



Chemical Anchoring 2024



Chemfix UK
Fix Pro CH+MAX 410 ML
Pure Vinylester Styrene free

Works
Underwater

Re
Rebar

Hi
Load



GOLD



FIXPRO MADE IN THE UK 
CH+MAX
pure vinyl ester
styrene free

CE 1404 Chemfix Products Ltd 2022

DoP: www.chemfix.co.uk/top/CHM
Chemfix CH+ MAX ETA-22/0328 EAD 330499-00-0601 M8-M24 8mm - 25mm Option 1 Un-cracked M8-M24 1404-CPR-3533
CE 1404 Chemfix Products Ltd 2022

DoP: www.chemfix.co.uk/top/CHM
Chemfix CH+ MAX ETA-22/0381 EAD 330076-00-0604 M6 - M12 Masonry 1404-CPR-3534
CE 1404 Chemfix Products Ltd 2022

DoP: www.chemfix.co.uk/top/CHM
Chemfix CH+ MAX 19/0102 EAD 330087-00-0601 8-12mm + Fire Post Installed Rebar 1404-CPR-3134



Chemical Anchoring Injection System

HEALTH AND SAFETY

HANDLING AND STORAGE:
Store in dry conditions away from direct sunlight between +5°C and +25°C.



ENVIRONMENTAL CARE: Please do not dispose of uncured material. If disposing please mix any waste product to its cured state.

410ml e

BATCH CODE / DATE OF EXPIRY

Chemfix Product Limited
Mill Street East Dewsbury
West Yorkshire WF12 9BQ,
United Kingdom
Tel: +44 (0) 1924 453886
Fax: +44 (0) 1924 431658
Emergency +44 (0) 1924 4316279



(A,B)
**Warning
Achtung
Dikkat**

UK: COMP A - Contains: 2,2'-ETHYLENE-DIETHYL DIMETHACRYLATE, METHACRYLIC ACID, MONOMER WITH PROPANE-1,2-DIOL, REACTION MASS OF 2,2'-(4-METHYLPHENYLIMINO)BIS(ETHANOL AND ETHANOL 2-[[2-(2-HYDROXYETHOXYETHYL)](4-METHYLPHENYLAMINO)]-). H317 - May cause an allergic skin reaction, H319 - Causes serious eye irritation, P261 - Avoid breathing dust/fume/gas/mist/vapour/spray, P264 - Wash hands, forearms and face thoroughly after handling, P272 - Contaminated work clothing should not be allowed out of the workplace, P280 - Wear protective clothing, eye protection, face protection, P302+P352 - IF ON SKIN: Wash with plenty of soap and water, P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing, COMP B - Contains: DIBENZOYL PEROXIDE, H317 - May cause an allergic skin reaction, H319 - Causes serious eye irritation, H412 - Harmful to aquatic life with long lasting effects, P261 - Avoid breathing dust/fume/gas/mist/vapour/spray, P264 - Wash hands, forearms and face thoroughly after handling, P272 - Contaminated work clothing should not be allowed out of the workplace, P273 - Avoid release to the environment, P280 - Wear protective clothing, eye protection, face protection, P302+P352 - IF ON SKIN: Wash with plenty of soap and water.

DE: COMP A - Enthält: 2,2'-ETHYLEN-DIÄTHYL-DIMETHACRYLAT, METHACRYLSÄURE, MONOMER MIT PROPAN-1,2-DIOL, REAKTIONSMASSE VON 2,2'-(4-METHYLPHENYLIMINO)BIS(ETHANOL UND ETHANOL 2-[[2-(2-HYDROXYÄTHOXYÄTHYL)](4-METHYLPHENYLAMINO)]-). H317 - Kann allergische Hautreaktionen verursachen, H319 - Verursacht schwere Augenreizung, P261 - Einatmen von Staub/Rauch/Gas/Nebel/Dampf/Aerosol vermeiden, P264 - Nach Gebrauch die Hände, Unterarme und das Gesicht gründlich waschen, P272 - Kontaminierte Arbeitskleidung nicht außerhalb des Arbeitsplatzes tragen, P280 - Schutzkleidung, Augenschutz, Gesichtsschutz tragen, P302+P352 - BEI BERÜHRUNG MIT DER HAUT: Mit viel Wasser und Seife waschen, P305+P351+P338 - BEI KONTAKT MIT DEN AUGEN: Einige Minuten lang behutsam mit Wasser spülen. Eventuell vorhandene Kontaktlinsen nach Möglichkeit entfernen. Weiter spülen, COMP B - Enthält: BENZOYLPEROXID, H317 - Kann allergische Hautreaktionen verursachen, H319 - Verursacht schwere Augenreizung, H412 - Schädlich für Wasserorganismen, mit langfristiger Wirkung, P261 - Einatmen von Staub/Rauch/Gas/Nebel/Dampf/Aerosol vermeiden, P264 - Nach Gebrauch die Hände, Unterarme und das Gesicht gründlich waschen, P272 - Kontaminierte Arbeitskleidung nicht außerhalb des Arbeitsplatzes tragen, P273 - Freisetzung in die Umwelt vermeiden, P280 - Schutzkleidung, Augenschutz, Gesichtsschutz tragen, P302+P352 - BEI BERÜHRUNG MIT DER HAUT: Mit viel Wasser und Seife waschen.

TR: COMP A - İçerir: 2,2'-ETİLENE-DIETİL-DİMİTAKRİLAT, METAKRİLİK ASİT, MONOMER İLE PROPAN-1,2-DIOL, REAKSIYON KİTİ 2,2'-(4-METİL-FENİLİMİNO)BİS(ETANOL VE ETANOL 2-[[2-(2-HİDROKSİETİLOKSİETİL)](4-METİL-FENİLİMİNO)]-). H317 - Alerjik cilt reaksiyonlarına yol açabilir, H319 - Ciddi göz tahrişine yol açar, P261 - Tozunu/dumanını/gazını/isi/buharını/bayramı/solumaktan kaçın, P264 - Elleçlemeden sonra elleri, kolları ve yüzü iyice yıkayın, P272 - Kirlenmiş kıyafetleri işyeri dışına çıkarmayın, P280 - Koruyucu kıyafet, göz koruyucu, yüz koruyucu kullanın, P302+P352 - DERİ İLE TEMAS HALİNDE: Su ile bulaşık deriyi dikkatlice durulayın. Takli ve yapması kolayca, kontak lensleri çıkarın. Durulamaya devam edin, COMP B - İçerir: DİBENZİL PEROXİD, H317 - Alerjik cilt reaksiyonlarına yol açabilir, H319 - Ciddi göz tahrişine yol açar, H412 - Sucul ortamda uzun süre kalıcı, zararlı etki, P261 - Tozunu/dumanını/gazını/isi/buharını/bayramı/solumaktan kaçın, P264 - Elleçlemeden sonra elleri, kolları ve yüzü iyice yıkayın, P272 - Kirlenmiş kıyafetleri işyeri dışına çıkarmayın, P273 - Çevreye verilmemesinden kaçın, P280 - koruyucu kıyafet, göz koruyucu, yüz koruyucu kullanın, P302+P352 - DERİ İLE TEMAS HALİNDE: Su ile sabun ve su ile yıkayın.

DESCRIPTION

CH+ anchor mortar is a two-part chemical anchoring system based on a high reactivity vinyl ester resin. ETA approved. Suitable for corrosion resistance and damp applications.

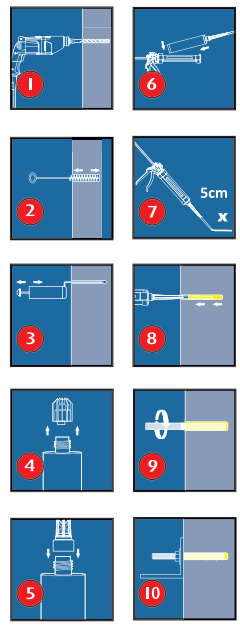
GEL & CURE TIMES

Temp °C	-10*	-5	0	15	25	35
Gel (mins)	50	40	20	9	5	3
Cure (mins)	240	180	90	60	30	20

* resin temp must be 20°C



Thorough hole cleaning prior to installation is vital to the performance of the fixing.



35373K

Friday, April 28, 2023

To Whom it may concern
EGE MAKINE VE TEKNİK LTD
Kurekciler Caddesi No 52/2
Karakoy – Istanbul
Turkey

To Whom it may concern.

Ref:- CHEMFIX CH+ New Improved Version CH+ MAX

This letter is to confirm that Chemfix Products Limited (UK) is the supplier of EGE MAKINE VE TEKNİK LTD, Turkey. The company has supplied EGE MAKINE VE TEKNİK LTD products FIX PRO CHEMICAL ANCHOR RESIN CH+ 410.

Chemfix Products Ltd is a UK manufacturer and is authorized to mark products with the ETA & CE marking by the European Notify Body 1404 – ZAG Dimičeva ulica 12, SI 1000 Ljubljana, Slovenia <http://www.zag.si>

The most recently delivered batch of Chemfix CH+ is batch 1435341d 03/24 is the new improved Chemfix resin, replacement for CH+ called CH+ MAX.

This is signified by the ETA approvals on the side of the labels three types mentioned CH+ MAX.

On this delivery, the product name FIX PRO CH+ has not been updated, however on all future deliveries of this product, the product name shall be FIX PRO CH+ MAX.

Yours sincerely



Urs Joos
Commercial and Marketing Director
Chemfix Products Limited



Certificate of Registration

Chemfix Products Ltd

Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ

Operate a management system that complies with the requirements of

ISO 9001:2015

With the scope:

The development, manufacture and supply of polymer based repair and maintenance compounds, adhesives and surface coatings.

EA Code: 12 & 29

Certificate No. QS 1634

Originally Registered: 6th October 1994

Registered by WQA: 21st December 2006

Re-Certification: 31st December 2026

Latest Issue: 13th December 2023

Signed on behalf of WQA

Validity of this certificate can be checked by contacting:
Worldwide Quality Assurance Ltd
Portland House,
Belmont Business Park,
Durham,
DH1 1TW
www.worldwideqa.com



This certificate remains the property of Worldwide Quality Assurance Ltd and must be returned on request.



Certificate of Registration

Chemfix Products Ltd

Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ

Operate a management system that complies with the requirements of

ISO 14001:2015

With the scope:

The development, manufacture and supply of polymer based repair and maintenance compounds, adhesives and surface coatings.

EA Code: 12 & 29

Certificate No. EMS 2865

Originally Registered: 14th December 2010

Registered by WQA: 14th December 2010

Re-Certification: 31st December 2026

Latest Issue: 13th December 2023


Signed on behalf of WQA

Validity of this certificate can be checked by contacting:
Worldwide Quality Assurance Ltd
Portland House,
Belmont Business Park,
Durham,
DH1 1TW
www.worldwideqa.com



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CH+ MAX

Chemical Anchor RESIN

Styrene Free



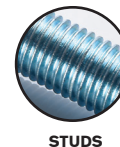
• CARTRIDGE SIZES

165ml | 300ml | 410ml
 345ml | 825ml

A two component chemical anchoring injection system. A formulation derived from vinylester resin with high bond strength, developed principally to anchor threaded rods into concrete. Used widely for medium to high loads in both horizontal and vertical applications.

• CHARACTERISTICS

- Suitable for high loads within standard annulus and embedments.
- Fast working times for early loading in time sensitive applications.
- No styrene allows for use indoors and in enclosed spaces.
- Use in wet or damp environments and fixing holes.
- Good durability formulation, resistance to chemicals.
- Approved for studs or rebar in uncracked concrete also Post Installed Rebar
- 10:1 resin available in a variety of cartridge types.
- Fixings in concrete, wood, or other high strength materials.



• APPROVALS / CERTIFICATIONS / TESTING

- **22/0328** - ETA EAD 330499-00-0601 Threaded Rods **Option 1 cracked.**
- **22/0328** - ETA EAD 330499-00-0601 M8-M24 Threaded Rods 8-25mm Rebar Option 7.
- **22/0381** - ETA EAD 330076-00-0804 M6-M12 Hollow Wall / Masonry Installations.
- **19/0102** - ETA EAD EAD 330087-00-0601 - Post-Installed Rebar 8-12mm.
- CE Certified 1404-CPR-TBA - ZAG, Slovenia.
- Fire Approval in ETA
- WRAS Approved for use with Potable drinking water* approval no. 1810574
- LEED tested 2009 EQ c4.1 SCAQMD rule 1168 (2005.)
- VOC A+ Rating (Volatile Organic Content)



• PHYSICAL PROPERTIES

- Mixed Colour - Grey
- Density - 1.56 kg/m³
- Compressive Strength - 40.7 (MPa) (EN ISO 604)
- Tensile Strength - 7 N/mm² (EN ISO 527)
- Flexural Strength - 16.6 N/mm² (EN ISO 178)



• TYPICAL TENSILE PERFORMANCE - STANDARD EMBEDMENT DEPTH

Concrete, C20/25, 5.8 Grade Studding						
Size	Recommended Load (kN)		Spacing (S _{cr,N}) (mm)	Drill Hole Ø (mm)	Fixing Hole Ø (mm)	Setting Depth (mm)
	Tension (N _{rec})	Shear (V _{rec})				
M8	9.07	5.14	160	10	9	80
M10	14.02	8.57	200	12	12	90
M12	19.71	12.00	240	14	14	110
M16	29.92	22.29	320	18	18	125
M20	48.75	34.86	400	22	22	170
M24	69.12	50.29	480	28	26	210
M30	94.25	81.43	560	35	32	280

CH+ MAX

Chemical Anchor RESIN Styrene Free

• TYPICAL PERFORMANCE IN AERATED CONCRETE

Characteristic values of resistance under tension & shear loads for Autoclaved Aerated Concrete. Compressive strength of material $f_b > 6\text{MPa}$ Temp range -40 to $+40$ C degree. Vinylester ECO.

Size	Condition :	d/d	w/w & w/d	d/d, w/w & w/d
	H _{ef} (mm)	Tension (kN)	Tension (kN)	Shear (kN)
M8	80	2	1.5	5
M10	90	3	2.5	8
M12	100	4	3.5	8
M16	100	5.5	4.5	8

*Note: The values are valid for steel 5.6 or greater. For steel 4.6 and 4.8 multiply VR_{k,b} by 0,8

• CHARACTERISTIC LOADS FOR HOLLOW MASONRY

Category c: Hollow Masonry, Doppio UNI (12.12.25) Bulk density class $p=0.9\text{ kg/dm}^3$ Minimum compressive strength $f_b=6.0\text{ MPa}$

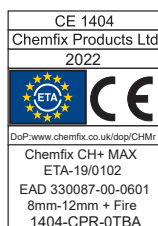
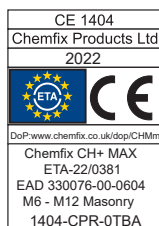
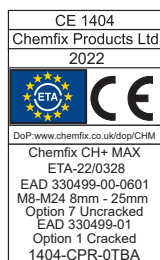
Size	Installation Parameters					Loads	
	d Anchor Rod \varnothing d ₀ Drill Hole \varnothing (mm)	Sleeve Type	Max. \varnothing Hole in Fixture d _{fix} (mm)	Drill Depth h ₁ (mm)	Installation Torque Moment T _{inst}	Tension N _{rk} (kN)	Shear V _{rk} (kN)
M6	6 / 12	12 x 80	7	85	2	0.75	1.5
M8	8 / 12	12 x 80	9	85	2	0.75	1.5
M10	10 / 16	16 x 85	12	90	2	1.5	1.5
M12	12 / 16	16 x 85	14	90	2	1.5	1.5

• WORKING AND HARDENING TIMES

Base Material Temperature	-10°C**	-5°C**	5°C	15°C	25°C	35°C
Gel Working Time	50'	40'	20'	9'	5'	3'
Curing Time Dry Concrete	240'	180'	90'	60'	30'	20'
Curing Time Wet Concrete	x 2	x 2	x 2	x 2	x 2	x 2

**Resin Temperature must be at least 20°C

• APPROVALS

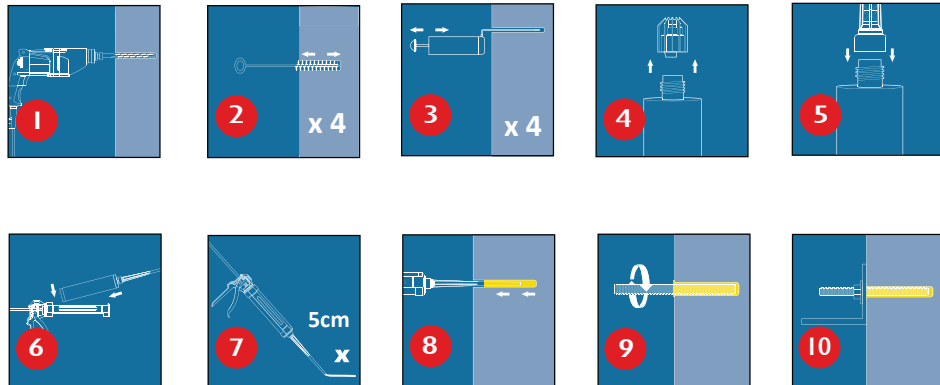


CH+ MAX

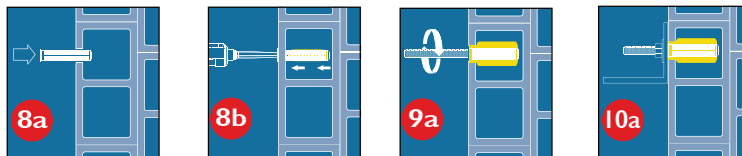
Chemical Anchor RESIN Styrene Free

• INSTALLATION

Solid substrates



Hollow wall



For further information, refer to the technical data sheet.

• STORAGE / SHELF

This product should be stored between +5°C & +25°C.

Avoid Direct Sunlight

The Shelf life of the product is 18 months from the manufacture date.

Features and Benefits

Version 18/05/2022

- High bond strength with High load resistance
- Used with all grades of threaded rod and rebar in accordance with TR029
- Used in non-cracked and cracked concrete
- Fast gelling and curing
- Used in dry and wet concrete and flooded holes
- Used in critical or overhead applications
- Used in corrosive environments
- ETA tested based on life of anchor 50 years
- Used for post installed rebar installations under TR029 and TR023
- Used for solid and hollow masonry
- Low shrinkage enables large diameter installations
- Close edge distance and small spacing
- Manual cleaning up to 20mm diameter and embedment depths of 240mm
- Independently tested and approved

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Shelf Life and Storage

This product should be stored between +5°C & +25°C.

The Shelf life of the product is 18 months from the manufacture date.

IMPORTANT The information and data given is based on our own experience, research and testing and is believed to be reliable and accurate.

However, as we cannot know the varied uses to which its products may be applied, or the methods of application used, no warranty as to the fitness or suitability of its products is given or implied. It is the users responsibility to determine suitability of use. For further information please contact Our Technical Department.

Product Description

Chemfix CH+MAX is a 2 component high strength 10:1 ratio chemical anchoring resin system. It is designed as a fast curing high strength resin fixing anchor for very high loads and critical and overhead fixings especially in corrosive environments, or damp conditions.

Available in sizes : 150/165/170/280/300ml Foil Bag 10:1, 330/345/350/825ml Side By Side and 380/400/410ml Coaxial Cartridges

Specific Benefits

- European Approved
- High loads possible
- High chemical resistance
- Use with potable water
- Studs and rebar
- Hammer drilling and dust free drilling
- Cracked or Non-Cracked
- A+ Rating VOC content
- Styrene Free Low odour
- Fire approved
- Suitable underwater

Approvals

- ETA Option 7 acc. EAD 330499 for uncracked concrete with studs and rebar TR029
- ETA Option 1 acc. EAD 330499 for cracked concrete with studs
- ETA for post installed Rebar with fire acc. EAD 330087
- ETA for application in masonry acc. to EAD 330076
- Tested to BS6920 for use with potable water
- Tested according to LEED (VOC A+)

Loads, Edge and Spacing based on Characteristic bond strengths - Showing steel failure

Size (mm)	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing (mm)	Nominal Embedment (mm)	Hole Diameter concrete (mm)	Hole Diameter fixture (mm)	Max Torque (Nm)
	Tension	Shear	Tension	Shear	Tension	Shear	Edge	Spacing	Edge					
	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	$C_{cr,N}$	$S_{cr,N}$	$C_{cr,V}$	C_{min}, S_{min}				
8	19.00		12.70		9.07							60		
	19.00	9.00	12.70	7.20	9.07	5.14	80	160	80	40	80	10	9	10
	19.00		12.70		9.07						160			
10	22.62		15.08		10.77							60		
	30.20	15.00	20.10	12.00	14.36	8.57	100	200	90	50	90	12	12	20
	30.20		20.10		14.36						200			
12	29.82		19.88		14.20							70		
	43.80	21.00	29.20	16.80	20.86	12.00	120	240	110	60	110	14	14	40
	43.80		29.20		20.86						240			
16	43.43		28.95		20.68							80		
	67.86	39.00	45.24	31.20	32.31	22.29	160	320	125	80	125	18	18	80
	81.60		54.40		38.86						320			
20	55.42		36.95		26.39							90		
	104.68	61.00	69.79	48.80	49.85	34.86	200	400	180	100	170	22	22	120
	127.40		84.90		60.64						400			
24	63.33		42.22		30.16							100		
	133.00	88.00	88.67	70.40	63.33	50.29	230	460	220	120	210	28	26	160
	183.60		122.40		87.43						480			
27	70.91		47.27		33.77							110		
	154.72	115.00	103.15	92.00	73.68	65.71	270	540	240	135	240	30	30	180
	238.00		159.10		113.64						540			
30	78.04		52.02		37.16							120		
	182.09	142.50	121.39	114.00	86.71	81.43	280	560	280	150	280	35	32	200
	292.00		194.50		138.93						600			
33	88.95		59.30		42.36							130		
	205.27	173.50	136.85	138.80	97.75	121.43	310	620	310	165	300	37	36	250
	360.00		240.60		171.86						660			
36	108.57		72.38		51.70							150		
	246.10	212.50	164.07	170.00	117.19	121.43	330	660	330	180	340	40	38	300
	425.00		283.33		202.38						720			

 = steel failure

Table notes : see back page

Design Resistance used with various stud strengths, material and rebar.

5.8 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth h_{ef}																			h_{ef} failure (mm)	$F_{d,s}$ design load (kN)	
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660			720
8	10	12.7																			59	12.7	
10	12	15.1	17.6	20.1																	80	20.1	
12	14		19.9	22.7	25.6	28.4	29.2														103	29.2	
16	18			29.0	32.6	36.2	39.8	43.4	47.1	50.7	54.4										150	54.4	
20	22			32.8	36.9	41.1	45.2	49.3	53.4	57.5	65.7	82.1	84.9								207	84.9	
24	28				42.2	46.5	50.7	54.9	59.1	67.6	84.5	101.3	118.2	122.4							290	122.4	
27	30					47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.3	137.5	159.1						370	159.1	
30	35						52.0	56.4	60.7	69.4	86.7	104.1	121.4	138.8	173.4	194.5					449	194.5	
33	38							59.3	63.9	73.0	91.2	109.5	127.7	146.0	182.5	219.0	240.6				527	240.6	
36	40								67.6	77.2	96.5	115.8	135.1	154.4	193.0	231.6	260.6	283.2			587	283.2	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

8.8 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth h_{ef}																			h_{ef} failure (mm)	$F_{d,s}$ design load (kN)	
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660			720
8	10	12.9	15.0	17.2	19.3	19.5															91	19.5	
10	12	15.1	17.6	20.1	22.6	25.1	27.6	30.2	30.9												123	30.9	
12	14		19.9	22.7	25.6	28.4	31.2	34.1	36.9	39.8	45.0										158	45.0	
16	18			29.0	32.6	36.2	39.8	43.4	47.1	50.7	57.9	72.4	83.7								231	83.7	
20	22			32.8	36.9	41.1	45.2	49.3	53.4	57.5	65.7	82.1	98.5	114.9	130.7						318	130.7	
24	28				42.2	46.5	50.7	54.9	59.1	67.6	84.5	101.3	118.2	135.1	168.9	188.3					446	188.3	
27	30					47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.3	137.5	171.9	206.3	232.1				570	244.8	
30	35						52.0	56.4	60.7	69.4	86.7	104.1	121.4	138.8	173.4	208.1	234.1	260.2			690	299.2	
33	38							59.3	63.9	73.0	91.2	109.5	127.7	146.0	182.5	219.0	246.4	273.7	301.1		811	370.1	
36	40								67.6	77.2	96.5	115.8	135.1	154.4	193.0	231.6	260.6	289.5	318.5	347.4	903	435.7	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

Design Resistance used with various stud strengths, material and rebar.

10.9 Grade Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef (mm)																			hef failure (mm)	F _{d,s} design load (kN)	
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660			720
8	10	12.9	15.0	17.2	19.3	21.4	23.6	25.7	27.2												127	27.2	
10	12	15.1	17.6	20.1	22.6	25.1	27.6	30.2	32.7	35.2	40.2	43.1									171	43.1	
12	14		19.9	22.7	25.6	28.4	31.2	34.1	36.9	39.8	45.4	56.8	62.6								220	62.6	
16	18			29.0	32.6	36.2	39.8	43.4	47.1	50.7	57.9	72.4	86.9	101.3	115.8	116.6					322	116.6	
20	22			32.8	36.9	41.1	45.2	49.3	53.4	57.5	65.7	82.1	98.5	114.9	131.4	164.2					443	182.0	
24	28				42.2	46.5	50.7	54.9	59.1	67.6	84.5	101.3	118.2	135.1	168.9	202.7					621	262.2	
27	30					47.3	51.6	55.9	60.2	68.8	86.0	103.2	120.3	137.5	171.9	206.3	232.1				793	341.0	
30	35						52.0	56.4	60.7	69.4	86.7	104.1	121.4	138.8	173.4	208.1	234.1	260.2			961	416.7	
33	38							59.3	63.9	73.0	91.2	109.5	127.7	146.0	182.5	219.0	246.4	273.7	301.1		1130	515.5	
36	40								67.6	77.2	96.5	115.8	135.1	154.4	193.0	231.6	260.6	289.5	318.5	347.4	1258	606.9	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

A4-70 Stainless Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef (mm)																			hef failure (mm)	F _{d,s} design load (kN)	
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660			720
8	10	12.9	13.7																		64	13.7	
10	12	15.1	17.6	20.1	21.7																86	21.7	
12	14		19.9	22.7	25.6	28.4	31.2	31.6													111	31.6	
16	18			29.0	32.6	36.2	39.8	43.4	47.1	50.7	57.9	58.8									162	58.8	
20	22			32.8	36.9	41.1	45.2	49.3	53.4	57.5	65.7	82.1	91.7								223	91.7	
24	28				42.2	46.5	50.7	54.9	59.1	67.6	84.5	101.3	118.2	132.1							313	132.1	
27	30					47.3	51.6	55.9	60.2	68.8	80.2										187	80.2	
30	35						52.0	56.4	60.7	69.4	86.7	98.1									226	98.1	
33	38							59.3	63.9	73.0	91.2	109.5	121								266	121.3	
36	40								67.6	77.2	96.5	115.8	135.1	143							296	142.8	
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

*1 = Tensile strength 500N/mm2

Design Resistance used with various stud strengths, material and rebar.

A4-80 Stainless Steel Studding

Stud Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef (mm)																		hef failure (mm)	F _{d,s} design load (kN)		
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600			660	720
8	10	12.9	15.0	15.7																	73	15.7	
10	12		17.6	20.1	22.6	24.8															99	24.8	
12	14		19.9	22.7	25.6	28.4	31.2	34.1	36.1												127	36.1	
16	18			29.0	32.6	36.2	39.8	43.4	47.1	50.7	57.9	67.2									186	67.2	
20	22			32.8	36.9	41.1	45.2	49.3	53.4	57.5	65.7	82.1	98.5	104.8							255	104.8	
24	28				42.2	46.5	50.7	54.9	59.1	67.6	84.5	101.3	118.2	132.1							*2	313	132.1
27	30					47.3	51.6	55.9	60.2	68.8	80.2										*1	187	80.2
30	35						52.0	56.4	60.7	69.4	86.7	98.1									*1	226	98.1
33	38							59.3	63.9	73.0	91.2	109.5	121.3								*1	266	121.3
36	40								67.6	77.2	96.5	115.8	135.1	142.8							*1	296	142.8
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	480	540	600	660	720		

*1 = Tensile strength 500N/mm²

*2 = Tensile strength 700N/mm²

High bond reinforcing bars F_{yk}=500N/mm²

Rebar Diameter (mm)	Hole Diameter (mm)	Embedment Depth hef (mm)																		hef failure (mm)	F _{d,s} yield load (kN)		
		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640			720	800
8	10	8.7	10.2	11.7	13.1	14.6	16.0	17.5	19.0	20.4	21.9											150	21.9
10	12	10.4	12.1	13.8	15.6	17.3	19.0	20.7	22.5	24.2	27.6	34.1										198	34.1
12	14		13.7	15.7	17.6	19.6	21.6	23.5	25.5	27.4	31.4	39.2	47.1	49.2								251	49.2
16	20			19.3	21.7	24.1	26.5	29.0	31.4	33.8	38.6	48.3	57.9	67.6	77.2							362	87.4
20	25			21.0	23.6	26.2	28.9	31.5	34.1	36.7	42.0	52.5	63.0	73.5	84.0	105.0						521	136.6
25	30				28.3	31.1	33.9	36.8	39.6	45.2	56.6	67.9	79.2	90.5	113.1	141.4						695	196.5
28	35					33.4	36.4	39.5	42.5	48.6	60.7	72.8	85.0	97.1	121.4	151.8	170.0					882	267.8
32	40						43.1	46.5	53.1	66.4	79.6	92.9	106.2	132.7	165.9	185.8	212.3					1054	349.7
36	44							52.3	59.7	74.7	89.6	104.5	119.4	149.3	186.6	209.0	238.9	268.8				1188	443.5
40	50								66.4	82.9	99.5	116.1	132.7	165.9	207.4	232.3	265.4	298.6	331.8			1317	546.3
Depth (mm)		60	70	80	90	100	110	120	130	140	160	200	240	280	320	400	500	560	640	720	800		

Characteristic and Design Load resistances based on characteristic bond strengths for hef 4d (minimum embedment) to 20d

Size (mm)	Non Cracked Concrete						Cracked Concrete						Nominal Embedment (mm)
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		
	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	
	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	N_{rk}	V_{rk}	N_{rd}	V_{rd}	N_{rec}	V_{rec}	
8	19.30	9.00	12.87	7.20	9.19	5.14	7.92	9.00	5.28	7.20	3.77	5.14	60
	25.74		17.16		12.26		10.56		7.04		5.03		80
	51.47		34.31		24.51		21.11		14.07		10.05		160
10	22.62	15.00	15.08	12.00	10.77	8.57	10.40	15.00	6.94	12.00	4.96	8.57	60
	33.93		22.62		16.16		15.60		10.40		7.43		90
	75.40		50.27		35.90		34.68		23.12		16.52		200
12	29.82	21.00	19.88	16.80	14.20	12.00	13.12	21.00	8.75	16.80	6.24	12.00	70
	46.86		31.24		22.31		20.62		13.75		9.82		110
	102.24		68.16		48.69		44.98		29.98		21.42		240
16	43.43	39.00	28.95	31.20	20.68	22.29	17.37	39.00	11.58	31.20	8.27	22.29	80
	67.86		45.24		32.31		27.14		18.10		12.93		125
	173.72		115.81		82.72		69.50		46.33		33.10		320
20	55.42	61.00	36.95	48.80	26.39	34.86	21.06	61.00	14.04	48.80	10.00	34.86	90
	104.68		69.79		49.85		39.78		26.52		18.94		170
	246.30		164.20		117.29		93.60		62.40		44.59		400
24	63.33	88.00	42.22	70.40	30.16	50.29	22.80	88.00	15.20	70.40	10.86	50.29	100
	133.00		88.67		63.33		47.88		31.92		22.80		210
	304.01		202.67		144.76		109.44		72.96		52.12		480
27	70.91	115.00	47.27	92.00	33.77	65.71	24.11	115.00	16.07	92.00	11.48	65.71	110
	154.72		103.15		73.68		52.60		35.07		25.05		240
	348.11		232.08		165.77		118.36		78.91		56.36		540
30	78.04	142.50	52.02	114.00	37.16	81.43	24.97	142.50	16.65	114.00	11.89	81.43	120
	182.09		121.39		86.71		58.27		38.85		27.75		280
	390.19		260.12		185.80		124.86		83.24		59.46		600
33	88.95	173.50	59.30	138.80	42.36	99.14	Not Applicable		Not Applicable		Not Applicable		130
	205.27		136.85		97.75		Not Applicable		Not Applicable		Not Applicable		300
	451.60		301.07		215.05		Not Applicable		Not Applicable		Not Applicable		660
36	108.57	212.50	72.38	170.00	51.70	121.43	Not Applicable		Not Applicable		Not Applicable		150
	246.10		164.07		117.19		Not Applicable		Not Applicable		Not Applicable		340
	521.15		347.44		248.17		Not Applicable		Not Applicable		Not Applicable		720

Table notes : see back page

Bond Strength Factors

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm ² (Mpa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
non cracked $f_c =$	0.96	1.00	1.03	1.05	1.06	1.07	1.08	1.10
cracked $f_c =$	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Influence of environmental conditions in non cracked concrete

		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36
Temp I 40°C / 24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Influence of environmental conditions in cracked concrete

		M8	M10	M12	M16	M20	M24	M27	M30
Temp I 40°C / 24°C	Dry and Wet	0.46	0.46	0.44	0.40	0.38	0.36	0.34	0.32

Table notes : see back page

Characteristic and Design Load resistances for REBAR based on characteristic bond strengths for hef 4d (min embedment) to 20d

Rebar ∅	Non Cracked Concrete						Cracked Concrete						Nominal Embedment (mm)
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		
	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear	
	N _{rk}	V _{rk}	N _{rd}	V _{rd}	N _{rec}	V _{rec}	N _{rk}	V _{rk}	N _{rd}	V _{rd}	N _{rec}	V _{rec}	
8	15.68		8.71		6.22		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	20.91	13.95	11.62	9.30	8.30	6.64							80
	41.82		23.23		16.60								160
10	18.66		10.37		7.41		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	60
	27.99	21.45	15.55	14.30	11.11	10.21							90
	62.20		34.56		24.68								200
12	24.70		13.72		9.80		10.56		5.86		4.19		70
	38.82	31.05	21.56	20.70	15.40	14.79	16.59	31.05	9.22	20.70	6.58	14.79	110
	84.69		47.05		33.61		36.19		20.11		14.36		240
14	31.67		17.59		12.57		13.72		7.62		5.45		80
	45.52	42.45	25.29	28.30	18.06	20.21	19.73	42.45	10.96	28.10	7.83	20.07	115
	110.84		61.58		43.98		48.03		26.68		19.06		280
16	34.74		19.30		13.79		15.28		8.49		6.06		80
	54.29	55.50	30.16	37.00	21.54	26.43	23.88	55.50	13.26	37.00	9.47	26.43	125
	138.97		77.21		55.15		61.12		33.96		24.26		320
18	37.55		20.86		14.90		16.51		9.17		6.55		80
	70.40	69.66	39.11	46.44	27.94	33.17	30.96	69.66	17.20	46.44	12.29	33.17	150
	168.97		93.87		67.05		74.31		41.28		29.49		360
20	36.76		20.42		14.59		19.79		11.00		7.85		90
	69.43	86.55	38.57	57.70	27.55	41.21	37.39	86.55	20.77	57.70	14.84	41.21	170
	163.36		90.76		64.83		87.96		48.87		34.91		400
22	44.92		24.96		17.83		24.19		13.44		9.60		100
	85.36	104.01	47.42	69.34	33.87	49.53	45.96	104.01	25.53	69.34	18.24	49.53	190
	197.67		109.82		78.44		106.44		59.13		42.24		440
25	51.05		28.36		20.26		27.49		15.27		10.91		100
	107.21	135.00	59.56	90.00	42.54	64.29	57.73	135.00	32.07	90.00	22.91	64.29	210
	255.26		141.81		101.29		137.45		76.36		54.54		500
28	61.08		33.93		24.24		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	112
	152.71	168.75	84.84	112.50	60.60	80.36							280
	305.41		169.67		121.20								560
32	77.21		42.89		30.64		Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	128
	193.02	220.95	107.23	147.30	76.60	105.21							320
	386.04		214.47		153.19								640

Table notes : see back page

Bond Strength Factors - REBAR

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm ² (MPa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
non cracked f_c =	0.96	1.00	1.03	1.05	1.06	1.07	1.08	1.10
cracked f_c =	0.96	1.00	1.03	1.05	1.06	1.07	1.08	1.09

Influence of environmental conditions in non cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20	Ø 22	Ø 25	Ø 28	Ø 32
Temp I 40°C / 24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Influence of environmental conditions in cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20	Ø 22	Ø 25	Ø 28	Ø 32
Temp I 40°C / 24°C	Dry and Wet	n/a	n/a	0.43	0.43	0.43	0.43	0.53	0.53	0.53	n/a	n/a

Table notes : see back page

Material Properties for grades of other threaded rod and rebar

Stud Diameter (mm)	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$N_{rk, s}$	$N_{rd, s}$	$N_{rk, s}$	$N_{rd, s}$	$N_{rk, s}$	$N_{rd, s}$	$N_{rk, s}$	$N_{rd, s}$
	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
M8	29.2	19.5	38.1	27.2	25.6	13.7	29.2	15.6
M10	46.4	30.9	60.3	43.1	40.6	21.7	46.4	24.8
M12	67.4	44.9	87.7	62.6	59.0	31.6	67.4	36.0
M16	125.6	83.7	163.0	116.4	109.9	58.8	125.7	67.2
M20	196.1	130.7	255.0	182.1	171.5	91.7	196.0	104.8
M24	282.5	188.3	367.0	262.1	247.1	132.1	293.0	132.1
M27	367.0	244.7	477.4	341.0	229.4	80.2	229.4	80.2
M30	448.8	299.2	583.0	416.4	280.6	98.1	280.6	98.1
M36	653.6	435.7	849.7	606.9	408.4	142.8	408.4	142.8

*1 = Tensile strength 500N/mm²

Stud Diameter (mm)	Stud Grade 8.8		Stud Grade 10.9		Stud Grade A4-70		Stud Grade A4-80	
	$V_{rk, s}$	$V_{rd, s}$	$V_{rk, s}$	$V_{rd, s}$	$V_{rk, s}$	$V_{rd, s}$	$V_{rk, s}$	$V_{rd, s}$
	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
M8	14.6	11.7	19.0	15.2	12.8	8.2	14.6	9.4
M10	23.2	18.6	30.2	24.1	20.3	13.0	23.2	14.9
M12	33.7	27.0	43.8	35.1	29.5	18.9	33.7	21.6
M16	62.8	50.2	81.6	65.3	55.0	35.2	62.8	40.3
M20	98.0	78.4	127.4	101.9	85.8	55.0	98.0	62.8
M24	141.2	113.0	183.6	146.8	123.6	79.2	141.2	90.5
M27	183.5	146.8	238.7	191.0	114.7	48.4	114.7	48.4
M30	224.4	179.5	291.5	215.9	140.3	59.2	140.3	59.2
M36	326.8	261.4	424.8	283.2	204.2	86.2	204.2	86.2

Rebar Diameter (mm)	Rebar BSt 500 to DIN 488		Rebar BSt 500 to DIN 488	
	$N_{rk, s}$	$N_{rd, s}$	$V_{rk, s}$	$V_{rd, s}$
	(kN)	(kN)	(kN)	(kN)
8	28.0	20.0	14.0	9.3
10	43.0	30.7	21.5	14.3
12	62.0	44.3	31.0	20.7
14	84.4	67.0	42.5	28.3
16	111.0	79.3	55.5	37.0
18	139.5	100.0	70.0	46.7
20	173.0	123.6	86.5	57.7
22	208.3	149.3	104.5	69.7
25	270.0	192.9	135.0	90.0
28	339.0	242.1	169.0	112.7
32	442	315.7	221	147.3
36	563.2	443.5	281.6	187.7
40	693.8	546.3	346.9	231.3

More notes : see back page

Effect of Anchor Spacing - Tension

Anchor Spacing	Stud / Rebar Diameter											
	(mm)	8	10	12	16	20	24	27	30	33	36	40
40	0.64											
50	0.67	0.63										
60	0.70	0.65	0.63									
70	0.73	0.67	0.64									
80	0.76	0.69	0.66	0.63								
90	0.79	0.72	0.68	0.64								
100	0.82	0.74	0.70	0.65	0.63							
120	0.87	0.79	0.74	0.68	0.65	0.63						
150	0.96	0.86	0.80	0.73	0.68	0.65	0.64	0.63				
160	1.00	0.88	0.82	0.74	0.70	0.66	0.65	0.63	0.62		0.63	
180		0.93	0.86	0.77	0.72	0.68	0.65	0.65	0.64	0.64	0.64	
200		1.00	0.90	0.80	0.74	0.69	0.67	0.66	0.65	0.65	0.65	
225			0.95	0.84	0.77	0.72	0.69	0.68	0.67	0.67	0.66	
240			1.00	0.86	0.79	0.73	0.71	0.69	0.69	0.68	0.67	
250				0.87	0.80	0.74	0.72	0.70	0.70	0.68	0.68	
275				0.91	0.83	0.76	0.74	0.72	0.72	0.70	0.69	
280				0.92	0.84	0.77	0.75	0.73	0.72	0.70	0.69	
300				0.95	0.86	0.79	0.76	0.74	0.74	0.72	0.71	
320				1.00	0.88	0.81	0.78	0.76	0.75	0.73	0.72	
350					0.92	0.83	0.81	0.78	0.78	0.75	0.73	
400					1.00	0.88	0.86	0.82	0.82	0.78	0.76	
440						0.92	0.89	0.85	0.85	0.81	0.79	
460						1.00	0.91	0.87	0.87	0.82	0.80	
500							0.95	0.90	0.90	0.85	0.82	
540							1.00	0.93	0.93	0.88	0.84	
560								1.00	0.95	0.89	0.86	
620									1.00	0.93	0.89	
660										1.00	0.91	
720											1.00	

Effect of Edge Distance - Tension

Edge Distance	Stud / Rebar Diameter											
	(mm)	8	10	12	16	20	24	27	30	33	36	40
40	0.64											
50	0.73	0.63										
60	0.82	0.70	0.63									
70	0.90	0.77	0.68									
80	1.00	0.84	0.74	0.63								
90		0.91	0.80	0.67								
100		1.00	0.86	0.71	0.63							
110			0.92	0.76	0.66							
120			1.00	0.80	0.70	0.64						
140				0.89	0.77	0.67	0.63	0.63				
160				1.00	0.84	0.72	0.70	0.65	0.62			
180					0.91	0.78	0.75	0.66	0.70	0.67	0.68	
200					1.00	0.84	0.81	0.76	0.76	0.78	0.71	
220						0.89	0.86	0.81	0.81	0.82	0.75	
240						1.00	0.92	0.86	0.86	0.87	0.78	
270							1.00	0.94	0.94	0.93	0.83	
280								1.00	0.97	0.96	0.85	
310									1.00	0.98	0.90	
330										1.00	0.93	
360											1.00	

Effect of Edge Distance - Shear

Edge Distance	Stud / Rebar Diameter											
	(mm)	8	10	12	16	20	24	27	30	33	36	40
40	0.25											
50	0.44	0.30										
60	0.63	0.48	0.30									
70	0.81	0.65	0.44									
80	1.00	0.83	0.58	0.40								
90		1.00	0.72	0.53								
100			0.86	0.67	0.35							
110			1.00	0.80	0.44							
125				1.00	0.58	0.35						
140					0.72	0.46	0.44	0.30				
160					0.91	0.62	0.57	0.35	0.34			
180					1.00	0.77	0.69	0.46	0.41	0.33		
200						0.92	0.82	0.57	0.50	0.42	0.32	
220							1.00	0.94	0.68	0.59	0.51	0.53
240								1.00	0.78	0.68	0.60	0.59
280									1.00	0.86	0.78	0.72
310										1.00	0.91	0.82
330											1.00	0.89
360												1.00

Post installed rebar connections

Minimum anchorage length ¹⁾ and lap splice length for C20/25 and maximum installation length (l_{max})

Rebar		$l_{b,min}$ (mm)	$l_{o,min}$ (mm)	$l_{max,min}$ (mm)	N/mm ² = MPa
$\varnothing d_s$ (mm)	$f_{y,k}$ (N/mm ²)				
8	500	113	200	1000	
10	500	142	204	1000	
12	500	170	200	1200	
14	500	198	210	1400	
16	500	227	240	1600	

1) According to EN 1992-1-1:2004 $l_{b,min}$ (8.6) and $l_{o,min}$ (8.11) for good bond conditions and $a_g = 1,0$ with maximum yield stress for rebar B500 B and $\gamma_M = 1,15$

Design values of the ultimate bond resistance f_{bd} ¹⁾ in N/mm² for all drilling methods for good conditions

Rebar \varnothing	Concrete Class								
	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/60	C50/60
8 mm	1.6	2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
10 mm	1.6	2	2.3	2.3	2.3	2.7	2.7	2.7	2.7
12 mm	1.6	2	2.3	2.3	2.3	2.7	2.7	2.7	2.7
14 mm	1.6	2	2.3	2.7	3	3	3	3	3
16 mm	1.6	2	2.3	2.7	3	3.4	3.7	4	4.3

1) Tabulated values for f_{bd} are valid for good bond condition according to EN1992-1-1:2004. For all other bond conditions multiply the values for f_{bd} by 0.7.

Post installed rebar connections

Values for pre-calculation of anchoring

Rebar - Ø ds	$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1.0$			α_2 or $\alpha_5=0.7$; $\alpha_1=\alpha_3=\alpha_4=1.0$		
	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume
(mm)	(mm)	(kN)	(ml)	(mm)	(kN)	(ml)
8	163*	9.42	12	163*	9.42	12
	180	10.40	14	175	10.11	13
	250	14.44	19	190	10.98	14
	378	21.84	28	265	15.31	20
10	204*	14.73	18	204*	14.73	18
	220	15.89	20	220	15.89	20
	310	22.39	28	240	17.33	22
	390	28.17	35	280	20.22	25
	473	34.16	43	331	23.90	30
12	170*	14.73	18	170*	14.73	18
	270	23.40	29	230	19.93	24
	370	32.07	39	280	24.27	30
	470	40.73	50	340	29.47	36
	567	49.14	60	397	34.41	42
14	198*	20.02	24	198*	20.02	24
	310	31.34	37	260	26.29	31
	430	43.48	52	330	33.37	40
	550	55.61	66	400	40.44	48
	662	66.93	80	463	46.81	56
16	227*	26.23	31	227*	26.23	31
	360	41.60	49	300	34.67	41
	490	56.62	67	380	43.91	52
	620	71.64	84	450	52.00	61
	756	87.36	103	529	61.13	72

Example For:

C20/25;
 good bond condition;
 Rebar Yield Strength
 500 N/mm² (500 MPa)

* Minimum anchorage length. The design value is valid for "good bond conditions" according to EN 1992-1-1.

All other condition: multiply value by 0.7. Mortar volume based on equation: $V = 1.2 \cdot (d_o^2 - d_d^2) \cdot \pi \cdot l_b / 4$

Post installed rebar connections

Values for pre-calculation of overlap joints

Rebar - Ø ds	$\alpha_1=\alpha_2=\alpha_3=\alpha_4=\alpha_5=1.0$			α_2 or $\alpha_5=0.7$; $\alpha_1=\alpha_3=\alpha_4=1.0$		
	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume	Anchorage length l_{bd}	Design value N_{rd}	Mortar volume
(mm)	(mm)	(kN)	(ml)	(mm)	(kN)	(ml)
8	200	11.56	15	200	11.56	15
	240	13.87	18	220	12.71	17
	290	16.76	22	230	13.29	17
	378	21.84	29	265	15.31	20
10	204	10.25	18	204	14.73	18
	270	13.56	24	230	16.61	21
	340	17.08	31	270	19.50	24
	400	20.10	36	300	21.67	27
	473	23.76	43	331	23.90	30
12	200	17.33	21	200	17.33	21
	290	25.13	31	250	21.67	26
	380	32.93	40	300	26.00	32
	480	41.60	51	350	30.33	37
	567	49.14	60	397	34.41	42
14	210	21.23	25	210	21.23	25
	320	32.35	39	270	27.30	33
	440	44.49	53	340	34.38	41
	550	55.61	66	400	40.44	48
	662	66.93	80	463	46.81	56
16	240	27.73	33	240	27.73	33
	370	42.75	50	310	35.82	42
	500	57.78	68	380	43.91	52
	630	72.80	86	460	53.15	62
	756	87.36	103	529	61.13	72

Example For:

C20/25;
 good bond condition;
 Rebar Yield Strength
 500 N/mm² (500 MPa)

* Minimum anchorage length. The design value is valid for "good bond conditions" according to EN 1992-1-1.

All other condition: multiply value by 0.7. Mortar volume based on equation: $V = 1.2 \cdot (d_o^2 - d_d^2) \cdot \pi \cdot l_b / 4$

Post installed rebar schematics

Application examples of post-installed rebar

Figure 1: Overlap joints in slabs and beams.

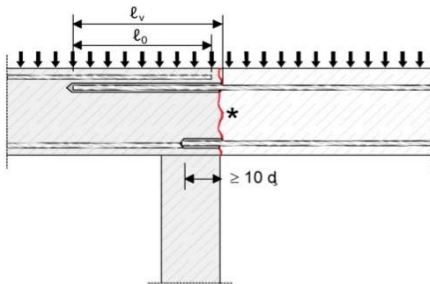


Figure 2: Overlap joint in foundation of a column or wall where the rebars are stressed in tension.

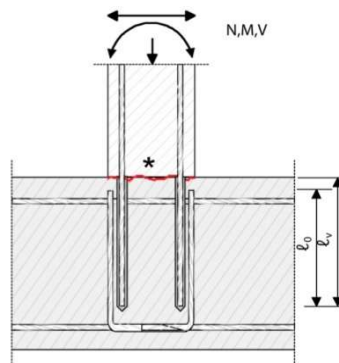


Figure 3: End anchoring of slabs or beams, designed as simply supported.

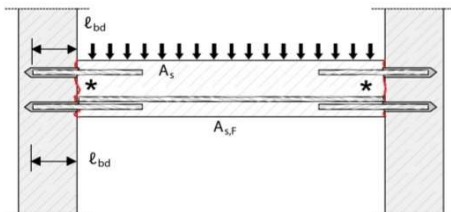


Figure 4: Rebar connection of components stressed primarily in compression. The rebar are stressed in compression.

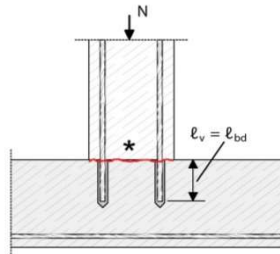
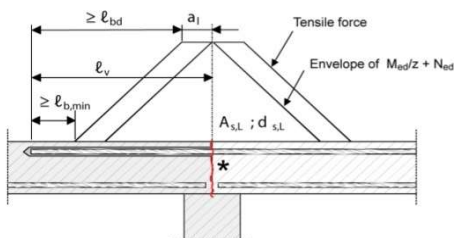


Figure 5: Anchoring of reinforcement to cover the line of acting tensile force.



Note to figure 1 to 5 :

In the figures no transverse reinforcement is plotted, the transverse reinforcement as required by EC 2 shall be present. The shear transfer between old and new concrete shall be designed according to EC2. Description of the bonded-in rebars and overlap joints see Annex 4 and 5.

*** Roughened joint**

Minimum Curing Time

Concrete Temperature	Gel - Working Time	Minimum curing time in dry concrete	Minimum curing time in wet concrete
- 10°C *	50 min	240 min	x2
-5°C *	40 min	180 min	x2
5°C	20 min	90 min	x2
15°C	9 min	60 min	x2
25°C	5 min	30 min	x2
35°C	3 min	20 min	x2

* Resin temperature must be at least 20°C

- Full cure 24 hours

- All specifications based on supplied mixer

Temperature Ranges

Temperature Range	Concrete Service Temperature	Maximum Long Term Concrete Temp	Maximum Short Term Concrete Temp
Range I	-40°C to +40°C	+24°C	+40°C

Service temperature range: Range of ambient temperatures after installation and during the lifetime of the anchor.

Short term temperature: Temperatures within the service temperature range which vary over short intervals, e.g. day/night cycles and freeze/thaw cycles.

Long term temperature: Temperature, within the service temperature range, which will be approximately constant over significant periods of time.

Long term temperatures will include constant or near constant temperatures, such as those experienced in cold stores or next to heating installations.

Notes

PAGE 2 :

Typical characteristic and design resistance performance with 5.8 grade studding and associated installation data

All data is based on correct installation - see instructions

No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

hef range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25N/mm² (25MPa)

5.8 grade stud

Temperature range I maximum long term / short term temperature +24/40°C

PAGE 3 to 5:

Design Resistance with various stud strengths, material and rebar.

Note 1 for stainless steel tensile strength is 500N/mm² (500MPa)

Note 2 for stainless steel tensile strength is 700N/mm² (700MPa)

Data shown below the minimum embedment depth is for reference only. Please refer to manufacturer for advice.

PAGE 6 and 8 :

Characteristic and Design Load resistances based on characteristic bond strengths for hef 4d (minimum embedment) to 20d

All data is based on correct installation - see instructions

No influence of edge and spacing

Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d

hef range minimum or 4d whichever is greatest to 20d

Concrete strength C20/25 - f_c cube = 25N/mm² (25MPa)

Temperature range i maximum long term / short term temperature +24/40°C

PAGE 7 & 9 :

Bond Strength Factors

Select concrete strength and environmental condition and apply to bond strength table on page 4

PAGE 10 :

Material Properties for grades of other threaded rod and rebar

All grades shown for information

M30 studding is 8.8 grade instead of 5.8 grade. >M27 for A4-70 tensile strength of 500N/mm², instead of 700N/mm²

M30 for A4-70 tensile strength of 500N/mm² (500MPa), instead of 700N/mm² (700MPa)

Safety factor is 1.5 tension and 1.25 shear for all carbon steel

Safety factor is 1.87 for stainless steel, up to M24, M27 to M36 is 2.86

Safety factor is 1.56 for stainless steel in shear, up to M24, M27 to M36 is 2.37

Safety factor is 1.4 tension and 1.5 shear for BSt 500 rebar

Partial Safety Factors for pages 2,3,4,5,6,7 :

1.5 for all sizes studs

1.8 for all sizes rebar



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ZAG

**ZAVOD ZA
GRADBENIŠTVO
SLOVENIJE**

SLOVENIAN
NATIONAL BUILDING
AND CIVIL ENGINEERING
INSTITUTE

Dimičeva ulica 12
1000 Ljubljana
Slovenija

info@zag.si
www.zag.si

Notified certification body
NB 1404

Certificate of constancy of performance

1404 – CPR – 3533

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction products Regulation or CPR), this certificate applies to the construction product

Chemfix CH+ MAX – Standard and Tropical

Bonded injection type anchor for use in concrete: sizes M8 to M24, rebar 8 to 25 mm

placed on the market under the name or trade mark of

Chemfix Products Ltd

**Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ,
United Kingdom**

and produced in the manufacturing plant

Chemfix Products Ltd

**Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ,
United Kingdom.**

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the

ETA-22/0328, issued on 8. 6. 2022

and

EAD 330499-01-0601

under system 1 for the performance set out in the ETA are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

For detailed information about the performance characteristics of the product and the intended use the above-mentioned ETA itself should be consulted.

This certificate was first issued on **10. 10. 2022** and will remain valid until **10. 10. 2027** as long as neither the ETA, the EAD, the construction product, the AVCP method nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

Ljubljana, 10. 10. 2022



Authorised signatory of the Certification body:

Marjan Japelj, B. Sc.

Certificate of constancy of performance

1404 – CPR – 3134

In compliance with Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011 (the Construction products Regulation or CPR), this certificate applies to the construction product

Chemfix Injection System CH+ Max for post-installed rebar connections

Post-installed rebar connections with Chemfix CH+ Max injection mortar

placed on the market under the name or trade mark of

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

and produced in the manufacturing plant

Chemfix Products Ltd
Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ,
United Kingdom.

This certificate attests that all provisions concerning the assessment and verification of constancy of performance described in the

ETA-19/0102, issued on 22. 6. 2022

and

EAD 330087-01-0601

under system 1 for the performance set out in the ETA are applied and that the factory production control conducted by the manufacturer is assessed to ensure the

constancy of performance of the construction product.

For detailed information about the performance characteristics of the product and the intended use the above-mentioned ETA itself should be consulted.

This certificate was first issued on **25. 4. 2019** and will remain valid until **10. 10. 2027** as long as neither the ETA, the EAD, the construction product, the AVCP method nor the manufacturing conditions in the plant are modified significantly, unless suspended or withdrawn by the notified product certification body.

Ljubljana, 10. 10. 2022

Authorised signatory of the Certification body:

Marjan Japelj, B. Sc.

Attestation

LEED v4 and v4.1 BETA

On 11 March 2022, Eurofins Product Testing A/S received a sample of a sealant with the product name:

Chemfix CH+ MAX

supplied by

CHEMFX PRODUCTS LIMITED

The sample was supplied as being representative of the manufactured product, and it has been tested in accordance with the relevant ISO 16000, EN 16516, and ASTM D2369 testing standards (See test report no. 392-2022-00115401_A_EN and no. 392-2022-00115402_XG_EN).

The test results of the tested sample indicate that the product qualifies for LEED v4 and LEED v4.1 BETA (February 2021) projects outside the US by showing compliance with the specifications for VOC emissions and VOC content by complying with:

VOC emissions specifications in LEED EQ credit "Low-Emitting Materials" for LEED projects outside the US:

- The requirements of LEED v4.1 BETA (February 2021) by not exceeding the LCI values mentioned in the German AgBB Testing and Evaluation Scheme (2018), showing an overall R-value below or equal to 1 and having a TVOC according to EN 16516 below or equal to 1,000 µg/m³, a sum of VOC without LCI less than 100 µg/m³ and a formaldehyde emission below or equal to 10 µg/m³; all after 28 days.
- The requirements of LEED v4 by complying with:
 - The requirements of Indoor Air Comfort Gold version 7.0 (May 2020).

VOC content specifications in LEED EQ credit "Low-Emitting Materials" for LEED projects globally:

- The requirements of LEED v4 and LEED v4.1 BETA (February 2021): South Coast Air The requirements of LEED v4 and LEED v4.1 BETA (February 2021): South Coast Air Quality Management District (SCAQMD) Rule 1168 (2017) for a "other adhesive" having a VOC content below 250 g/L.

17 May 2022



Rasmus Verdier
Analytical Service Manager

LEED® is the preeminent program for the design, construction, maintenance and operations of high-performance green buildings. USGBC® and the related logo are trademarks owned by the U.S. Green Building Council and are used with permission.

Approval Number 1810574
Test Report: J-00362149 & J-00305078



Water Regulations Approval Scheme Ltd.
Unit 13,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

21st March 2022

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

**WATER REGULATIONS APPROVAL SCHEME LTD. (WRAS)
MATERIAL APPROVAL**

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS6920-1:2000 and/or 2014 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

RESIN ANCHORS

5311

'Chemfix CH+ Max '. Site applied, two-part (supplied with internal mixing nozzle so no manual mixing required), brown coloured chemical anchor resin.

Apply as per manufacturer's instructions dated 14.12.2021. Cure for 4 days@5°C.

For use with water up to 23°C.

For use only as a resin anchor having been tested at a reduced surface area to volume ratio of 1,000mm² per 1 litre of water.

This material is only approved for the mixing and curing conditions that appear on the approval. If the mix and cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval.

APPROVAL NUMBER: 1810574
APPROVAL HOLDER: CHEMFIX PRODUCTS LTD.

The Scheme reserves the right to review approval.
Approval 1810574 is valid between October 2018 and October 2023

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wrasapprovals.co.uk/approvals-directory/

Yours Faithfully

A handwritten signature in blue ink, appearing to read 'Ian Hughes', is written over a horizontal line.

Ian Hughes
WRAS Approvals Manager

WRAS MATERIAL APPROVAL - MATERIALS WHICH HAVE PASSED FULL TESTS OF EFFECT ON WATER QUALITY

The material referred to in this letter is suitable for contact with water for domestic purposes. **Approval of this material does not signify the approval of its mechanical or physical properties for any use.**

Manufacturers or applicants may only quote in their sales literature terms which are used in this letter, namely that; 'the material as listed, having passed the tests of effect on water quality, is suitable for use in contact with wholesome water'

This may be abbreviated to 'Water Regulations Approval Scheme - Approved Material' or 'WRAS Approved Material'.

The scope of an Approval does not extend to rebranded materials unless otherwise agreed by the Scheme.

Use of the WRAS Approved Material Logo

Approval holders may use the WRAS Approved Material logo and make reference to any approval issued by WRAS Ltd. in respect of a particular material or range of materials provided the approval is, and remains valid.

Approval holders are entitled to use the logo on the packing, promotional literature and point of sale advertising Approved Materials.

Modifications to existing Approvals

It is a condition of WRAS Material Approval that NO changes or modifications to the Approved Material, be made without the Approval Holder first notifying WRAS Ltd. Full details of the proposed changes must be provided to the Scheme. Failure to comply with this condition will immediately invalidate a previously granted Approval.

Re-Approval

WRAS will write to you 1 year before the approval expires asking whether you would like to renew it. Please complete the relevant section of the MA3 application form which will be included with the letter and return to WRAS (via e-mail or post).

Please note it is the responsibility of the Approval Holder to ensure the Approval remains valid. WRAS Ltd. accepts no liability for the delay in granting approval where this is caused by circumstances outside of the Scheme's control.


Intended use or uses of the construction product according to ETAG 001 part 1 and part 5	
Generic type	Bonded anchor for anchorage of threaded rod and rebar.
Base material	<p>cracked and un-cracked concrete C20/25 to C50/60 acc. to ENV 206:2000-12 Cracked: M12 and M16</p> <p>un-cracked M8 to M24, Rebar 8mm to 25mm</p>
Material	<p>a) Carbon galvanized steel class 5.8, 8.8 and 10.9 according to EN ISO 898-1 for dry internal conditions.</p> <p>b) Stainless steel A4-70 and A4-80 according to EN ISO 3506 for dry internal conditions, external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist.</p> <p>c) High resistant corrosion stainless steel 1.4529, 1.4565 to EN 10088</p> <p>d) Post-installed reinforcing bars may be used as anchor designed in accordance with the EOTA Technical Report TR 029 and in un-cracked concrete only. Such applications are e.g. concrete overlay or shear dowel connections or the connections of a wall predominantly loaded by shear and compression forces with the foundation, where the reinforcing bars act as dowels to take up shear forces. Connections with post-installed reinforcing bars in concrete structures designed in accordance with EN1992-1-1: 2004 are not covered by this European Technical Approval.</p>
Durability	50 years
Loading	static, quasi-static
Service temperature range	<p>a) -40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C),</p> <p>b) -40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C).</p>
Use category	Category 1: dry and wet concrete.
Fire Resistance	NPD
Fire Reaction	NPD
ETA - 12/0024 issued by	CSTB Paris dated 17/01/2014
On the basis of	ETAG 001 Part 5:2013

Declared performances according to ETAG 001 parts 1 and 5

Essential Characteristics			Performance					
			M8	M10	M12	M16	M20	M24
Installation parameters								
d	Diameter of anchor bolt or thread diameter	[mm]	8	10	12	16	20	24
d ₀	Nominal diameter of drill bit	[mm]	10	12	14	18	24	28
d _{fix}	Diameter of clearance hole in the fixture	[mm]	9	12	14	18	22	26
h _{eff}	Minimum effective anchorage depth	[mm]	60	60	70	80	90	100
	Maximum effective anchorage depth	[mm]	160	200	240	320	400	480
h ₁	Depth of the drilling hole	[mm]	80	90	110	125	170	210
h _{min}	Minimum thickness of the concrete member	[mm]	h _{ef} + 30mm ≥ 100mm			h _{ef} + 2d _o		
T _{inst}	Nominal torque moment	[Nm]	10	20	30	60	90	140
t _{fix}	Thickness to be fixed	[mm]						
s _{min}	Minimum spacing	[mm]	40	50	60	80	100	120
for c ≥	Edge distance	[mm]						
c _{min}	Minimum edge distance	[mm]	40	50	60	80	100	120
for s ≥	Anchor spacing	[mm]						
Pull-out failure mode								
τ _{Rk,ucr}	Characteristic bond resistance in un-cracked concrete class C20/25 temperature range a)	[MPa]	10.0	9.5	9.0	8.0	7.5	7.5
	Characteristic bond resistance in un-cracked concrete class C20/25 temperature range b)	[MPa]	9.0	8.0	7.5	7.0	6.5	6.0
τ _{Rk,cr}	Characteristic bond resistance in cracked concrete class C20/25 temperature range a)	[MPa]	-	-	3.5	3.5	-	-
	Characteristic bond resistance in cracked concrete class C20/25 temperature range b)	[MPa]	-	-	3.0	3.0	-	-
γ ₂	Partial safety factor	[-]	1.5	1.5	1.5	1.5	1.5	1.5
ψ _{c,ucr} C30/37	Increasing factor for un-cracked concrete C30/37	[-]	1.12					
ψ _{c,ucr} C40/50	Increasing factor for un-cracked concrete C40/50	[-]	1.23					
ψ _{c,ucr} C50/60	Increasing factor for un-cracked concrete C50/60	[-]	1.30					
ψ _{c,cr} C30/37	Increasing factor for cracked concrete C30/37	[-]	1.04					
ψ _{c,cr} C40/50	Increasing factor for cracked concrete C40/50	[-]	1.07					
ψ _{c,cr} C50/60	Increasing factor for cracked concrete C50/60	[-]	1.09					
Resistance for splitting failure								
s _{cr,sp}	Critical spacing (splitting)	[mm]	2 c _{cr,sp}					
c _{cr,sp}	Critical edge distance (splitting)	[mm]	For: h / h _{ef} ≥ 2,0 = 1,0 h _{ef} • 2,0 > h / h _{ef} > 1,3 = 4,6 h _{ef} - 1,8 h • h / h _{ef} ≤ 1,3 = 1,3					

Declared performances according to ETAG 001 part 5 - Rebar									
Essential Characteristics			Performance						
			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25
Installation parameters									
d	Diameter of anchor bolt or thread diameter	[mm]	8	10	12	14	16	20	25
d ₀	Nominal diameter of drill bit	[mm]	12	14	16	18	20	25	32
h _{eff}	Minimum effective anchorage depth	[mm]	60	60	70	75	80	90	100
	Maximum effective anchorage depth	[mm]	160	200	240	280	320	400	500
h _{min}	Minimum thickness of the concrete member	[mm]	h _{eff} + 30mm ≥ 100mm			h _{eff} + 2d ₀			
s _{min}	Minimum spacing	[mm]	40	50	60	70	80	100	125
c _{min}	Minimum edge distance	[mm]	40	50	60	70	80	100	125
Pull-out failure mode									
τ _{Rk,ucr}	Characteristic bond resistance in un-cracked concrete class C20/25 temperature range a)	[MPa]	7.0	7.5	7.0	7.0	6.5	6.5	6.0
	Characteristic bond resistance in un-cracked concrete class C20/25 temperature range b)	[MPa]	6.5	6.5	6.0	6.0	6.0	5.5	5.5
τ _{Rk,cr}	Characteristic bond resistance in cracked concrete class C20/25 temperature range a)	[MPa]	-	-	-	-	-	-	-
	Characteristic bond resistance in cracked concrete class C20/25 temperature range b)	[MPa]	-	-	-	-	-	-	-
γ ₂	Partial safety factor	[-]	1.8						
ψ _{c,ucr} C30/37	Increasing factor for un-cracked concrete C30/37	[-]	1.12						
ψ _{c,ucr} C40/50	Increasing factor for un-cracked concrete C40/50	[-]	1.23						
ψ _{c,ucr} C50/60	Increasing factor for un-cracked concrete C50/60	[-]	1.30						
ψ _{c,cr} C30/37	Increasing factor for cracked concrete C30/37	[-]	-						
ψ _{c,cr} C40/50	Increasing factor for cracked concrete C40/50	[-]	-						
ψ _{c,cr} C50/60	Increasing factor for cracked concrete C50/60	[-]	-						
Resistance for splitting failure									
s _{cr,sp}	Critical spacing (splitting)	[mm]	2 C _{cr,sp}						
c _{cr,sp}	Critical edge distance (splitting)	[mm]	For: $h / h_{ef} \geq 2,0 = 1,0 h_{ef}$ • $2,0 > h / h_{ef} > 1,3 = 4,6 h_{ef} - 1,8 h$ • $h / h_{ef} \leq 1,3 = \leq 1,3$						

The performances of the product identified by the above identification code are in conformity with the declared performance. This declaration of performance is issued under the sole responsibility of Chemfix Products Ltd.
Signed for and behalf of the manufacturer by:

Name and functions	Place and date of issue	Signature
URS JOOS - COMMERCIAL AND MARKETING DIRECTOR	DEWSBURY 16.09.2015	



Declaration of Performance – 1404-CPR-2584

Chemfix CH+ (Bonded anchor)

Chemfix Products Ltd

Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ, UK



CHEMFIX CH+, with post-installed rebar

Intended use or uses of the construction product according to ETAG 001 parts 1 and 5 EOTA TR023	
Generic type	Bonded anchor for anchorage of post-installed rebar
Base material	Concrete C12/15 to C50/60 acc. to EN 206-1 non-carbonated concrete allowable chloride content of 0,40 % (Cl 0,40) related to the cement content according to EN 206-1
Use	Material Straight deformed reinforcing bars, diameter 8 - 16 mm, mechanical properties according Annex C, EN 1992-1-1 & EN 10080. (Class B & C are recommended).
Loading	Predominantly static loads
Service temperature range	-40°C to +40°C (max. short term temperature +80°C and max. long term temperature +50°C).
Use category 1	Structures subject to dry internal conditions, i.e. exposure class X0 and XC1 of EC2 §3.3.4. - Dry or wet concrete (use category 1). - It must not be installed in flooded holes. - Overhead installation is permissible. - Hole drilling by hammer drill or by compressed air drilling
ETA - 14/0057 issued by	ETA DANMARK dated 18/03/2014
On the basis of	ETAG 001 Part 5:2013 & EOTA TR023

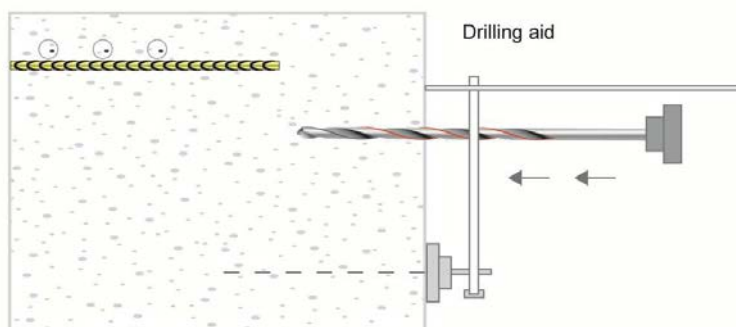
Installation Parameters

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

* 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: $0,05 * d \leq h_{rib} \leq 0,07 * d$
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	$30\text{mm} + 0.06 \cdot \ell_v \geq 2d_s$	$30\text{mm} + 0.02 \cdot \ell_v \geq 2d_s$
Compressed air drilling	< 25mm	$50\text{mm} + 0.08 \cdot \ell_v$	$50\text{mm} + 0.02 \cdot \ell_v$

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

Table B3: Minimum anchorage length¹⁾ and lap splice length for C20/25 and maximum installation length l_{\max}

Rebar		$l_{b,\min}$ (mm)	$l_{o,\min}$ (mm)	l_{\max} (mm)
$\text{Ø}d_s$	$F_{y,k}$ [N/mm ²]			
8mm	500	113	200	1000
10mm	500	142	200	1000
12mm	500	170	200	1200
14mm	500	198	210	1400
16mm	500	227	240	1600

1) according to EN 1992-1-1:2004: $l_{b,\min}$ (8.6) and $l_{o,\min}$ (8.11) for good bond conditions and $a_6 = 1.0$ with maximum yield stress for rebar B500 B and $\gamma_M = 1.15$.

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)
$\geq -5 - 0^\circ\text{C}$	25	38
$\geq +0 - 5^\circ\text{C}$	17	27
$\geq +10 - 20^\circ\text{C}$	12	20
$\geq +20 - 30^\circ\text{C}$	6	12
$\geq +30 - 35^\circ\text{C}$	3	10
$\geq +35 - 40^\circ\text{C}$	2	9

Note. For a value of anchorage length or lap splice length higher than 400mm the maximum temperature in the concrete member shall be limited to 20 °C”

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



Declaration of Performance – 1404-CPR-2584

Chemfix CH+ (Bonded anchor)

Chemfix Products Ltd

Mill Street East, Dewsbury, West Yorkshire, WF12 9BQ, UK



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.

Table C2: Resistance to fire

HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 1 PARAGRAPH 5.2.2 AND TECHNICAL REPORT TR020	
ESSENTIAL CHARACTERISTICS	PERFORMANCE
Resistance to fire	NPD

Table C3: Reaction to fire

HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 1 PARAGRAPH 5.2.1	
ESSENTIAL CHARACTERISTICS	PERFORMANCE
Reaction to fire	In the final application the thickness of the mortar layer is about 1 to 2 mm and most of the mortar is material classified class A1 according to EC Decision 96/603/EC. Therefore it may be assumed that the bonding material (synthetic mortar or a mixture of synthetic mortar and cementitious mortar) in connection with the metal anchor in the end use application do not make any contribution to fire growth or to the fully developed fire and they have no influence to the smoke hazard.

The performance of the product identified above is in conformity with the set of declared performance/s.

This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of Chemfix Products Ltd by:

Place and date of issue: Dewsbury, 16.09.2015

Urs Joos, Commercial & Marketing Manager



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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-19/0102 of 2022/06/22

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 Injection System CH+ Max for post-installed rebar connections

Product family to which the above construction product belongs:

Post-installed rebar connections with Chemfix CH+ Max 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:

17 pages including 12 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 330087-01-0601, Systems for post-installed rebar connections with mortar

This version replaces:

The ETA with the same number issued on 2019-04-05

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 CH+ Max 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 12 mm and Chemfix CH+ Max injection mortar are used for the post-installed rebar connections. The steel element is placed into a drilled hole filled 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 performances given in Section 3 are only valid if the rebar connection 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.

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 C.

Safety in case of fire (BWR2):

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

Resistance to fire: See annex C

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 the EAD 330087-01-06.01, 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 2022-06-22 by



Thomas Bruun
Managing Director, ETA-Danmark

Design value of the ultimate bond stress $f_{bd,fi}$ under fire exposure for concrete classes C12/15 to C50/60, (all drilling methods):

The design value of the bond strength $f_{bd,fi}$ under fire exposure has to be calculated by the following equation:

$$f_{bd,fi} = k_{fi}(\theta) \cdot f_{bd,PIR} \cdot \gamma_c / \gamma_{M,fi}$$

$f_{bd,fi}$ Design value of the ultimate bond stress in case of fire in N/mm²

$$k_{fi}(\theta) = \frac{16.76 \cdot e^{-0.014 \cdot \theta}}{f_{bd,PIR} \cdot 4.3} \leq 1,0 \quad \theta \leq 181^\circ\text{C}$$

$$k_{fi}(\theta) = 0 \quad \theta > 181^\circ\text{C}$$

θ Temperature in °C in the mortar layer .

$k_{fi}(\theta)$ Reduction factor under fire exposure.

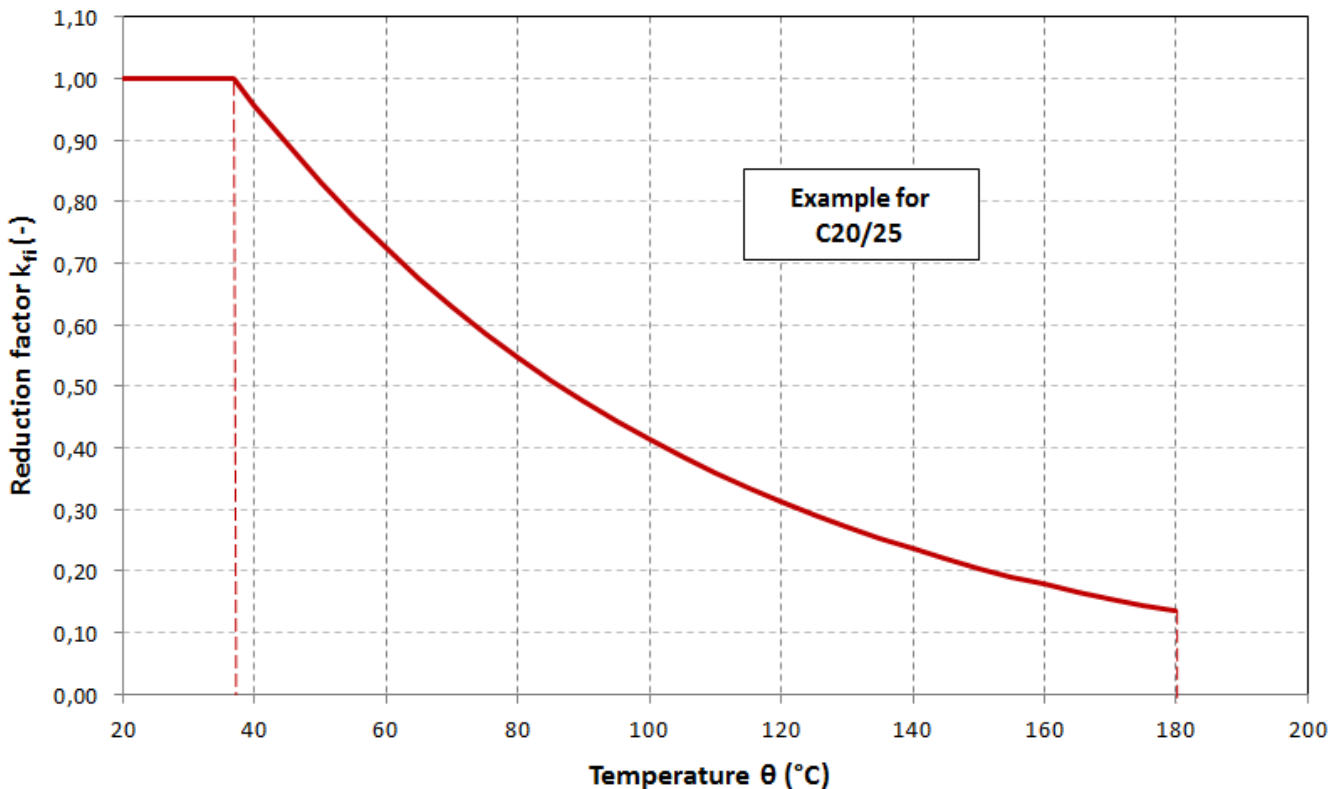
$f_{bd,PIR}$ Design value of the ultimate bond stress in N/mm² in cold condition according to Table C3 considering the concrete classes, the rebar diameter, the drilling method and the bond conditions according to EN 1992-1-1.

γ_c partially safety factor according to EN 1992-1-1

$\gamma_{M,fi}$ partially safety factor according to EN 1992-1-2

For evidence under fire exposure the anchorage length shall be calculated according to EN 1992-1-1:2004+AC:2010 Equation 8.3 using the temperature-dependent ultimate bond stress $f_{bd,fi}$.

Example graph of Reduction factor $k_{fi}(\theta)$ for concrete classes C20/25 for good bond conditions:



CH+ MAX Injection System for rebar connection

Performances

Design value of bond strength $f_{bd,fi}$ under fire exposure

Annex C2



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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-22/0328 of 2022/06/08

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 CH+ MAX – Standard and Tropical

Product family to which the above construction product belongs:

Bonded injection type anchor for use in concrete:
sizes M8 to M24, rebar 8 to 25 mm

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:

20 pages including 14 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:

EOTA EAD 330499-01-0601, “Bonded fasteners for use in concrete”

This version replaces:

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

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II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

The Chemfix CH+ MAX is a bonded anchor (injection type) for concrete consisting of a cartridge with Chemfix injection mortar and a steel element. The steel element consists of a commercial threaded rod with washer and hexagon nut in the range of M8 to M24 or a reinforcing bar in the range of diameter 8 to 25mm.

The product specification is given in annex A.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, 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.

2 Specification of the intended use 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.

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 (BWR 1):

The essential characteristics are detailed in the Annex C.

Safety in case of fire (BWR 2):

The essential characteristics are detailed in the Annex C.

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).

Sustainable use of natural resources (BWR7)

No performance determined

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 EOTA EAD 330499-01-0601, “Bonded fasteners for use in concrete” option 1 and 7.

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 2022-06-08 by



Thomas Bruun
Managing Director, ETA-Danmark

Table C1: Characteristic values for steel tension resistance and steel shear resistance of threaded rods

Size			M8	M10	M12	M16	M20	M24	
Cross section area	A _s	[mm ²]	36.6	58	84.3	157	245	353	
Characteristic tension resistance, Steel failure									
Steel, Property class 4.6 and 4.8	N _{Rk,s}	[kN]	15	23	34	63	98	141	
Steel, Property class 5.6 and 5.8	N _{Rk,s}	[kN]	18	29	42	78	122	176	
Steel, Property class 8.8	N _{Rk,s}	[kN]	29	46	67	125	196	282	
Steel, Property class 10.9	N _{Rk,s}	[kN]	37	58	84	157	245	353	
Steel, Property class 12.9	N _{Rk,s}	[kN]	44	70	101	188	294	424	
Stainless steel A2, A4 and HCR, Property class 50	N _{Rk,s}	[kN]	18	29	42	79	123	177	
Stainless steel A2, A4 and HCR, Property class 70	N _{Rk,s}	[kN]	26	41	59	110	171	247	
Stainless steel A4 and HCR, Property class 80	N _{Rk,s}	[kN]	29	46	67	126	196	282	
Characteristic tension resistance, Partial factor									
Steel, Property class 4.6 and 5.6	γ _{Ms,N} ¹⁾	[-]	2,0						
Steel, Property class 4.8, 5.8 and 8.8	γ _{Ms,N} ¹⁾	[-]	1,5						
Steel, Property class 10.9 and 12.9	γ _{Ms,N} ¹⁾	[-]	1,4						
Stainless steel A2, A4 and HCR, Property class 50	γ _{Ms,N} ¹⁾	[-]	2,86						
Stainless steel A2, A4 and HCR, Property class 70	γ _{Ms,N} ¹⁾	[-]	1,87						
Stainless steel A4 and HCR, Property class 80	γ _{Ms,N} ¹⁾	[-]	1,6						
Characteristic shear resistance, Steel failure									
Without lever arm	Steel, Property class 4.6 and 4.8	V ⁰ _{Rk,s}	[kN]	7	12	17	31	49	71
	Steel, Property class 5.6 and 5.8	V ⁰ _{Rk,s}	[kN]	9	15	21	39	61	88
	Steel, Property class 8.8	V ⁰ _{Rk,s}	[kN]	15	23	34	63	98	141
	Steel, Property class 10.9	V ⁰ _{Rk,s}	[kN]	18	29	42	79	123	177
	Steel, Property class 12.9	V ⁰ _{Rk,s}	[kN]	22	35	51	94	147	212
	Stainless steel A2, A4 and HCR, Property class 50	V ⁰ _{Rk,s}	[kN]	9	15	21	39	61	88
	Stainless steel A2, A4 and HCR, Property class 70	V ⁰ _{Rk,s}	[kN]	13	20	30	55	86	124
	Stainless steel A4 and HCR, Property class 80	V ⁰ _{Rk,s}	[kN]	15	23	34	63	98	141
With lever arm	Steel, Property class 4.6 and 4.8	M ⁰ _{Rk,s}	[Nm]	15	30	52	133	260	449
	Steel, Property class 5.6 and 5.8	M ⁰ _{Rk,s}	[Nm]	19	37	65	166	324	560
	Steel, Property class 8.8	M ⁰ _{Rk,s}	[Nm]	30	60	105	266	519	896
	Steel, Property class 10.9	M ⁰ _{Rk,s}	[Nm]	37	75	131	333	649	1123
	Steel, Property class 12.9	M ⁰ _{Rk,s}	[Nm]	45	90	157	400	778	1347
	Stainless steel A2, A4 and HCR, Property class 50	M ⁰ _{Rk,s}	[Nm]	19	37	66	167	325	561
	Stainless steel A2, A4 and HCR, Property class 70	M ⁰ _{Rk,s}	[Nm]	26	52	92	232	454	784
	Stainless steel A4 and HCR, Property class 80	M ⁰ _{Rk,s}	[Nm]	30	59	105	266	519	896
Characteristic shear resistance, Partial factor									
Steel, Property class 4.6 and 5.6	γ _{Ms,V} ¹⁾	[-]	1,67						
Steel, Property class 4.8, 5.8 and 8.8	γ _{Ms,V} ¹⁾	[-]	1,25						
Steel, Property class 10.9 and 12.9	γ _{Ms,V} ¹⁾	[-]	1,50						
Stainless steel A2, A4 and HCR, Property class 50	γ _{Ms,V} ¹⁾	[-]	2,38						
Stainless steel A2, A4 and HCR, Property class 70	γ _{Ms,V} ¹⁾	[-]	1,56						
Stainless steel A4 and HCR, Property class 80	γ _{Ms,V} ¹⁾	[-]	1,33						

¹⁾ in absence of national regulation

SYSTEM CH+ MAX

Performance for static and quasi-static loads: Resistances

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Table C2: Characteristic values of tension loads under static and quasi-static for threaded rods									
Anchor size threaded rod			M8	M10	M12	M16	M20	M24	
Steel failure									
Characteristic tension resistance	$N_{Rk,s}$	[kN]	see Table C1						
Partial factor	$\gamma_{Ms,N}$	[-]	see Table C1						
Combined Pull-out and Concrete cone failure ²⁾									
Characteristic bond resistance in concrete C20/25 – dry or wet concrete for hammer drilling (HD) and CD									
Temperature range 40°C/24°C non-cracked concrete	$\tau_{Rk,ucr}$	[N/mm ²]	11	10	10	9,5	9	8,5	
Temperature range 40°C/24°C cracked concrete	$\tau_{Rk,cr}$	[N/mm ²]	3,5	3,5	3	3,5	3,5	3,5	
Partial safety factor – dry or wet concrete	γ_{inst}	[-]	1,2			1,4			
Characteristic bond resistance in non-cracked concrete C20/25 – flooded holes for hammer drilling (HD)									
Temperature range 40°C/24°C non-cracked concrete	$\tau_{Rk,ucr}$	[N/mm ²]	11	10	10	9	7,5	7	
Temperature range 40°C/24°C cracked concrete	$\tau_{Rk,cr}$	[N/mm ²]	3,5	3,5	3	3,5	3	3	
Partial safety factor – flooded holes	γ_{inst}	[-]	1,2			1,4			
Characteristic bond resistance in non-cracked concrete C20/25 – dry or wet concrete for hollow drill bits (HDB) – dust free system									
Temperature range 40°C/24°C non-cracked concrete	$\tau_{Rk,ucr}$	[N/mm ²]	7	7	7,5	8	8	8,5	
Temperature range 40°C/24°C cracked concrete	$\tau_{Rk,cr}$	[N/mm ²]	3,5	3,5	4	3,5	3,5	3,5	
Partial safety factor – dry or wet concrete	γ_{inst}	[-]	1,2					1,4	
Increasing factor for $\tau_{Rk,ucr}$ in non-cracked for hammer drilling	ψ_c	C30/37	1,08					1,00	
		C40/50	1,15					1,00	
		C50/60	1,20					1,00	
Increasing factor for $\tau_{Rk,cr}$ in cracked concrete for hammer drilling	ψ_c	C30/37	1,08	1,00					
		C40/50	1,15	1,00					
		C50/60	1,20	1,00					
Increasing factor for $\tau_{Rk,ucr}$ in non-cracked concrete for hollow drilling	ψ_c	C30/37	1,00						
		C40/50	1,00						
		C50/60	1,00						
Increasing factor for $\tau_{Rk,cr}$ in cracked concrete for hollow drilling	ψ_c	C30/37	1,20	1,00					
		C40/50	1,36	1,00					
		C50/60	1,50	1,00					
Reduction factor in cracked or non-cracked concrete C20/25 for all drilling methods	ψ_{sus}^0	[-]	0,794						
Factor for determination of the concrete cone failure	$k_{ucr,N}$	[-]	11,0 (based on concrete cylinder strength f_{ck})						
Factor for determination of the concrete cone failure	$k_{cr,N}$	[-]	7,7						
Edge distance for concrete cone failure	$c_{cr,N}$	[mm]	1,5 h_{ef}						
Axial distance for concrete cone failure	$s_{cr,N}$	[mm]	2 $c_{cr,N}$						
SYSTEM CH+ MAX						Annex C2 of European Technical Assessment ETA-22/0328.			
Performance for static, quasi-static: Displacements									

Table C2 : continuation

Splitting failure ²⁾			
Edge distance $c_{cr,sp}$ [mm] for	$h / h_{ef}^{4)} \geq 2,0$	$1,0 h_{ef}$	
	$2,0 > h / h_{ef}^{4)} > 1,3$	$3 h_{ef} - 1 h$	
	$h / h_{ef}^{4)} \leq 1,3$	$1,7 h_{ef}$	
Spacing	$s_{cr,sp}$	[mm]	$2 c_{cr,sp}$

¹⁾ In absence of national regulations

³⁾ Explanations, see annex B1

²⁾ Calculation of concrete and splitting, see annex B1

⁴⁾ h concrete member thickness, h_{ef} effective anchorage depth

Table C3: Displacements under tension load

Chemfix CH+ MAX with threaded rods With Hammer drilling (HD) or compressed air drilling (CD)		M8	M10	M12	M16	M20	M24
Temperature range a ⁵⁾ : 40°C / 24°C							
Displacement	δ_{N0} [mm/(N/mm ²)]	0,11	0,11	0,10	0,11	0,12	0,10
Displacement	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,28	0,18	0,82	0,76	0,22	0,30
Chemfix CH+ MAX with threaded rods for Hollow drilling HDB (dust-free system)		M8	M10	M12	M16	M20	M24
Temperature range a ⁵⁾ : 40°C / 24°C							
Displacement	δ_{N0} [mm/(N/mm ²)]	0,10	0,12	0,15	0,14	0,14	0,13
Displacement	$\delta_{N\infty}$ [mm/(N/mm ²)]	0,49	0,19	0,38	0,52	0,14	0,19

⁵⁾ Explanation see annex B1

Table C4: Displacements under shear load for all types of drilling for threaded rods

Chemfix CH+ MAX with threaded rods		M8	M10	M12	M16	M20	M24
Displacement	δ_{V0} [mm/kN]	0,06	0,06	0,05	0,04	0,04	0,03
Displacement	$\delta_{V\infty}$ [mm/kN]	0,09	0,08	0,08	0,06	0,06	0,05

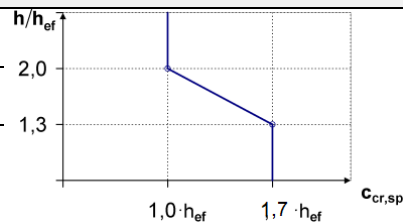
SYSTEM CH+ MAX

Performance for static, quasi-static and seismic loads: Displacements

Annex C3
of European
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Table C5: Characteristic values for steel tension resistance and tension load values for rebar

Chemfix CH+ MAX with rebar			ϕ 8	ϕ 10	ϕ 12	ϕ 14	ϕ 16	ϕ 20	ϕ 24	ϕ 25	
Steel failure											
Characteristic tension resistance	$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}^{1)}$								
Cross section area	A_s	[mm ²]	50	79	113	154	201	314	452	491	
Partial safety factor	$\gamma_{Ms,N}^{2)}$	[-]	1,4								
Combined Pull-out and Concrete cone failure³⁾											
Diameter of rebar	d	[mm]	8	10	12	14	16	20	24	25	
Characteristic bond resistance in non-cracked concrete C20/25 – dry or wet concrete for hammer drilling (HD) and CD											
Temperature range a ⁴⁾ : 40°C/24°C	$\tau_{Rk,ucr}$	[N/mm ²]	6	6	6	5,5	5,5	5,5	5,5	5,5	
Partial safety factor – dry or wet concrete	$\gamma_{inst}^{2)}$	[-]	1,2				1,4				
Characteristic bond resistance in non-cracked concrete C20/25 – flooded holes for hammer drilling (HD) and CD											
Temperature range a ⁴⁾ : 40°C/24°C	$\tau_{Rk,ucr}$	[N/mm ²]	6	6	6	5,5	5,5	4,5	4,5	4,5	
Partial safety factor – flooded holes	γ_{inst}	[-]	1,2				1,4				
Characteristic bond resistance in non-cracked concrete C20/25 – dry or wet concrete for hollow drill bits (HDB) – dust free system											
Temperature range a ⁴⁾ : 40°C/24°C	$\tau_{Rk,ucr}$	[N/mm ²]	5	5	5,5	5,5	5,5	5,5	5,5	5,5	
Partial safety factor – dry or wet concrete	γ_{inst}	[-]	1,2						1,4		
Increasing factor for $\tau_{Rk,ucr}$ in non-cracked concrete	ψ_c	C30/37	1,00	1,04	1,08				1,13		
		C40/50	1,00	1,07	1,15				1,23		
		C50/60	1,00	1,10	1,20				1,32		
Factor for determination of the concrete cone failure	$k_{Ucr,N}$	[-]	11,0 (based on concrete cylinder strength f_{ck})								
Factor for determination of the concrete cone failure	$k_{Cr,N}$	[-]	7,7								
Splitting failure³⁾											
Edge distance $c_{Cr,sp}$ [mm] for	$h / h_{ef}^{5)} \geq 2,0$		1,0 h_{ef}								
	$2,0 > h / h_{ef}^{5)} > 1,3$		3 h_{ef} - 1 h								
	$h / h_{ef}^{5)} \leq 1,3$		1,7 h_{ef}								
Spacing	$s_{Cr,sp}$	[mm]	2 $c_{Cr,sp}$								



¹⁾ f_{uk} shall be taken from the specifications of reinforcing bars

²⁾ in absence of national regulation

³⁾ Calculation of concrete and splitting, see annex B1

⁴⁾ Explanations, see annex B1

⁵⁾ h concrete member thickness, h_{ef} effective anchorage depth

SYSTEM CH+ MAX

Performance for static and quasi-static loads: Resistances

Annex C4
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Table C6: Displacements under tension load for rebar

Chemfix CH+ MAX with rebar for hammer drilling (HD) and CD			φ 8	φ 10	φ 12	φ 14	φ 16	φ 20	φ 24/ φ 25
Temperature range a ⁴⁾ : 40°C / 24°C									
Displacement	δ_{N0}	[mm/(N/mm ²)]	0,03	0,03	0,04	0,04	0,07	0,07	0,10
Displacement	$\delta_{N\infty}$	[mm/(N/mm ²)]	0,11	0,11	0,15	0,21	0,26	0,26	0,38
Chemfix CH+ MAX with rebar for hollow drilling dust free system (HDB)			φ 8	φ 10	φ 12	φ 14	φ 16	φ 20	φ 25
Temperature range a ⁴⁾ : 40°C / 24°C									
Displacement	δ_{N0}	[mm/(N/mm ²)]	0,16	0,10	0,03	0,03	0,04	0,04	0,04
Displacement	$\delta_{N\infty}$	[mm/(N/mm ²)]	0,75	0,45	0,15	0,16	0,17	0,18	0,19

Table C7: Characteristic steel shear resistance for rebar

Chemfix CH+ MAX with rebar			φ 8	φ 10	φ 12	φ 14	φ 16	φ 20	φ 25
Steel failure without lever arm									
Characteristic shear resistance	$V_{Rk,s}$	[kN]	$0,50 \cdot A_s \cdot f_{uk}^{1)}$						
Cross section area	A_s	[mm ²]	50	79	113	154	201	314	491
Partial safety factor	$\gamma_{Ms,N^2)}$	[-]	1,5						
Steel failure with lever arm									
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	$1,2 \cdot W_{el} \cdot f_{uk}^{1)}$						
Elastic section modulus	W_{el}	[Nm]	50	98	170	269	402	785	1534
Partial safety factor	$\gamma_{Ms,N^2)}$	[-]	1,5						
Concrete pryout failure									
Factor	k_b	[-]	1,0 for $h_{ef} < 60\text{mm}$ 2,0 for $h_{ef} \geq 60\text{mm}$						
Partial safety factor	γ_{Mc}	[-]	1,5						
Concrete edge failure									
Partial safety factor	$\gamma_{Mc}^{1)}$	[-]	1,5						

¹⁾ f_{uk} shall be taken from the specifications of reinforcing bars

²⁾ In absence of national regulations

Table C8: Displacements under shear load for rebar

Chemfix CH+ MAX with rebar			φ 8	φ 10	φ 12	φ 14	φ 16	φ 20	φ 25
Displacement	δ_{V0}	[mm/kN]	0,05	0,05	0,05	0,04	0,04	0,04	0,03
Displacement	$\delta_{V\infty}$	[mm/kN]	0,08	0,08	0,07	0,06	0,06	0,05	0,05

SYSTEM CH+ MAX

Performance for static and quasi-static loads: Resistances

Annex C5
of European
Technical Assessment
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Table C9: Resistance to fire

ESSENTIAL CHARACTERISTICS	PERFORMANCE
Resistance to fire	No performance assessed

Table C10: Reaction to fire

ESSENTIAL CHARACTERISTICS	PERFORMANCE
Reaction to fire	In the final application, the thickness of the mortar layer is about 1 to 2 mm and most of the mortar is material classified class A1 according to EC Decision 96/603/EC. Therefore, it may be assumed that the bonding material (synthetic mortar or a mixture of synthetic mortar and cementitious mortar) in connection with the metal anchor in the end use application do not contribute to fire growth or to the fully developed fire and they have no influence on the smoke hazard.

SYSTEM CH+ MAX

Performance for exposure to fire

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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-22/0381 of 20/06/2022

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 Injection System CH+ MAX

Product family to which the above construction product belongs:

Bonded injection type anchor for use in masonry:
sizes M6 to M12

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:

21 pages including 15 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 330076-00-0604, Metal injection anchors for use in masonry

This version replaces:

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 Chemfix CH+ MAX is a bonded anchor (injection type) for use in masonry consisting of a cartridge with Chemfix injection mortar a perforated nylon sleeve, and an anchor rod with hexagon nut and washer in the range of M6, M8, M10 and M12.

The product specification is given in annex A.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and masonry.

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.

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

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 (BWR 1):

The essential characteristics are detailed in the Annex C.

Safety in case of fire (BWR 2):

The essential characteristics are detailed in the Annex C.

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 330076-00-0604, Metal injection anchors for use in masonry.

4 Assessment and verification of constancy of performance (AVCP)

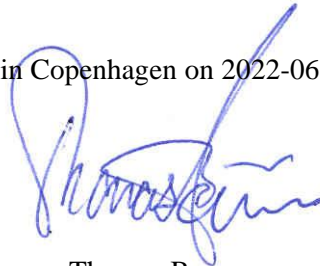
4.1 AVCP system

According to the decision 1997/177/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 2022-06-20 by



Thomas Bruun
Managing Director, ETA-Danmark

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture
Name : CH+ MAX COMP A
UFI : HCCN-HTF8-DG04-SF4K
Type of product : A Chemical anchoring application
Product group : Trade product

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Main use category : Industrial use, Professional use
Use of the substance/mixture : A Chemical anchoring application
Function or use category : Building and construction work

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Chemfix Products Limited
A Briolf Group Company Ctra. N-II, km 706,5
17457 RIUDELLOTS DE LA SELVA (Girona)
SPAIN
T +44 (0)1924 453886/+34 872 729 763 - F +44 (0)1924 458995
sds@chemfix.co.uk - www.chemfix.co.uk

1.4. Emergency telephone number

Emergency number : Emergency Number Association (EENA) : 112 / UK Manufacturer +44 (0)1924 431679

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital	Dudley Road B18 7QH Birmingham	0344 892 0111	Only for healthcare professionals

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Serious eye damage/eye irritation, Category 2 H319

Skin sensitisation, Category 1 H317

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

May cause an allergic skin reaction. Causes serious eye irritation.

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS07

CH+ MAX COMP A

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

Signal word (CLP)	: Warning
Contains	: 2,2'-ETHYLENEDIOXYDIETHYL DIMETHACRYLATE, METHACRYLIC ACID, MONOESTER WITH PROPANE-1,2-DIOL, REACTION MASS OF 2,2'-[(4-METHYLPHENYL)IMINO]BISETHANOL AND ETHANOL 2-[[2-(2-HYDROXYETHOXY)ETHYL](4-METHYLPHENYL)AMINO]-
Hazard statements (CLP)	: H317 - May cause an allergic skin reaction. H319 - Causes serious eye irritation.
Precautionary statements (CLP)	: P261 - Avoid breathing dust/fume/gas/mist/vapours/spray. P264 - Wash hands, forearms and face thoroughly after handling. P272 - Contaminated work clothing should not be allowed out of the workplace. P280 - Wear protective clothing, eye protection, face protection. P302+P352 - IF ON SKIN: Wash with plenty of soap and water. P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3. Other hazards

Contains no PBT/vPvB substances $\geq 0.1\%$ assessed in accordance with REACH Annex XIII

The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %

Component	
REACTION MASS OF 2,2'-[(4-METHYLPHENYL)IMINO]BISETHANOL AND ETHANOL 2-[[2-(2-HYDROXYETHOXY)ETHYL](4-METHYLPHENYL)AMINO]-	The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
VINYL TOLUENE.	CAS-No.: 25013-15-4 EC-No.: 246-562-2 REACH-no: 01-2119622074-50	<10	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
2,2'-ETHYLENEDIOXYDIETHYL DIMETHACRYLATE	CAS-No.: 109-16-0 EC-No.: 203-652-6 REACH-no: 01-2119969287-21	3 – 10	Skin Sens. 1, H317
METHACRYLIC ACID, MONOESTER WITH PROPANE-1,2-DIOL	CAS-No.: 27813-02-1 EC-No.: 248-666-3 REACH-no: 01-2119490226-37	3 – 10	Eye Irrit. 2, H319 Skin Sens. 1, H317
1,1'-(P-TOLYLIMINO)DIPROPAN-2-OL	CAS-No.: 38668-48-3 EC-No.: 254-075-1 REACH-no: 01-2119980937-17	< 1	Acute Tox. 2 (Oral), H300 Eye Irrit. 2, H319 Aquatic Chronic 3, H412

CH+ MAX COMP A

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
REACTION MASS OF 2,2'-[(4-METHYLPHENYL)IMINO]BIETHANOL AND ETHANOL 2-[[2-(2-HYDROXYETHOXY)ETHYL](4-METHYLPHENYL)AMINO]-	-	< 1	Acute Tox. 4 (Oral), H302 Skin Irrit. 2, H315 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Chronic 3, H412
P-BENZOQUINONE	CAS-No.: 106-51-4 EC-No.: 203-405-2 EC Index-No.: 606-013-00-3 REACH-no: 01-2119933861-35	< 1	Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Inhalation), H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335 Aquatic Acute 1, H400 (M=10)

Full text of H- and EUH-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing.
First-aid measures after skin contact	: Wash skin with plenty of water. Take off contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.
First-aid measures after eye contact	: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	: Call a poison center or a doctor if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after skin contact	: May cause an allergic skin reaction.
Symptoms/effects after eye contact	: Eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray. Dry powder. Foam.
------------------------------	----------------------------------

5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products in case of fire	: Toxic fumes may be released.
--	--------------------------------

5.3. Advice for firefighters

Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.
--------------------------------	--

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures	: Ventilate spillage area. Avoid contact with skin and eyes. Avoid breathing dust/fume/gas/mist/vapours/spray.
----------------------	--

CH+ MAX COMP A

Safety Data Sheet

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

6.1.2. For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Mechanically recover the product.
Other information : Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Ensure good ventilation of the work station. Avoid contact with skin and eyes. Avoid breathing dust/fume/gas/mist/vapours/spray. Wear personal protective equipment.
Hygiene measures : Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a well-ventilated place. Keep cool.

7.3. Specific end use(s)

Building and construction work.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

No additional information available

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:
Ensure good ventilation of the work station.

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8.2.2. Personal protection equipment

Personal protective equipment symbol(s):



8.2.2.1. Eye and face protection

Eye protection:

Safety glasses

8.2.2.2. Skin protection

Skin and body protection:

Wear suitable protective clothing

Hand protection:

Chemical resistant gloves (according to European standard EN 374 or equivalent)

Hand protection					
Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves, Reusable gloves	Nitrile rubber (NBR), Butyl rubber, Viton® II	6 (> 480 minutes)	0.4	As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.	EN ISO 374

8.2.2.3. Respiratory protection

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment. EN141

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Environmental exposure controls:

Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Colour	: Beige.
Appearance	: Paste.
Odour	: Characteristic odour.
Odour threshold	: Not available
Melting point	: Not available
Freezing point	: Not applicable
Boiling point	: Not available
Flammability	: Non flammable.
Explosive limits	: Not applicable
Lower explosion limit	: Not applicable
Upper explosion limit	: Not applicable

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Flash point	: Not applicable
Auto-ignition temperature	: Not applicable
Decomposition temperature	: Not available
pH	: Not available
pH solution	: Not available
Viscosity, kinematic	: Not applicable
Viscosity, dynamic	: > 100000 cP Brookfield HB DV1 viscometer
Solubility	: Material insoluble in water.
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: Not available
Vapour pressure at 50 °C	: Not available
Density	: Not available
Relative density	: 1.68 – 1.69
Relative vapour density at 20 °C	: 0.6 hPa
Particle size	: Not available
Particle size distribution	: Not available
Particle shape	: Not available
Particle aspect ratio	: Not available
Particle aggregation state	: Not available
Particle agglomeration state	: Not available
Particle specific surface area	: Not available
Particle dustiness	: Not available

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

VOC content	: 180 g/l
Additional information	: Solid suspension - classified as non-flammable according to results from Test N.1 test method for readily combustible solids.

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral)	: Not classified
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Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

2,2'-ETHYLENEDIOXYDIETHYL DIMETHACRYLATE (109-16-0)

LD50 oral rat 10837 mg/kg Source: NLM, THOMSON

METHACRYLIC ACID, MONOESTER WITH PROPANE-1,2-DIOL (27813-02-1)

LD50 oral rat > 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 401 (Acute Oral Toxicity)

LD50 dermal rat > 5000 mg/kg

LD50 dermal rabbit > 5000 mg/kg bodyweight Animal: rabbit, Animal sex: male

1,1'-(P-TOLYLIMINO)DIPROPAN-2-OL (38668-48-3)

LD50 oral rat 25 mg/kg bw/day

LD50 dermal rat > 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity), Guideline: EPA OPPTS 870.1200 (Acute Dermal Toxicity), Guideline: other:, Guideline: other:

P-BENZOQUINONE (106-51-4)

LD50 oral rat 197 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method)

VINYL TOLUENE. (25013-15-4)

LD50 oral rat 3680 mg/kg

LD50 dermal 4490 mg/kg

REACTION MASS OF 2,2'-[(4-METHYLPHENYL)IMINO]BIETHANOL AND ETHANOL 2-[[2-(2-HYDROXYETHOXY)ETHYL](4-METHYLPHENYL)AMINO]-

LD50 oral rat 619 mg/kg bodyweight Animal: rat, Animal sex: male, Guideline: OECD Guideline 401 (Acute Oral Toxicity), Guideline: EU Method B.1 (Acute Toxicity (Oral)), Remarks on results: other:, 95% CL: 305 - 1256

LD50 dermal rat > 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity), Guideline: EU Method B.3 (Acute Toxicity (Dermal)), Guideline: EPA OPPTS 870.1200 (Acute Dermal Toxicity), Guideline: other:

Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Causes serious eye irritation.
Respiratory or skin sensitisation : May cause an allergic skin reaction.
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

P-BENZOQUINONE (106-51-4)

IARC group 3 - Not classifiable

VINYL TOLUENE. (25013-15-4)

IARC group 3 - Not classifiable

Reproductive toxicity : Not classified
STOT-single exposure : Not classified

P-BENZOQUINONE (106-51-4)

STOT-single exposure May cause respiratory irritation.

STOT-repeated exposure : Not classified

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2,2'-ETHYLENEDIOXYDIETHYL DIMETHACRYLATE (109-16-0)	
LOAEC (inhalation, rat, gas, 90 days)	350 ppm Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study), Remarks on results: other:
NOAEL (oral, rat, 90 days)	1000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
NOAEC (inhalation, rat, gas, 90 days)	100 ppm Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study), Remarks on results: other:
METHACRYLIC ACID, MONOESTER WITH PROPANE-1,2-DIOL (27813-02-1)	
LOAEC (inhalation, rat, gas, 90 days)	350 ppm Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study), Remarks on results: other:
NOAEL (oral, rat, 90 days)	300 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 422 (Combined Repeated Dose Toxicity Study with the Reproduction / Developmental Toxicity Screening Test)
NOAEC (inhalation, rat, gas, 90 days)	100 ppm Animal: rat, Guideline: OECD Guideline 413 (Subchronic Inhalation Toxicity: 90-Day Study), Remarks on results: other:
VINYL TOLUENE. (25013-15-4)	
NOAEC (inhalation, rat, gas, 90 days)	60 ppm Animal: rat, Remarks on results: other:
Aspiration hazard	: Not classified
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Viscosity, kinematic	Not applicable

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general	: The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified
Not rapidly degradable	

2,2'-ETHYLENEDIOXYDIETHYL DIMETHACRYLATE (109-16-0)	
LC50 - Fish [1]	16.4 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio)
METHACRYLIC ACID, MONOESTER WITH PROPANE-1,2-DIOL (27813-02-1)	
LC50 - Fish [1]	233.174 mg/l Source: ECOSAR
EC50 - Crustacea [1]	> 143 mg/l Test organisms (species): Daphnia magna
EC50 - Other aquatic organisms [1]	> 130 mg/l
EC50 72h - Algae [1]	> 97.2 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
NOEC (chronic)	45.2 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC chronic crustacea	45.2 mg/l

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1,1'-(P-TOLYLIMINO)DIPROPAN-2-OL (38668-48-3)	
LC50 - Fish [1]	17 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio)
EC50 - Crustacea [1]	28.8 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	245 mg/l Test organisms (species): Desmodesmus subspicatus (previous name: Scenedesmus subspicatus)
P-BENZOQUINONE (106-51-4)	
LC50 - Fish [1]	0.045 mg/l Source: Toxic Substances Information Summary
VINYL TOLUENE. (25013-15-4)	
LC50 - Fish [1]	5.2 mg/l Test organisms (species): Pimephales promelas
EC50 - Crustacea [1]	1.3 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	4.3 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
ErC50 algae	2.6 mg/l Source: ECHA
NOEC chronic fish	2.6 mg/l
REACTION MASS OF 2,2'-[(4-METHYLPHENYL)IMINO]BIETHANOL AND ETHANOL 2-[[2-(2-HYDROXYETHOXY)ETHYL](4-METHYLPHENYL)AMINO]-	
LC50 - Fish [1]	100 mg/l
EC50 - Crustacea [1]	48 mg/l Test organisms (species): Daphnia magna
EC50 - Other aquatic organisms [1]	100 mg/l
EC50 72h - Algae [1]	> 100 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

2,2'-ETHYLENEDIOXYDIETHYL DIMETHACRYLATE (109-16-0)	
Partition coefficient n-octanol/water (Log Pow)	1.88 Source: ChemIDplus
METHACRYLIC ACID, MONOESTER WITH PROPANE-1,2-DIOL (27813-02-1)	
Partition coefficient n-octanol/water (Log Pow)	0.48
1,1'-(P-TOLYLIMINO)DIPROPAN-2-OL (38668-48-3)	
Partition coefficient n-octanol/water (Log Pow)	2.1 Source: ECHA
P-BENZOQUINONE (106-51-4)	
Partition coefficient n-octanol/water (Log Pow)	0.2 Source: HSDB
VINYL TOLUENE. (25013-15-4)	
Partition coefficient n-octanol/water (Log Pow)	3.35 Source: ECHA

12.4. Mobility in soil

No additional information available

12.5. Results of PBT and vPvB assessment

No additional information available

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12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.2. UN proper shipping name				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available				

14.6. Special precautions for user

Overland transport

Not regulated

Transport by sea

Not regulated

Air transport

Not regulated

Inland waterway transport

Not regulated

Rail transport

Not regulated

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

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SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

Contains no REACH substances with Annex XVII restrictions

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

Contains no substance subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

Contains no substance subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

Contains no substance subject to REGULATION (EU) No 1005/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 September 2009 on substances that deplete the ozone layer.

Contains no substance subject to Regulation (EU) 2019/1148 of the European Parliament and of the Council of 20 June 2019 on the marketing and use of explosives precursors.

VOC content : 180 g/l

Contains no substance subject to Regulation (EC) 273/2004 of the European Parliament and of the Council of 11 February 2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances.

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Abbreviations and acronyms:

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level

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Abbreviations and acronyms:	
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disrupting properties

Full text of H- and EUH-statements:	
Acute Tox. 2 (Oral)	Acute toxicity (oral), Category 2
Acute Tox. 3 (Inhalation)	Acute toxicity (inhal.), Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Acute Tox. 4 (Inhalation)	Acute toxicity (inhal.), Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment – Acute Hazard, Category 1
Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic Hazard, Category 3
Asp. Tox. 1	Aspiration hazard, Category 1
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
H226	Flammable liquid and vapour.
H300	Fatal if swallowed.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H332	Harmful if inhaled.

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Full text of H- and EUH-statements:	
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.
Skin Irrit. 2	Skin corrosion/irritation, Category 2
Skin Sens. 1	Skin sensitisation, Category 1
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**

Product form : Mixture
Name : CATALYST COMP.B
UFI : K806-D15C-K00W-VC8M
Product code : 13363
Type of product : A Chemical anchoring application
Product group : Trade product

1.2. Relevant identified uses of the substance or mixture and uses advised against**1.2.1. Relevant identified uses**

Main use category : Industrial use, Professional use
Use of the substance/mixture : A Chemical anchoring application
Catalyst
Function or use category : Building and construction work

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Chemfix Products Limited
A Briolf Group Company Ctra. N-II, km 706,5
17457 RIUDELLOTS DE LA SELVA (Girona)
SPAIN
T +44 (0)1924 453886/+34 872 729 763 - F +44 (0)1924 458995
sds@chemfix.co.uk - www.chemfix.co.uk

1.4. Emergency telephone number

Emergency number : Emergency Number Association (EENA) : 112 / UK Manufacturer +44 (0)1924 431679

Country	Organisation/Company	Address	Emergency number	Comment
United Kingdom	National Poisons Information Service (Birmingham Centre) City Hospital	Dudley Road B18 7QH Birmingham	0344 892 0111	Only for healthcare professionals

SECTION 2: Hazards identification**2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

Serious eye damage/eye irritation, Category 2 H319
Skin sensitisation, Category 1 H317
Hazardous to the aquatic environment — Chronic Hazard, Category 3 H412

Full text of H- and EUH-statements: see section 16

Adverse physicochemical, human health and environmental effects

May cause an allergic skin reaction. Causes serious eye irritation. Harmful to aquatic life with long lasting effects.

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2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS07

Signal word (CLP) :

Warning

Contains :

DIBENZOYL PEROXIDE.

Hazard statements (CLP) :

H317 - May cause an allergic skin reaction.

H319 - Causes serious eye irritation.

H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements (CLP) :

P261 - Avoid breathing dust/fume/gas/mist/vapours/spray.

P264 - Wash hands, forearms and face thoroughly after handling.

P272 - Contaminated work clothing should not be allowed out of the workplace.

P273 - Avoid release to the environment.

P280 - Wear protective clothing, eye protection, face protection.

P302+P352 - IF ON SKIN: Wash with plenty of soap and water.

2.3. Other hazards

Contains no PBT/vPvB substances $\geq 0.1\%$ assessed in accordance with REACH Annex XIII

The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0,1 %

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
DIBENZOYL PEROXIDE.	CAS-No.: 94-36-0 EC-No.: 202-327-6 EC Index-No.: 617-008-00-0 REACH-no: 01-2119511472-50	10 – 20	Org. Perox. B, H241 Eye Irrit. 2, H319 Skin Sens. 1, H317 Aquatic Acute 1, H400 (M=10) Aquatic Chronic 1, H410 (M=10)
ETHYLENE GLYCOL. substance with a Community workplace exposure limit	CAS-No.: 107-21-1 EC-No.: 203-473-3 EC Index-No.: 603-027-00-1 REACH-no: 01-2119456816-28	3 – 10	Acute Tox. 4 (Oral), H302 STOT RE 2, H373

Full text of H- and EUH-statements: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation

: Remove person to fresh air and keep comfortable for breathing.

First-aid measures after skin contact

: Wash skin with plenty of water. Take off contaminated clothing. If skin irritation or rash occurs: Get medical advice/attention.

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First-aid measures after eye contact	: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	: Call a poison center or a doctor if you feel unwell.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects after skin contact	: May cause an allergic skin reaction.
Symptoms/effects after eye contact	: Eye irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: Water spray. Dry powder. Foam.
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5.2. Special hazards arising from the substance or mixture

Hazardous decomposition products in case of fire	: Toxic fumes may be released.
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5.3. Advice for firefighters

Protection during firefighting	: Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.
--------------------------------	--

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Emergency procedures	: Ventilate spillage area. Avoid contact with skin and eyes. Avoid breathing dust/fume/gas/mist/vapours/spray.
----------------------	--

6.1.2. For emergency responders

Protective equipment	: Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
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6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up	: Mechanically recover the product.
Other information	: Dispose of materials or solid residues at an authorized site.

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	: Ensure good ventilation of the work station. Avoid contact with skin and eyes. Avoid breathing dust/fume/gas/mist/vapours/spray. Wear personal protective equipment.
Hygiene measures	: Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store in a well-ventilated place. Keep cool.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

DIBENZOYL PEROXIDE. (94-36-0)	
United Kingdom - Occupational Exposure Limits	
Local name	Dibenzoyl peroxide
WEL TWA (OEL TWA) [1]	5 mg/m ³
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
ETHYLENE GLYCOL. (107-21-1)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Ethylene glycol
IOEL TWA [ppm]	20 ppm
IOEL STEL	104 mg/m ³
IOEL STEL [ppm]	40 ppm
Remark	Skin
Regulatory reference	COMMISSION DIRECTIVE 2000/39/EC
United Kingdom - Occupational Exposure Limits	
Local name	Ethane-1,2-diol
WEL TWA (OEL TWA) [1]	10 mg/m ³ particulate 52 mg/m ³ vapour
WEL TWA (OEL TWA) [2]	20 ppm vapour
WEL STEL (OEL STEL)	104 mg/m ³ vapour
WEL STEL (OEL STEL) [ppm]	40 ppm vapour
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

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8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Ensure good ventilation of the work station.

8.2.2. Personal protection equipment

Personal protective equipment symbol(s):



8.2.2.1. Eye and face protection

Eye protection:

Safety glasses

8.2.2.2. Skin protection

Skin and body protection:

Wear suitable protective clothing

Hand protection:

Chemical resistant gloves (according to European standard EN 374 or equivalent)

Hand protection					
Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves, Reusable gloves	Nitrile rubber (NBR), Butyl rubber, Viton® II	6 (> 480 minutes)	0.4	As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.	EN ISO 374

8.2.2.3. Respiratory protection

Respiratory protection:

Wear suitable respiratory equipment in case of insufficient ventilation. EN141

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Environmental exposure controls:

Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Solid
Colour	: Beige. Black. white. Grey.
Appearance	: Paste.
Odour	: Barely perceptible odour.
Odour threshold	: Not available
Melting point	: 0 °C

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Freezing point	: Not available
Boiling point	: Not available
Flammability	: Not available
Oxidising properties	: Not oxidising.
Explosive limits	: Not applicable
Lower explosion limit	: Not applicable
Upper explosion limit	: Not applicable
Flash point	: Not applicable
Auto-ignition temperature	: Not applicable
Decomposition temperature	: Not available
SADT	: ≈ 50 °C
pH	: Not available
pH solution	: Not available
Viscosity, kinematic	: Not applicable
Solubility	: Material insoluble in water.
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: Not available
Vapour pressure at 50 °C	: Not available
Density	: Not available
Relative density	: 1.45 g/cm ³
Relative vapour density at 20 °C	: Not applicable
Particle size	: Not available
Particle size distribution	: Not available
Particle shape	: Not available
Particle aspect ratio	: Not available
Particle aggregation state	: Not available
Particle agglomeration state	: Not available
Particle specific surface area	: Not available
Particle dustiness	: Not available

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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SECTION 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity (oral) : Not classified
Acute toxicity (dermal) : Not classified
Acute toxicity (inhalation) : Not classified

DIBENZOYL PEROXIDE. (94-36-0)

LD50 oral rat	> 2000 mg/kg
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ETHYLENE GLYCOL. (107-21-1)

LD50 oral rat	7712 mg/kg bodyweight Animal: rat
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LD50 dermal	3500 mg/kg
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Skin corrosion/irritation : Not classified
Serious eye damage/irritation : Causes serious eye irritation.
Respiratory or skin sensitisation : May cause an allergic skin reaction.
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified

DIBENZOYL PEROXIDE. (94-36-0)

IARC group	3 - Not classifiable
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Reproductive toxicity : Not classified
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified

ETHYLENE GLYCOL. (107-21-1)

NOAEL (oral, rat, 90 days)	150 mg/kg bodyweight/day
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Aspiration hazard : Not classified

11.2. Information on other hazards

No additional information available

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Harmful to aquatic life with long lasting effects.
Hazardous to the aquatic environment, short-term (acute) : Not classified
Hazardous to the aquatic environment, long-term (chronic) : Harmful to aquatic life with long lasting effects.
Not rapidly degradable

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LC50 - Fish [1]	> 100 mg/l OECD TG 203
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EC50 - Other aquatic organisms [1]	> 10 mg/l OECD TG 202
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EC50 72h - Algae [1]	> 60 mg/l OECD TG 201
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DIBENZOYL PEROXIDE. (94-36-0)

LC50 - Fish [1]	0.0602 mg/l Test organisms (species): Oncorhynchus mykiss (previous name: Salmo gairdneri)
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EC50 - Crustacea [1]	0.11 mg/l Test organisms (species): Daphnia magna
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EC50 - Other aquatic organisms [1]	0.11 mg/l
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DIBENZOYL PEROXIDE. (94-36-0)	
ErC50 algae	0.071 mg/l Source: ECHA
ETHYLENE GLYCOL. (107-21-1)	
LC50 - Fish [1]	> 72860 mg/l Test organisms (species): Pimephales promelas
EC50 - Crustacea [1]	> 100 mg/l Test organisms (species): Daphnia magna
EC50 - Other aquatic organisms [1]	100 mg/l
EC50 96h - Algae [1]	6500 – 13000 mg/l Source: ECHA
NOEC (chronic)	≥ 1000 mg/l Test organisms (species): Americamysis bahia (previous name: Mysidopsis bahia) Duration: '23 d'
NOEC chronic fish	15380 mg/l
NOEC chronic crustacea	8590 mg/l

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

DIBENZOYL PEROXIDE. (94-36-0)	
Partition coefficient n-octanol/water (Log Pow)	3.46 Source: HSDB
ETHYLENE GLYCOL. (107-21-1)	
Partition coefficient n-octanol/water (Log Pow)	-1.36

12.4. Mobility in soil

ETHYLENE GLYCOL. (107-21-1)	
Mobility in soil	0.2 Source: HSDB

12.5. Results of PBT and vPvB assessment

No additional information available

12.6. Endocrine disrupting properties

No additional information available

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated

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ADR	IMDG	IATA	ADN	RID
14.2. UN proper shipping name				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.3. Transport hazard class(es)				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.4. Packing group				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
14.5. Environmental hazards				
Not regulated	Not regulated	Not regulated	Not regulated	Not regulated
No supplementary information available				

14.6. Special precautions for user

Overland transport

Not regulated

Transport by sea

Not regulated

Air transport

Not regulated

Inland waterway transport

Not regulated

Rail transport

Not regulated

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

Contains no REACH substances with Annex XVII restrictions

Contains no substance on the REACH candidate list

Contains no REACH Annex XIV substances

Contains no substance subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals.

Contains no substance subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

Contains no substance subject to REGULATION (EU) No 1005/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 September 2009 on substances that deplete the ozone layer.

Contains no substance subject to Regulation (EU) 2019/1148 of the European Parliament and of the Council of 20 June 2019 on the marketing and use of explosives precursors.

Contains no substance subject to Regulation (EC) 273/2004 of the European Parliament and of the Council of 11 February 2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances.

15.1.2. National regulations

No additional information available

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15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16: Other information

Abbreviations and acronyms:

ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative

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Abbreviations and acronyms:

ED	Endocrine disrupting properties
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Full text of H- and EUH-statements:

Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
H241	Heating may cause a fire or explosion.
H302	Harmful if swallowed.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
Org. Perox. B	Organic Peroxides, Type B
Skin Sens. 1	Skin sensitisation, Category 1
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2

The classification complies with : ATP 12

Safety Data Sheet (SDS), EU

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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John Pearce
Chief Executive, Made in Britain

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