Rebar connections satisfy requirements for Class A1.

Resistance to fire: No performance assessed

Hygiene, health and the environment (BWR3):

No performance assessed

Safety in use (BWR4):

For basic requirement Safety in use the same criteria are valid for Basic Requirement Mechanical resistance and stability (BWR1).

Other Basic Requirements are not relevant.

3.2 Methods of assessment

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 has been made in accordance with EAD 330087-00-0601, Systems for post-installed rebar connections with mortar

4 Assessment and verification of constancy of performance (AVCP)

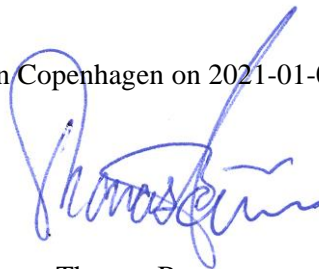
4.1 AVCP system

According to the decision 96/582/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 1.

5 Technical details necessary for the implementation of the AVCP system, as foreseen 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

Issued in Copenhagen on 2021-01-05 by



Thomas Bruun
Managing Director, ETA-Danmark

Examples of use for rebars

Figure 1: Overlapping joint for rebar connections of slabs and beams

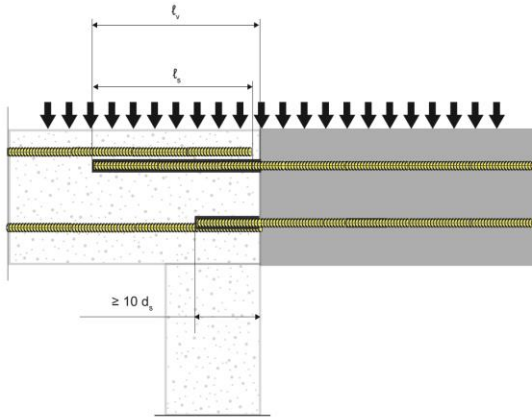


Figure 2: Overlapping joint at a foundation of a wall or column where the rebars are stressed in tension

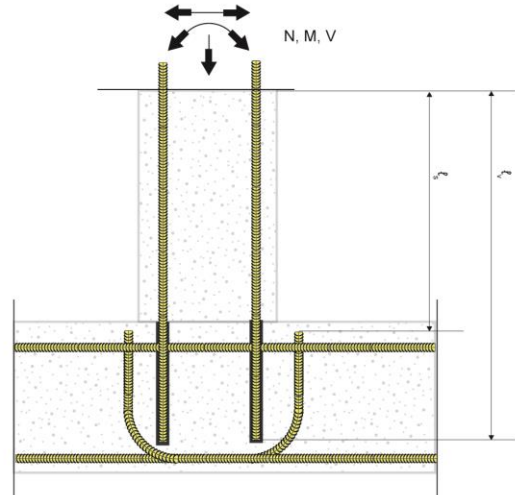


Figure 3: End anchoring of slabs or beams, designed as simply supported

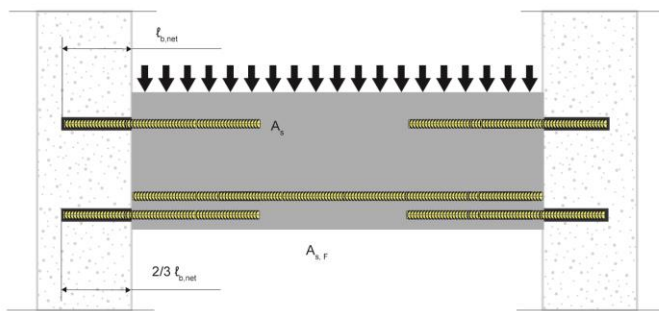


Figure 4: Rebar connection for components stressed primarily in compression. The rebars are stressed in compression.

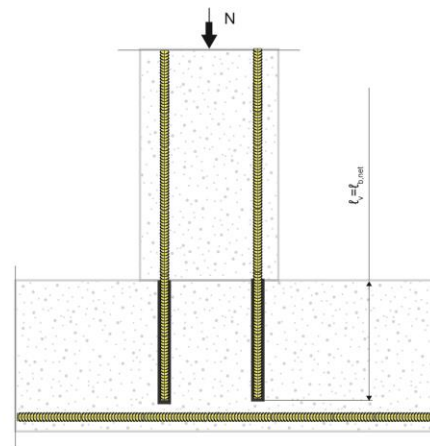
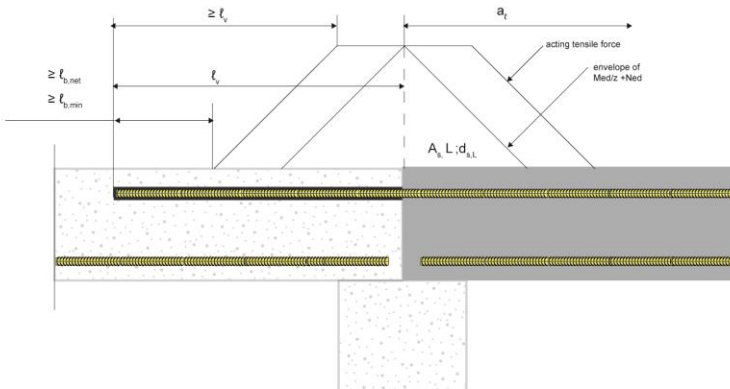


Figure 5: Anchoring of reinforcement to cover the line of acting tensile force.



Note to Figure 1 to 5:
In the figures no transverse reinforcement is plotted, the transverse reinforcement as required by EN 1992-1-1 shall be present.

The shear transfer between old and new concrete shall be designed according to EN 1992-1-1

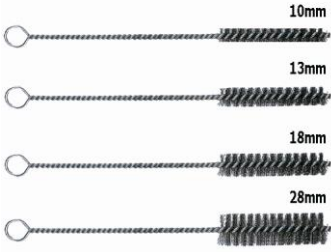

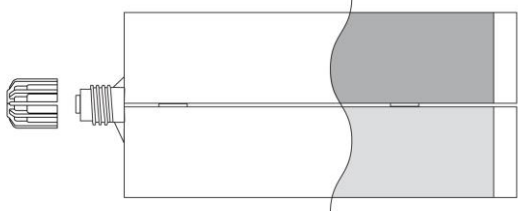

General rules for construction and design compare Annex 4

Chemfix 10 for post-installed rebar connection

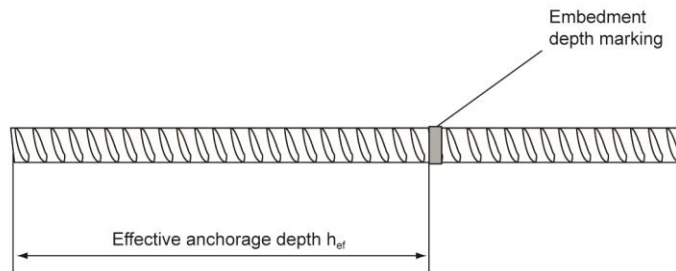
Use of the product

Annex A1
of European
Technical Assessment
ETA-15/0255

Injection system Chemfix 10

<p>Hole Cleaning Brush</p>	 <p>10mm 13mm 18mm 28mm</p>
<p>Push Pump</p>	 <p>190mm 280mm 400mm</p>
<p>Injection Mortar : Chemfix 10 1:1 Resin System A) 400ml, 600ml and 1500ml Cartridge System</p>	
<p>Mixer</p>	

<p>Chemfix 10 for post-installed rebar connection</p>	<p>Annex A2 of European Technical Assessment ETA-15/0255</p>
<p>Product description</p>	

Properties of reinforcement**Rebar**

Diameter Ø 8mm, Ø 10mm, Ø 12mm, Ø 14mm, Ø 16mm, Ø 20mm

Table A1: Abstract of EN 1992-1-1 Annex C Table C.1 Properties of reinforcement

Product form		Bars and de-coiled rods	
Class		B	C
Characteristic yield strength f_{yk} or $f_{0,2k}$ (N/mm ²)		400 to 600	
Minimum value of $k = (f_t / f_y)_k$		$\geq 1,08$	$\geq 1,15$ < 1,35
Characteristic strain at maximum force, ε_{uk} (%)		$\geq 5,0$	$\geq 7,5$
Bendability		Bend / Rebend test	
Maximum deviation from nominal mass (individual bar) (%)	Nominal bar size (mm)		
	≤ 8	$\pm 6,0$	
	> 8	$\pm 4,5$	
Bond: Minimum relative rib area, $f_{R,min}$ (determination according to EN 15630)	Nominal bar size (mm)		
	8 to 12	0,040	
	> 12	0,056	

Rib height h_{rib} of the rebar shall be in the range $0,05d \geq h_{rib} \geq 0,07d$
(d: Nominal diameter of the rebar)

Table A2: Injection mortar

Product	Composition
Chemfix 10 two components injection mortar	Additive: quartz Bonding agent: epoxy resin

Chemfix 10 for post-installed rebar connection

Materials

Annex A3
of European
Technical Assessment
ETA-15/0255

Specification of intended use

Anchorage subject to:

- Static and quasi-static loads.

Base materials:

- Reinforced or unreinforced normal weight concrete of strength class C12/15 at minimum to C50/60 at maximum according to EN 206-1.
- Maximum chloride content of 0,40% (CL 0,40) related to the cement content according to EN 206-1.
- Non-carbonated concrete.

Note: In case of a carbonated surface of the existing concrete structure the carbonate layer shall be removed in the area of the post-installed rebar connection with a diameter of $d_s + 60$ mm prior to the installation of the new rebar. The depth of concrete to be removed shall correspond to at least the minimum concrete cover according to EN 1992-1-1. The above may be neglected if building components are new and not carbonated and if building components are in dry conditions.

Temperature range:

- The anchors may be used in the following temperature range:
-40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C).

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions.

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking into account of the forces to be transmitted.
- Design according to EN 1992-1-1 and Annex B2.
- The actual position of the reinforcement in the existing structure shall be determined on the basis of the construction documentation and taken into account when designing.

Installation:

- Dry or wet concrete (use category 1).
- It must not be installed in flooded holes.
- Overhead installation is permissible.
- Hole drilling by hammer drill and diamond drilling machine (dry and wet cutting system).
- Installation of the post-installed rebars shall be done only by suitable trained installer and under supervision on the site.
- Check the position of the existing rebars (if the position of existing rebars in not known it shall be determined using a rebar detector suitable for this purpose as well as on the basis of the construction documentation and then marked on the building component for the overlap joint).

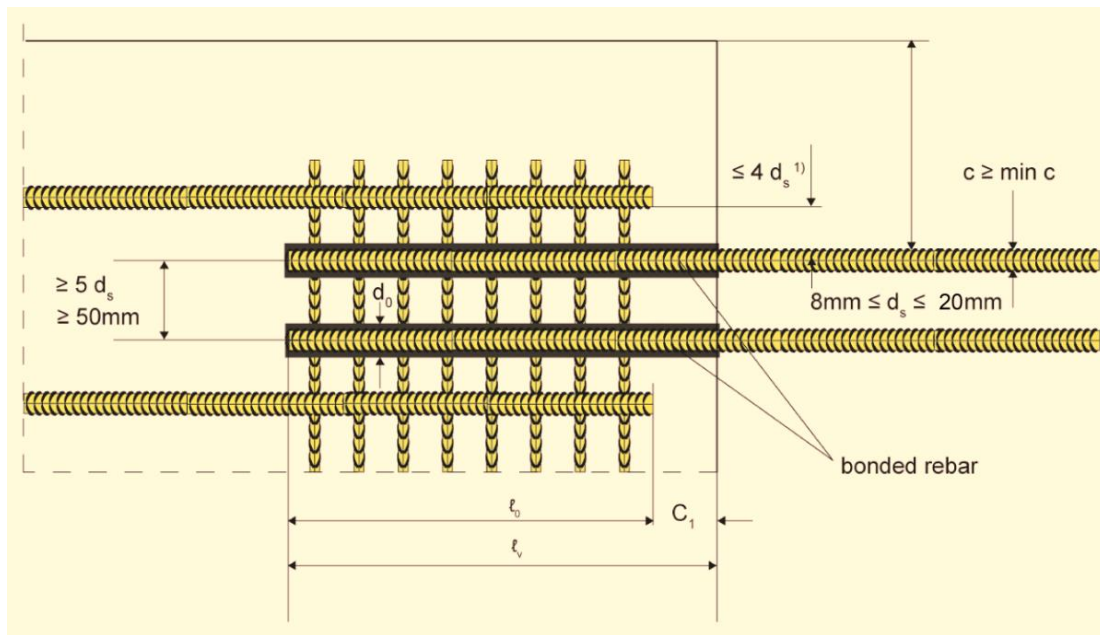
Chemfix 10 for post-installed rebar connection	Annex B1 of European Technical Assessment ETA-15/0255
Intended use - Specification	

General design rules of construction for post-installed rebars

Only tension forces in the axis of the rebar may be transmitted.

The transfer of shear forces between new concrete and existing structure shall be designed additionally according to EN 1992-1-1.

The joints for concreting must be roughened to at least such an extent that aggregate protrude.



¹⁾ If the clear distance between overlapping rebars is greater than $4 \cdot \emptyset$ the overlap length shall be enlarged by the difference between the clear distance and $4 \cdot \emptyset$.

l_0 – lap length acc. to EN 1992-1-1, clause 8.7.3

l_v – effective embedment depth; $l_v \geq l_0 + c_1$

c – concrete cover of post-installed rebar

c_{\min} – minimum concrete cover acc. to Annex B3 and EN 1992-1-1, clause 4.4.1.2.

c_1 – concrete cover at end-face of existing rebar

d_0 – nominal drill bit diameter acc. to Annex B3

\emptyset – rebar diameter (d_s)

Chemfix 10 for post-installed rebar connection

Intended use. General construction rules for post-installed rebars

Annex B2

of European
Technical Assessment
ETA-15/0255

Table B1: Drill bit diameter and setting depth

Rebar Diameter			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20
Diameter of element	D	[mm]	8	10	12	14	16	20
Nominal diameter of drill bit	d _o	[mm]	10-12*	12-14*	14-16*	18	20	25

* Both given values for drill diameter can be used

Height of the rebar rib h_{rib}:

The height of the rebar rib h_{rib} shall fulfil the following requirement: $0,05 \cdot d \leq h_{rib} \leq 0,07 \cdot d$
with: d = nominal diameter of the rebar element.

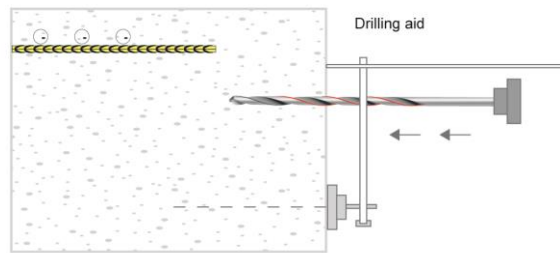


Table B2: Minimum concrete cover min c of bonded-in rebar depending on drilling method

Drilling method	Rebar diameter	Without drilling aid	With drilling aid
Hammer drilling	< 25mm	30mm + 0.06 · ℓ _v ≥ 2d _s	30mm + 0.02 · ℓ _v ≥ 2d _s

The minimum concrete cover must be observed according to EN 1992-1-1:2004

Table B3: Minimum anchorage length¹⁾, lap splice length and maximum installation length l_{max}

The calculation is performed according to EN 1992-1-1:2004. The minimum anchorage length l_{b,min} (8.6) and the minimum lap length l_{0,min} (8.11) shall be multiplied by a factor according to Table B3. The maximum installation length l_{max} is equal to 800 mm for all rebar diameters.

Concrete class	Factor
C12/15 to C50/60	1,5

¹⁾ according to EN 1992-1-1:2004: l_{b,min} (8.6) and l_{0,min} (8.11) for good bond conditions and a₆ = 1.0 with maximum yeild stress for rebar B500 B and y_M = 1.15.

Chemfix 10 for post-installed rebar connection	Annex B3 of European Technical Assessment ETA-15/0255
Installation data	

Table B4: Minimum curing time

Temperature in the concrete member	Minimum gelling time in dry concrete (100g mass) (mins)	Minimum gelling time in dry concrete (45g mass) (mins)
≥ -5 - 0°C	25	38
≥ +0 - 5°C	17	27
≥ +10 - 20°C	12	20

Note: for a value of installation temperature lower than 10°C the maximum installation length is limited to 350 mm

Chemfix 10 for post-installed rebar connection	Annex B4 of European Technical Assessment ETA-15/0255
Curing time	

Manual Cleaning (MAC):

Chemfix hand pump recommended for Blowing out bore holes with diameters $d_o \leq 18$ mm and bore holes depth $h_o \leq 10d$






Compressed air cleaning (CAC):

Recommended air nozzle with an Orifice opening of minimum 3,5mm in diameter.



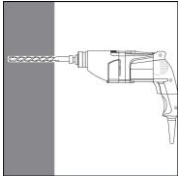
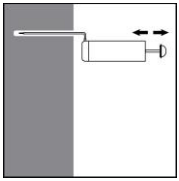
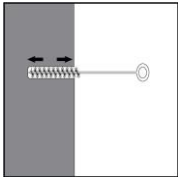
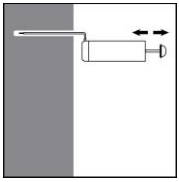
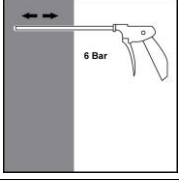
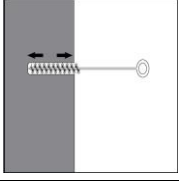
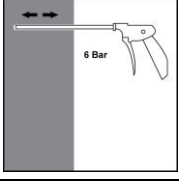
Table B5: Bore hole cleaning: Steel brush

Element	Size	Nominal drill bit diameter d_o (mm)	Steel Brush	Cleaning methods	
				Manual cleaning (MAC)	Compressed air cleaning (CAC)
					
Rebar 	Ø8	10 to 12	10mm	Yes ... $h_{ef} \leq 80$ mm	Yes
	Ø10	12 to 14	10mm	Yes ... $h_{ef} \leq 100$ mm	Yes
	Ø12	14 to 16	13mm	Yes ... $h_{ef} \leq 120$ mm	Yes
	Ø14	18	18mm	Yes ... $h_{ef} \leq 140$ mm	Yes
	Ø16	20	18mm	No	Yes
	Ø20	25	28mm	No	No

Chemfix 10 for post-installed rebar connection

Cleaning tools

Annex B5
of European
Technical Assessment
ETA-15/0255

Instructions for use	
Bore hole drilling	
	Drill hole to the required embedment depth with a hammer drill set in rotation-hammer mode using an appropriately sized carbide drill bit.
Bore hole cleaning Just before setting an anchor, the bore hole must be free of dust and debris.	
a) Manual air cleaning (MAC) for bore hole diameters $d_o \leq 18\text{mm}$ and bore hole depth $h_o \leq 10d$	
 X 4	The Chemfix manual pump may be used for blowing out bore holes up to diameters $d_o \leq 18\text{mm}$ and embedment depths up to $h_{ef} \leq 10d$. Blow out at least 4 times from the back of the bore hole until return air stream is free of noticeable dust.
 X 4	Brush 4 times with the specified brush size (brush $\varnothing \geq$ bore hole \varnothing , see Table 6) by inserting the Chemfix steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole. If not, the brush is too small and must be replaced with the proper brush diameter.
 X 4	Blow out again with manual pump at least 4 times until return air stream is free from noticeable dust.
b) Compressed air cleaning (CAC) for all bore hole diameters d_o and all bore hole depth h_o	
 X 2	Blow 2 times from the back of the hole (if needed with a nozzle extension) over the hole length with oil-free compressed air (min. 6 bar at $6\text{m}^3/\text{h}$) until return air stream is free from noticeable dust.
 X 2	Brush 2 times with the specified brush size (brush $\varnothing \geq$ bore hole \varnothing , see Table 6) by inserting the Chemfix steel brush to the back of the hole (if needed with an extension) in a twisting motion and removing it. The brush must produce natural resistance as it enters the bore hole. If not, the brush is too small and must be replaced with the proper brush diameter.
 X 2	Blow out again with compressed air at least 2 times until return air stream is free from noticeable dust.
Chemfix 10 for post-installed rebar connection	Annex B6
Instruction for use	of European Technical Assessment ETA-15/0255

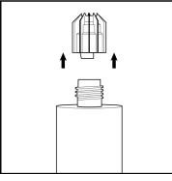
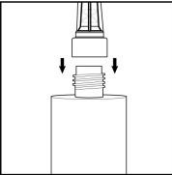
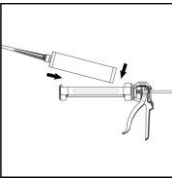
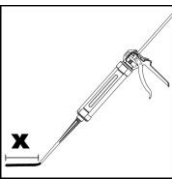
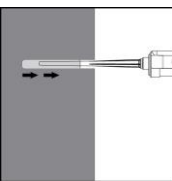
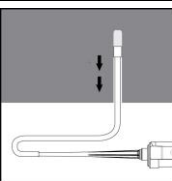
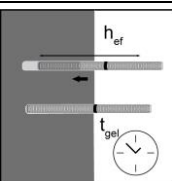
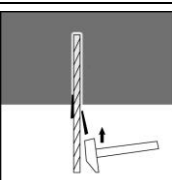
Instructions for use	
Injection of the mortar and bar installation	
	Remove the threaded cap from the cartridge without cutting.
	Tightly attach the supplied mixing nozzle. Do not modify the mixer in any way. Make sure the mixing element is inside the mixer. Use only the supplied mixer with the adhesive.
	Insert the cartridge into the Chemfix dispenser. Press the release trigger to retract the plunger and insert the cartridge neatly into the cradle without any distortion.
	Discard the initial trigger pulls of adhesive. Resin will flow from the cartridge as soon as dispensing is initiated. Depending on the size of the cartridge, an initial amount of adhesive mix must be discarded. Discard quantities are - 10cm for all sizes
	Inject the adhesive starting at the back of the hole, slowly withdrawing the mixer with each trigger pull. Fill holes approximately 2/3 full, or as required to ensure that the annular gap between the anchor and the concrete is completely filled with adhesive along the embedment depth. After injection is completed, depressurize the dispenser by pressing the release trigger. This will prevent further adhesive discharge from the mixer.
	Overhead installation and installation with embedment depth $h_{ef} > 250\text{mm}$ For overhead installation the injection is only possible with the aid of extensions and piston plugs. Assemble mixer, extension(s) and appropriately sized piston plug . Insert piston plug to back of hole and inject adhesive. During injection, the piston plug will be naturally extruded out of the bore hole by the adhesive pressure.
	Before use, verify that the element is dry and free of oil and other contaminants. Mark and set element to the required embedment depth till working time t_{gel} has elapsed. The working time t_{gel} .
	For overhead installation fix embedded parts with e.g. wedges.
Chemfix 10 for post-installed rebar connection	Annex B7 of European Technical Assessment ETA-15/0255
Instruction for use (2)	

Table C1: Design values of the ultimate bond resistance $f_{bd}^{1)}$ in N/mm^2 for all drilling methods for good conditions.

Rebar - Ø	Concrete class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
8 mm	1,6	2	2,3	2,7	3	3,4	3,4	3,7	3,7
10 mm	1,6	2	2,3	2,7	3	3	3	3,4	3,4
12 mm	1,6	2	2,3	2,7	2,7	2,7	2,7	3	3
14 mm	1,6	2	2,3	2,3	2,3	2,7	2,7	2,7	2,7
16 mm	1,6	2	2	2,3	2,3	2,3	2,3	2,3	2,3
20 mm	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6	1,6

1) Tabulated values are for f_{bd} are valid for good bond conditions according to EN 1992-1-1:2004. For all other bond conditions multiply the values for f_{bd} by 0,7.

Chemfix 10 for post-installed rebar connection

Performance for static and quasi-static loads: Resistances

Annex C1
of European
Technical Assessment
ETA-15/0255