KLIMAS

FASTENER TECHNOLOGIES

MECHANICAL ANCHORS
CONCRETE SCREWS
CHEMICAL ANCHORS

Wkręt-met
KLIMAS

POLISH
PRODUCER

Production plant no. 2 and central warehouse - total area of 30,000 m²
New investment: plants no. 3 and 4 - total area of 30,000 m²

Production plant no. 1 - total area of 20,000 m²

4 PRODUCTION AND STORAGE FACILITIES OF TOTAL AREA OF **80 000 m²**

OWN PRODUCTION

OF FASTENER TECHNOLOGIES

Production of Klimas Wkręt-met fastening technologies is held in 4 modern facilities, located in Kuźnica Kiedrzyńska and Wanaty near Częstochowa. The Company has launched production in its third facility in Wanaty which, with use of state-of-the-art technologies and applications, implements the assumptions of the Industry 4.0. programme.

ADVANCED MACHINE PARK ROLLING MILL AND STAMPING PRESS DEPARTMENT

PRODUCTION PROCESS OF STEEL PRODUCTS:

- Top-quality raw-material from European steelworks.
- Various steel grades.
- Own R&D department.
- Extensive machine park.
- Hardening (heat treatment).
- Application of protective coats.
- Possibility of painting heads and washers to RAL colours.
- Quality control at each production stage.
- Polish and European technical assessments.

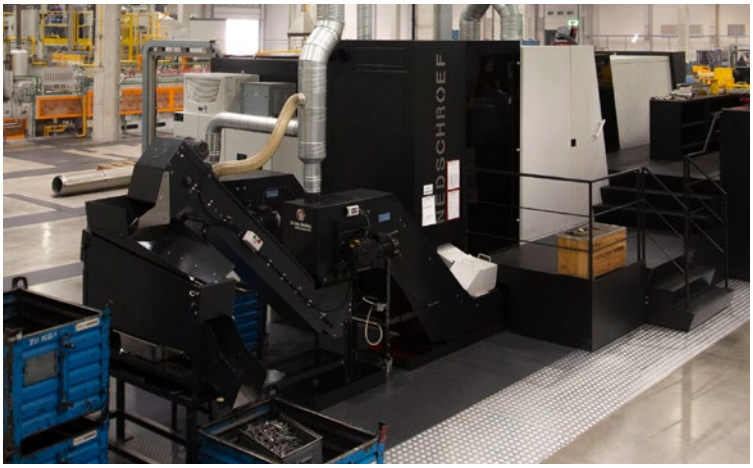
WE PRODUCE

30 000 000 pcs. of SCREWS DAILY

Production plant no. 1 - total area of 20,000 m²

ADVANCED MACHINE PARK ROLLING MILL AND STAMPING PRESS DEPARTMENT

KLIMAS
FASTENER TECHNOLOGIES



OWN PRODUCTION OF FASTENER TECHNOLOGIES

PRODUCTS DEVELOPED BY R&D
WIDE RANGE OF SIZES
TOP QUALITY

MORE THAN **400** MODERN MACHINES

KLIMAS
FASTENER TECHNOLOGIES

ADVANCED MACHINE PARK INJECTION MOULDER DEPARTMENT

- Highest quality production materials.
- Appropriate flexibility is guaranteed by conditioning of polyamide products.
- Own production using the highest quality hybrid injection moulding machines with robots.
- Automatic packing process: from carton/blister to pallet wrapping.

WE PRODUCE

9 000 000 **pcs. of PLASTIC FASTENERS** DAILY

Production plant no. 2 and central warehouse - total area of 30,000 m²

Fully-automated process of production of plastic fasteners

OWN PRODUCTION OF FASTENER TECHNOLOGIES

PRODUCTS DEVELOPED BY R&D
WIDE RANGE OF SIZES
TOP QUALITY

MORE THAN **120** **STATE-OF-THE-ART INJECTION MOULDERS**

ADVANCED MACHINE PARK HARDENING PLANT DEPARTMENT

PROCESS OF SCREW HARDENING:

- Advanced machine park including 7 hardening furnaces.
- 2 modern furnaces for hardening of screws over 200 mm long while keeping high quality of parameters – no curvature.
- Automated hardening line – high capacity.

WE HARDEN

21 000 000 pcs. of SCREWS

DAILY

CUSTOM COATING

White Zinc
Zinc coating guarantee of quality and high level of anti-corrosion protection.

Yellow Zinc
Zinc coating guarantee of quality and high level of anti-corrosion protection.

SQ Ceramic
Very high level of anti-corrosion protection (several times higher than the traditional galvanization).

Advanced machine park: **ZN yellow without CR6+.**
Advanced processing line for SQ Ceramic coating.
Automatic passivation and top coat line.
State-of-the-art robots and baths for sealing of coating.

ADVANCED PROCESSING LINE – HARDENING PLANT AND GALVANIZING LINE DEPARTMENT

PRECISION
HIGH QUALITY
HIGH PRODUCTION CAPACITY

7

HARDENING FURNACES

ADVANCED MACHINE PARK RESEARCH & DEVELOPMENT DEPARTMENT

1

1. Hardness and micro Vickers hardness testing. | 2. Assembly and load-resistance tests for all substrate categories according to ETAG. | 3. Testing thickness of corrosion protection plating using X-ray fluorescence spectroscopy tester - Fischeroscope X-RAY XDL. Analysis of chemical composition of alloy steels. | 4. Preparation of metallographic micro-sections – metallographic tests. | 5. Preparation of metallographic micro-sections – metallographic tests. | 6. Torque value testing | 7. Determination of tensile strength for wire and finished goods. 8. Metallographic tests – control of thermal and chemical treatment process, hardness, structure. | 9. Testing of corrosion resistance in salt spray/cyclic chamber. | 10. Accelerated ageing of paint coats in UV chamber. | 11. Testing of loading resistance of fasteners – characteristic pull-out strength.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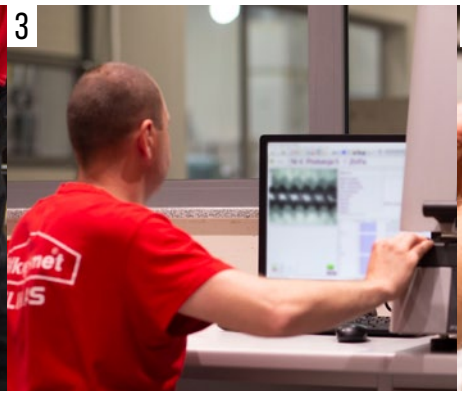
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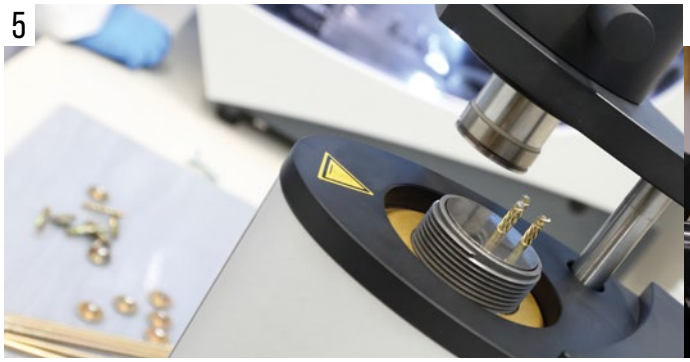
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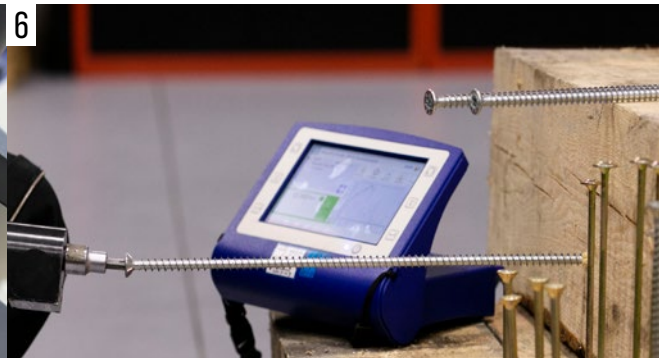
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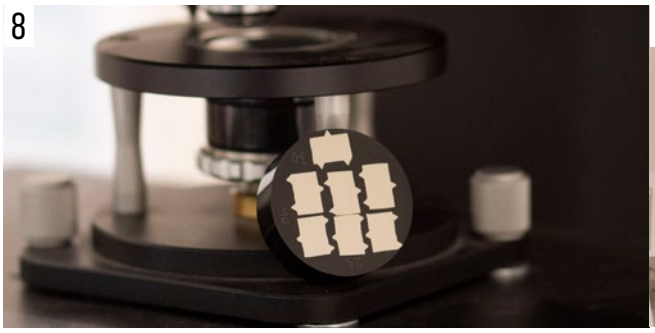
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APPROVALS
CERTIFICATES
AWARDS

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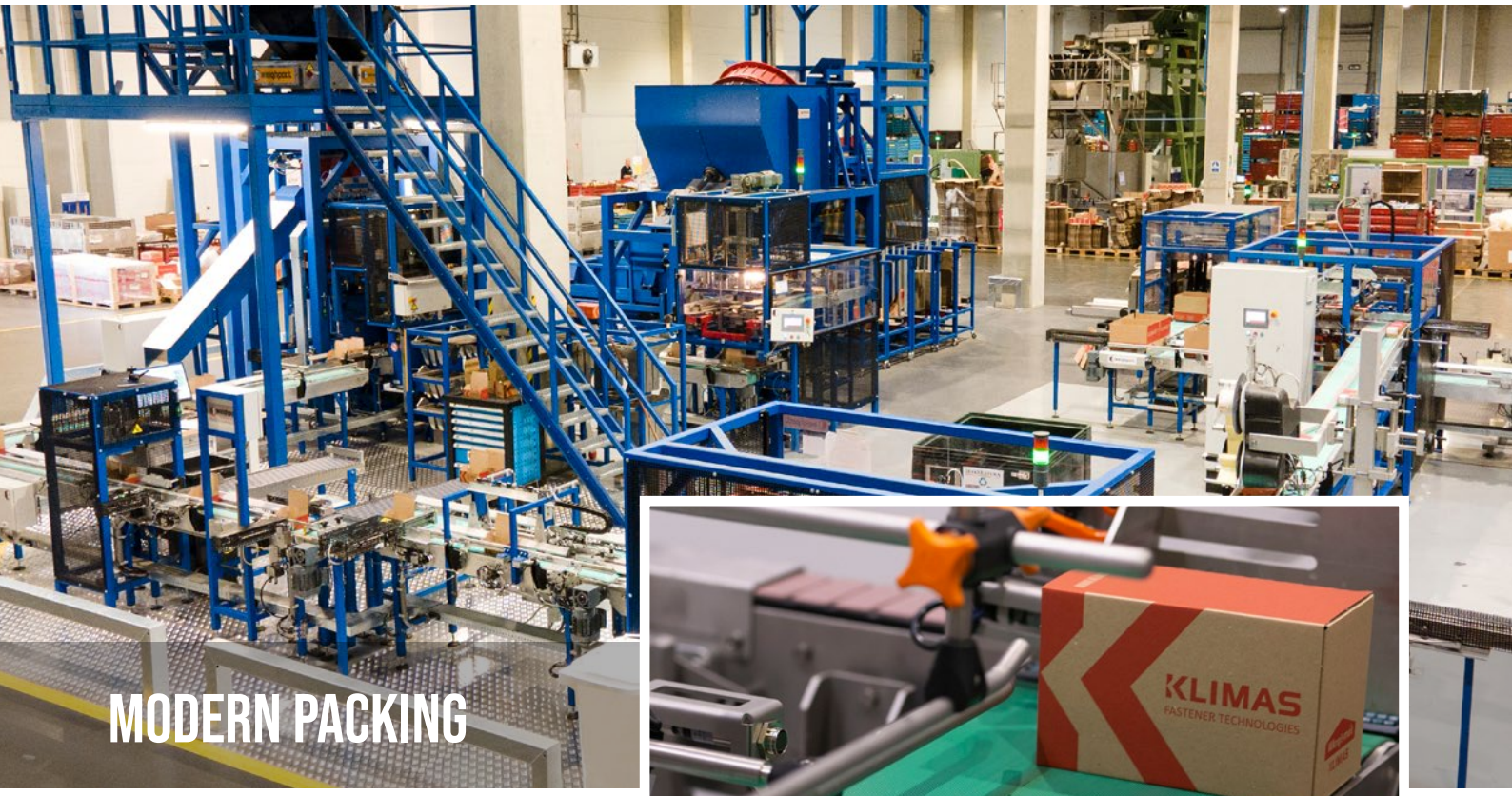
EUROPEAN APPROVALS

KLIMAS
FASTENER TECHNOLOGIES

COMPREHENSIVE SOLUTIONS PACKING DEPARTMENT AND HIGH STORAGE WAREHOUSE



MODERN PACKING

- Automated picking and packing processes.
- Most popular packaging: unit packages, bags, blisters.
- High performance

HIGH STORAGE WAREHOUSE

24 000 PALLET PLACE

BRAND MOST FREQUENTLY CHOSEN BY CONTRACTORS IN POLAND*

*according to annual research of ASM - Centre for Market Research and Analysis (2020)

Certified products - 21 European Technical Approvals and 21 Polish Technical Approvals
Our products regularly receive Polish and European technical approvals what proves their reliability. Due to these documents Polish and foreign Clients obtain a guarantee of the highest quality of Klimas Wkręt-met brand products.

Technical advisory
Caring about the Client's comfort, we ensure the assistance of technical advisors in the selection of our products. Persons interested in our offer may always count on the professional support in the selection of fastening systems adequate to the needs of the Client and requirements of the specific construction.

Partnership
Our company is set on continuous improvement of its production control processes at each stage of manufacture. We wish to provide our customers with services of the highest possible standard.

Our company offers products that find application in many different industries
Specialised sections of products reach many selected groups of customers who value and appreciate their reliability.
Klimas Wkręt-met undertakes cooperation with companies from various industries using products marked with our brand. Thus, for example, thanks to cooperation with window producers we deliver them high quality products used by them in the production process – and in return we receive the knowledge necessary for enhancing our products and developing brand new innovative products by Klimas Wkręt-met that perfectly fit the needs of a given industry or field.

Integrated Management System
Quality Management System according to PN-EN ISO 9001.
OH&S Management System according to PN-EN ISO 45001.
Energy Management System according to PN-EN ISO 50001.

PRIZES AND AWARDS

Budowlana Marka Roku 2021

For the 9th time, Klimas Wkręt-met won the most prestigious title on the market of building materials in Poland.

Forbes Diamond Award 2021

Klimas Wkręt-met has been awarded with Forbes Diamond 2021. According to the ranking compiled by Forbes Magazine and Bisnode Polska, the producer of fastening techniques dynamically increased its sales value in the last three years.

Statuettes of the Polish Windows and Doors Association

The Polish Windows and Doors Association awarded Klimas Wkręt-met for its achievements in the woodwork industry. The Association also awarded the prestigious title of Honorary Member to the founder and President of the company - Wojciech Klimas.

Construction Company of the Year

The editors and the Program Council of the "Builder" magazine once more awarded Klimas Wkręt-met the title of Construction Company of the Year. The distinction is awarded to companies characterized by dynamic development and strong market position. This title aims at selecting the most outstanding companies in the country, their promotion and popularization of good business practices.

Creator of Construction 2020

For 9 years now, the Polish Chamber of Civil Engineers has been distinguishing individuals and companies that shape the construction market with their activities, introduce new technologies and innovative solutions, as well as take care of the quality of products and services offered and can be proud of their CSR activities. The title of the Creator of Construction 2019 went to President Wojciech Klimas, as well as to the entire Klimas Wkręt-met company.

DAFA - Flat Roof and Fasade Contractors Association

The organization undertakes activities aimed at unification of executive standards and commercial conditions, creation of partnership relations, initiation of activities influencing the development of the industry and integration of environments that operate in the area of design and construction of flat roofs and facades.

POiD - Polish Windows and Doors Association

The organization unites domestic manufacturers, suppliers and distributors related to woodwork. The Association aims to combat all forms of unfair competition, set professional standards and carry out technical analyses, among other things.

PSD - Polish Roofers' Association

The Polish Roofers' Association unites professionals from the roofing industry: contractors, experts, designers, suppliers and manufacturers of construction materials for roofing.

EDG - Energy Efficient Finished Houses Association

The EDG Association is an organization associating manufacturers of prefabricated buildings and producers of materials dedicated to this type of construction in Poland. The organization places great emphasis on increasing awareness and taking care of the quality and reliability of services.

SSO - Association for External Thermal Insulation Composite Systems - ETICS

Membership in the Association for Thermal Insulation composite systems allows us to actively contribute to the development of energy efficient and sustainable construction industry. The Association unites the leading manufacturers of thermal insulation composite systems in Poland.

SDD - Wooden House Association

One of product categories carried by Klimas Wkręt-met are fasteners for wooden constructions that work great in the wooden construction industry. That is why, since 2014, the company has been a member of the Wooden House Association which promotes wood as an environmentally friendly material and gathers all stakeholders interested in the subject of wooden houses. A significant goal of the organization is to take up activities aimed at improving the quality of houses made of wood.

BCC - Business Centre Club

The Klimas Wkręt-met company has been awarded the European Medal. The award was granted by the largest organization of individual employers in the country - Business Center Club. Awards were granted by the Business Center Club on June 12th this year at Warsaw headquarter placed in the Lubomirski Palace. It was the final of the 30th edition of the event. Among the guests were European Medal winners, honorary winners, Chancellors of the BCC Regional Lodge and the representatives of the European Economic and Social Committee.

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WEDGE ANCHORS

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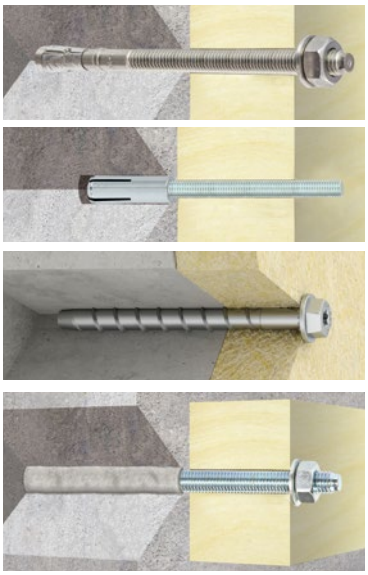
CHEMICAL ANCHORS - ACCESSORIES

TYPE OF ANCHORS



Anchoring by friction (expansion achieved by tightening) - load acting on fastener is transferred to the base material via friction forces arising between fastener and substrate. Expansion forces are achieved thanks to torque applied by tightening the screw, what cause sleeve to press against the side of drilled hole due to moving cone.

Anchoring by friction (expansion achieved by displacement) – load acting on fastener is transferred to the base material via friction forces arising between fastener and substrate. Expansion is generally achieved by impacts acting on sleeve or cone , what causes their displacement and pressing against the side of drilled hole.

Undercut fixing (achieved by screwing) – is characterised by mechanical interlock between fastener and substrate. Concrete screws are screwed into a pre-drilled cylindrical hole. The special thread of the fastener cuts an internal thread into the concrete member while setting. Installation is possible with a torque wrench or impact screw driver.

Anchoring by bonding – the load is transferred using adhesion forces between embedded metal part of fastener and substrate using resin. Bonding processes arise as a result of mixing two components (resin and hardener). By avoiding mechanical expansion, they do not introduce during installation stress into the substrate and can be installed close to each other and to substrate edges. Bonded systems could be utilised for standard anchoring purposes or also for post-installed rebaring applications. In the case of hollow masonry substrate additionally a plastic or metal mesh sleeve must be used, that prevents the resin to get lost in the voids.

FACTORS DETERMINATING SELECTION OF ANCHORS

The selection and correct installation of an anchor are essential points. Thus users should consider the following factors for the selection:

Type of fastening (structural, non-structural). Consider whether connection is of a structural type (fastening main structural members of building - e.g. beams, columns, wall plates, staircase cantilevers , etc.) or non-structural heavy elements need to be anchored or whether installation of lightweight interior furnishing elements (skirting boards, lighting elements, frames of paintings and pictures).

Substrate material (concrete strength class, cracked or non-cracked concrete, solid brick, hollow brick) - Depending on type of substrate suitable anchor must be selected. Some anchors are approved to be used in many substrates, while others are designed for a particular one type of substrate.

Value and type of load - An increase in load value determines selection of type and diameter of an anchor. For chemical anchors, it can indicate a required diameter and rod anchorage depth. A chemical anchor with a larger diameter and deeper anchorage can transfer higher loads. The direction of the load (tension, shearing, combination of these two).

Spacing and distance from edge - Fixing should be done while keeping essential installation conditions (recommended spacing and edge distances) in order to obtain full loading resistance. These values can be reduced to minimum values, however this has an impact on loading resistance of anchors and in such case, appropriate reduction factors should be applied.

Environmental conditions

Atmospheric conditions determine selection of material or anti-corrosion protection of anchor . Fastenings located in chemical plants or coastal areas are more exposed to corrosion risk.

Installation parameters and additional requirements

Fastenings located in seismic areas, dynamic loads acting, required resistance under fire exposure , type of drilling , concrete conditions. Diameter of clearance hole in fixture, installation torque value.

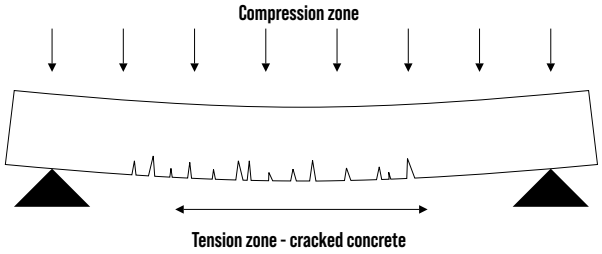
Substrate types

Wide range of construction materials are currently available on the market. Substrates in general can be divided into solid and with voids. First group includes normal weight concrete, solid ceramic and silicate bricks and Autoclaved Aerated Concrete blocks. Substrates with voids include various types of perforated bricks, hollow blocks , and all masonry materials containing any type of voids.

Cracked and uncracked concrete

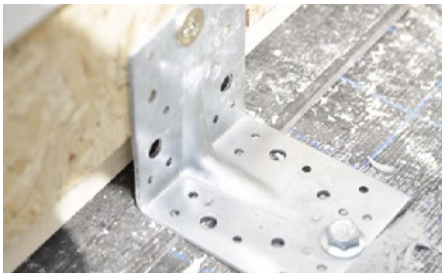
Concrete as construction material has a very high compressive strength, but its tensile strength is low. Therefore, in the zone where tensile stresses occur, steel reinforcement bars (so-called rebars) are used , which are designed to transfer tensile stresses. Such structure is called reinforced concrete.

In loaded reinforced concrete element, there are always two stress zones separated by neutral axis: tension zone and compression zone. Cracked concrete is present in the tension zone, while non-cracked in the compression zone. Micro cracks appearing in the tension zone are normal (maximum acceptable crack width is 0.3 mm). The tension zone occurs predominantly in the bottom part of the cross-section in the concrete elements supported on both ends (due to behaviour of the load), however can't be considered as general rule for all structures. The figure below shows a typical example of simply supported reinforced concrete beam with a marking of cracked zone.



The strength of concrete is defined by its class given in the form of an abbreviation (e.g. C20/25) in accordance with the EN 206:2013+A1:2016 standard. Two numbers stand for characteristic compressive strength in MPa measured on cylindrical and cubic test samples, respectively.

Masonry wall is a wall constructed from individual units, which are often laid in and bound together with the use of mortar. The individual masonry unit can be solid or with voids. Although masonry with voids have very good thermal insulation characteristics and sufficient compressive strength ,they are very weak substrate material for anchoring purposes.



DRILLING METHODS:

There are four main types of drilling:

Rotary drilling - is the use of a continuous circular motion of the drill bit without generating hammering motion. Recommended for drilling in masonry with voids and in base materials with low compressive strength. Does not cause hole enlargement due to cracking of masonry unit internal structure.

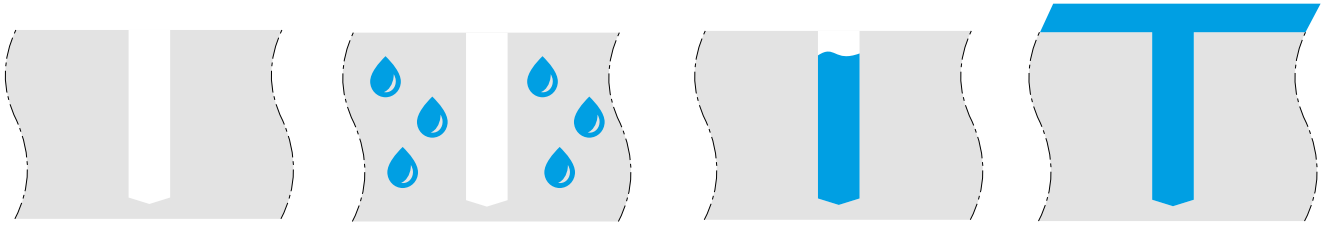
Reduced hammer drilling - drilling is performed by rotation with generating also low energy hammering motion. Recommended for base materials, which are solid but brittle.

Full hammer drilling - is a type of rotary drill with an impact mechanism that generates full energy hammering motion. Recommended for concrete substrates , which have high strength characteristics compared to other materials.

Diamond drilling – mainly used when drilling holes in reinforced concrete with a large diameter and/or large depth.

INSTALLATION CONDITIONS

There is a number of conditions, that allow installation and use in service during working life of chemical anchors. We distinguish installation and use of chemical anchors in dry concrete, wet concrete (water-saturated), water-filled holes and also in fully immersed under water conditions. Keep in mind , that the load-bearing capacity of the fastening installed in wet concrete or water-filled hole may be lower than that one performed in dry concrete.



Dry concrete | Wet concrete | Water-filled hole | Hole fully immersed under water

INSTALLATION METHODS

There are two installation methods:

Pre-positioned installation - it involves drilling a hole in the substrate , setting the anchor in the hole first and then installing the fixture. This requires preliminary marking of drilling points. The diameter of the hole in the fixture is usually smaller than in the substrate.

Push-through installation - it involves drilling a hole in the substrate , setting anchor in the hole through the fixture.The diameter of the hole in the fixture is equal or larger than in the substrate. In this case , it is not necessary to mark points of drilling.

INSTALLATION TORQUE

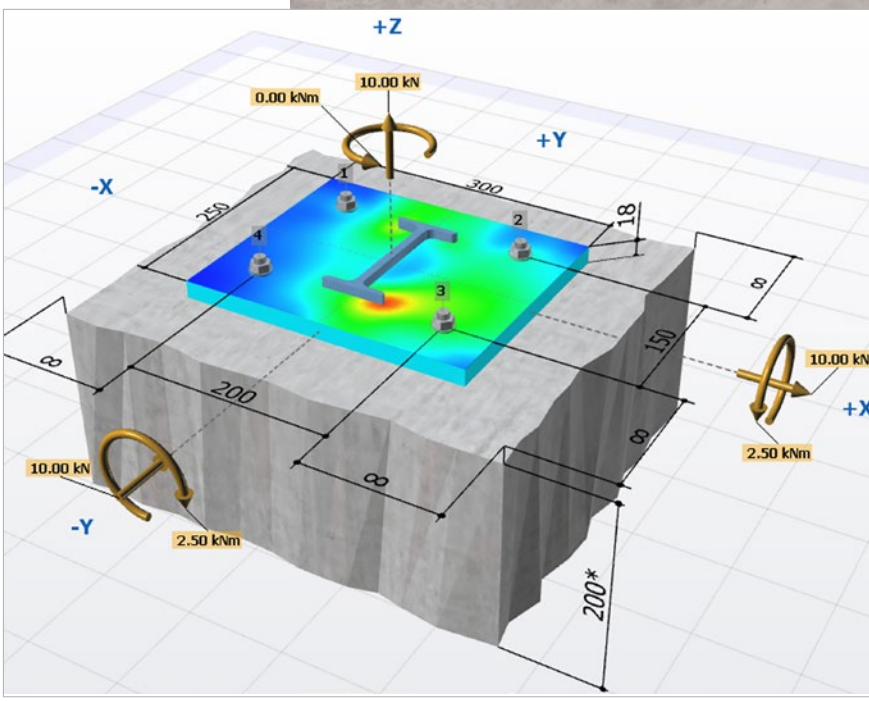
After setting the anchor in the substrate, the appropriate installation torque should be applied to secure the fixture using a calibrated torque wrench. Furthermore , it is extremely important in the case of anchors with working principle through the frictional force obtained by tightening. The correct expansion of the fastener depends on the applied value of installation tightening torque.

Design of chemical and mechanical KLIMAS anchors has never been so easy!

Klimas DesignFiX

- fast and intuitive selection of fastener

- Using our software , you can quickly and easily design anchors exactly according to your requirements and needs.
- Software is designed by engineers in accordance with the European standard EN-1992-4:2018 (Design of fastenings for use in concrete) and the standard EN 1992-1-1 (Design of post-installed rebar connections).
- Intuitive interface allow you to input all load and geometry data directly on the 3D drawing.
- The software displays the anchors that meet the required design criteria in real time and gives their percentage of utilisation.
- To save costs and installation time software chooses optimal embedment depth for chemical anchors.
- KLIMAS Design Fix software allows to design all anchor pattern according to particular standard and many shapes of base plate.
- Ideal tool for designers , engineers, architects and project site managers, but also for building owners, developers and contractors.
- Available in many languages.



Software is available free of charge.

To download our software or to get more information please contact us.

https://www.wkret-met.com/en/our-products/wkret-met-designfix

Wkręt-met
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FASTENER TECHNOLOGIES

SQ CERAMIC

10x improved resistance to corrosion*

*) compared to galvanising 5 µm

WHAT IS SQ CERAMIC?

SUPER QUALITY SQ CERAMIC

SQ Ceramic lamellar coating application technology is the modern way of protection against corrosion. Lamellar coating application technology properties are also used in the automotive and aerospace industries. The coating consists of a mix of zinc and aluminium flakes, and binding resins. The lamellar coating is characterised by exceptionally effective protection against corrosion despite a relatively thin layer. This ensures 10-time higher protection against corrosion in relation to zinc plating and 2-time higher protection in relation to hot-dip galvanizing (HDG). The coating has also high resistance to chemicals and UV radiation but does not contain heavy metals, including hexavalent chromium (VI).

KLIMAS
FASTENER TECHNOLOGIES

INNOVATIVE STRUCTURE OF SQ CERAMIC

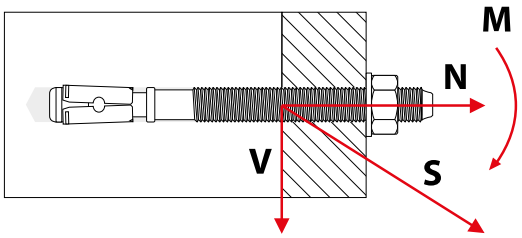
SQ CERAMIC

MAIN CHARACTERISTICS

- Very high protection against corrosion.
- Non - hexavalent chromium (Cr-VI).
- Thermal resistance up to 260°C.
- Resistant to UV.

TYPICAL CORROSIVE ENVIRONMENTS

LOADS ACTING ON ANCHORS



The following loads can act on anchors:

Tensile (or compression) force (N) – is a force trying to pull fastener out of the substrate (or pushing) acting along the axis of the fastener.

Resultant force (S) - is a single force that would produce the same effect on the fasteners as two or more forces that are applied simultaneously.

Shear force (V) – is a force acting in a direction perpendicular to the axis of the fastener applied in the point of contact of the fastener with the substrate.

Bending moment (M) – as a result of the action of the shear force at some distance from the substrate , a bending moment arises, which is the product of the length of lever arm and the value of this force.

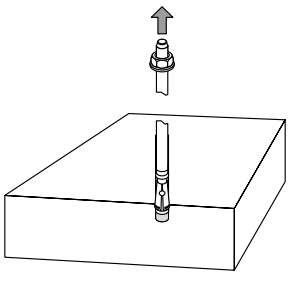
These forces can cause failure of anchor or base material and load-bearing resistance of fastening will not be provided anymore. The load-bearing capacity of the anchorage depends on the essential factors such as: substrate type, type of fastener, steel class of fastener , anchorage depth, spacing and edge distance and bond strength of resin (for chemical anchors).

Static loads - constant value load over time. Static loads include permanent loads (self-weight of the structure) and variable loads (resulting from operation, e.g. goods on a shelf).

Dynamic loads – loads of a variable value (alternating - of a sinusoidal or pulsating nature), among which, due to the frequency, we can distinguish fatigue loads (of high frequency and long duration, e.g. devices or engines), seismic or impact loads (single shock).

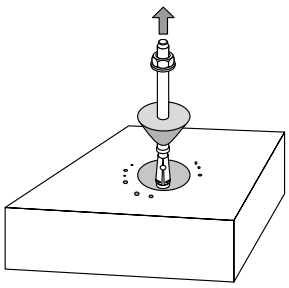
FAILURE CAUSED BY ACTION OF TENSILE AND SHEAR FORCES

TENSILE LOADS:



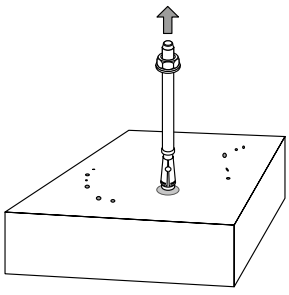
Failure of steel (fastener)

Failure mode characterized by fracture of the steel fastener part, occurs due to action of tensile force applied along the axis of a fastener. The load-bearing capacity of the anchorage depends on the class of steel the fastener is made of and its diameter.



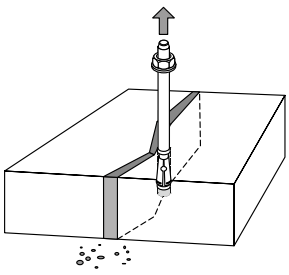
Concrete cone failure

As a result of action of tensile force the fastener, along with the substrate material, is pulled out as a cone-shaped piece. The load-bearing capacity of the anchorage depends on strength of the substrate material (class of concrete used) and the anchorage depth.



Pull-out failure

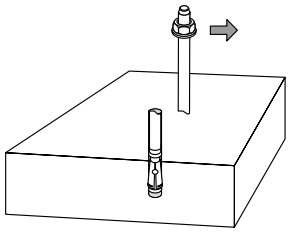
Failure mode in which the fastener due to tensile force applied is pulled out of the concrete without development of the full concrete resistance. The load-bearing capacity of the anchorage depends on pull-out resistance of the mechanical fasteners or for chemical anchors on bond strength of resin and the anchorage depth.



Splitting failure

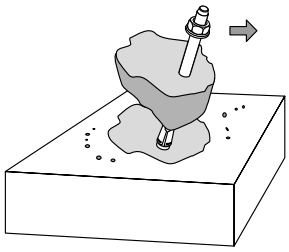
Concrete failure mode in which the concrete fractures along a plane passing through the axis of the fastener. This type of failure occurs predominantly in case when the thickness of the substrate is insufficient.

SHEAR LOADS:



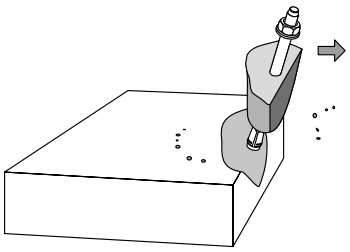
Failure of steel (fastener)

Failure mode characterized by fracture of the steel fastener part, occurs due to action of shear force applied perpendicular to the longitudinal axis of a fastener. The load-bearing capacity of the anchorage depends on the class of steel the fastener is made of and its diameter.



Pry-out failure

Concrete failure mode that corresponds to the formation of a concrete spall opposite to the loading direction under shear loading. The load-bearing capacity of the anchorage depends on strength of the substrate material (class of concrete used) and the anchorage depth.

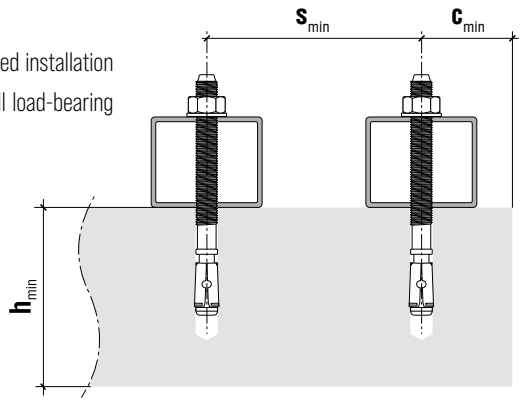


Concrete edge failure

Concrete failure mode occurring due to action of shear load applied on anchor situated near to an edge and in direction towards the edge of the concrete member in case when edge distance is insufficient.

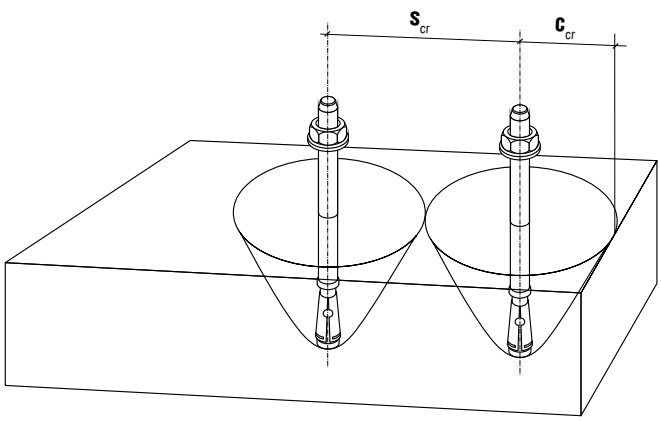
SPACING AND EDGE DISTANCE

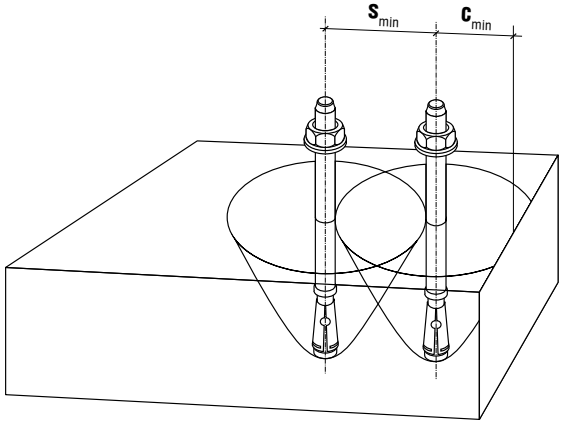
A very important point is the correct installation of the anchor along with keeping the recommended installation parameters. In such situation, the anchors can provide optimal stress distribution and achieve full load-bearing capacity.



Minimum installation parameters to be considered:

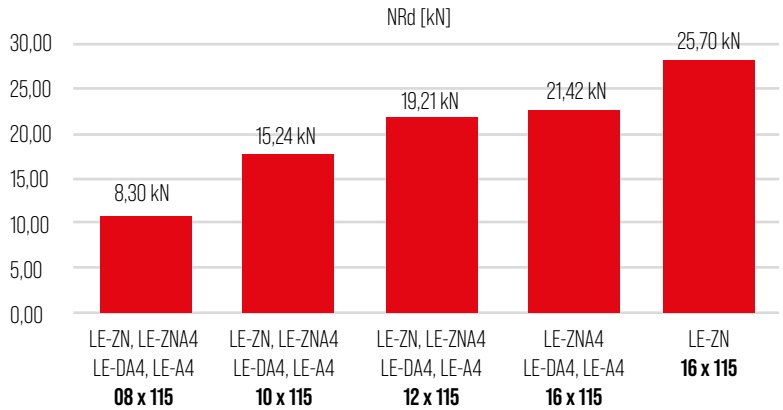
- minimum substrate thickness (depending on anchorage depth) - h_{min},
- minimum spacing between fasteners - s_{min},
- minimum edge distance - c_{min}.

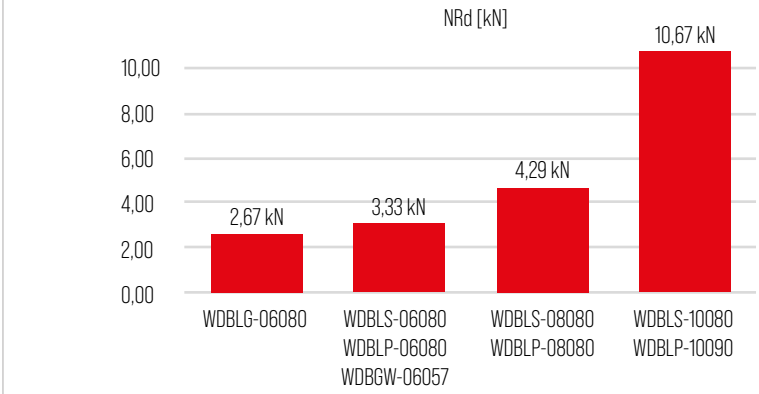




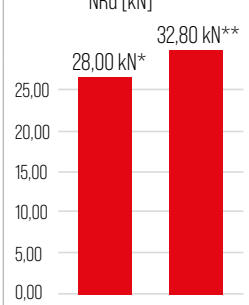
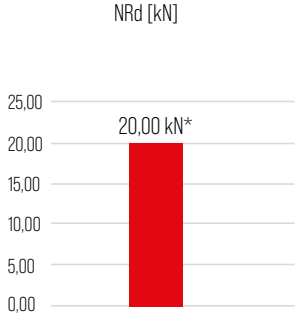
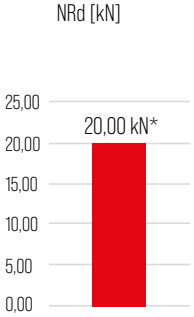
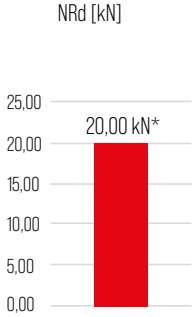
If characteristic values of spacing and edge distance can not be fulfilled , it is possible to reduce them to minimum values. To determine resistance of such anchorage , reduction factors should be taken into account as concrete cones of adjacent fasteners are overlapping each other.

WEDGE ANCHORS - TECHNICAL DATA

					
Information	Name	Wedge anchor			
	Code	LE-ZN	LE-ZNA4	LE-DA4	LE-A4
Documents	ETA	ETA 20/0640	ETA 20/0641	ETA 20/0641	ETA 20/0641
	ITB	-	-	-	-
	Seismic	-	C1 (C2 in preparation)		
	Resistance under fire exposure	R30 - R120	R30 - R120	R30 - R120	R30 - R120
Substrate	Uncracked concrete	Option 7			
	Cracked concrete		Option 1	Option 1	Option 1
Material	Galvanized	BOLT / WEDGE / NUT, WASHER	BOLT / NUT, WASHER		
	SQ Ceramic			BOLT / NUT, WASHER	
	Stainless steel A4		WEDGE	WEDGE	BOLT / WEDGE / NUT, WASHER
Tension load resistance	Design resistance of single anchor not influenced by adjacent fasteners or edges of the concrete member N_{Rd} **Assumptions:** Anchor 08 x 115, standard anchorage depth h_{ef}=40 mm Anchor 10 x 115, standard anchorage depth h_{ef}=60 mm Anchor 12 x 115, standard anchorage depth h_{ef}=70 mm Anchor 16 x 115, standard anchorage depth h_{ef}=85 mm Concrete C20/25 - uncracked				
	Page	**34**	**38**	**42**	**46**

						
Information	Name	Concrete screw with hex washer head	Concrete screw with countersunk head, TX	Concrete screw with pan head, TX	Concrete screw with external metric thread	Concrete screw with internal metric thread
	Code	**WDBLS**	**WDBLP**	**WDBLG**	**WDBGZ**	**WDBGW**
Documents	ETA	**ETA-20/0769**: WDBLS-06060 / WDBLS-06080 **ETA -20/0768**: WDBLS-08070 / WDBLS-08080 / WDBLS-10080/ WDBLS-10090 / WDBLS-10100 / WDBLS-10110 / WDBLS-10120/ WDBLS-10130 / WDBLS-10140	**ETA-20/0769**: WDBLP-06080/ WDBLP-06100/WDBLP-06120 **ETA -20/0768**: WDBLP-08080/ WDBLP-08150 / WDBLP-10090 / WDBLP-10110 / WDBLP-10150	ETA-20/0769	-	ETA-20/0769
	ITB					
	Seismic					
	Resistance under fire exposure	R30-R120	R30-R120	R30-R120	-	R30-R120
Substrate	Uncracked concrete	✓	✓	✓	✓	✓
	Cracked concrete	✓	✓	✓		✓
	Cracked concrete, multiple non-structural applications	ETA-20/0769 only for multiple fastening in non-structural applications				
	Uncracked concrete, multiple non-structural applications	ETA-20/0769 only for multiple fastening in non-structural applications				
Material	Galvanized	✓	✓	✓	✓	✓
	SQ Ceramic					
	Stainless steel A4					
Tension load resistance	Design resistance of single anchor not influenced by adjacent fasteners or edges of the concrete member N_{Rd} **Assumptions:** Concrete screw WDBLS-06080/WDBLP-06080/ WDBLG-06080/WDBGW-06057 anchorage depth h_{nom}=55 mm Concrete screw WDBLS-08080/WDBLP-08080 anchorage depth h_{nom}=65 mm Concrete screw WDBLS-10080/WDBLP-10090 anchorage depth h_{nom}=75 mm Concrete C20/25 - uncracked					
	Page	**54**	**58**	**62**	**66**	**70**

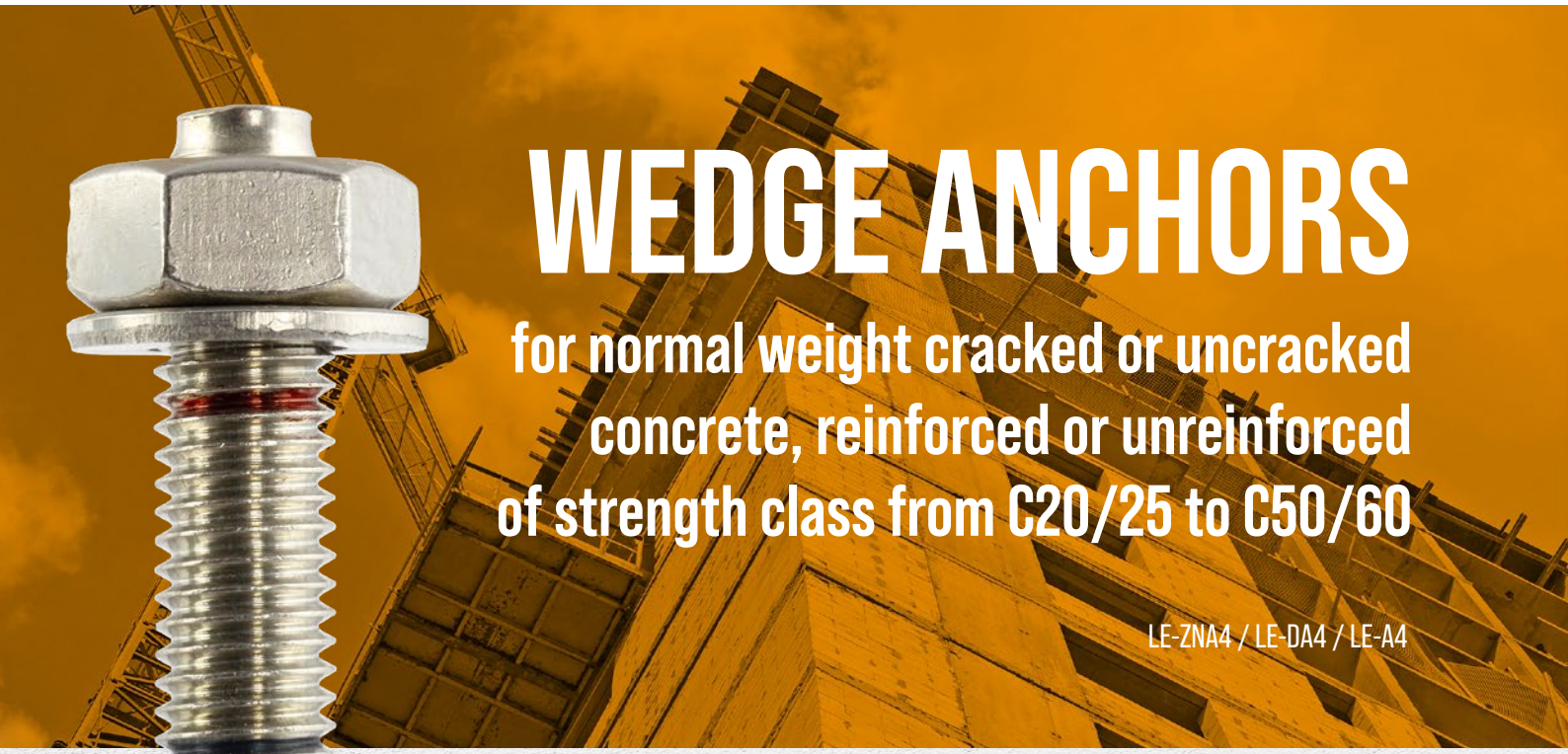
CHEMICAL ANCHORS - TECHNICAL DATA

					
Chemical anchor		MOUNT EVEREST	NANDA-KOT		
		WCF-E3	WCF-XS	WCF-XS-E	WCF-XS-C
		Standard	Standard	Tropical	Winter
Classification		PROFESSIONAL			
Type		Pure Epoxy	Hybrid		
Cartridge size		585 ml	410 ml	410 ml	410 ml
Documents	Concrete	ETA 17/0234	ETA 20/0617		
	Post-installed rebar connections	ETA 15/0681	ETA 20/0615		
	Masonry	-	-		
Steel element	Threaded rods	✓	✓		
	Rebars	✓	✓		
Substrates	Uncracked concrete	✓	✓		
	Cracked concrete	✓	✓		
	Solid clay brick	✗	✗		
	Hollow clay brick	✗	✗		
	Solid calcium silicate brick	✗	✗		
	Hollow calcium silicate brick	✗	✗		
	Hollow clay brick POROTHERM	✗	✗		
	Lightweight concrete hollow block	✗	✗		
	AAC block	✗	✗		
Base material temperature	Minimum curing time				
	(-) 10°C - (-) 5°C	-	-	-	-
	(-) 5°C - (+) 5°C	-	-	-	(from+/- 0°C) 75 min.
	(+) 5°C - (+) 10°C	24 h	145 min	-	50 min.
	(+) 10°C - (+) 20°C	(to+ 15°C) 18 h - (from + 15°C) 12 h	(to +15°C) 85 min. - (from +15°C) - 75 min.	(from + 15°C) 5 h	50 min.
	(+) 20°C - (+) 25°C	8 h	50 min.	145 min.	(+20°C) 20 min.
	(+) 25°C - (+) 30°C	6 h	40 min.	85 min.	-
	(+) 30°C	4 h	40 min.	50 min.	-
	(+) 30°C - (+) 35°C	4 h	-	50 min.	-
	(+) 35° C - (+) 40° C	2 h	-	40 min.	-
	(+) 40° C - (+) 45° C	-	-	-	-
	(+) 45° C	-	-	-	-
Tension load resistance	Design resistance of single anchor not influenced by adjacent fasteners or edges of the concrete member N_{Rd} **Assumptions:** Threaded rod M12x160, class 5.8 h_{ef} = 100 mm Concrete C20/25 - uncracked * threaded rod M12 kl. 5.8 ** threaded rod M12 kl. 8.8 (28 kN = 100 %)				
	Page	84	88	88	88

Chemical anchor		MAKALU			ELBRUS		MONT BLANC		
		WCF-EASF	WCF-EASF-E	WCF-EASF-C	WCF-VESF	WCF-VESF-E	WCF-PESF	WCF-PESF- E	WCF-PESF-C
		Standard	Tropical	Winter	Standard	Tropical	Standard	Tropical	Winter
Classification		PROFESSIONAL			BASIC				
Type		Methacrylate			Vinylester		Polyester		
Capacity		410 ml	410 ml	410 ml	300 / 410 ml	300 / 410 ml	300 ml	300 / 410 ml	300 ml
Documents	Concrete	ETA 15/0702			ETA 15/0744		ETA 15/0745		
	Post-installed rebar connections	ETA 15/0703			-		-		
	Masonry	ETA 20/0618			-		ETA 16/0677		
Steel element	Threaded rods	✓			✓		✓		
	Rebars	✓			✗		✗		
Substrates	Uncracked concrete	✓			✓		✓		
	Cracked concrete	✓			✗		✗		
	Solid clay brick	✓			✗		✓		
	Hollow clay brick	✓			✗		✓		
	Solid calcium silicate brick	✓			✗		✓		
	Hollow calcium silicate brick	✓			✗		✓		
	Hollow clay brick POROTHERM	✓			✗		✓		
	Lightweight concrete hollow block	✗			✗		✓		
	AAC block	✗			✗		✗		
Base material temperature	Minimum curing time								
	(-) 10°C - (-) 5°C	-	-	-	-	-	-	-	4 h
	(-) 5°C - (+) 5°C	-	-	(from 0°C) -75 min.	-	-	-	-	125 min.
	(+) 5°C - (+) 10°C	145 min.	-	50 min.	145 min.	-	145 min.	-	60 min.
	(+) 10°C - (+) 20°C	(to +15°C) - 85 min. from (+15°C) -75 min.	(from + 15°C) 5 h	50 min.	85 min.	5 h	85 min.	5 h	40 min.
	(+) 20°C - (+) 25°C	50 min.	145 min.	(+20°C) 20 min.	50 min.	145 min.	50 min.	145 min.	20 min.
	(+) 25°C - (+) 30°C	40 min.	85 min.	-	40 min.	85 min.	40 min.	85 min.	15 min .
	(+) 30°C	40 min.	50 min.	-	35 min.	50 min.	35 min .	50 min.	10 min .
	(+) 30°C - (+) 35°C	-	50 min.	-	-	50 min.	-	50 min.	-
	(+) 35° C - (+) 40° C	-	40 min.	-	-	40 min.	-	40 min.	-
	(+) 40° C - (+) 45° C	-	-	-	-	35 min.	-	35 min.	-
	(+) 45° C	-	-	-	-	12 min.	-	12 min.	-
Tension load resistance	Design resistance of single anchor not influenced by adjacent fasteners or edges of the concrete member N_{Rd} **Assumptions:** Threaded rod M12x160, class 5.8 h_{ef} = 100 mm Concrete C20/25 - uncracked * threaded rod M12 kl. 5.8 ** threaded rod M12 kl. 8.8 (28 kN = 100 %)	NRd [kN] 20,00 kN*	NRd [kN] 20,00 kN*	NRd [kN] 20,00 kN*	NRd [kN] 18,80 kN*	NRd [kN] 18,80 kN*	NRd [kN] 18,80 kN*	NRd [kN] 18,80 kN*	NRd [kN] 18,80 kN*
	Page	92	92	94	98	98	100	100	100

KLIMAS
FASTENER TECHNOLOGIES

STRONG FOR GENERATIONS



WEDGE ANCHORS

for normal weight cracked or uncracked concrete, reinforced or unreinforced of strength class from C20/25 to C50/60

LE-ZNA4 / LE-DA4 / LE-A4

ANTI-CORROSION PROTECTION

Galvanized steel - Guarantees high degree of anti-corrosion protection

SQ Ceramic - Special anti-scratch multi-layer aluminum-zinc lamellar coating allows the use of the anchors in environments with higher corrosivity classification.

Stainless Steel A4 - Highest level of anti-corrosion protection.

RESISTANCE UNDER FIRE EXPOSURE R30 - R120

Anchor's characteristics regarding resistance to load under fire exposure influence the safety of anchorages during a fire. Value of resistance to load under fire exposure determined for particular fire duration from R30 to R120 allows to design optimal fastenings for each type of applications complying with required fire resistance class.

LE-ZN	Wedge anchor	34
M8 M10 M12 M16	**Length:** 60 - 165 mm	**Galvanized steel**

LE-ZNA4	Wedge anchor	38
M8 M10 M12 M16	**Length:** 60 - 165 mm	**Galvanized steel + Stal A4**

LE-DA4	Wedge anchor	42
M8 M10 M12 M16	**Length:** 60 - 165 mm	**SQ Ceramic + Stainless steel A4**

LE-A4	Wedge anchor	46
M8 M10 M12 M16	**Length:** 60 - 165 mm	**Stainless steel A4**

LSI	Single sleeve steel anchor with flange nut	50
M8 M10 M12 M16	**Length:** 40 - 147 mm	**Galvanized steel**

LTP	Double sleeve anchor	50
M10 M12 M16 M20	**Length:** 100 - 250 mm	**Galvanized steel**

LM	Single sleeve steel machine anchor	50
M12 M14	**Length:** 80 mm	**Galvanized steel**

LHP, LHS, LHO, LHH	Sleeve anchor with hook	50-51
M8 M10 M12 M14	**Length:** 85 - 195 mm	**Galvanized steel**

TSW	Steel drop-in anchor	51
M6 M8 M10 M12 M16 M20	**Length:** 25 - 80 mm	**Galvanized steel**

KRM	Brass drop-in anchor	51
M8 M10 M12 M16	**Length:** 24 - 41 mm	**Brass**

Wedge anchor

LE-ZN

Powerful mechanical anchor for standard static and quasi-static loads, designed for setting in uncracked concrete.

ETA-20/0640

Zn WHITE

FIRE

SUBSTRATES

Normal weight uncracked concrete, reinforced or unreinforced of strength class from C20/25 to C50/60.

BOLT MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
HEAD TYPE	Hexagonal nut
WEDGE MATERIAL	Galvanized carbon steel
NUT AND WASHER MATERIAL	Galvanized carbon steel
INSTALLATION METHOD	Push-through installation
APPLICATION	· Machine and device installation. · Installation of railings, handrails, balustrades inside buildings. · Anchoring of base plates, consoles, cantilevers, cable trays in dry internal conditions. · Fixing of steel construction to concrete structural components in dry internal conditions inside the buildings.

	Galvanized steel
M8	LE-ZN **Length range: 60 - 155 mm**
M10	LE-ZN **Length range: 85 - 155 mm**
M2	LE-ZN **Length range: 85 - 165 mm**
M16	LE-ZN **Length range: 105 - 165 mm**

FAST AND EASY INSTALLATION

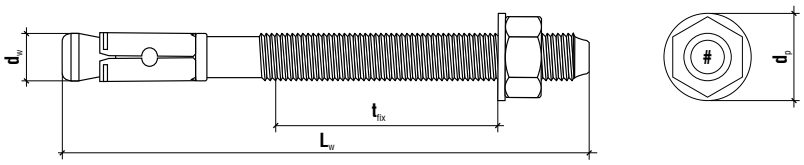
· Fast and easy installation by hammering the anchor into pre-drilled hole and tightening with required value of torque.
· Immediate loading capacity.
· The diameter of the hole is equal to anchor's bolt diameter.
· Cold formed steel prevents fracture of anchor's bolt while hammering and tightening.

THE HIGHEST PERFORMANCE PARAMETERS

State of the art machine park and many years of experience contribute to highest performance parameters of products. Our anchors are dedicated as a professional solution for structural fastenings with highest demands.

RESISTANCE UNDER FIRE EXPOSURE R30-R120

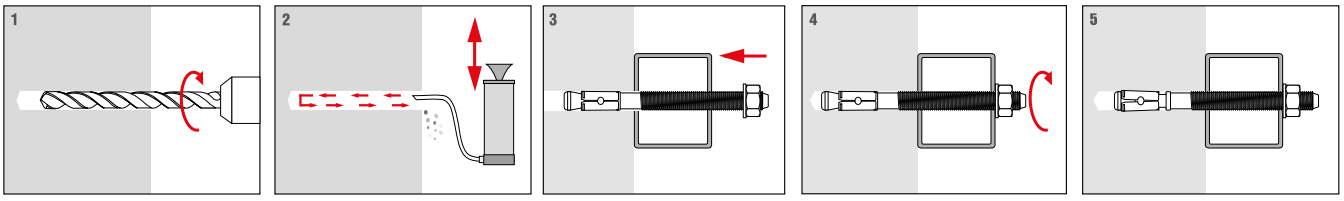
Anchor's characteristics regarding resistance to load under fire exposure influence the safety of anchorages during a fire. Value of resistance to load under fire exposure determined for particular fire duration from R30 to R120 allows to design optimal fastenings for each type of applications complying with required fire resistance class.



SELECTION TABLE

	Product code	Anchor diameter and length	Max. usable length	Thread	Head type	Unit pack quantity
		d_w x L_w [mm]	t_{fix1} / t_{fix2} [mm]	[-]	[-]	[pcs.]
			LE-ZN M8			
M8	LE-ZN-08060	8x60	5 / -	M8	SW-13	100
	LE-ZN-08075	8x75	20 / -	M8	SW-13	100
	LE-ZN-08095	8x95	40 / -	M8	SW-13	50
	LE-ZN-08115	8x115	60 / -	M8	SW-13	50
	LE-ZN-08135	8x135	80 / -	M8	SW-13	50
	LE-ZN-08155	8x155	100 / -	M8	SW-13	50
			LE-ZN M10			
M10	LE-ZN-10085	10x85	5 / 25	M10	SW-17	50
	LE-ZN-10095	10x95	15 / 35	M10	SW-17	50
	LE-ZN-10105	10x105	25 / 45	M10	SW-17	25
	LE-ZN-10115	10x115	35 / 55	M10	SW-17	25
	LE-ZN-10135	10x135	55 / 75	M10	SW-17	25
	LE-ZN-10155	10x155	75 / 95	M10	SW-17	25
			LE-ZN M12			
M12	LE-ZN-12085	12x85	- / 5	M12	SW-19	40
	LE-ZN-12095	12x95	- / 15	M12	SW-19	50
	LE-ZN-12105	12x105	5 / 25	M12	SW-19	50
	LE-ZN-12115	12x115	15 / 35	M12	SW-19	40
	LE-ZN-12125	12x125	25 / 45	M12	SW-19	25
	LE-ZN-12145	12x145	45 / 65	M12	SW-19	25
	LE-ZN-12165	12x165	65 / 85	M12	SW-19	25
			LE-ZN M16			
M16	LE-ZN-16105	16x105	- / 5	M16	SW-24	25
	LE-ZN-16115	16x115	- / 15	M16	SW-24	25
	LE-ZN-16125	16x125	5 / 25	M16	SW-24	25
	LE-ZN-16145	16x145	25 / 45	M16	SW-24	20
	LE-ZN-16165	16x165	45 / 65	M16	SW-24	15

INSTALLATION INSTRUCTIONS



LE-ZN - TECHNICAL DATA

ETA-20/0640

Zn WHITE

FIRE

INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH						
Anchor diameter	**d**	**[mm]**	**Ø8**	**Ø10**	**Ø12**	**Ø16**
Drill hole diameter	d_0	[mm]	8	10	12	16
Effective embedment depth	h_{ef}	[mm]	40	60	70	85
Depth of drill hole	$h_0 \geq$	[mm]	52	74	88	106
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	10	12	14	18
Installation torque	T_{inst}	[Nm]	20	30	50	100
Size of torque wrench	S_w	[mm]	13	17	19	24
Minimum thickness of concrete member	h_{min}	[mm]	100	120	160	170
Minimum spacing	s_{min}	[mm]	54	82	109	116
Minimum edge distance	c_{min}	[mm]	54	82	109	116
INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH						
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	120	180	210	255
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	60	90	105	127,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	200	300	400	425
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	100	150	200	215
TENSION LOAD - STANDARD EMBEDMENT DEPTH						
Characteristic resistance in case of steel failure	$N_{Rk,s}$	[kN]	16,2	27,7	38,6	71,9
Design resistance in case of steel failure ($\gamma_{M,s}$=1,81)	$N_{Rd,s}$	[kN]	8,9	15,3	21,3	39,7
Characteristic resistance in case of pull-out failure	$N_{Rk,p}$	[kN]	*	*	*	*
Design resistance in case of pull-out failure ($\gamma_{M,p}$=1,5)	$N_{Rd,p}$	[kN]	*	*	*	*
Characteristic resistance in case of concrete cone failure	$N_{Rk,c}$	[kN]	12,4	22,9	28,8	38,6
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5)	$N_{Rd,c}$	[kN]	8,3	15,2	19,2	25,7
Characteristic resistance in case of splitting failure	$N_{Rk,sp}$	[kN]	12,4	22,9	28,8	38,6
Design resistance in case of splitting failure ($\gamma_{M,sp}$=1,5)	$N_{Rd,sp}$	[kN]	8,3	15,2	19,2	25,7
SHEAR LOAD - STANDARD EMBEDMENT DEPTH						
Characteristic resistance in case of steel failure	$V_{Rk,s}$	[kN]	12,4	19,7	28,7	53,4
Design resistance in case of steel failure ($\gamma_{M,s}$=1,51)	$V_{Rd,s}$	[kN]	8,2	13,1	19,0	35,4
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	38,0	75,4	131,6	316,0
Design bending resistance ($\gamma_{M,s}$ =1,51)	$M_{Rd,s}$	[Nm]	25,2	49,9	87,2	209,2
Characteristic resistance in case of concrete pry-out failure	$V_{Rk,cp}$	[kN]	12,4	22,9	28,8	77,1
Design resistance in case of concrete pry-out failure ($\gamma_{M,cp}$ =1,5)	$V_{Rd,cp}$	[kN]	8,3	15,2	19,2	51,4

* - is not decisive

LE-ZN - TECHNICAL DATA

ETA-20/0640

Zn WHITE

FIRE

INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH						
Anchor diameter	**d**	**[mm]**	**Ø8**	**Ø10**	**Ø12**	**Ø16**
Drill hole diameter	d_0	[mm]	-	10	12	16
Effective embedment depth	h_{ef}	[mm]	-	40	50	65
Depth of drill hole	$h_0 \geq$	[mm]	-	54	68	86
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	-	12	14	18
Installation torque	T_{inst}	[Nm]	-	30	50	100
Size of torque wrench	S_w	[mm]	-	17	19	24
Minimum thickness of concrete member	h_{min}	[mm]	-	100	100	130
Minimum spacing	s_{min}	[mm]	-	54	68	88
Minimum edge distance	c_{min}	[mm]	-	54	68	88
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH						
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	-	120	150	195
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	-	60	75	97,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	-	200	250	325
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	-	100	125	165
TENSION LOAD - REDUCED EMBEDMENT DEPTH						
Characteristic resistance in case of steel failure	$N_{Rk,s}$	[kN]	-	27,7	38,6	71,9
Design resistance in case of steel failure ($\gamma_{M,s}$=1,81)	$N_{Rd,s}$	[kN]	-	15,3	21,3	39,7
Characteristic resistance in case of pull-out failure	$N_{Rk,p}$	[kN]	-	*	*	*
Design resistance in case of pull-out failure ($\gamma_{M,p}$=1,5)	$N_{Rd,p}$	[kN]	-	*	*	*
Characteristic resistance in case of concrete cone failure	$N_{Rk,c}$	[kN]	-	12,4	17,4	25,8
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5)	$N_{Rd,c}$	[kN]	-	8,3	11,6	17,2
Characteristic resistance in case of splitting failure	$N_{Rk,sp}$	[kN]	-	12,4	17,4	25,8
Design resistance in case of splitting failure ($\gamma_{M,sp}$=1,5)	$N_{Rd,sp}$	[kN]	-	8,3	11,6	17,2
SHEAR LOAD - REDUCED EMBEDMENT DEPTH						
Characteristic resistance in case of steel failure	$V_{Rk,s}$	[kN]	-	19,7	28,7	53,4
Design resistance in case of steel failure ($\gamma_{M,s}$=1,51)	$V_{Rd,s}$	[kN]	-	13,1	19,0	35,4
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	-	75,4	131,6	316,0
Design bending resistance ($\gamma_{M,s}$ =1,51)	$M_{Rd,s}$	[Nm]	-	49,9	87,2	209,2
Characteristic resistance in case of concrete pry-out failure	$V_{Rk,cp}$	[kN]	-	12,4	17,4	51,6
Design resistance in case of concrete pry-out failure ($\gamma_{M,cp}$ =1,5)	$V_{Rd,cp}$	[kN]	-	8,3	11,6	34,4

* - is not decisive

Wedge anchor

LE-ZNA4

Powerful mechanical anchor for static, quasi-static and seismic loads, designed for setting in both cracked or uncracked concrete.

ETA-20/0641

	Galvanized steel + Stainless steel A4
M8	LE-ZNA4 **Length range: 60 - 155 mm**
M10	LE-ZNA4 **Length range: 85 - 155 mm**
M2	LE-ZNA4 **Length range: 85 - 165 mm**
M16	LE-ZNA4 **Length range: 105 - 165 mm**

SUBSTRATES

Normal weight cracked or uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

BOLT MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
HEAD TYPE	Hexagonal nut
WEDGE MATERIAL	Stainless steel A4
NUT AND WASHER MATERIAL	Galvanized carbon steel
INSTALLATION METHOD	Push-through installation
APPLICATION	· Installation of facade steel substructures in non-aggressive environments. · Machine and device installation. · Installation of railings, handrails, balustrades inside buildings. · Anchoring of base plates, consoles, cantilevers, cable trays in dry internal conditions. · Fixing of steel construction to concrete structural components in dry internal conditions inside the buildings.

FAST AND EASY INSTALLATION

· Fast and easy installation by hammering the anchor into pre-drilled hole and tightening with required value of torque.
· Immediate loading capacity.
· The diameter of the hole is equal to anchor's bolt diameter.
· Cold formed steel prevents fracture of anchor's bolt while hammering and tightening.

THE HIGHEST PERFORMANCE PARAMETERS

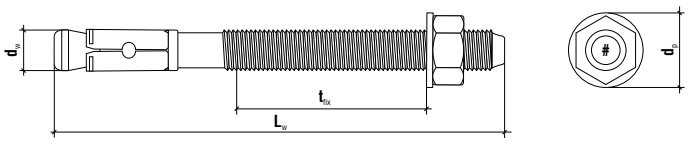
State of the art machine park and many years of experience contribute to highest performance parameters of products. Our anchors are dedicated as a professional solution for structural fastenings with highest demands.

RESISTANCE UNDER FIRE EXPOSURE R30-R120

Anchor's characteristics regarding resistance to load under fire exposure influence the safety of anchorages during a fire. Value of resistance to load under fire exposure determined for particular fire duration from R30 to R120 allows to design optimal fastenings for each type of applications complying with required fire resistance class.

SEISMIC APPROVAL C1

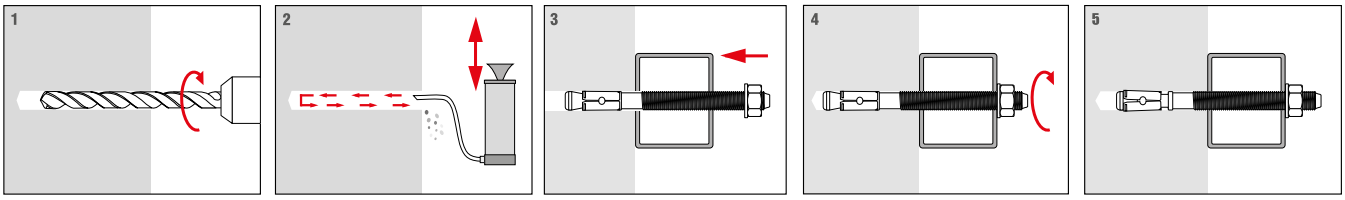
Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.



SELECTION TABLE

	Product code	Anchor diameter and length	Max. usable length	Thread	Head type	Unit pack quantity
		$d_w \times L_w$ [mm]	t_{fix1} / t_{fix2} [mm]	[-]	[-]	[pcs.]
LE-ZNA4 M8						
M8	LE-ZNA4-08060	8x60	5 / -	M8	SW-13	100
	LE-ZNA4-08075	8x75	20 / -	M8	SW-13	100
	LE-ZNA4-08095	8x95	40 / -	M8	SW-13	50
	LE-ZNA4-08115	8x115	60 / -	M8	SW-13	50
	LE-ZNA4-08135	8x135	80 / -	M8	SW-13	50
	LE-ZNA4-08155	8x155	100 / -	M8	SW-13	50
LE-ZNA4 M10						
M10	LE-ZNA4-10085	10x85	5 / 25	M10	SW-17	50
	LE-ZNA4-10095	10x95	15 / 35	M10	SW-17	50
	LE-ZNA4-10105	10x105	25 / 45	M10	SW-17	25
	LE-ZNA4-10115	10x115	35 / 55	M10	SW-17	25
	LE-ZNA4-10135	10x135	55 / 75	M10	SW-17	25
	LE-ZNA4-10155	10x155	75 / 95	M10	SW-17	25
LE-ZNA4 M12						
M12	LE-ZNA4-12085	12x85	- / 5	M12	SW-19	40
	LE-ZNA4-12095	12x95	- / 15	M12	SW-19	50
	LE-ZNA4-12105	12x105	5 / 25	M12	SW-19	50
	LE-ZNA4-12115	12x115	15 / 35	M12	SW-19	40
	LE-ZNA4-12125	12x125	25 / 45	M12	SW-19	25
	LE-ZNA4-12145	12x145	45 / 65	M12	SW-19	25
	LE-ZNA4-12165	12x165	65 / 85	M12	SW-19	25
LE-ZNA4 M16						
M16	LE-ZNA4-16105	16x105	- / 5	M16	SW-24	25
	LE-ZNA4-16115	16x115	- / 15	M16	SW-24	25
	LE-ZNA4-16125	16x125	5 / 25	M16	SW-24	25
	LE-ZNA4-16145	16x145	25 / 45	M16	SW-24	20
	LE-ZNA4-16165	16x165	45 / 65	M16	SW-24	15

INSTALLATION INSTRUCTIONS



LE-ZNA4 - TECHNICAL DATA

ETA-20/0641

Anchor diameter		d	[mm]	Ø8	Ø10	Ø12	Ø16
INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH							
Drill hole diameter		d_0	[mm]	8	10	12	16
Effective embedment depth		h_{ef}	[mm]	40	60	70	85
Depth of drill hole		$h_0 \geq$	[mm]	52	74	88	106
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	10	12	14	18
Installation torque		T_{inst}	[Nm]	20	30	50	100
Size of torque wrench		S_w	[mm]	13	17	19	24
Minimum thickness of concrete member		h_{min}	[mm]	100	120	160	170
Minimum spacing		s_{min}	[mm]	54	82	109	116
Minimum edge distance		c_{min}	[mm]	54	82	109	116
INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH							
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$s_{cr,N}$	[mm]	120	180	210	255
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$c_{cr,N}$	[mm]	60	90	105	127,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$s_{cr,sp}$	[mm]	200	300	400	425
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$c_{cr,sp}$	[mm]	100	150	200	215
TENSION LOAD - STANDARD EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	16,2	27,7	38,6	71,9
Design resistance in case of steel failure ($\gamma_{M,s}$=1,57)		$N_{Rd,s}$	[kN]	10,3	17,6	24,6	45,8
Characteristic resistance in case of failure by pull-out		$N_{Rk,p}$	[kN]	*	*	*	*
Design resistance in case of failure by pull-out ($\gamma_{M,p}$=1,5 for M8, M10, M12 | $\gamma_{M,p}$=1,8 for M16)		$N_{Rd,p}$	[kN]	*	*	*	*
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	12,4	22,9	28,8	38,6
	cracked concrete	$N_{Rk,c}$	[kN]	8,7	16,0	20,2	27,0
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5 for M8, M10, M12 | $\gamma_{M,c}$=1,8 for M16)	uncracked concrete	$N_{Rd,c}$	[kN]	8,3	15,2	19,2	21,4
	cracked concrete	$N_{Rd,c}$	[kN]	5,8	10,7	13,4	15,0
Characteristic resistance of a single anchor in case of splitting failure	uncracked concrete	$N_{Rk,sp}$	[kN]	12,4	22,9	28,8	38,6
	cracked concrete	$N_{Rk,sp}$	[kN]	8,7	16,0	20,2	27,0
Design resistance of a single anchor in case of splitting failure ($\gamma_{M,sp}$=1,5 for M8, M10, M12 | $\gamma_{M,sp}$=1,8 for M16)	uncracked concrete	$N_{Rd,sp}$	[kN]	8,3	15,2	19,2	21,4
	cracked concrete	$N_{Rd,sp}$	[kN]	5,8	10,7	13,4	15,0
SHEAR LOAD - STANDARD EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	12,4	19,7	26,6	49,6
Design resistance in case of steel failure ($\gamma_{M,s}$=1,31)		$V_{Rd,s}$	[kN]	9,5	15,1	20,3	37,9
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	25,5	50,8	89,1	226,4
Design bending resistance ($\gamma_{M,s}$ =1,31)		$M_{Rd,s}$	[Nm]	19,5	38,8	68,0	172,8

* - is not decisive

LE-ZNA4 - TECHNICAL DATA

ETA-20/0641

Anchor diameter		d	[mm]	Ø8	Ø10	Ø12	Ø16
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH							
Drill hole diameter		d_0	[mm]	-	10	12	16
Effective embedment depth		h_{ef}	[mm]	-	40	50	65
Depth of drill hole		$h_0 \geq$	[mm]	-	54	68	86
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	-	12	14	18
Installation torque		T_{inst}	[Nm]	-	30	50	100
Size of torque wrench		S_w	[mm]	-	17	19	24
Minimum thickness of concrete member		h_{min}	[mm]	-	100	100	130
Minimum spacing		s_{min}	[mm]	-	54	68	88
Minimum edge distance		c_{min}	[mm]	-	54	68	88
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH							
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$s_{cr,N}$	[mm]	-	120	150	195
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$c_{cr,N}$	[mm]	-	60	75	97,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$s_{cr,sp}$	[mm]	-	200	250	325
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$c_{cr,sp}$	[mm]	-	100	125	165
TENSION LOAD - REDUCED EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	-	27,7	38,6	71,9
Design resistance in case of steel failure ($\gamma_{M,s}$=1,57)		$N_{Rd,s}$	[kN]	-	17,6	24,6	45,8
Characteristic resistance in case of failure by pull-out		$N_{Rk,p}$	[kN]	-	*	*	*
Design resistance in case of failure by pull-out ($\gamma_{M,p}$=1,5 for M8, M10, M12 | $\gamma_{M,p}$=1,8 for M16)		$N_{Rd,p}$	[kN]	-	*	*	*
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	-	12,4	17,4	25,8
	cracked concrete	$N_{Rk,c}$	[kN]	-	8,7	12,2	18,0
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5 for M8, M10, M12 | $\gamma_{M,c}$=1,8 for M16)	uncracked concrete	$N_{Rd,c}$	[kN]	-	8,3	11,6	14,3
	cracked concrete	$N_{Rd,c}$	[kN]	-	5,8	8,1	10,0
Characteristic resistance of a single anchor in case of splitting failure	uncracked concrete	$N_{Rk,sp}$	[kN]	-	12,4	17,4	25,8
	cracked concrete	$N_{Rk,sp}$	[kN]	-	8,7	12,2	18,0
Design resistance of a single anchor in case of splitting failure ($\gamma_{M,sp}$=1,5 for M8, M10, M12 | $\gamma_{M,sp}$=1,8 for M16)	uncracked concrete	$N_{Rd,sp}$	[kN]	-	8,3	11,6	14,3
	cracked concrete	$N_{Rd,sp}$	[kN]	-	5,8	8,1	10,0
SHEAR LOAD - REDUCED EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	-	19,7	26,6	49,6
Design resistance in case of steel failure ($\gamma_{M,s}$=1,31)		$V_{Rd,s}$	[kN]	-	15,1	20,3	37,9
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	-	50,8	89,1	226,4
Design bending resistance ($\gamma_{M,s}$ =1,31)		$M_{Rd,s}$	[Nm]	-	38,8	68,0	172,8

* - is not decisive

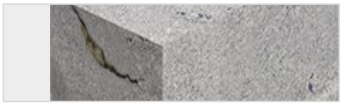
Wedge anchor

LE-DA4

Powerful mechanical anchor for static, quasi-static and seismic loads, designed for setting in both cracked or uncracked concrete.

ETA-20/0641

SUBSTRATES



Normal weight cracked or uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

BOLT MATERIAL	Carbon steel
CORROSION PROTECTION	SQ Ceramic
HEAD TYPE	Hexagonal nut
WEDGE MATERIAL	Stainless steel A4
NUT AND WASHER MATERIAL	SQ Ceramic
INSTALLATION METHOD	Push-through installation
APPLICATION	· Installation of facade steel substructures in environments requiring higher level of corrosion protection · Machine and device installation in environments requiring higher level of corrosion protection · Installation of railings, handrails, balustrades in environments requiring higher level of corrosion protection. · Anchoring of base plates, consoles, cantilevers, cable trays in environments requiring higher level of corrosion protection. · Fixing of steel construction to concrete structural components in environments requiring higher level of corrosion protection.

	SQ Ceramic + Stainless steel A4
M8	LE-DA4 **Length range: 60 - 155 mm**
M10	LE-DA4 **Length range: 85 - 155 mm**
M2	LE-DA4 **Length range: 85 - 165 mm**
M16	LE-DA4 **Length range: 105 - 165 mm**

FAST AND EASY INSTALLATION

· Fast and easy installation by hammering the anchor into pre-drilled hole and tightening with required value of torque.
· Immediate loading capacity.
· The diameter of the hole is equal to anchor's bolt diameter.
· Cold formed steel prevents fracture of anchor's bolt while hammering and tightening.

THE HIGHEST PERFORMANCE PARAMETERS

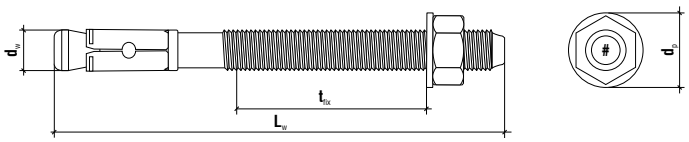
State of the art machine park and many years of experience contribute to highest performance parameters of products. Our anchors are dedicated as a professional solution for structural fastenings with highest demands.

RESISTANCE UNDER FIRE EXPOSURE R30-R120

Anchor's characteristics regarding resistance to load under fire exposure influence the safety of anchorages during a fire. Value of resistance to load under fire exposure determined for particular fire duration from R30 to R120 allows to design optimal fastenings for each type of applications complying with required fire resistance class.

SEISMIC APPROVAL C1

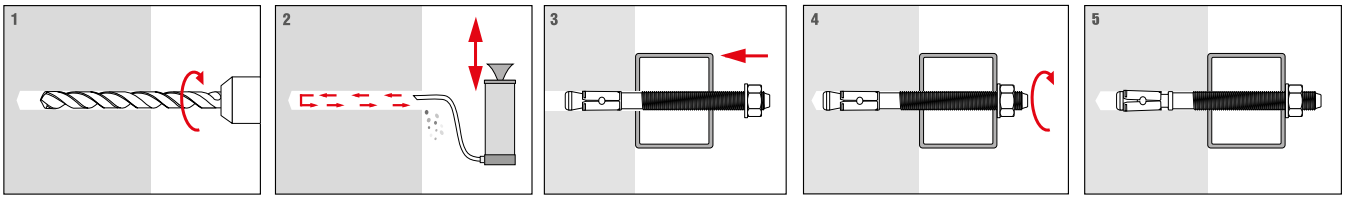
Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.



SELECTION TABLE

	Product code	Anchor diameter and length	Max. usable length	Thread	Head type	Unit pack quantity
		$d_w \times L_w$ [mm]	t_{fix1} / t_{fix2} [mm]	[-]	[-]	[pcs.]
LE-DA4 M8						
M8	LE-DA4-08060	8x60	5 / -	M8	SW-13	100
	LE-DA4-08075	8x75	20 / -	M8	SW-13	100
	LE-DA4-08095	8x95	40 / -	M8	SW-13	50
	LE-DA4-08115	8x115	60 / -	M8	SW-13	50
	LE-DA4-08135	8x135	80 / -	M8	SW-13	50
	LE-DA4-08155	8x155	100 / -	M8	SW-13	50
LE-DA4 M10						
M10	LE-DA4-10085	10x85	5 / 25	M10	SW-17	50
	LE-DA4-10095	10x95	15 / 35	M10	SW-17	50
	LE-DA4-10105	10x105	25 / 45	M10	SW-17	25
	LE-DA4-10115	10x115	35 / 55	M10	SW-17	25
	LE-DA4-10135	10x135	55 / 75	M10	SW-17	25
	LE-DA4-10155	10x155	75 / 95	M10	SW-17	25
LE-DA4 M12						
M12	LE-DA4-12085	12x85	- / 5	M12	SW-19	40
	LE-DA4-12095	12x95	- / 15	M12	SW-19	50
	LE-DA4-12105	12x105	5 / 25	M12	SW-19	50
	LE-DA4-12115	12x115	15 / 35	M12	SW-19	40
	LE-DA4-12125	12x125	25 / 45	M12	SW-19	25
	LE-DA4-12145	12x145	45 / 65	M12	SW-19	25
	LE-DA4-12165	12x165	65 / 85	M12	SW-19	25
LE-DA4 M16						
M16	LE-DA4-16105	16x105	- / 5	M16	SW-24	25
	LE-DA4-16115	16x115	- / 15	M16	SW-24	25
	LE-DA4-16125	16x125	5 / 25	M16	SW-24	25
	LE-DA4-16145	16x145	25 / 45	M16	SW-24	20
	LE-DA4-16165	16x165	45 / 65	M16	SW-24	15

INSTALLATION INSTRUCTIONS



LE-DA4 - TECHNICAL DATA

ETA-20/0641

Anchor diameter		d	[mm]	Ø8	Ø10	Ø12	Ø16
INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH							
Drill hole diameter		d_0	[mm]	8	10	12	16
Effective embedment depth		h_{ef}	[mm]	40	60	70	85
Depth of drill hole		$h_0 \geq$	[mm]	52	74	88	106
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	10	12	14	18
Installation torque		T_{inst}	[Nm]	20	30	50	100
Size of torque wrench		S_w	[mm]	13	17	19	24
Minimum thickness of concrete member		h_{min}	[mm]	100	120	160	170
Minimum spacing		s_{min}	[mm]	54	82	109	116
Minimum edge distance		c_{min}	[mm]	54	82	109	116
INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH							
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$s_{cr,N}$	[mm]	120	180	210	255
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$c_{cr,N}$	[mm]	60	90	105	127,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$s_{cr,sp}$	[mm]	200	300	400	425
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$c_{cr,sp}$	[mm]	100	150	200	215
TENSION LOAD - STANDARD EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	16,2	27,7	38,6	71,9
Design resistance in case of steel failure ($\gamma_{M,s}$=1,57)		$N_{Rd,s}$	[kN]	10,3	17,6	24,6	45,8
Characteristic resistance in case of failure by pull-out		$N_{Rk,p}$	[kN]	*	*	*	*
Design resistance in case of failure by pull-out ($\gamma_{M,p}$=1,5 for M8, M10, M12 | $\gamma_{M,p}$=1,8 for M16)		$N_{Rd,p}$	[kN]	*	*	*	*
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	12,4	22,9	28,8	38,6
	cracked concrete	$N_{Rk,c}$	[kN]	8,7	16,0	20,2	27,0
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5 for M8, M10, M12 | $\gamma_{M,c}$=1,8 for M16)	uncracked concrete	$N_{Rd,c}$	[kN]	8,3	15,2	19,2	21,4
	cracked concrete	$N_{Rd,c}$	[kN]	5,8	10,7	13,4	15,0
Characteristic resistance of a single anchor in case of splitting failure	uncracked concrete	$N_{Rk,sp}$	[kN]	12,4	22,9	28,8	38,6
	cracked concrete	$N_{Rk,sp}$	[kN]	8,7	16,0	20,2	27,0
Design resistance of a single anchor in case of splitting failure ($\gamma_{M,sp}$=1,5 for M8, M10, M12 | $\gamma_{M,sp}$=1,8 for M16)	uncracked concrete	$N_{Rd,sp}$	[kN]	8,3	15,2	19,2	21,4
	cracked concrete	$N_{Rd,sp}$	[kN]	5,8	10,7	13,4	15,0
SHEAR LOAD - STANDARD EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	12,4	19,7	26,6	49,6
Design resistance in case of steel failure ($\gamma_{M,s}$=1,31)		$V_{Rd,s}$	[kN]	9,5	15,1	20,3	37,9
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	25,5	50,8	89,1	226,4
Design bending resistance ($\gamma_{M,s}$ =1,31)		$M_{Rd,s}$	[Nm]	19,5	38,8	68,0	172,8

* - is not decisive

LE-DA4 - TECHNICAL DATA

ETA-20/0641

Anchor diameter		d	[mm]	Ø8	Ø10	Ø12	Ø16
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH							
Drill hole diameter		d_0	[mm]	-	10	12	16
Effective embedment depth		h_{ef}	[mm]	-	40	50	65
Depth of drill hole		$h_0 \geq$	[mm]	-	54	68	86
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	-	12	14	18
Installation torque		T_{inst}	[Nm]	-	30	50	100
Size of torque wrench		S_w	[mm]	-	17	19	24
Minimum thickness of concrete member		h_{min}	[mm]	-	100	100	130
Minimum spacing		s_{min}	[mm]	-	54	68	88
Minimum edge distance		c_{min}	[mm]	-	54	68	88
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH							
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$s_{cr,N}$	[mm]	-	120	150	195
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$c_{cr,N}$	[mm]	-	60	75	97,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$s_{cr,sp}$	[mm]	-	200	250	325
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$c_{cr,sp}$	[mm]	-	100	125	165
TENSION LOAD - REDUCED EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	-	27,7	38,6	71,9
Design resistance in case of steel failure ($\gamma_{M,s}$=1,57)		$N_{Rd,s}$	[kN]	-	17,6	24,6	45,8
Characteristic resistance in case of failure by pull-out		$N_{Rk,p}$	[kN]	-	*	*	*
Design resistance in case of failure by pull-out ($\gamma_{M,p}$=1,5 for M8, M10, M12 | $\gamma_{M,p}$=1,8 for M16)		$N_{Rd,p}$	[kN]	-	*	*	*
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	-	12,4	17,4	25,8
	cracked concrete	$N_{Rk,c}$	[kN]	-	8,7	12,2	18,0
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5 for M8, M10, M12 | $\gamma_{M,c}$=1,8 for M16)	uncracked concrete	$N_{Rd,c}$	[kN]	-	8,3	11,6	14,3
	cracked concrete	$N_{Rd,c}$	[kN]	-	5,8	8,1	10,0
Characteristic resistance of a single anchor in case of splitting failure	uncracked concrete	$N_{Rk,sp}$	[kN]	-	12,4	17,4	25,8
	cracked concrete	$N_{Rk,sp}$	[kN]	-	8,7	12,2	18,0
Design resistance of a single anchor in case of splitting failure ($\gamma_{M,sp}$=1,5 for M8, M10, M12 | $\gamma_{M,sp}$=1,8 for M16)	uncracked concrete	$N_{Rd,sp}$	[kN]	-	8,3	11,6	14,3
	cracked concrete	$N_{Rd,sp}$	[kN]	-	5,8	8,1	10,0
SHEAR LOAD - REDUCED EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	-	19,7	26,6	49,6
Design resistance in case of steel failure ($\gamma_{M,s}$=1,31)		$V_{Rd,s}$	[kN]	-	15,1	20,3	37,9
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	-	50,8	89,1	226,4
Design bending resistance ($\gamma_{M,s}$ =1,31)		$M_{Rd,s}$	[Nm]	-	38,8	68,0	172,8

* - is not decisive

	Stainless steel A4
M8	LE-A4 **Length range: 60 - 155 mm**
M10	LE-A4 **Length range: 85 - 155 mm**
M2	LE-A4 **Length range: 85 - 165 mm**
M16	LE-A4 **Length range: 105 - 165 mm**

Wedge anchor

LE-A4

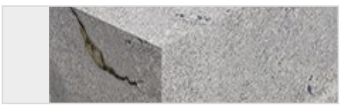
Powerful mechanical anchor for static, quasi-static and seismic loads, designed for setting in both cracked or uncracked concrete.

ETA-20/0641

A4 INOX

FIRE

SUBSTRATES



Normal weight cracked or uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

BOLT MATERIAL	Stainless steel A4
CORROSION PROTECTION	Stainless steel A4
HEAD TYPE	Hexagonal nut
WEDGE MATERIAL	Stainless steel A4
NUT AND WASHER MATERIAL	Stainless steel A4
INSTALLATION METHOD	Push-through installation
APPLICATION	· Installation of facade steel substructures in urban, industrial and also marine environment. · Machine and device installation , which are subject to permanently damp internal conditions · Installation of railings, handrails, balustrades in both interior and exterior. · Anchoring of base plates, consoles, cantilevers in both internal and external conditions. · Fixing of steel construction to concrete structural components inside and also outside of buildings.

FAST AND EASY INSTALLATION

· Fast and easy installation by hammering the anchor into pre-drilled hole and tightening with required value of torque.
· Immediate loading capacity.
· The diameter of the hole is equal to anchor's bolt diameter.
· Cold formed steel prevents fracture of anchor's bolt while hammering and tightening.

THE HIGHEST PERFORMANCE PARAMETERS

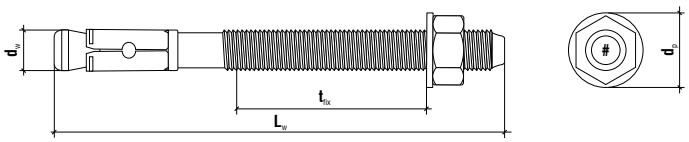
State of the art machine park and many years of experience contribute to highest performance parameters of products. Our anchors are dedicated as a professional solution for structural fastenings with highest demands.

RESISTANCE UNDER FIRE EXPOSURE R30-R120

Anchor's characteristics regarding resistance to load under fire exposure influence the safety of anchorages during a fire. Value of resistance to load under fire exposure determined for particular fire duration from R30 to R120 allows to design optimal fastenings for each type of applications complying with required fire resistance class.

SEISMIC APPROVAL C1

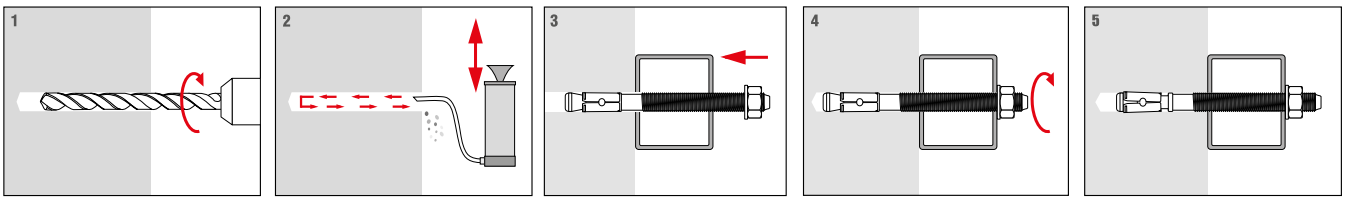
Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.



SELECTION TABLE

	Product code	Anchor diameter and length	Max. usable length	Thread	Head type	Unit pack quantity
		d_w x L_w [mm]	t_{fix1} / t_{fix2} [mm]	[-]	[-]	[pcs.]
			LE-A4 M8			
M8	LE-A4-08060	8x60	5 / -	M8	SW-13	100
	LE-A4-08075	8x75	20 / -	M8	SW-13	100
	LE-A4-08095	8x95	40 / -	M8	SW-13	50
	LE-A4-08115	8x115	60 / -	M8	SW-13	50
	LE-A4-08135	8x135	80 / -	M8	SW-13	50
	LE-A4-08155	8x155	100 / -	M8	SW-13	50
			LE-A4 M10			
M10	LE-A4-10085	10x85	5 / 25	M10	SW-17	50
	LE-A4-10095	10x95	15 / 35	M10	SW-17	50
	LE-A4-10105	10x105	25 / 45	M10	SW-17	25
	LE-A4-10115	10x115	35 / 55	M10	SW-17	25
	LE-A4-10135	10x135	55 / 75	M10	SW-17	25
	LE-A4-10155	10x155	75 / 95	M10	SW-17	25
			LE-A4 M12			
M12	LE-A4-12085	12x85	- / 5	M12	SW-19	40
	LE-A4-12095	12x95	- / 15	M12	SW-19	50
	LE-A4-12105	12x105	5 / 25	M12	SW-19	50
	LE-A4-12115	12x115	15 / 35	M12	SW-19	40
	LE-A4-12125	12x125	25 / 45	M12	SW-19	25
	LE-A4-12145	12x145	45 / 65	M12	SW-19	25
	LE-A4-12165	12x165	65 / 85	M12	SW-19	25
			LE-A4 M16			
M16	LE-A4-16105	16x105	- / 5	M16	SW-24	25
	LE-A4-16115	16x115	- / 15	M16	SW-24	25
	LE-A4-16125	16x125	5 / 25	M16	SW-24	25
	LE-A4-16145	16x145	25 / 45	M16	SW-24	20
	LE-A4-16165	16x165	45 / 65	M16	SW-24	15

INSTALLATION INSTRUCTIONS



LE-A4 - TECHNICAL DATA

ETA-20/0641

INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH							
Anchor diameter		**d**	**[mm]**	**Ø8**	**Ø10**	**Ø12**	**Ø16**
Drill hole diameter		d_0	[mm]	8	10	12	16
Effective embedment depth		h_{ef}	[mm]	40	60	70	85
Depth of drill hole		$h_0 \geq$	[mm]	52	74	88	106
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	10	12	14	18
Installation torque		T_{inst}	[Nm]	20	30	50	100
Size of torque wrench		S_w	[mm]	13	17	19	24
Minimum thickness of concrete member		h_{min}	[mm]	100	120	160	170
Minimum spacing		s_{min}	[mm]	54	82	109	116
Minimum edge distance		c_{min}	[mm]	54	82	109	116
INSTALLATION PARAMETERS - STANDARD EMBEDMENT DEPTH							
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$s_{cr,N}$	[mm]	120	180	210	255
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$c_{cr,N}$	[mm]	60	90	105	127,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$s_{cr,sp}$	[mm]	200	300	400	425
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$c_{cr,sp}$	[mm]	100	150	200	215
TENSION LOAD - STANDARD EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	16,7	28,5	39,7	74,0
Design resistance in case of steel failure ($\gamma_{M,s}$=1,62)		$N_{Rd,s}$	[kN]	10,3	17,6	24,5	45,7
Characteristic resistance in case of failure by pull-out		$N_{Rk,p}$	[kN]	*	*	*	*
Design resistance in case of failure by pull-out ($\gamma_{M,p}$=1,5 for M8, M10, M12 | $\gamma_{M,p}$=1,8 for M16)		$N_{Rd,p}$	[kN]	*	*	*	*
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	12,4	22,9	28,8	38,6
	cracked concrete	$N_{Rk,c}$	[kN]	8,7	16,0	20,2	27,0
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5 for M8, M10, M12 | $\gamma_{M,c}$=1,8 for M16)	uncracked concrete	$N_{Rd,c}$	[kN]	8,3	15,2	19,2	21,4
	cracked concrete	$N_{Rd,c}$	[kN]	5,8	10,7	13,4	15,0
Characteristic resistance of a single anchor in case of splitting failure	uncracked concrete	$N_{Rk,sp}$	[kN]	12,4	22,9	28,8	38,6
	cracked concrete	$N_{Rk,sp}$	[kN]	8,7	16,0	20,2	27,0
Design resistance of a single anchor in case of splitting failure ($\gamma_{M,sp}$=1,5 for M8, M10, M12 | $\gamma_{M,sp}$=1,8 for M16)	uncracked concrete	$N_{Rd,sp}$	[kN]	8,3	15,2	19,2	21,4
	cracked concrete	$N_{Rd,sp}$	[kN]	5,8	10,7	13,4	15,0
SHEAR LOAD - STANDARD EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	12,8	20,3	25,9	48,6
Design resistance in case of steel failure ($\gamma_{M,s}$=1,35)		$V_{Rd,s}$	[kN]	9,5	15,0	19,2	36,0
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	26,2	52,3	91,7	233,1
Design bending resistance ($\gamma_{M,s}$ =1,35)		$M_{Rd,s}$	[Nm]	19,4	38,8	67,9	172,6

* - is not decisive

LE-A4 - TECHNICAL DATA

ETA-20/0641

Anchor diameter		d	[mm]	Ø8	Ø10	Ø12	Ø16
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH							
Drill hole diameter		d_0	[mm]	-	10	12	16
Effective embedment depth		h_{ef}	[mm]	-	40	50	65
Depth of drill hole		$h_0 \geq$	[mm]	-	54	68	86
Diameter of clearance hole in the fixture		$d_f \leq$	[mm]	-	12	14	18
Installation torque		T_{inst}	[Nm]	-	30	50	100
Size of torque wrench		S_w	[mm]	-	17	19	24
Minimum thickness of concrete member		h_{min}	[mm]	-	100	100	130
Minimum spacing		s_{min}	[mm]	-	54	68	88
Minimum edge distance		c_{min}	[mm]	-	54	68	88
INSTALLATION PARAMETERS - REDUCED EMBEDMENT DEPTH							
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$s_{cr,N}$	[mm]	-	120	150	195
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure		$c_{cr,N}$	[mm]	-	60	75	97,5
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$s_{cr,sp}$	[mm]	-	200	250	325
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure		$c_{cr,sp}$	[mm]	-	100	125	165
TENSION LOAD - REDUCED EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	-	28,5	39,7	74,0
Design resistance in case of steel failure ($\gamma_{M,s}$=1,62)		$N_{Rd,s}$	[kN]	-	17,6	24,5	45,7
Characteristic resistance in case of failure by pull-out		$N_{Rk,p}$	[kN]	-	*	*	*
Design resistance in case of failure by pull-out ($\gamma_{M,p}$=1,5 for M8, M10, M12 | $\gamma_{M,p}$=1,8 for M16)		$N_{Rd,p}$	[kN]	-	*	*	*
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	-	12,4	17,4	25,8
	cracked concrete	$N_{Rk,c}$	[kN]	-	8,7	12,2	18,0
Design resistance in case of concrete cone failure ($\gamma_{M,c}$=1,5 for M8, M10, M12 | $\gamma_{M,c}$=1,8 for M16)	uncracked concrete	$N_{Rd,c}$	[kN]	-	8,3	11,6	14,3
	cracked concrete	$N_{Rd,c}$	[kN]	-	5,8	8,1	10,0
Characteristic resistance of a single anchor in case of splitting failure	uncracked concrete	$N_{Rk,sp}$	[kN]	-	12,4	17,4	25,8
	cracked concrete	$N_{Rk,sp}$	[kN]	-	8,7	12,2	18,0
Design resistance of a single anchor in case of splitting failure ($\gamma_{M,sp}$=1,5 for M8, M10, M12 | $\gamma_{M,sp}$=1,8 for M16)	uncracked concrete	$N_{Rd,sp}$	[kN]	-	8,3	11,6	14,3
	cracked concrete	$N_{Rd,sp}$	[kN]	-	5,8	8,1	10,0
SHEAR LOAD - REDUCED EMBEDMENT DEPTH							
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	-	20,3	25,9	48,6
Design resistance in case of steel failure ($\gamma_{M,s}$=1,35)		$V_{Rd,s}$	[kN]	-	15,0	19,2	36,0
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	-	52,3	91,7	233,1
Design bending resistance ($\gamma_{M,s}$ =1,35)		$M_{Rd,s}$	[Nm]	-	38,8	67,9	172,6

* - is not decisive

LSI - Single sleeve steel machine anchor

Product code	Diameter and length	Thread	Head type
	[mm]	[-]	[-]
LSI-08040	8x40	M6	SW-10
LSI-08065	8x65	M6	SW-10
LSI-08085	8x85	M6	SW-10
LSI-10050	10x50	M8	SW-13
LSI-10060	10x60	M8	SW-13
LSI-10077	10x77	M8	SW-13
LSI-10097	10x97	M8	SW-13
LSI-12060	12x60	M10	SW-17
LSI-12075	12x75	M10	SW-17
LSI-12100	12x100	M10	SW-17
LSI-12129	12x129	M10	SW-17
LSI-16111	16x111	M12	SW-19
LSI-16147	16x147	M12	SW-19

LTP - Double sleeve anchor

Product code	Diameter and length	Thread	Head type
	[mm]	[-]	[-]
LTP-10100	10x100	M6	SW-10
LTP-10150	10x150	M6	SW-10
LTP-12100	12x100	M8	SW-13
LTP-12120	12x120	M8	SW-13
LTP-12150	12x150	M8	SW-13
LTP-12180	12x180	M8	SW-13
LTP-12200	12x200	M8	SW-13
LTP-12250	12x250	M8	SW-13
LTP-12330	12x330	M8	SW-13
LTP-14100	14x100	M10	SW-17
LTP-14180	14x180	M10	SW-17
LTP-14200	14x200	M10	SW-17
LTP-14250	14x250	M10	SW-17
LTP-14330	14x330	M10	SW-17
LTP-16120	16x120	M12	SW-19
LTP-16200	16x200	M12	SW-19
LTP-16250	16x250	M12	SW-19
LTP-16330	16x330	M12	SW-19
LTP-20180	20x180	M16	SW-24
LTP-20200	20x200	M16	SW-24
LTP-20250	20x250	M16	SW-24

Single sleeve steel anchor with flange nut

Product code	Diameter and length	Thread	Head type
	[mm]	[-]	[-]
LM-12080	12x80	M8	SW-13
LM-14080	14x80	M10	SW-17

LHP - Sleeve anchor with straight hook

Product code	Diameter and length	Head type
	[mm]	[-]
LHP-10090	10x90	M6
LHP-12120	12x120	M8

LHS - Sleeve anchor with round hook

Product code	Diameter and length	Thread
	[mm]	[-]
LHS-08085	8x85	M5
LHS-10115	10x115	M6
LHS-12130	12x130	M8

LHO - Sleeve anchor with eye bolt

Product code	Diameter and length	Thread
	[mm]	[-]
LHO-12140	12x140	M8
LHO-14195	14x195	M10

LHH - Sleeve anchor with pig tail hook

Product code	Diameter and length	Thread
	[mm]	[-]
LHH-12140	12x140	M8

KRM - Brass drop-in anchor

Product code	Diameter and length	Thread	Nut size
	[mm]	[-]	[-]
KRM-080624	8x24	M6	SW-10
KRM-100831	10x31	M8	SW-13
KRM-121034	12x34	M10	SW-17
KRM-161241	16x41	M12	SW-19

TSW - Steel drop-in anchor

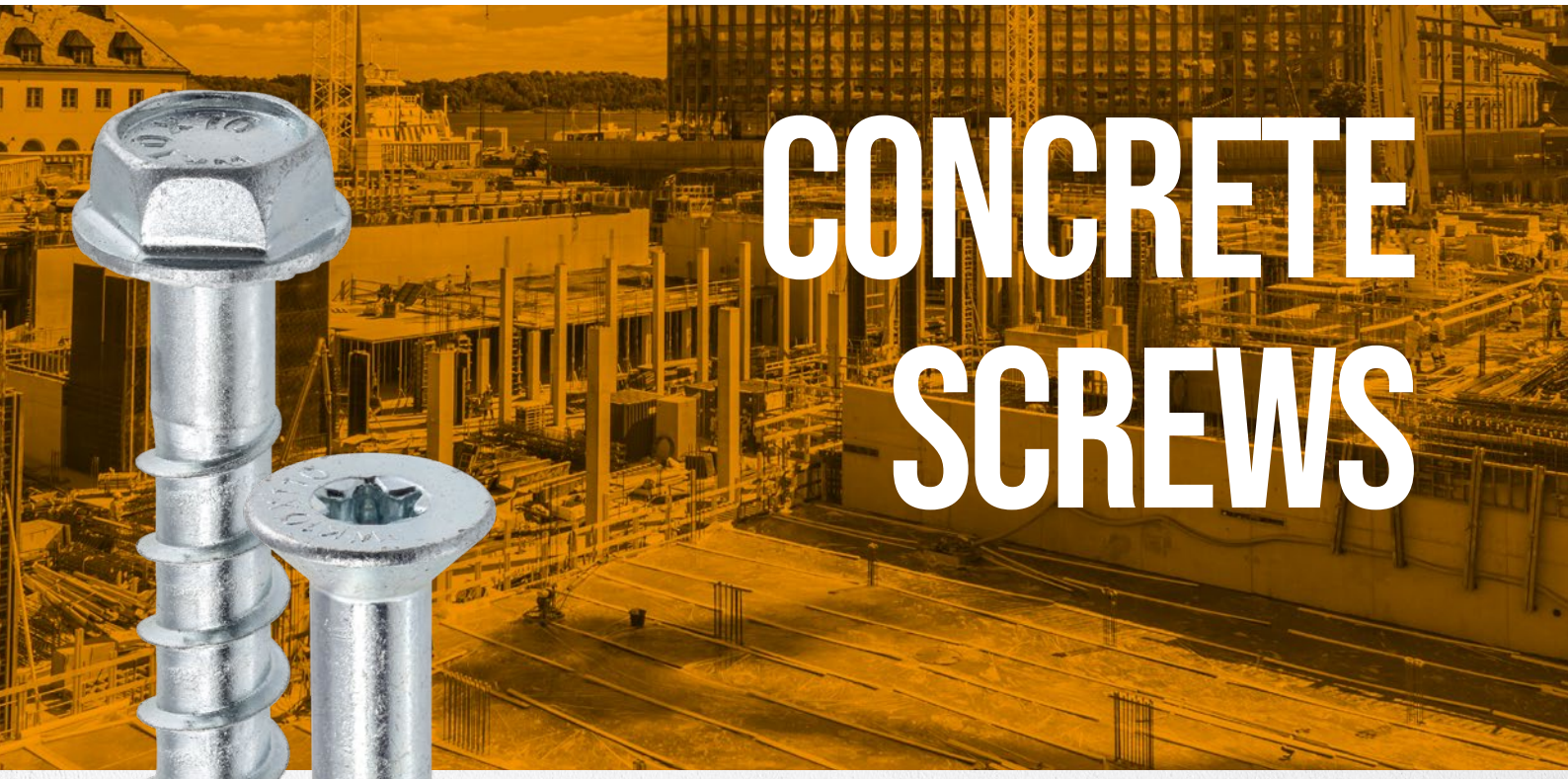
Code produktu	Diameter and length	Thread	Nut size
	[mm]	[-]	[-]
TSW-06	8x25	M6	SW-10
TSW-08	10x30	M8	SW-13
TSW-10	12x40	M10	SW-17
TSW-12	15x50	M12	SW-19
TSW-16	20x65	M16	SW-24
TSW-20	25x80	M20	SW-27

OTSW - Drop-in anchor setting tool

Product code	Code TSW - Steel drop-in anchor
	[-]
OTSW-06	TSW-06
OTSW-08	TSW-08
OTSW-10	TSW-10
OTSW-12	TSW-12
OTSW-16	TSW-16
OTSW-20	TSW-20

KLIMAS
FASTENER TECHNOLOGIES

STRONG FOR GENERATIONS



CONCRETE SCREWS

WDBLS

WDBLP

SIMPLE AND QUICK INSTALLATION

- Installation by screwing into a pre-drilled cylindrical hole in concrete
- The special thread of concrete screw cuts an internal thread into the concrete member while setting
- Immediate loading capacity

REUSABILITY

Possibility to be reused for temporary installations.

LOW EXPANSION STRESSES

Concrete screws generate much less expanding forces during installation and load is distributed across a larger area of entire length of the anchor. This feature enable even closer edge and spacing distances.

EUROPEAN TECHNICAL ASSESSMENT
ETA-20/0768 / ETA-20/0769

WDBLS	Concrete screw with hex washer head	54
6 8 10	**Length:** 40 - 140 mm	**Galvanized steel**

WDBLP	Concrete screw with countersunk head, TX	58
6 8 10	**Length:** 60 - 150 mm	**Galvanized steel**

WDBLG	Concrete screw with pan head, TX	62
6	**Length:** 40 - 80 mm	**Galvanized steel**

WDBGZ	Concrete screw with external metric thread	66
6	**Length:** 35 - 55 mm	**Galvanized steel**

WDBGW	Concrete screw with internal metric thread	70
6	**Length:** 35 - 57 mm	**Galvanized steel**

	Galvanized steel
6	WDBLS **Length range: 40 - 80 mm**
8	WDBLS **Length range: 50 - 80 mm**
10	WDBLS **Length range: 60 - 140 mm**

Concrete screw with hex washer head

WDBLS

Concrete hex head screw for quick installation of permanent and temporary fastenings.

ETA-20/0769: WDBLS-06060 / WDBLS-06080
ETA -20/0768: WDBLS-08070 / WDBLS-08080 / WDBLS-10080
WDBLS-10090 / WDBLS-10100 / WDBLS-10110 / WDBLS-10120
WDBLS-10130 / WDBLS-10140

Zn WHITE

SUBSTRATES

Normal weight cracked or uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

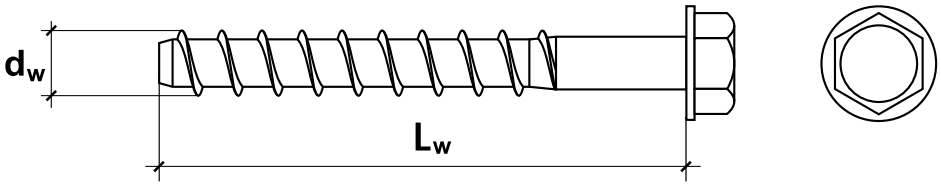
SCREW MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
METHOD OF INSTALLATION	Push-through installation
APPLICATION	· Installation of temporary fastenings, e.g. formwork supports · Installation of guard rails, handrails · Installation of anchor brackets/ plates · Installation of metal profiles · Installation of safety barriers · Installation of beams and sills · Installation of equipment on construction site · Installation of racks · Installation of mounting rails and brackets · Installation of seasonal garden arrangement elements · Installation of garden tents

ANCHORING BY MECHANICAL INTERLOCK
Working principal for concrete screws is keying , which distinguishes them from wedge anchors.

SIMPLE AND QUICK INSTALLATION
- Installation by screwing into a pre-drilled cylindrical hole in concrete.
- No specific installation torque value required to create a clamping force to the fixture as anchor is distance controlled. Only visual control needed to ensure full contact of screw head with the fixture.
- Immediate loading capacity.

LOW EXPANSION STRESSES
Concrete screws generate much less expanding forces during installation and load is distributed across a larger area of entire length of the anchor. This feature enable even closer edge and spacing distances.

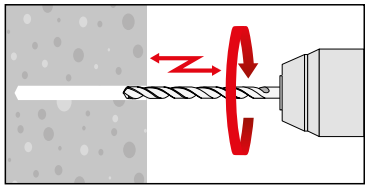
REUSABILITY
Possibility to be reused for temporary installations



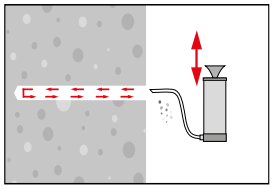
	Product code	Hole diameter	Length of fastener	Thread diameter	Head type	Unit pack quantity
		[mm]	L_w [mm]	d_w [mm]	[-]	[pcs]
WDBLS-6						
6	WDBLS-06040*	6	40	7,5	SW-10	100
	WDBLS-06060	6	60	7,5	SW-10	100
	WDBLS-06080	6	80	7,5	SW-10	100
WDBLS-8						
8	WDBLS-08050*	8	50	9,9	SW-13	50
	WDBLS-08060*	8	60	9,9	SW-13	50
	WDBLS-08070	8	70	9,9	SW-13	50
	WDBLS-08080	8	80	9,9	SW-13	50
WDBLS-10						
10	WDBLS-10060*	10	60	12,5	SW-17	50
	WDBLS-10070*	10	70	12,5	SW-17	50
	WDBLS-10080	10	80	12,5	SW-17	50
	WDBLS-10090	10	90	12,5	SW-17	50
	WDBLS-10100	10	100	12,5	SW-17	50
	WDBLS-10110	10	110	12,5	SW-17	50
	WDBLS-10120	10	120	12,5	SW-17	50
	WDBLS-10130	10	130	12,5	SW-17	50
	WDBLS-10140	10	140	12,5	SW-17	50

* not covered by ETA

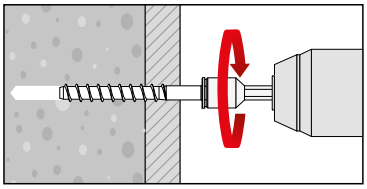
INSTALLATION INSTRUCTIONS



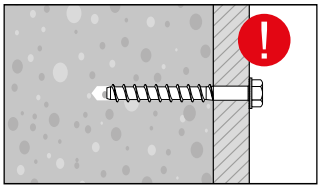
HAMMER DRILLING - HOLE DIAMETER d_0



CLEAN THE HOLE



SCREW IN THE ANCHOR BY USING IMPACT SCREW DRIVER OR TORQUE WRENCH



CONTROL OF COMPLETE SETTING, FULL CONTACT OF SCREW HEAD WITH THE FIXTURE

Concrete screw with hex washer head

WDBLS - TECHNICAL DATA

INSTALLATION PARAMETERS					
Anchor reference size		**[mm]**	**6**	**8**	**10**
Hole diameter	d_0	[mm]	6	8	10
Effective anchorage depth	h_{ef}	[mm]	42,6	50,6	58,1
Drilled hole depth	$h_{0 \geq}$	[mm]	64	75	85
Clearance hole in the fixture	$d_{f \leq}$	[mm]	9	11	13
Installation torque	T_{inst}	[Nm]	20	40	60
Wrench size	SW	[mm]	SW-10	SW-13	SW-17
Minimum substrate thickness	h_{min}	[mm]	100	110	130
Minimum spacing	s_{min}	[mm]	40	50	60
Minimum edge distance	c_{min}	[mm]	40	50	60
INSTALLATION PARAMETERS					
Anchor reference size		**[mm]**	**6**	**8**	**10**
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	128	152	174
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	64	76	87
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	128	152	174
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	64	76	87

Concrete screw with hex washer head

WDBLS - TECHNICAL DATA

Zn WHITE

TENSION LOAD						
Anchor reference size		**-**	**[mm]**	**6**	**8**	**10**
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	19,7	35,9	57,0
Design resistance in case of steel failure		$N_{Rd,s}$	[kN]	14,1	25,6	40,7
Characteristic resistance in case of pull-out failure	uncracked concrete	$N_{Rk,p}$	[kN]	5,0	9,00	16,00
	cracked concrete	$N_{Rk,p}$	[kN]	5,0	4,50	10,00
Design resistance in case of pull-out failure	uncracked concrete	$N_{Rd,p}$	[kN]	3,33	4,29	10,67
	cracked concrete	$N_{Rd,p}$	[kN]	3,33	2,14	6,67
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	13,7	17,7	21,8
	cracked concrete	$N_{Rk,c}$	[kN]	9,6	12,4	15,2
Design resistance in case of concrete cone failure	uncracked concrete	$N_{Rd,c}$	[kN]	9,1	8,4	14,5
	cracked concrete	$N_{Rd,c}$	[kN]	6,4	5,9	10,2
SHEAR LOAD						
Anchor reference size		**-**	**[mm]**	**6**	**8**	**10**
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	7,9	16,9	26,8
Design resistance in case of steel failure		$V_{Rd,s}$	[kN]	5,3	11,3	17,9
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	15,9	39,1	79,0
Design bending resistance		$M_{Rd,s}$	[Nm]	10,6	26,1	52,7
Characteristic resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rk,cp}$	[kN]	13,7	17,7	21,8
	cracked concrete	$V_{Rk,cp}$	[kN]	9,6	12,4	15,3
Design resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rd,cp}$	[kN]	9,1	11,8	14,5
	cracked concrete	$V_{Rd,cp}$	[kN]	6,4	8,3	10,2

Concrete screw with countersunk head, TX

WDBLP

Concrete countersunk head screw for quick installation of permanent and temporary fastenings.

ETA-20/0769: WDBLP-06080 / WDBLP-06100 / WDBLP-06120
ETA-20/0768: WDBLP-08080 WDBLP-08150 / WDBLP-10090 / WDBLP-10110 / WDBLP-10150

Zn WHITE

SUBSTRATES

Normal weight cracked or uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

SCREW MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
METHOD OF INSTALLATION	Push-through installation
APPLICATION	· Installation of metal profiles · Installation of pipelines and ventilation ducts · Installation of handrails and guard rails · Installation of temporary fastenings · Installation of beams and sills · Installation of equipment on construction site · Installation of steel decorative elements · Installation of mounting rails and brackets · Installation of seasonal garden arrangement elements

ANCHORING BY MECHANICAL INTERLOCK
Working principal for concrete screws is keying , which distinguishes them from wedge anchors.

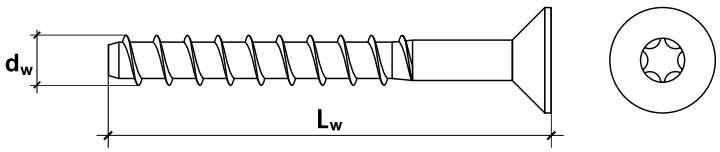
COUNTERSUNK HEAD WITH TX DRIVE
Countersunk head allows flush installation with the fixture and provide solution for visually demanding fastenings with aesthetic finish result.

SIMPLE AND QUICK INSTALLATION
- Installation by screwing into a pre-drilled cylindrical hole in concrete.
- No specific installation torque value required to create a clamping force to the fixture as anchor is distance controlled. Only visual control needed to ensure full contact of screw head with the fixture.
- Immediate loading capacity.

LOW EXPANSION STRESSES
Concrete screws generate much less expanding forces during installation and load is distributed across a larger area of entire length of the anchor. This feature enable even closer edge and spacing distances.

REUSABILITY
Possibility to be reused for temporary installations

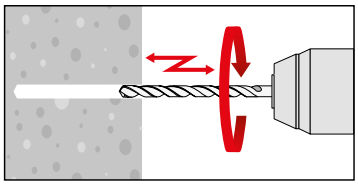
	Galvanized steel
6	WDBLP **Length range: 60 - 120 mm**
8	WDBLP **Length range: 80 - 150 mm**
10	WDBLP **Length range: 90 - 150 mm**



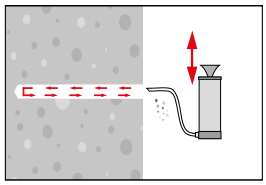
	Product code	Hole diameter	Length of fastener	Thread diameter	Head type	Unit pack quantity
		[mm]	L_w [mm]	d_w [mm]	[-]	[pcs]
WDBLP 6						
6	WDBLP-06060*	6	60	7,5	TX-40	100
	WDBLP-06080	6	80	7,5	TX-40	100
	WDBLP-06100	6	100	7,5	TX-40	100
	WDBLP-06120	6	120	7,5	TX 40	100
WDBLP 8						
8	WDBLP-08080	8	80	9,9	TX-45	50
	WDBLP-08150	8	150	9,9	TX-45	50
WDBLP 10						
10	WDBLP-10090	10	90	12,5	TX-50	50
	WDBLP-10110	10	110	12,5	TX-50	50
	WDBLP-10150	10	150	12,5	TX-50	50

* not covered by ETA

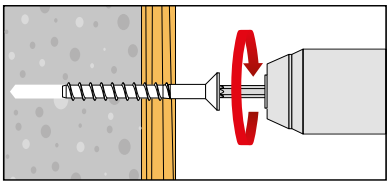
INSTALLATION INSTRUCTIONS



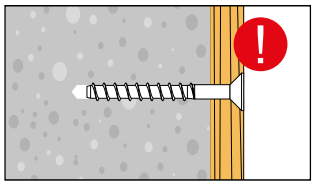
HAMMER DRILLING - HOLE DIAMETER d_0



CLEAN THE HOLE



SCREW IN THE ANCHOR BY USING IMPACT SCREW DRIVER



CONTROL OF COMPLETE SETTING, FULL CONTACT OF SCREW HEAD WITH THE FIXTURE

Concrete screw with flat head, TX

WDBLP - TECHNICAL DATA

INSTALLATION PARAMETERS					
Anchor reference size		**[mm]**	**6**	**8**	**10**
Hole diameter	d_0	[mm]	6	8	10
Effective anchorage depth	h_{ef}	[mm]	42,6	50,6	58,1
Drilled hole depth	$h_{0 \geq}$	[mm]	64	75	85
Clearance hole in the fixture	$d_{f \leq}$	[mm]	9	11	13
Wrench size	TX	[mm]	TX-40	TX-45	TX-50
Minimum substrate thickness	h_{min}	[mm]	100	110	130
Minimum spacing	s_{min}	[mm]	40	50	60
Minimum edge distance	c_{min}	[mm]	40	50	60
INSTALLATION PARAMETERS					
Anchor reference size		**[mm]**	**6**	**8**	**10**
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	128	152	174
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	64	76	87
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	128	152	174
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	64	76	87

Concrete screw with flat head, TX

WDBLP - TECHICAL DATA

TENSION LOAD						
Anchor reference size		**-**	**[mm]**	**6**	**8**	**10**
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	19,7	35,9	57,0
Design resistance in case of steel failure		$N_{Rd,s}$	[kN]	14,1	25,6	40,7
Characteristic resistance in case of pull-out failure	uncracked concrete	$N_{Rk,p}$	[kN]	5,0	9,00	16,00
	cracked concrete	$N_{Rk,p}$	[kN]	5,0	4,50	10,00
Design resistance in case of pull-out failure	uncracked concrete	$N_{Rd,p}$	[kN]	3,33	4,29	10,67
	cracked concrete	$N_{Rd,p}$	[kN]	3,33	2,14	6,67
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	13,7	17,7	21,8
	cracked concrete	$N_{Rk,c}$	[kN]	9,6	12,4	15,2
Design resistance in case of concrete cone failure	uncracked concrete	$N_{Rd,c}$	[kN]	9,1	8,4	14,5
	cracked concrete	$N_{Rd,c}$	[kN]	6,4	5,9	10,2
SHEAR LOAD						
Anchor reference size		**-**	**[mm]**	**6**	**8**	**10**
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	7,9	16,9	26,8
Design resistance in case of steel failure		$V_{Rd,s}$	[kN]	5,3	11,3	17,9
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	15,9	39,1	79,0
Design bending resistance		$M_{Rd,s}$	[Nm]	10,6	26,1	52,7
Characteristic resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rk,cp}$	[kN]	13,7	17,7	21,8
	cracked concrete	$V_{Rk,cp}$	[kN]	9,6	12,4	15,2
Design resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rd,cp}$	[kN]	9,1	11,8	14,5
	cracked concrete	$V_{Rd,cp}$	[kN]	6,4	8,3	10,2

Concrete screw with pan head, TX

WDBLG

Concrete pan head screw for quick installation of permanent and temporary fastenings.

ETA-20/0769: WDBLG-06060 / WDBLG-06080

Zn WHITE

	Galvanized steel
6	WDBLG **Length range: 40 - 80 mm**

SUBSTRATES

Normal weight cracked or uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

SCREW MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
METHOD OF INSTALLATION	Push-through installation
APPLICATION	· Installation of metal profiles · Installation of pipelines and ventilation ducts · Installation of handrails and guard rails · Installation of temporary fastenings · Installation of beams and sills · Installation of equipment on construction site · Installation of steel decorative elements · Installation of mounting rails and brackets · Installation of seasonal garden arrangement elements

ANCHORING BY MECHANICAL INTERLOCK

Working principal for concrete screws is keying , which distinguishes them from wedge anchors.

SIMPLE AND QUICK INSTALLATION

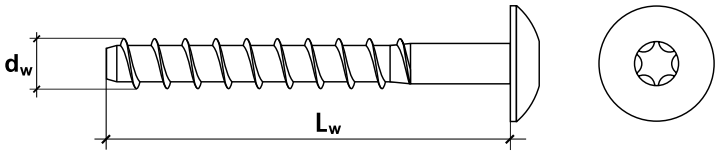
- Installation by screwing into a pre-drilled cylindrical hole in concrete.
- No specific installation torque value required to create a clamping force to the fixture as anchor is distance controlled. Only visual control needed to ensure full contact of screw head with the fixture.
- Immediate loading capacity.

LOW EXPANSION STRESSES

Concrete screws generate much less expanding forces during installation and load is distributed across a larger area of entire length of the anchor. This feature enable even closer edge and spacing distances.

REUSABILITY

Possibility to be reused for temporary installations



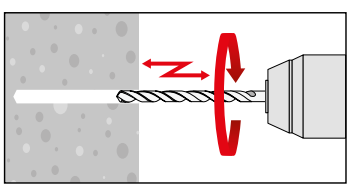
	Product code	Hole diameter	Length of fastener	Thread diameter	Head type	Unit pack quantity
		[mm]	L_w [mm]	d_w [mm]	[-]	[pcs]
WDBLG 6						
6	WDBLG-06040*	6	40	7,5	TX-40	100
	WDBLG-06060	6	60	7,5	TX-40	100
	WDBLG-06080	6	80	7,5	TX-40	100

* not covered by ETA

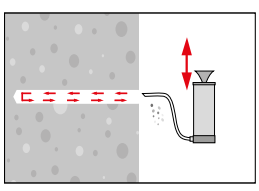
INSTALLATION PARAMETERS			
Anchor reference size		**[mm]**	**6**
Hole diameter	d_0	[mm]	6
Effective anchorage depth	h_{ef}	[mm]	42,6
Drilled hole depth	$h_{0\geq}$	[mm]	64
Clearance hole in the fixture	$d_{f\leq}$	[mm]	9
Wrench size	TX	[mm]	TX-40
Minimum substrate thickness	h_{min}	[mm]	100
Minimum spacing	s_{min}	[mm]	40
Minimum edge distance	c_{min}	[mm]	40

INSTALLATION PARAMETERS			
Anchor reference size		**[mm]**	**6**
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	128
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	64
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	128
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	64

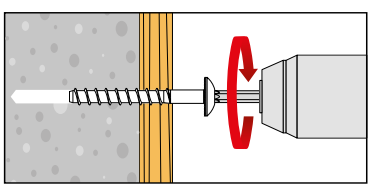
INSTALLATION INSTRUCTIONS



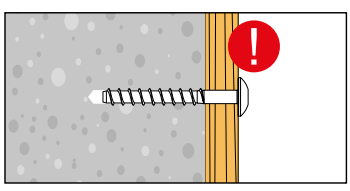
HAMMER DRILLING - HOLE DIAMETER d_0



CLEAN THE HOLE



SCREW IN THE ANCHOR BY USING IMPACT SCREW DRIVER



CONTROL OF COMPLETE SETTING, FULL CONTACT OF SCREW HEAD WITH THE FIXTURE

Concrete screw with pan head, TX

WDBLG - TECHNICAL DATA

TENSION LOAD				
Anchor reference size		**-**	**[mm]**	**6**
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	19,7
Design resistance in case of steel failure		$N_{Rd,s}$	[kN]	14,1
Characteristic resistance in case of pull-out failure	uncracked concrete	$N_{Rk,p}$	[kN]	4,0
	cracked concrete	$N_{Rk,p}$	[kN]	4,0
Design resistance in case of pull-out failure	uncracked concrete	$N_{Rd,p}$	[kN]	2,67
	cracked concrete	$N_{Rd,p}$	[kN]	2,67
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	13,7
	cracked concrete	$N_{Rk,c}$	[kN]	9,6
Design resistance in case of concrete cone failure	uncracked concrete	$N_{Rd,c}$	[kN]	9,1
	cracked concrete	$N_{Rd,c}$	[kN]	6,4
SHEAR LOAD				
Anchor reference size		**-**	**[mm]**	**6**
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	7,9
Design resistance in case of steel failure		$V_{Rd,s}$	[kN]	5,3
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	15,9
Design bending resistance		$M_{Rd,s}$	[Nm]	10,6
Characteristic resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rk,cp}$	[kN]	13,7
	cracked concrete	$V_{Rk,cp}$	[kN]	9,6
Design resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rd,cp}$	[kN]	9,1
	cracked concrete	$V_{Rd,cp}$	[kN]	6,4

TECHNICAL SUPPORT

AT EACH STAGE OF INVESTMENT

DO YOU NEED TECHNICAL SUPPORT?

Contact us: dt@wkret-met.com

TECHNICAL ADVICE AND ENGINEERING SUPPORT ON THE JOBSITE | PULL-OUT TESTS | ASSISTANCE WITH SELECTION OF FASTENERS

Concrete screw with external metric thread

WDBGZ

Concrete screw with external thread for quick installation of permanent and temporary fastenings.

Zn
WHITE

SUBSTRATE

Normal weight uncracked concrete , reinforced or unreinforced of strength class from C20/25 to C50/60

SCREW MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
METHOD OF INSTALLATION	Pre-positioned
APPLICATION	· Installation of pipeline routes · Installation of channel support systems · Installation of ventilation ducts · Installation of wire hanging systems for building services (MEP & HVAC) · Installation of suspended mounting rails · Installation of cable trays

ANCHORING BY MECHANICAL INTERLOCK

Working principal for concrete screws is keying , which distinguishes them from wedge anchors.

EXTERNAL THREAD

The most common use is fixing of support framework for building services (MEP&HVAC) .

SIMPLE AND QUICK INSTALLATION

- Installation by screwing into a pre-drilled cylindrical hole in concrete
- No specific installation torque value required to set anchor into concrete. Installers must only apply T_{inst} to create the clamping force on the fixture.
- Immediate loading capacity

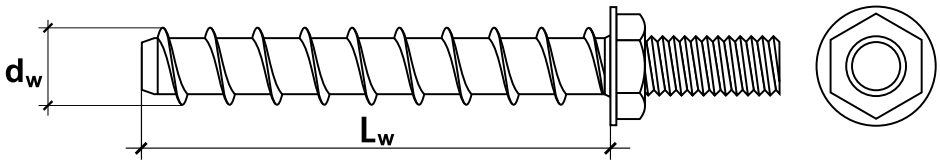
LOW EXPANSION STRESSES

Concrete screws generate much less expanding forces during installation and load is distributed across a larger area of entire length of the anchor. This feature enable even closer edge and spacing distances.

REUSABILITY

Possibility to be reused for temporary installations

	Galvanized steel
6	WDBGZ **Length range: 35 - 55 mm**

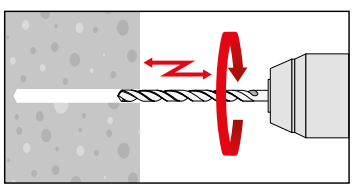


	Product code	Hole diameter	Length of fastener	Thread diameter	Metric thread	Wrench size	Unit pack quantity
		[mm]	L_w [mm]	d_w [mm]	[-]	[-]	[pcs]
WDBGZ 6							
6	WDBGZ-06035*	6	35	7,5	M8	SW-10	100
	WDBGZ-06055*	6	55	7,5	M8	SW-10	100

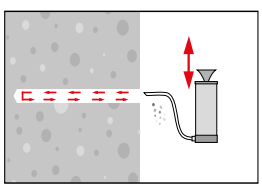
* not covered by ETA

INSTALLATION PARAMETERS			
Anchor reference size		**[mm]**	**6**
Hole diameter	d_0	[mm]	6
Effective anchorage depth	h_{ef}	[mm]	42,6
Drilled hole depth	$h_{0 \geq}$	[mm]	64
Installation torque	T_{inst}	[Nm]	20
Wrench size	SW	[mm]	SW-10
Minimum substrate thickness	h_{min}	[mm]	100
Minimum spacing	s_{min}	[mm]	40
Minimum edge distance	c_{min}	[mm]	40
INSTALLATION PARAMETERS			
Anchor reference size		**[mm]**	**6**
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	128
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	64
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	128
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	64

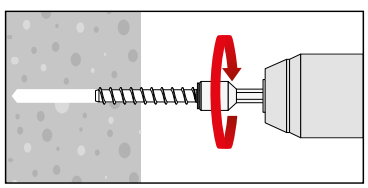
INSTALLATION INSTRUCTIONS



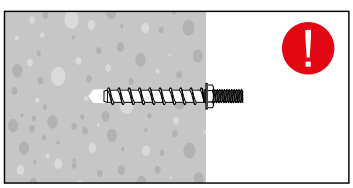
HAMMER DRILLING - HOLE DIAMETER d_0



CLEAN THE HOLE



SCREW IN THE ANCHOR BY USING IMPACT SCREW DRIVER



CONTROL OF COMPLETE SETTING , FULL CONTACT OF SCREW HEAD WITH THE SURFACE OF CONCRETE MEMBER

Concrete screw with external metric thread

WDBGZ - TECHNICAL DATA

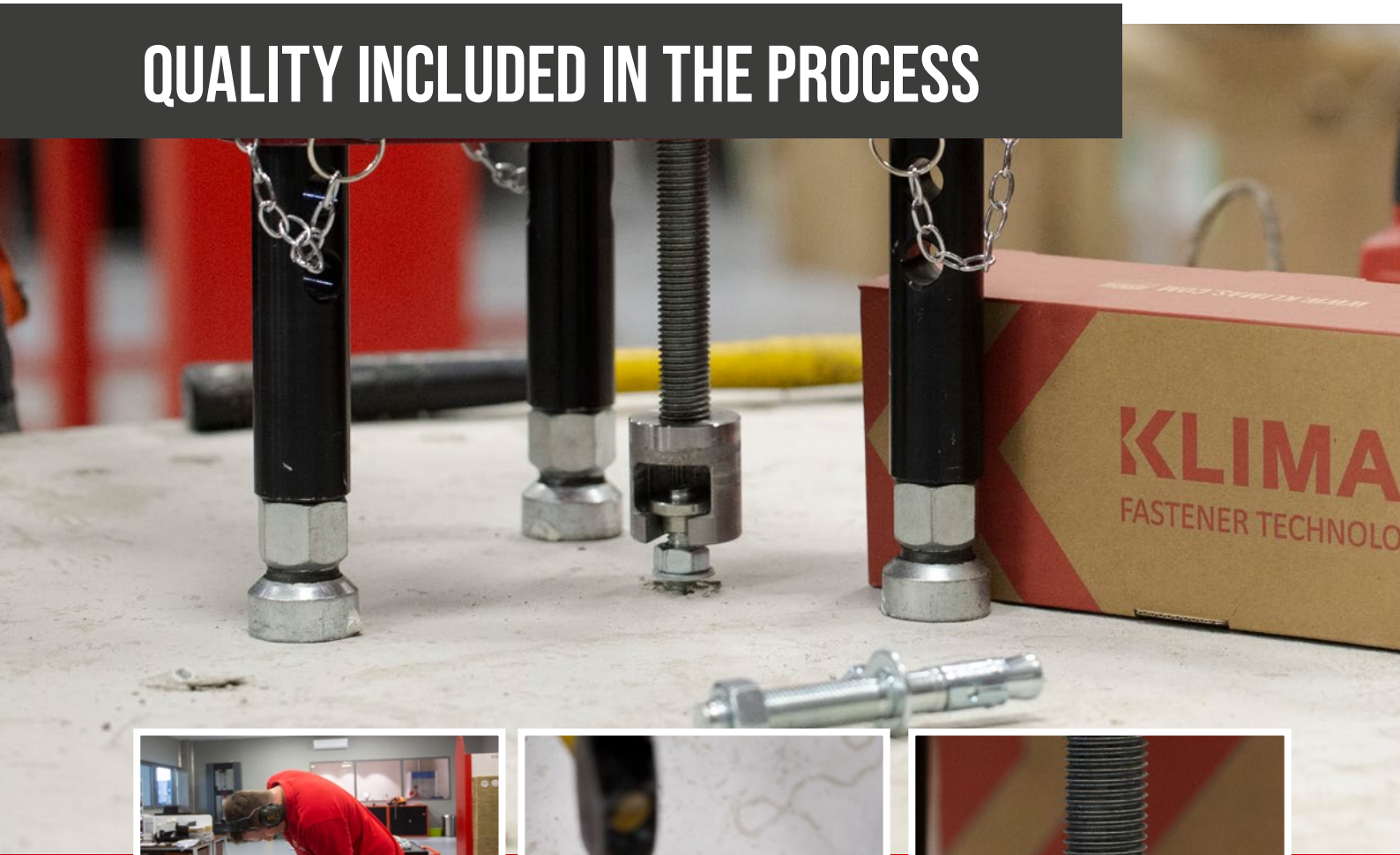
Zn WHITE

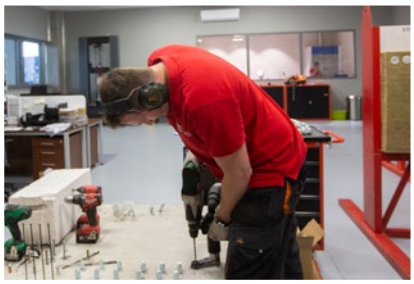
TENSION LOAD (indicative values)				
Anchor reference size		**-**	**[mm]**	**6**
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	19,7
Design resistance in case of steel failure		$N_{Rd,s}$	[kN]	14,1
Characteristic resistance in case of pull-out failure	uncracked concrete	$N_{Rk,p}$	[kN]	5,00
	cracked concrete	$N_{Rk,p}$	[kN]	-
Design resistance in case of pull-out failure	uncracked concrete	$N_{Rd,p}$	[kN]	3,33
	cracked concrete	$N_{Rd,p}$	[kN]	-
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	13,7
	cracked concrete	$N_{Rk,c}$	[kN]	-
Design resistance in case of concrete cone failure	uncracked concrete	$N_{Rd,c}$	[kN]	9,1
	cracked concrete	$N_{Rd,c}$	[kN]	-
SHEAR LOAD (indicative values)				
Anchor reference size		**-**	**[mm]**	**6**
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	7,9
Design resistance in case of steel failure		$V_{Rd,s}$	[kN]	5,3
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	15,9
Design bending resistance		$M_{Rd,s}$	[Nm]	10,6
Characteristic resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rk,cp}$	[kN]	13,7
	cracked concrete	$V_{Rk,cp}$	[kN]	-
Design resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rd,cp}$	[kN]	9,1
	cracked concrete	$V_{Rd,cp}$	[kN]	-

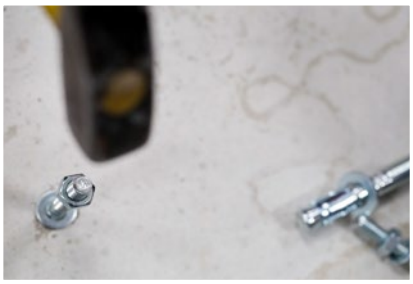
STRONG FOR GENERATIONS

KLIMAS
FASTENER TECHNOLOGIES

QUALITY INCLUDED IN THE PROCESS







We have launched a high-tech quality-control laboratory to ensure the highest quality of the products from our portfolio.

Our laboratory is equipped with measuring microscope, X-ray spectrometer, salt spray chamber, load capacity testing machine, Vickers microhardness tester, Rockwell hardness tester, torque converters, permascope and a number of other equipment, which allow us to:

- check and control paint and zinc coat thickness;
- check resistance of protective coating to highly corrosive environments;
- check hardness of the screw surface and screw core, thickness of carburized layer;
- measure the torque required for a particular screw to be installed;
- test the pull-out strength;
- measure rigidity of the support washer;
- measure installation time of screws;
- and many others.

Concrete screw with internal metric thread

WDBGW

Concrete screw with internal thread for quick installation of permanent and temporary fastenings.

ETA-20/0769: WDBGW-06057

Zn WHITE

	Galvanized steel
6	WDBGW **Length range: 35 - 57 mm**

SUBSTRATES

Normal weight cracked or uncracked concrete, reinforced or unreinforced of strength class from C20/25 to C50/60

SCREW MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
METHOD OF INSTALLATION	Pre-positioned
APPLICATION	· Installation of pipeline routes · Installation of channel support systems · Installation of ventilation ducts · Installation of wire hanging systems for building services (MEP & HVAC) · Installation of suspended mounting rails · Installation of cable trays

ANCHORING BY MECHANICAL INTERLOCK

Working principal for concrete screws is keying , which distinguishes them from wedge anchors.

STEPPED M8 AND M10 INTERNALLY THREADED HEAD

Allows direct fastening of threaded rods.

SIMPLE AND QUICK INSTALLATION

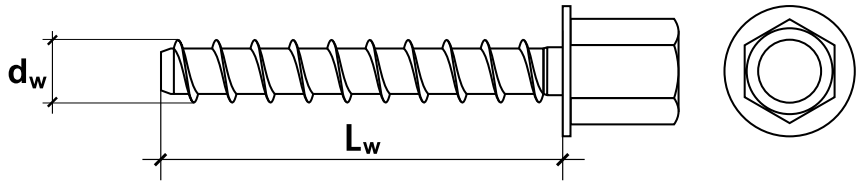
- Installation by screwing into a pre-drilled cylindrical hole in concrete
- No specific installation torque value required to set anchor into concrete. Installers must only apply T_{inst} to create the clamping force on the fixture.
- Immediate loading capacity

LOW EXPANSION STRESSES

Concrete screws generate much less expanding forces during installation and load is distributed across a larger area of entire length of the anchor. This feature enable even closer edge and spacing distances.

REUSABILITY

Possibility to be reused for temporary installations

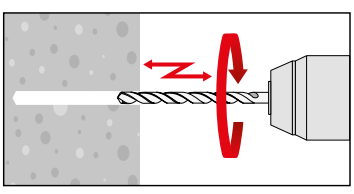


	Product code	Hole diameter	Length of fastener	Thread diameter	Metric thread	Wrench size	Number of pieces in a box
		[mm]	L_w [mm]	d_w [mm]	[-]	[-]	[pcs]
WDBGW 6							
6	WDBGW-06035*	6	35	7,5	M8/M10	SW-13	100
	WDBGW-06057	6	57	7,5	M8/M10	SW-13	100

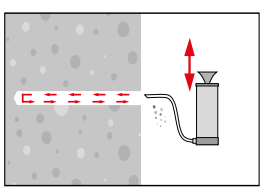
* not covered by ETA

INSTALLATION PARAMETERS			
Anchor reference size		**[mm]**	**6**
Hole diameter	d_0	[mm]	6
Effective anchorage depth	h_{ef}	[mm]	42,6
Drilled hole depth	$h_{0\geq}$	[mm]	64
Installation torque	T_{inst}	[Nm]	20
Wrench size	S_w	[mm]	SW-13
Minimum substrate thickness	h_{min}	[mm]	100
Minimum spacing	s_{min}	[mm]	40
Minimum edge distance	c_{min}	[mm]	40
INSTALLATION PARAMETERS			
Anchor reference size		**[mm]**	**6**
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$s_{cr,N}$	[mm]	128
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of concrete cone failure	$c_{cr,N}$	[mm]	64
Spacing for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$s_{cr,sp}$	[mm]	128
Edge distance for ensuring the transmission of the characteristic resistance in tension of a single fastener without edge and spacing influence in case of splitting failure	$c_{cr,sp}$	[mm]	64

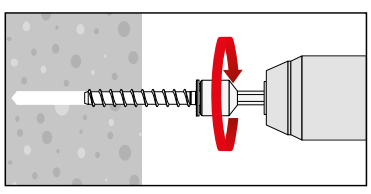
INSTALLATION INSTRUCTIONS



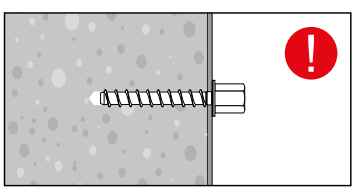
HAMMER DRILLING - HOLE DIAMETER d_0



CLEAN THE HOLE



SCREW IN THE ANCHOR BY USING IMPACT SCREW DRIVER



CONTROL OF COMPLETE SETTING , FULL CONTACT OF SCREW HEAD WITH THE SURFACE OF CONCRETE MEMBER

Concrete screw with internal metric thread

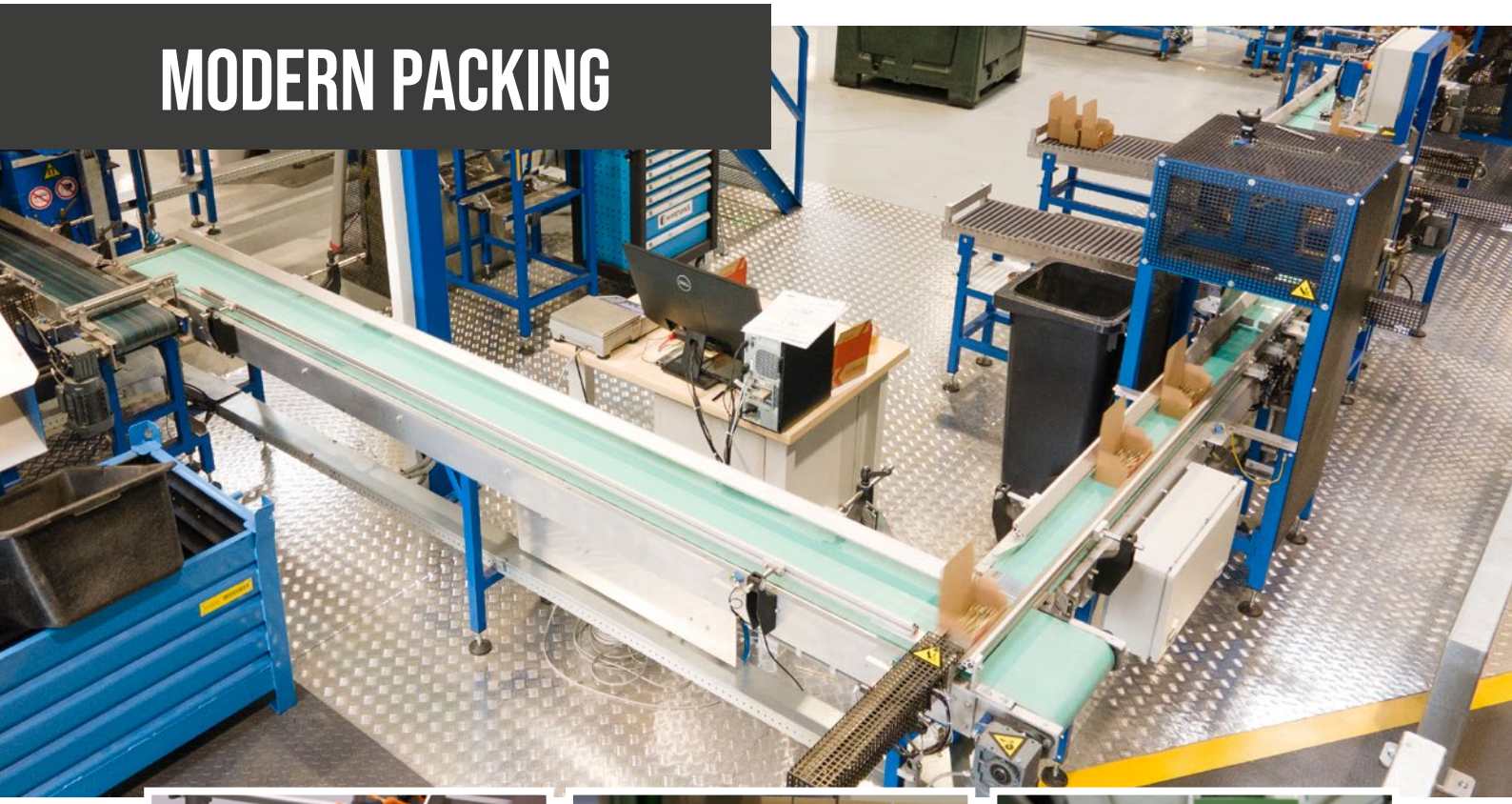
WDBGW - TECHNICAL DATA

TENSION LOAD				
Anchor reference size		**-**	**[mm]**	**6**
Characteristic resistance in case of steel failure		$N_{Rk,s}$	[kN]	19,7
Design resistance in case of steel failure		$N_{Rd,s}$	[kN]	14,1
Characteristic resistance in case of pull-out failure	uncracked concrete	$N_{Rk,p}$	[kN]	5,0
	cracked concrete	$N_{Rk,p}$	[kN]	5,0
Design resistance in case of pull-out failure	uncracked concrete	$N_{Rd,p}$	[kN]	3,33
	cracked concrete	$N_{Rd,p}$	[kN]	3,33
Characteristic resistance in case of concrete cone failure	uncracked concrete	$N_{Rk,c}$	[kN]	13,7
	cracked concrete	$N_{Rk,c}$	[kN]	9,6
Design resistance in case of concrete cone failure	uncracked concrete	$N_{Rd,c}$	[kN]	9,1
	cracked concrete	$N_{Rd,c}$	[kN]	6,4
SHEAR LOAD				
Anchor reference size		**-**	**[mm]**	**6**
Characteristic resistance in case of steel failure		$V_{Rk,s}$	[kN]	7,9
Design resistance in case of steel failure		$V_{Rd,s}$	[kN]	5,3
Characteristic bending resistance		$M^0_{Rk,s}$	[Nm]	15,9
Design bending resistance		$M_{Rd,s}$	[Nm]	10,6
Characteristic resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rk,cp}$	[kN]	13,7
	cracked concrete	$V_{Rk,cp}$	[kN]	9,6
Design resistance in case of concrete pry-out failure	uncracked concrete	$V_{Rd,cp}$	[kN]	9,1
	cracked concrete	$V_{Rd,cp}$	[kN]	6,4

STRONG FOR GENERATIONS

KLIMAS
FASTENER TECHNOLOGIES

MODERN PACKING

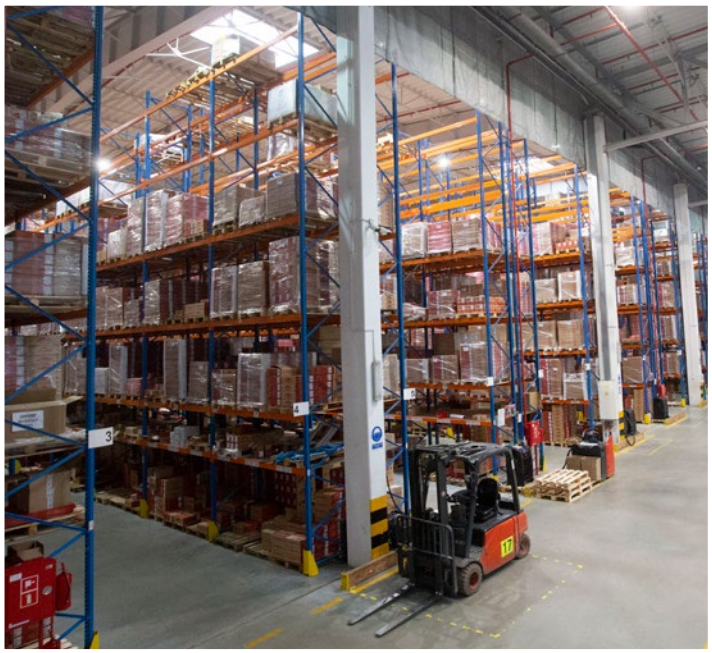


- Automated picking and packing processes.
- Most popular packaging: unit packages, bags, blisters.
- High performance

HIGH STORAGE WAREHOUSE

24 000

PALLET PLACE



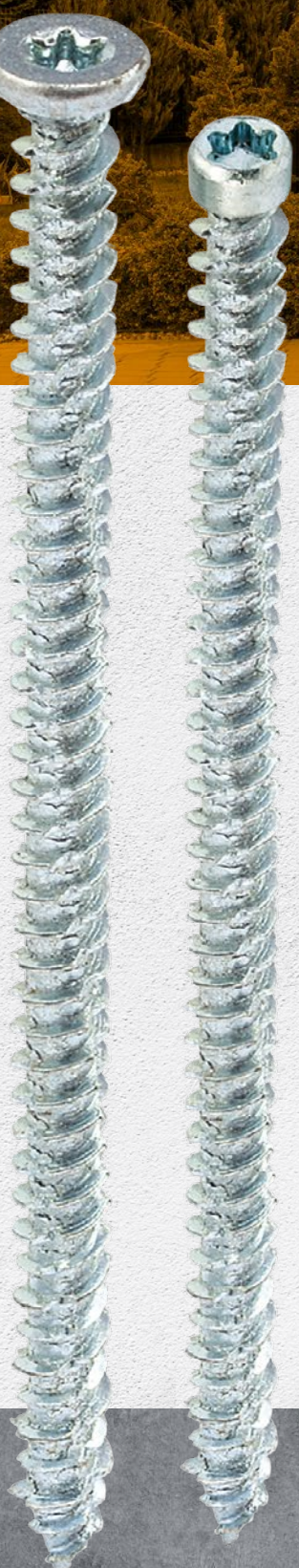
Wkręt-met®
KLIMAS

STRONG FOR GENERATIONS

METAL ANCHORS

Screws and fasteners for installation of windows and doors

WHO / WHOW



QUICK INSTALLATION

Screws for installation of windows and doors facilitate fastenings and enable efficient series fixings. Compared to expansion type of fasteners, the installation time is reduced.

NO TENSILE STRESS GENERATED DURING INSTALLATION

Screws enable to secure the frame to the supporting wall without generating tensile force causing the frame to be pulled against the substrate.

FULL THREAD

Guarantees to maintain secure and reliable fastening while keeping also appropriate distance between the frame and the substrate.

NOTCH ON THREAD

Special notch on thread reduces screwing resistance while setting.

SMM	Metal hammer drive anchor	76
⌀6	**Length:** 40 - 65 mm	**Galvanized steel**

KRW	Hammer-in expanding metal anchor	77
⌀6	**Length:** 35 - 65 mm	**Galvanized steel**

KMG		Hammer-in anchor for AAC substrates	78
M5	M6 M8 M10	**Length:** 30 - 60 mm	**Galvanized steel**

LO	Metal frame anchor	79
⌀10	**Length:** 72 - 202 mm	**Galvanized steel**

WHO	Frame screw with flat head	80
⌀7,5	**Length:** 42 - 212 mm	**Galvanized steel**

WHOW	Frame screw with cylindrical head	81
⌀7,5	**Length:** 42 - 212 mm	**Galvanized steel**

Metal hammer drive anchor

SMM

Universal metal hammer-in anchor designed for fixing of thin metal elements, profiles in drywall systems, metal flashings.

Zn/Al FIRE ITB-KOT-2018/0463

SUBSTRATES

Concrete

Solid clay brick

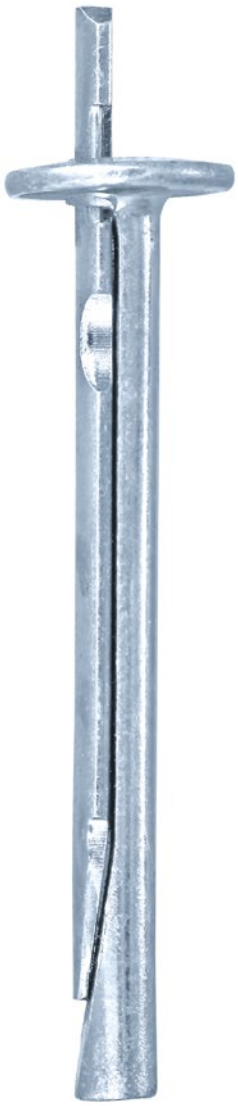
NAIL MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
SLEEVE MATERIAL	Alloy Zn/Al
INSTALLATION METHOD	Push-through installation
APPLICATION	· Fixing cable routes to solid substrates. · Fixing apartment furnishing elements to solid substrates. · Used as a substitute for plastic hammer-drive fixings in applications with fire rating required.

ZnAl EXPANSION SLEEVE + STEEL NAIL
High resistance under fire exposure, class A1 fire rating (non-combustible).

HAMMER-IN INSTALLATION DIAMETER 6 MM
Used as a substitute for plastic hammer-drive fixings in applications with fire rating required.

REDUCTION OF INSTALLATION TIME
Fast and easy push-through installation.

	Alloy Zn/Al + steel nail
ø6	SMM **Length range: 40 - 65 mm**



Hammer-in expanding metal anchor

KRW

Anchor designed for fixing of suspended ceiling systems to concrete substrate.

ITB-KOT-2018/0463

SUBSTRATES

Concrete

Solid clay brick

ANCHOR MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
INSTALLATION METHOD	Push-through installation
APPLICATION	· Fixing cable routes to solid substrates · Fixing of suspended ceilings · Fixings apartment furnishing elements to solid substrates · Used as a substitute for plastic hammer-drive fixings in applications with fire rating required.

STEEL ANCHOR
High resistance under fire exposure, class A1 fire rating (non-combustible).

HAMMER-IN INSTALLATION DIAMETER 6 MM
Used as a substitute for plastic hammer-drive fixings in applications with fire rating required.

REDUCTION OF INSTALLATION TIME
Fast and easy push-through installation.

APPROVED FOR CRACKED CONCRETE
Approved for applications requiring fastening into cracked zone of concrete slab e.g. suspended ceiling fixing.

	Galvanized steel
ø6	KRW **Length range: 35 - 65 mm**

Hammer-in anchor for AAC substrates

KMG

Universal metal hammer-in anchor utilised as expansion element combined with screw-in expansion pin (screws, screw-in hooks, etc.).

Zn WHITE

SUBSTRATES

Autoclaved aerated concrete

MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
INSTALLATION METHOD	Pre-positioned installation
APPLICATION	Universal metal hammer-in anchor utilised as expansion element combined with screw-in expansion pin (screws, screw-in hooks, etc.)

RIBBED DESIGN

The external teeth expand in the building material, thus ensuring a high load-bearing capacity. The ribbed design guide the screw securely.

STEEL ANCHOR

High resistance under fire exposure , class A1 fire rating (non-combustible).

INSTALLATION OF PROFILES FOR DRYWALL SYSTEMS

Use in fastening of profiles for drywall systems into AAC substrate.

	Galvanized steel
ø5	KMG **Length range: 30 mm**
ø6	KMG **Length range: 32 mm**
ø8	KMG **Length range: 36 - 60 mm**
ø10	KMG **Length range: 60 mm**

Metal frame anchor

LO

Universal metal fastener for fixing window and door frames for use with plastic cover in a variety of colours.

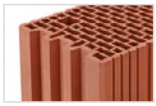
Zn WHITE

ITB-KOT-2017/0307

SUBSTRATES

Concrete

Solid clay brick



Hollow clay brick

Hollow silicate block

MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
METHOD OF INSTALLATION	Push-through installation
APPLICATION	Installation of window and door frames

SPECIAL DESIGN OF STEEL SLEEVE
Provide ideal expansion simultaneously in the substrate material and also in the fixture.

TWO EXPANSION ZONES
Guarantees to maintain secure and reliable fastening while keeping also appropriate distance between the frame and the substrate.

COUNTERSUNK HEAD WITH PZ DRIVE
Enables the screw to be screwed in with commonly available PZ drive and ensures flush installation with the frame.

POSSIBILITY OF USING PLASTIC COVERS
Aesthetic finish result is achieved by using of plastic cover in appropriate colour.

	Galvanized steel
ø10	LO **Length range: 72 - 202 mm**

Z Plastic cover for LO fastener

Frame screw with flat head

WHO

Frame screw with flat head for window and door installation.

Zn WHITE

ITB-KOT-2017/0308

SUBSTRATES

Concrete

Solid clay brick

Autoclaved aerated concrete

MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
INSTALLATION METHOD	Push-through installation
APPLICATION	Installation of window and door frames made from PVC

QUICK INSTALLATION
Screws for installation of windows and doors facilitate fastenings and enable efficient series fixings. Compared to expansion type of fasteners the installation time is reduced.

NO TENSILE STRESS GENERATED DURING INSTALLATION
Screws enable to secure the frame to the supporting wall without generating tensile force causing the frame to be pulled against the substrate.

FULL THREAD
Guarantees to maintain secure and reliable fastening while keeping also appropriate distance between the frame and the substrate.

TX DRIVE
TX drive provide excellent holding of bit and efficient torque transfer. Head with milling ribs ensures optimal and smooth countersink in the frame.

NOTCH ON THREAD
Special notch on thread reduces screwing resistance while setting.

The screw can be easily removed without leaving any parts in the substrate.

	Galvanized steel
ø7,5	WHO **Length range: 42 - 212 mm**

Frame screw with cylindrical head

WHOW

Frame screw with cylindrical head for window and door installation.

Zn WHITE

ITB-KOT-2017/0308

SUBSTRATES

Concrete

Solid clay brick

Autoclaved aerated concrete

MATERIAL	Carbon steel
CORROSION PROTECTION	Galvanized
INSTALLATION METHOD	Push-through installation
APPLICATION	Installation of window and door frames made from wood

QUICK INSTALLATION

Screws for installation of windows and doors facilitate fastenings and enable efficient series fixings. Compared to expansion type of fasteners the installation time is reduced.

NO TENSILE STRESS GENERATED DURING INSTALLATION

Screws enable to secure the frame to the supporting wall without generating tensile force causing the frame to be pulled against the substrate.

FULL THREAD

Guarantees to maintain secure and reliable fastening while keeping also appropriate distance between the frame and the substrate.

TX DRIVE

TX drive provide excellent holding of bit and efficient torque transfer. Cylindrical head is recommended to use for wooden frames as enable concealed installation with reliability of fastening.

NOTCH ON THREAD

Special notch on thread reduces screwing resistance while setting.

The screw can be easily removed without leaving any parts in the substrate.

	Galvanized steel
ø7,5	WHOW **Length range: 42 - 212 mm**

KLIMAS
FASTENER TECHNOLOGIES

STRONG FOR GENERATIONS

Pure epoxy injection anchor

FOR EXTREME LOADS

WCF-E3-585 - MOUNT EVEREST

SEISMIC APPROVAL C1/C2

Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.

INSTALLATION IN CRACKED CONCRETE

Approved for fastening threaded rods and rebars in tension zone of reinforced concrete member. Tension zone, also called cracked zone might occur in all main structural concrete members e.g. beams , slabs, columns.

HIGH LOAD-BEARING PARAMETERS

It is ideally suited for highest load/heavy duty structural anchoring.
Offer highest performance for most demanding applications.

STYRENE-FREE

Being free of styrene is well suited and safe for use indoors and in confined spaces.

SEISMIC APPROVAL C1/C2

				
MOUNT EVEREST	**NANDA KOT**	**MAKALU**	**ELBRUS**	**MONT BLANC**
WCF-E3-585 Pure epoxy	WCF-XS-410 WCF-XS-E-410 WCF-XS-C-410 Hybrid	WCF-EASF-410 WCF-EASF-E-410 WCF-EASF-C-410 Methacrylate	WCF-VESF-300 WCF-VESF-410 WCF-VESF-E-300 WCF-VESF-E-410 Vinylester	WCF-PESF-300 WCF-PESF-E-300 WCF-PESF-C-300 WCF-PESF-E-410 Polyester
84	88	92	98	100

ACCESSORIES

103-110

PG0 / PG05 / PG08 / PG0A2 / PG0A4
Threaded rods for injection anchors

KPG/ KPGA2
Anchor rods for injection anchors

NM / NM8
Nuts

PON
Washers

POD
Washers

DCF-300 / DCF-410 / DCF-585
Injection anchor dispensers

TSN
Nylon mesh sleeves for fastening in hollow base materials

TSM
Metal mesh sleeve for hollow materials

MCF
Mixing nozzle

PCF
Hole cleaning pump

SCF
Hole cleaning brush

TCF
Resin stopper

SCF-H / SCF-E / SCF-B
Deep hole cleaning brush

MCF-P
Extension hose

MCF-PK
Extension tube

MOUNT EVEREST		
585 ml	5°C to 40°C	WCF-E3-585

MOUNT EVEREST - Epoxy injection anchor - FOR HEAVY LOADS

WCF-E3

Pure epoxy two-component 3:1 ratio bonded injection anchor. For professional use in highest load/heavy duty structural anchoring. Offer highest performance for most demanding applications.

C1/C2
(C2 - only for threaded rod)

ETA-17/0234
ETA-15/0681 for PIR calculations in accordance with EC2 EN 1992-1-1

SUBSTRATES

- Cracked and uncracked concrete (option 1) C20/25 to C50/60.
- Reinforced and non-reinforced concrete.
- Dry, wet concrete and flooded holes (Cat 2).
- Post-installed rebar connections - calculation in accordance with EC2 EN 1992-1-1.
- Strength class of concrete from C12/15 to C50/60.

INSTALLATION TEMPERATURE RANGE	5°C to 40°C
CARTRIDGE SIZE	585 ml
APPROVED STEEL ELEMENTS	· Threaded rods M8-M30 made of galvanized steel grades: 4.6, 5.8, 8.8, 10.9; · Threaded rods M8-M30 made of stainless steel grades: A2-70, A4-70, A4-80; · Threaded rods M8-M30 made of HCR steel: 1.4529, 1.4565; · Galvanized or hot-dip galvanized rods and thermodiffusion; · Rebars: Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32, grade: B,C; · Rebars (post installed in accordance with TR023/EC2): Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25, Ø28, Ø32, class: B, C;
APPLICATIONS	· - Anchoring of heavy steel constructions to concrete structural components · -Anchoring of base plates, brackets, consoles in highest load applications with most challenging conditions · - Strengthening and reinforcement of concrete members in existing superstructure (old buildings restoration, bridges renovation, etc.) · -Wide range of post-installed rebar connections including anchorage and overlap joint applications (e.g. slab to slab at support, overlap joint at a foundation of column or wall, etc.) · - Design method according to EN 1992-4:2018 and EC2 EN 1992-1-1

SEISMIC APPROVAL C1/C2
Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.

HIGH LOAD-BEARING PARAMETERS
It is ideally suited for highest load/heavy duty structural anchoring. Offer highest performance for most demanding applications.

STYRENE-FREE
Being free of styrene is well suited and safe for use indoors and in confined spaces.

INSTALLATION IN CRACKED CONCRETE
Approved for fastening threaded rods and rebars in tension zone of reinforced concrete member. Tension zone, also called cracked zone might occur in all main structural concrete members e.g. beams , slabs, columns.

MOUNT EVEREST (WCF-E3) - Epoxy injection anchor - FOR HEAVY LOADS (THREADED RODS)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
585ml	WCF-E3-585	5 to 40	12

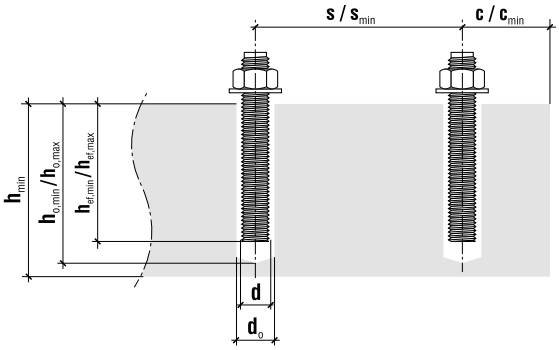
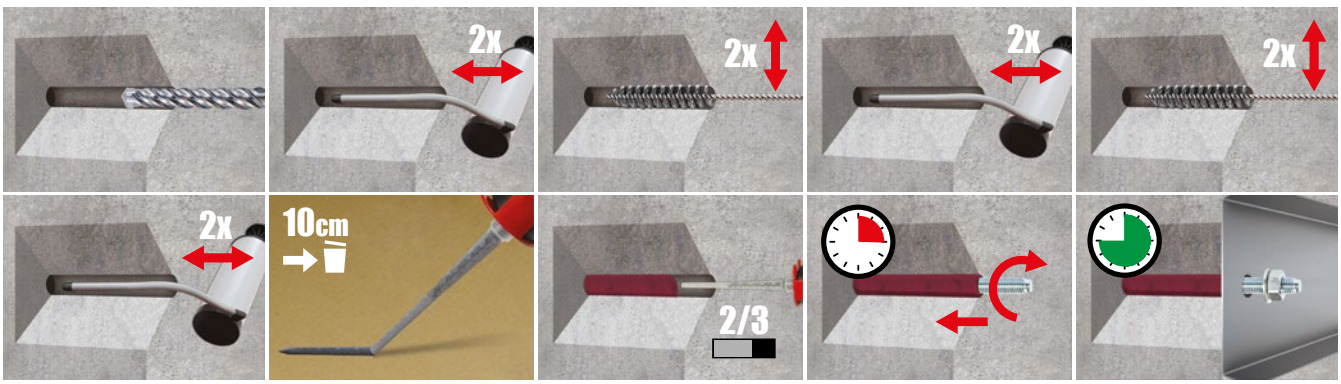


TABLE 2. INSTALLATION PARAMETERS - THREADED RODS

Parameters			THREADED ROD SIZE							
			M8	M10	M12	M16	M20	M24	M27	M30
Threaded rod diameter	d	[mm]	8	10	12	16	20	24	27	30
Hole diameter	d_0	[mm]	10	12	14	18	22	26	30	35
Min. embedment depth	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120
Min. hole depth	$h_{0,min}$	[mm]	65	65	75	85	95	101	113	125
Min. edge distance	c_{min}	[mm]	40	40	40	40	50	50	50	60
Min. spacing	s_{min}	[mm]	40	40	40	40	50	50	50	60
Max. embedment depth	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	485	545	605
Min. base material thickness	h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm			$h_{ef}+2*d_0$				
Installation torque	T_{inst}	[Nm]	10	20	40	80	120	160	180	200

TABLE 3. CURING TIME

Substrate temp [˚C]	5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	300	150	40	25	18	12	8	6
Minimum curing time [h]	24	24	18	12	8	6	4	2



MOUNT EVEREST (WCF-E3) - Epoxy injection anchor - FOR HEAVY LOADS (REBARS)

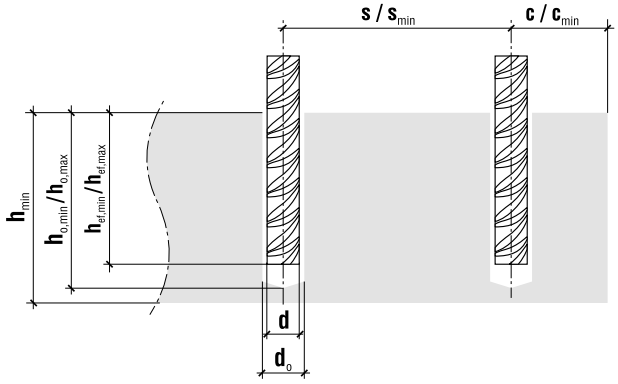


TABLE 1. SELECTION TABLE

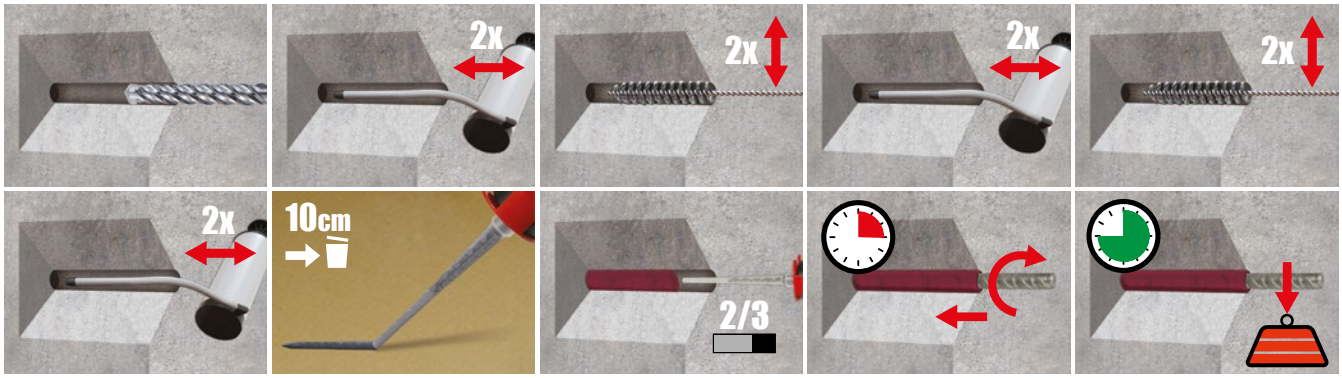
	Code	[° C]	Pcs.
585ml	WCF-E3-585	5 to 40	12

TABLE 2. INSTALLATION PARAMETERS - REBARS ACCORDING TO THE EN-1992-4:2018

Parameters			THREADED ROD SIZE						
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar diameter	d	[mm]	8	10	12	16	20	25	32
Hole diameter	d_0	[mm]	12	14	16	20	25	32	40
Min. embedment depth	$h_{ef,min}$	[mm]	60	60	70	80	90	100	128
Min. hole depth	$h_{0,min}$	[mm]	65	65	75	85	95	105	133
Min. edge distance	c_{min}	[mm]	40	40	40	40	50	50	70
Min. spacing	s_{min}	[mm]	40	40	40	40	50	50	70
Max. embedment depth	$h_{ef,max}$	[mm]	160	200	240	320	400	500	640
Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	505	645
Min. base material thickness	h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm			h_{ef}+2*d_0			

TABLE 3. CURING TIME

Substrate temp [° C]	5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	300	150	40	25	18	12	8	6
Minimum curing time [h]	24	24	18	12	8	6	4	2



MOUNT EVEREST (WCF-E3) - Epoxy injection anchor - FOR HEAVY LOADS (POST-INSTALLED REBAR CONNECTION)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
585ml	WCF-E3-585	5 to 40	12

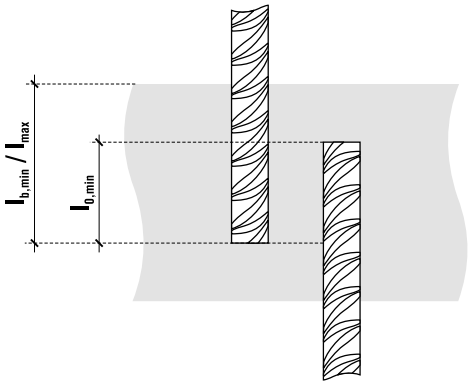


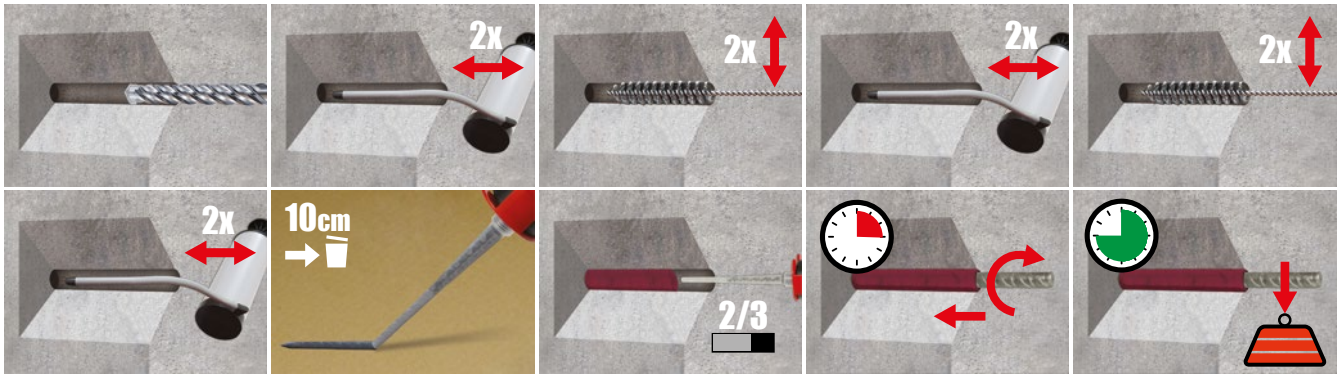
TABLE 2. INSTALLATION PARAMETERS - POST-INSTALLED REBAR CONNECTIONS

Parameters			THREADED ROD SIZE								
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Rebar diameter	d	[mm]	8	10	12	14	16	20	25	28	32
Hole diameter	d_0	[mm]	12	14	16	18	20	25	32	35	40
Min. anchorage length - C20/25	$l_{b,min}$	[mm]	113	142	170	198	227	284	354	397	454
Min. anchorage length - C50/60	$l_{b,min}$	[mm]	100	100	120	140	160	200	250	280	320
Minimum overlap length	$l_{0,min}$	[mm]	200	200	200	210	240	300	375	420	480
Max. installation length	l_{max}	[mm]	400	500	600	700	800	1000	1000	1000	1000

Values have been calculated for good bond conditions and α_6=1,0
Minimum anchorage length for PIR applications: $l_{b,min}$=max(0,3*$l_{b,rqd}$;10*d;100 mm)
Minimum overlap length for PIR applications: $l_{0,min}$=max(0,3*α_6*$l_{b,rqd}$;15*d;200 mm)

TABLE 3. CURING TIME

Substrate temp [˚C]	5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	300	150	40	25	18	12	8	6
Minimum curing time [h]	24	24	18	12	8	6	4	2



NANDA KOT - Hybrid injection anchors - **FOR HEAVY AND MEDIUM LOADS**

WCF-XS / WCF-XS-E
WCF-XS-C

Hybrid bonded injection anchor system offering very high performance in both cracked & uncracked concrete, along with a very good performance under seismic conditions (C1&C2). For professional use in heavy and medium duty applications.

C1/C2
(C2 - only for threaded rod)

ETA-20/0615 - for PIR calculations in accordance with EC2 EN 1992-1-1
ETA-20/0617 - for threaded rods and rebars calculations according to EN-1992-4:2018

SUBSTRATES


- Cracked and uncracked concrete (option 1) C20/25 to C50/60.
- Reinforced and non-reinforced concrete.
- Dry, wet concrete and flooded holes (Cat 2).
- Post-installed rebar connections - calculation in accordance with EC2 EN 1992-1-1.
- Strength class of concrete from C12/15 to C50/60.

INSTALLATION TEMPERATURE RANGE	**WCF-XS-410** - for normal installation conditions: 5°C to 30°C **WCF-XS-E-410** - for summer (tropical) installation conditions: 15°C to 40°C **WCF-XS-C-410** - for winter installation conditions: 0°C to 20°C
CARTRIDGE SIZE	410 ml
APPROVED STEEL ELEMENTS	· Threaded rods M8-M30 made of galvanized steel grades: 4.6, 5.8, 8.8, 10.9; · Threaded rods M8-M30 made of stainless steel grades: A4-70, A4-80, A2-70; · Threaded rods M8-M30 made of HCR steel: 1.4529 and 1.4565; · Galvanized or hot-dip galvanized rods and thermodiffusion; · Rebars: Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32, grade: B,C; · Rebars (post installed in accordance with TR023/EC2): Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25, Ø28, Ø32, class: B, C;
APPLICATIONS	· Anchoring of steel constructions to concrete structural components · Anchoring of base plates, brackets, consoles in high/medium load applications · Strengthening and reinforcement of concrete members in existing superstructure (old buildings restoration, bridges renovation, etc.). · Wide range of post-installed rebar connections including anchorage and overlap joint applications (e.g. slab to slab at support, overlap joint at a foundation of column or wall, etc.) · Design method according to EN 1992-4:2018 and EC2 EN 1992-1-1

SEISMIC APPROVAL C1/C2
Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.

HIGH LOAD-BEARING PARAMETERS
Being free of styrene is well suited and safe for use indoors and in confined spaces.

STYRENE-FREE
Being free of styrene is well suited and safe for use indoors and in confined spaces.

INSTALLATION IN CRACKED CONCRETE
Approved for fastening threaded rods in tension zone of reinforced concrete member. Tension zone, also called cracked zone might occur in all main structural concrete members e.g. beams , slabs, columns.

NANDA KOT		
410 ml	5°C to 30°C	WCF-XS-400
410 ml	15°C to 40°C	WCF-XS-E-400*
410 ml	0°C to 20°C	WCF-XS-C-400*

*product available on request

NANDA KOT (WCF-XS / WCF-XS-E / WCF-XS-C) - Hybrid injection anchors - FOR HEAVY AND MEDIUM LOADS (THREADED RODS)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
410 ml	WCF-XS-410	5 to 30	12
	WCF-XS-E-410*	15 to 40	12
	WCF-XS-C-410*	0 to 20	12

*product available on request

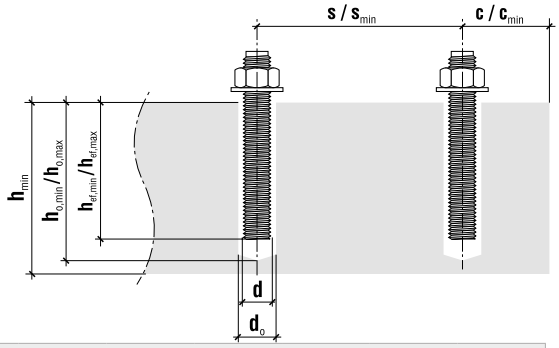


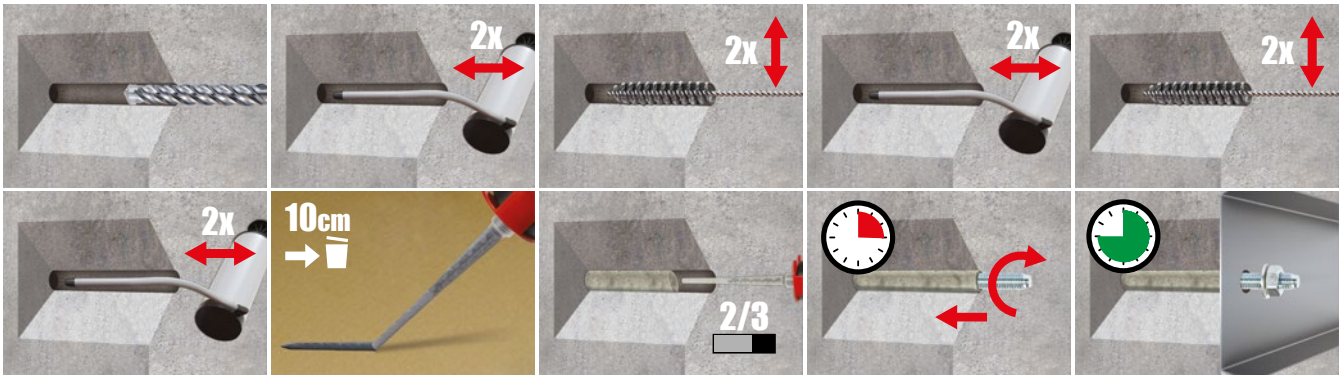
TABLE 2. INSTALLATION PARAMETERS - THREADED RODS

Parameters				THREADED ROD SIZE							
				M8	M10	M12	M16	M20	M24	M27	M30
Threaded rod diameter		d	[mm]	8	10	12	16	20	24	27	30
Hole diameter		d_0	[mm]	10	12	14	18	22	26	30	35
Minimum embedment depth = 8d	Min. embedment depth	$h_{ef,min}$	[mm]	64	80	96	128	160	192	216	240
	Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	197	221	245
	Min. edge distance	c_{min}	[mm]	35	40	50	65	80	96	110	120
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	96	110	120
Maximum embedment depth = 20d	Max. embedment depth	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
	Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	485	545	605
Min. base material thickness		h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm				h_{ef}+2*d_0			
Installation torque		T_{inst}	[Nm]	10	20	40	80	150	200	240	275

TABLE 3. CURING TIME

Substrate temp [˚C]	Resin type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Maximum working time [min.]	XS	-	10	8	6	5	4	-	-
	XS-E	-	-	-	15	10	7,5	5	3,5
	XS-C	10	5	5	5	1,7*	-	-	-
Minimum curing time [min.]	XS	-	145	85	75	50	40	-	-
	XS-E	-	-	-	300	145	85	50	40
	XS-C	75	50	50	50	20*	-	-	-

* applies only to the temperature of + 20 ˚C



NANDA KOT (WCF-XS / WCF-XS-E / WCF-XS-C) - Hybrid injection anchors - FOR HEAVY AND MEDIUM LOADS (REBARS)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
410ml	WCF-XS-410	5 to 30	12
	WCF-XS-E-410*	15 to 40	12
	WCF-XS-C-410*	0 to 20	12

*product available on request

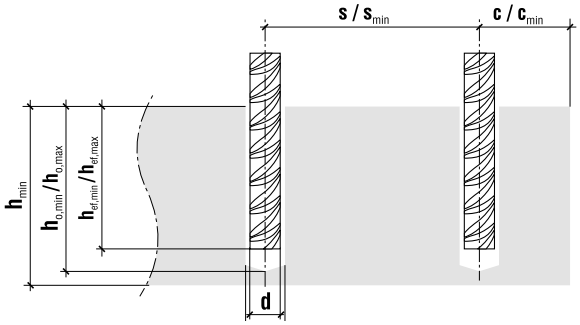
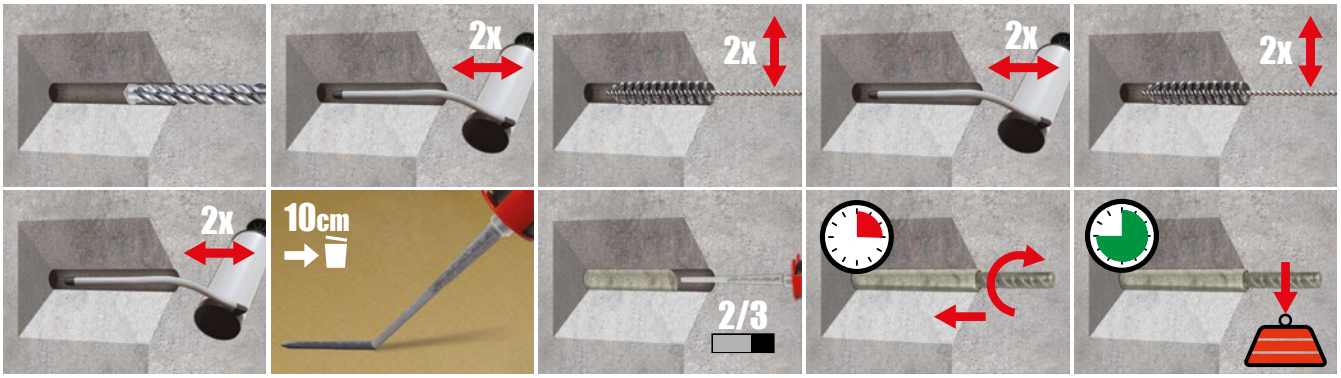


TABLE 2. INSTALLATION PARAMETERS - REBARS ACCORDING TO THE EN-1992-4:2018

Parameters				THREADED ROD SIZE						
				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar diameter		d	[mm]	8	10	12	16	20	25	32
Hole diameter		d_0	[mm]	12	14	16	20	25	32	40
Minimum embedment depth = 8d	Min. embedment depth	$h_{ef,min}$	[mm]	64	80	96	128	160	200	256
	Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	205	261
	Min. edge distance	c_{min}	[mm]	35	40	50	65	80	100	130
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	100	130
Maximum embedment depth = 20d	Max. embedment depth	$h_{ef,max\,[mm]}$	[mm]	160	200	240	320	400	500	640
	Max. hole depth	$h_{0,max\,[mm]}$	[mm]	165	205	245	325	405	505	645
Min. base material thickness		h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm				h_{ef}+2*d_0		

Substrate temp [˚C]	Resin type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	XS	-	10	8	6	5	4	-	-
	XS-E	-	-	-	15	10	7,5	5	3,5
	XS-C	10	5	5	5	1,7*	-	-	-
Minimum curing time [min.]	XS	-	145	85	75	50	40	-	-
	XS-E	-	-	-	300	145	85	50	40
	XS-C	75	50	50	50	20*	-	-	-

* applies only to the temperature of + 20 ˚C



NANDA KOT (WCF-XS / WCF-XS-E / WCF-XS-C) - Hybrid injection anchors - FOR HEAVY AND MEDIUM LOADS (POST-INSTALLED REBAR CONNECTION)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
410 ml	WCF-XS-410	5 to 30	12
	WCF-XS-E-410*	15 to 40	12
	WCF-XS-C-410*	0 to 20	12

*product available on request

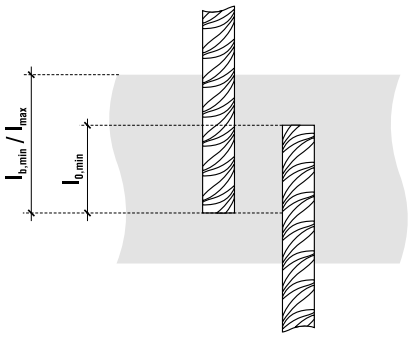


TABLE 2. INSTALLATION PARAMETERS - POST INSTALL REBAR CONNECTIONS

Parameters			THREADED ROD SIZE								
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø28	Ø32
Rebar diameter	d	[mm]	8	10	12	14	16	20	25	28	32
Hole diameter	d_0	[mm]	12	14	16	18	20	25	32	35	40
Min. anchorage length - C20/25	$l_{b,min}$	[mm]	113	142	170	198	227	284	354	397	454
Min. anchorage length - C50/60	$l_{b,min}$	[mm]	100	100	120	140	160	200	272	338	454
Minimum overlap length	$l_{0,min}$	[mm]	200	200	200	210	240	300	375	420	480
Max. installation length	l_{max}	[mm]	400	500	600	700	800	1000	1000	1000	1000

Values have been calculated for good bond conditions and α_6=1,0

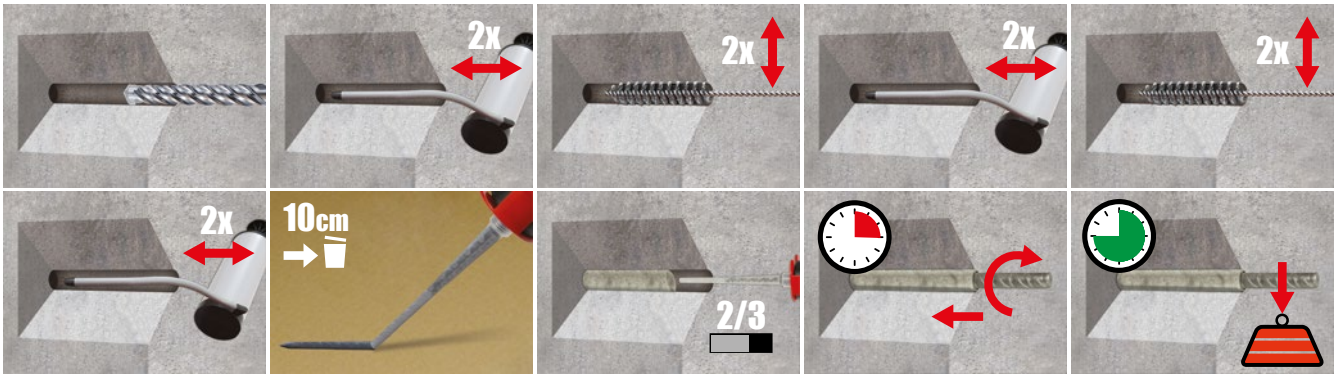
Minimum anchorage length for PIR applications: $l_{b,min}$=max(0,3*$l_{b,rqd}$;10*d;100 mm)

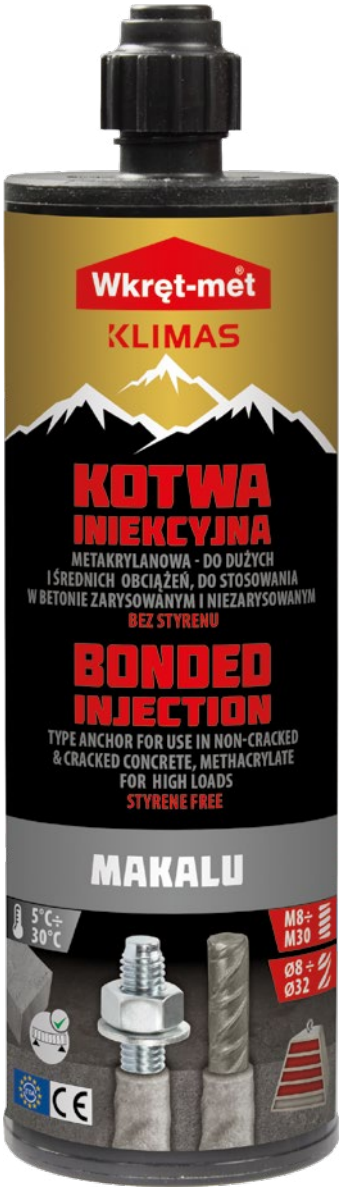
Minimum overlap length for PIR applications: $l_{0,min}$=max(0,3*α_6*$l_{b,rqd}$;15*d;200 mm)

TABLE 3. CURING TIME (POST INSTALL REBAR CONNECTIONS)

Substrate temp [˚C]	Resin type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	XS	-	10	8	6	5	4	-	-
	XS-E	-	-	-	15	10	7,5	5	3,5
	XS-C	10	5	5	5	1,7*	-	-	-
Minimum curing time [min.]	XS	-	145	85	75	50	40	-	-
	XS-E	-	-	-	300	145	85	50	40
	XS-C	75	50	50	50	20*	-	-	-

* applies only to the temperature of + 20 ˚C





MAKALU - Epoxy Acrylate injection anchors - **FOR HEAVY AND MEDIUM LOADS**

WCF-EASF / WCF-EASF-E WCF-EASF-C

Epoxy Acrylate two-component (10:1 ratio) is universal bonded anchoring system approved for use in cracked & uncracked concrete in anchorages subject to static and quasi-static load and seismic actions in category C1 , and also in masonry. For professional use in heavy and medium duty applications.

C1 (only for threaded rod M10-M24)

ETA-20/0618 - for installation of threaded rods into masonry substrate
ETA-15/0703 - for PIR calculations in accordance with EC2 EN 1992-1-1
ETA-15/0702 - for threaded rods and rebars calculations according to EN-1992-4:2018

SUBSTRATES



- Cracked and uncracked concrete (option 1) C20/25 to C50/60.
- Reinforced and non-reinforced concrete.
- Dry, wet concrete and flooded holes (Cat 2).
- Post-installed rebar connections - calculation in accordance with EC2 EN 1992-1-1.
- Strength class of concrete from C12/15 to C50/60

- Masonry substrate.

INSTALLATION TEMPERATURE RANGE	**WCF-EASF-410** - for normal installation conditions: 5°C to 30°C **WCF-EASF-E-410** - for summer (tropical) installation conditions: 15°C to 40°C **WCF-EASF-C-410** - for winter installation conditions: 0°C to 20°C (not approved for PIR connections).
CARTRIDGE SIZE	410 ml
APPROVED STEEL ELEMENTS	· Threaded rods M8-M30 made of galvanized steel grades: 4.6, 5.8, 8.8, 10.9; · Threaded rods M8-M30 made of stainless steel grades: A4-70, A4-80, A2-70; · Threaded rods M8-M30 made of HCR steel: 1.4529 and 1.4565; · Galvanized or hot-dip galvanized rods and thermodiffusion; · Rebars: Ø8, Ø10, Ø12, Ø16, Ø20, Ø25, Ø32, grade: B,C; · Rebars (post installed in accordance with TR023/EC2): Ø8, Ø10, Ø12, Ø14, Ø16, Ø20, Ø25, class: B, C;
APPLICATIONS	· Anchoring of steel constructions to concrete structural components · Anchoring of base plates, brackets, consoles in high/medium load applications · Strengthening and reinforcement of concrete members in existing superstructure (old buildings restoration, bridges renovation, etc.) · Wide range of post-installed rebar connections including anchorage and overlap joint applications (e.g. slab to slab at support, overlap joint at a foundation of column or wall, etc.) · Design method according to EN 1992-4:2018 and EC2 EN 1992-1-1

MAKALU		
410 ml	5°C to 30°C	WCF-EASF-400
410 ml	15°C to 40°C	WCF-EASF-E-400*
410 ml	0°C to 20°C	WCF-EASF-C-400*

*product available on request

SEISMIC APPROVAL C1
Anchors have been tested for seismic loads, and thus are approved for use in applications in seismically active areas. Seismic approval allows to design reliable fastenings with increased level of safety.

HIGH LOAD-BEARING PARAMETERS
Being free of styrene is well suited and safe for use indoors and in confined spaces.

STYRENE-FREE
Being free of styrene is well suited and safe for use indoors and in confined spaces.

INSTALLATION IN CRACKED CONCRETE
Approved for fastening threaded rods in tension zone of reinforced concrete member. Tension zone, also called cracked zone might occur in all main structural concrete members e.g. beams , slabs, columns.

MAKALU (WCF-EASF / WCF-EASF-E / WCF-EASF-C) - FOR HEAVY AND MEDIUM LOADS (THREADED RODS)

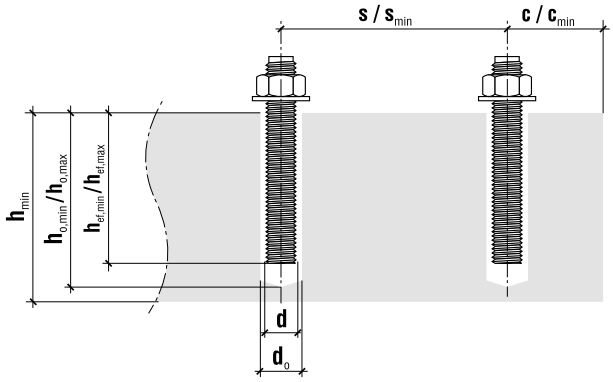


TABLE 1. SELECTION TABLE

	Code	[° C]	Pcs.
410 ml	WCF-EASF-410	5 to 30	12
	WCF-EASF-E-410*	15 to 40	12
	WCF-EASF-C-410*	0 to 20	12

*product available on request

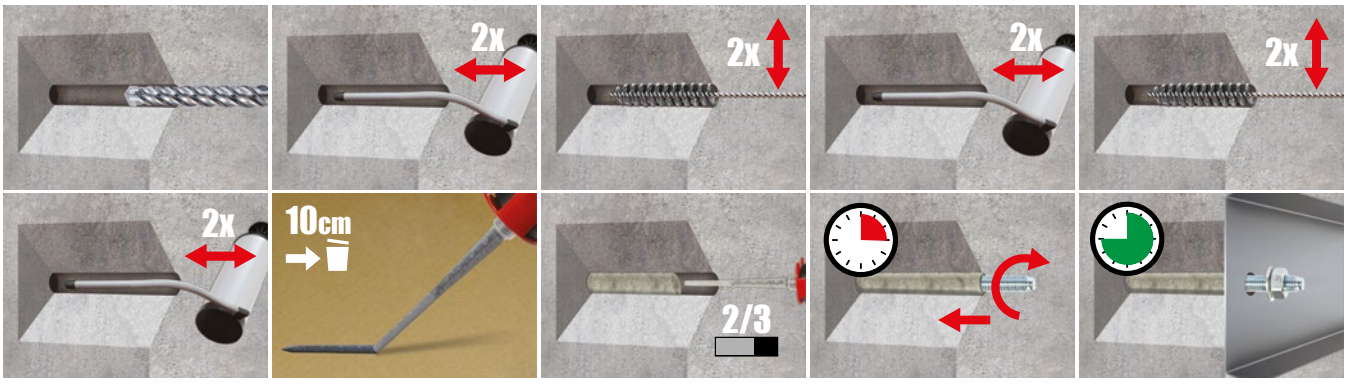
TABLE 2. INSTALLATION PARAMETERS - THREADED RODS

Parameters				THREADED ROD SIZE							
				M8	M10	M12	M16	M20	M24	M27	M30
Threaded rod diameter		d	[mm]	8	10	12	16	20	24	27	30
Hole diameter		d_0	[mm]	10	12	14	18	22	26	30	35
For minimum embedment depth = 8d	Min. embedment depth	$h_{ef,min}$	[mm]	64	80	96	128	160	192	216	240
	Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	197	221	245
	Min. edge distance	c_{min}	[mm]	35	40	50	65	80	96	110	120
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	96	110	120
Maximum anchoring depth = 20d	Max. embedment depth	$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
	Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	485	545	605
Min. base material thickness		h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm				h_{ef}+2*d_0			
Installation torque		T_{inst}	[Nm]	10	20	40	80	150	200	240	275

TABLE 3. CURING TIME

Substrate temp [° C]	Resin type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	EASF	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	15	10	7,5	5	3,5
	EASF-C	10	5	5	5	1,7*	-	-	-
Minimum curing time [min.]	EASF	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	300	145	85	50	40
	EASF-C	75	50	50	50	20*	-	-	-

* applies only to the temperature of + 20 ° C



MAKALU (WCF-EASF / WCF-EASF-E / WCF-EASF-C) - FOR HEAVY AND MEDIUM LOADS (REBARS ACCORDING TO THE TR029 STANDARD)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
410ml	WCF-EASF-410	5 to 30	12
	WCF-EASF-E-410*	15 to 40	12
	WCF-EASF-C-410*	0 to 20	12

*product available on request

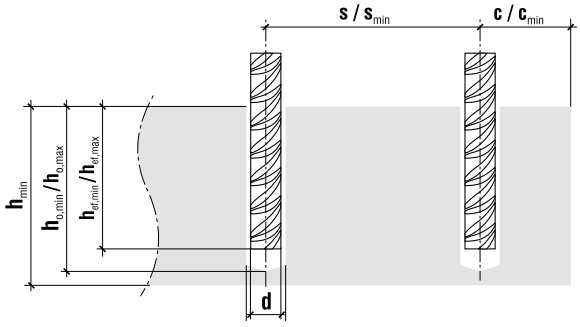


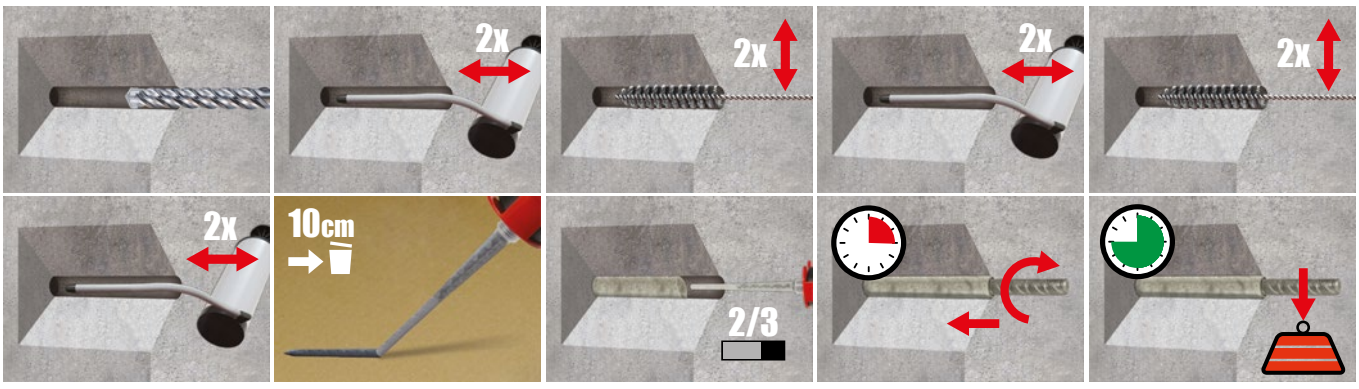
TABLE 2. INSTALLATION PARAMETERS - REBARS ACCORDING TO THE EN-1992-4:2018

Parameters				THREADED ROD SIZE						
				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Rebar diameter		d	[mm]	8	10	12	16	20	25	32
Hole diameter		d_0	[mm]	12	14	16	20	25	32	40
For minimum embedment depth = 8d	Min. embedment depth	$h_{ef,min}$	[mm]	64	80	96	128	160	200	256
	Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	205	261
	Min. edge distance	c_{min}	[mm]	35	40	50	65	80	100	130
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	100	130
Maximum embedment depth = 20d	Max. embedment depth	$h_{ef,max}$	[mm]	160	200	240	320	400	500	640
	Max. hole depth	$h_{0,max}$	[mm]	165	205	245	325	405	505	645
Min. base material thickness		h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm				$h_{ef}+2*d_0$		

TABLE 3. CURING TIME

Substrate temp [˚C]	Resin type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	EASF	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	15	10	7,5	5	3,5
	EASF-C	10	5	5	5	1,7*	-	-	-
Minimum curing time [min.]	EASF	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	300	145	85	50	40
	EASF-C	75	50	50	50	20*	-	-	-

* applies only to the temperature of + 20 ˚C



MAKALU (WCF-EASF / WCF-EASF-E / WCF-EASF-C) - FOR HEAVY AND MEDIUM LOADS (POST-INSTALLED REBAR CONNECTION)

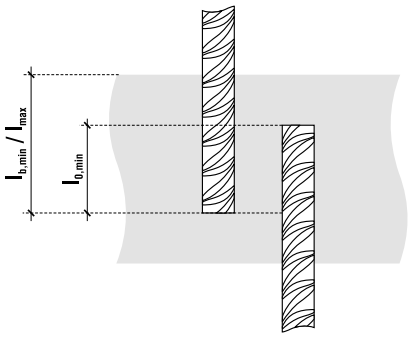


TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
410 ml	WCF-EASF-410	5 to 30	12
	WCF-EASF-E-410*	15 to 40	12

*product available on request

TABLE 2. INSTALLATION PARAMETERS - POST INSTALL REBAR CONNECTIONS

Parameters			THREADED ROD SIZE						
			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25
Rebar diameter	d	[mm]	8	10	12	14	16	20	25
Hole diameter	d_0	[mm]	12	14	16	18	20	25	32
Min. anchorage length - C20/25	$l_{b,min}$	[mm]	113	142	170	198	227	284	354
Min. anchorage length - C50/60	$l_{b,min}$	[mm]	100	100	120	140	160	200	272
Minimum overlap length	$l_{0,min}$	[mm]	200	200	200	210	240	300	375
Max. installation length	l_{max}	[mm]	400	500	600	700	800	1000	1000

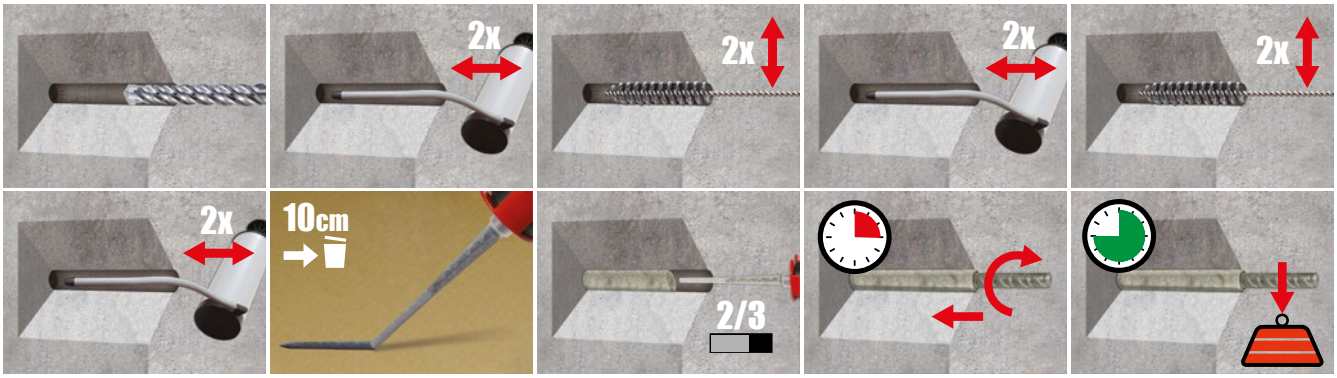
Values have been calculated for good bond conditions and α_6=1,0

Minimum anchorage length for PIR applications: $l_{b,min}$=max(0,3*$l_{b,rqd}$;10*d;100 mm)

Minimum overlap length for PIR applications: $l_{0,min}$=max(0,3*α_6*$l_{b,rqd}$;15*d;200 mm)

TABLE 3. CURING TIME - POST INSTALL REBAR CONNECTIONS

Substrate temp [˚C]	Resin type	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	WCF-EASF-410	10	8	6	5	4	-	-
	WCF-EASF-E-410	-	-	15	10	7	5	3
Minimum curing time [min.]	WCF-EASF-410	145	85	75	50	40	-	-
	WCF-EASF-E-410	-	-	300	145	85	50	40



MAKALU (WCF-EASF / WCF-EASF-E / WCF-EASF-C) - FOR HEAVY AND MEDIUM LOADS (THREADED RODS - MASONRY)

TABLE 1. SELECTION TABLE

	Code	[˚C]	pcs.
410ml	WCF-EASF-410	5 to 30	12
	WCF-EASF-E-410	15 to 40	12
	WCF-EASF-C-410	0 to 20	12

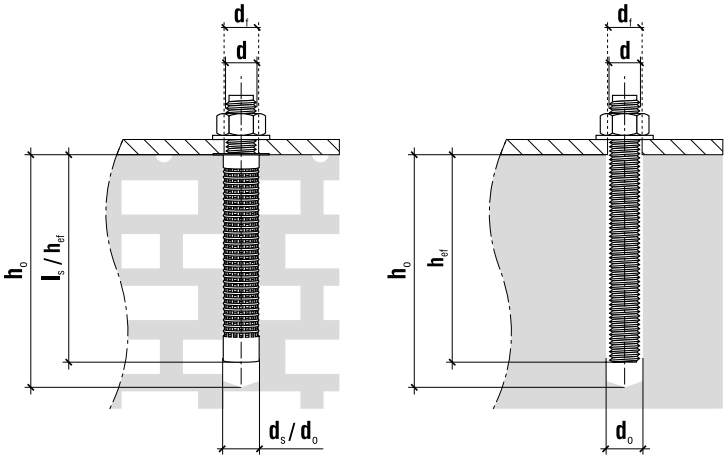


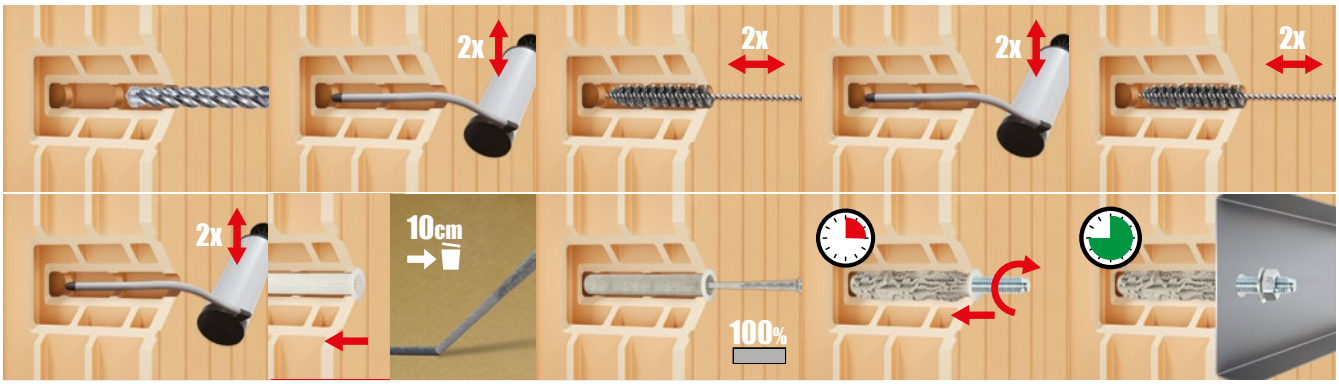
TABLE 2.INSTALLATION PARAMETERS - THREADED RODS - MASONRY

Parameters			THREADED RODS					
Substrate			Solid masonry			Hollow masonry		
Threaded rod diameter	d	[mm]	M8	M10	M12	M8	M10	M12
Sleeve length	l_s	[mm]	-	-	-	85	85	85
Sleeve diameter	d_s	[mm]	-	-	-	16	16	20
Hole diameter	d_0	[mm]	16	16	20	16	16	20
Depth of the drill hole	h_0	[mm]	90					
Effective anchorage depth	h_{ef}	[mm]	85					
Diameter of clearance hole in the fixture	$d_{f\leq}$	[mm]	9	12	14	9	12	14
Installation torque	$T_{inst\leq}$	[Nm]	2					

TABLE 3. CURING TIME

Substrate temp [˚C]	Resin type	0 to 5	5 to 10	10 to 15	15 to 20	20 to 25	25 to 30	30 to 35	35 to 40
Max. working time [min.]	EASF	-	10	8	6	5	4	-	-
	EASF-E	-	-	-	15	10	7,5	5	3,5
	EASF-C	10	5	5	5	1,7*	-	-	-
Minimum curing time [min.]	EASF	-	145	85	75	50	40	-	-
	EASF-E	-	-	-	300	145	85	50	40
	EASF-C	75	50	50	50	20*	-	-	-

* applies only to the temperature of + 20 ˚C



Reinforcement system for strengthening external concrete facade layer of communist-era prefabricated panel-system buildings

In response to the problem of reinforcing the external concrete facade layer of communist-era prefabricated panel-system buildings KLIMAS company has developed an economical and easy to install strengthening system, which maintain high performance properties. The estimated cost of the WK RENO reinforcement system (not considering load-bearing capacity of existing panel anchors) is about 20-25 % of the price of External Thermal Insulation System , which considering entire thermal modernization works is not a big expense , taking into account also possible additional costs that may occur in the event of existing panel anchors failure after thermal modernization of building.taking into account any costs that may occur during any malfunction after the thermal improvements.

The advantages of WK Reno system:

- Fast and easy installation - installation process is not complicated and does not require the use of specialized tools and equipment.
- High load-bearing capacity - system provides high load-bearing parameters and guarantee long-term safe service.
- No stress generated during installation - by avoiding mechanical expansion, the WK RENO system does not introduce during installation stress into the substrate and can be installed close to each other and to substrate edges.
- ITB Technical Approval - the quality of the system is confirmed with Technical Approval issued by the Institute of Building Technology in Poland.
- Threaded rods made of A2 or A4 stainless steel - the highest anti-corrosion protection.
- The WK RENO system ensures the stabilization of the entire facade by transferring self-weight load (shear force) and wind suction (tension force) into the supporting structure.
- One size drill diameter is used for drilling holes, which significantly speeds up and facilitates installation process.
- Simple installation also during additional thermal modernization of buildings (new ETICS system applied on old ETICS system) - no need to remove old ETICS in the area of WK RENO setting.

ELBRUS - Vinylester Injection Anchors - **FOR MEDIUM LOADS**

WCF-VESF / WCF-VESF-E

Vinylester two-component (10:1 ratio) is styrene-free bonded anchoring system approved for use in uncracked concrete with medium performance level. Suitable for both DIY applications and also professional use.

ETA-15/0744

SUBSTRATES

- Uncracked concrete (option 7) C20/25 to C50/60.
- Reinforced and non-reinforced concrete.
- Dry and wet concrete and flooded holes (Cat 2).

INSTALLATION TEMPERATURE RANGE	**WCF-VESF-300** - for normal installation conditions: 5°C to 30°C **WCF-VESF-410** - for normal installation conditions: 5°C to 30°C **WCF-VESF-E-300** - for summer (tropical) installation conditions: 10°C to 45°C **WCF-VESF-E-410** - for summer (tropical) installation conditions: 10°C to 45°C
CARTRIDGE SIZE	**WCF-VESF-300** - 300 ml **WCF-VESF-410** - 410 ml **WCF-VESF-E-300** - 300 ml **WCF-VESF-E-410** - 410 ml
APPROVED STEEL ELEMENTS	· Threaded rods M8-M24 made of galvanized steel grades: 5.8 8.8 10.9; · Threaded rods M8-M24 made of stainless steel grades: A2-70, A4-70, A4-80; · Threaded rods M8-M24 made of HCR steel: 1.4529, 1.4565; · Galvanized, hot-dip galvanized or thermodiffusion galvanized bars;
APPLICATIONS	· Anchoring of base plates, brackets, consoles when load-bearing capacity is less critical. · Fastenings in safety related non-structural applications e.g. handrails, guard rails , canopies, cantilevers etc. · Design method according to EOTA Technical Report TR029 and EN-1992-4:2018.

ELBRUS		
300 ml	5°C to 30°C	WCF-VESF-300
410 ml	5°C to 30°C	WCF-VESF-410
300 ml	10°C to 45°C	WCF-VESF-E-300
410 ml	10°C to 45°C	WCF-VESF-E-410

STYRENE-FREE
Being free of styrene is well suited and safe for use indoors and in confined spaces.

NO STRESS IN SUBSTRATE DURING INSTALLATION
By avoiding mechanical expansion, they do not introduce during installation stress into the substrate and can be installed close to each other and to substrate edges.

FAST CURING
Resin is designed to cure fast so you can load the fastening point earlier.

ADDITIONAL MIXING NOZZLE FOR CARTRIDGE SIZE 300 ml
Two mixing nozzles for one cartridge allow to reuse remaining resin for next anchoring works.
After finishing installation, leave used mixing nozzle on the cartridge until next anchoring job.
Then remove used mixing nozzle with cured resin inside and screw a new one.
The injection anchor is ready for another works.

ELBRUS (WCF-VESF / WCF-VESF-E) - Vinylester Injection Anchors - FOR MEDIUM LOADS (THREADED RODS)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
300ml	WCF-VESF-300	5 to 30	12
	WCF-VESF-E-300*	10 to 45	12
410ml	WCF-VESF-410	5 to 30	12
	WCF-VESF-E-410*	10 to 45	12

*product on order

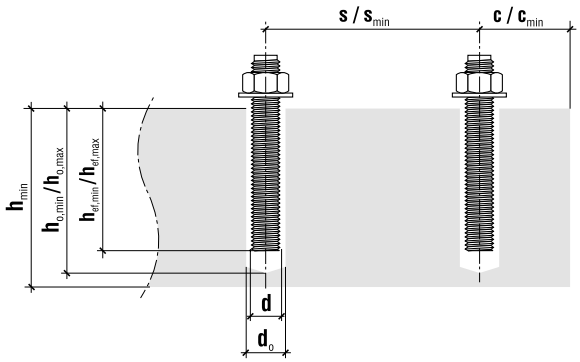
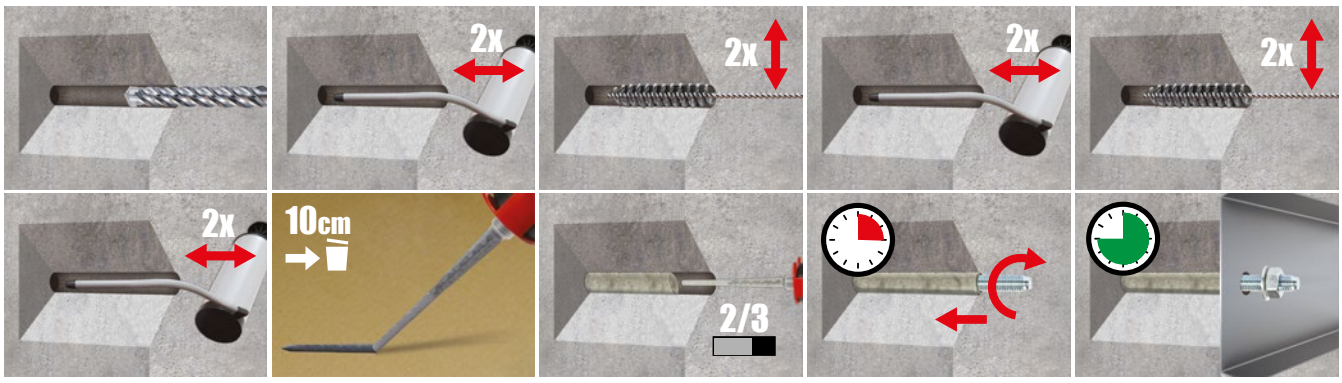


TABLE 2. INSTALLATION PARAMETERS - THREADED RODS

Parameters				THREADED ROD SIZE					
				M8	M10	M12	M16	M20	M24
Threaded rod diameter		d	[mm]	8	10	12	16	20	24
Hole diameter		d_0	[mm]	10	12	14	18	22	26
For minimum embedment depth = 8d	Min. embedment depth	$h_{ef,min}$	[mm]	64	80	96	128	160	192
	Min. hole depth	$h_{0,min}$	[mm]	69	85	101	133	165	197
	Min. edge distance	c_{min}	[mm]	35	40	50	65	80	96
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	96
Maximum embedment depth = 12d	Max. embedment depth	$h_{ef,max}$	[mm]	96	120	144	192	240	288
	Max. hole depth	$h_{0,max}$	[mm]	101	125	149	197	245	293
	Min. edge distance	c_{min}	[mm]	50	60	70	95	120	145
	Min. spacing	s_{min}	[mm]	50	60	70	95	120	145
Min. substrate thickness		h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm				h_{ef}+2*d_0	
Installation torque		T_{inst}	[Nm]	10	20	40	80	150	200

TABLE 3. CURING TIME

Substrate temp [˚C]	Resin type	5	5 to 10	10	10 to 20	20 to 25	25 to 30	30	30 to 35	35 to 40	40 to 45	45
Max. working time [min.]	VESF	18	10	-	6	5	4	4	-	-	-	-
	VESF-E	-	-	30	15	10	7,5	-	5	3,5	2,5	2,5
Minimum curing time [min.]	VESF	145	145	-	85	50	40	35	-	-	-	-
	VESF-E	-	-	300	300	145	85	-	50	40	35	12



MONT BLANC - Polyester injection anchors - **FOR LOW AND MEDIUM LOADS**

WCF-PESF / WCF-PESF-E

Polyester is a low to medium performance level, cost effective, general purpose two-component (10:1 ratio), styrene-free chemical anchoring system with unsaturated polyester as chemical base, that has been formulated for anchoring in a wide variety of building materials. Ideal for standard DIY applications in uncracked concrete and masonry substrates.

ETA-16/0677 for threaded rods in masonry substrates calculations according to ETAG 029, Annex C, Design method A
ETA-15/0745 for threaded rods calculations according to TR029 and EN-1992-4:2018

SUBSTRATES

- Uncracked concrete (option 7) C20/25 to C50/60.
- Reinforced and non-reinforced concrete.
- Dry and wet concrete and flooded holes (Cat 2).
- Masonry substrate.

INSTALLATION TEMPERATURE RANGE	**WCF-PESF-410** - for normal installation conditions: 5°C to 30°C **WCF-PESF-E-410** - for summer (tropical) installation conditions: 10°C to 45°C **WCF-PESF-C-410** - for winter installation conditions: -10°C to 30°C
CARTRIDGE SIZE	**WCF-PESF-E-300** - 300 ml * **WCF-PESF-410** - 410 ml **WCF-PESF-E-410** - 410 ml
APPROVED STEEL ELEMENTS	· Threaded rods M8-M24 made of galvanized steel grades: 5.8 8.8 10.9; · Threaded rods M8-M24 made of stainless steel grades: A2-70, A4-70, A4-80; · Threaded rods M8-M24 made of HCR steel: 1.4529, 1.4565; · Galvanized, hot-dip galvanized or thermodiffusion galvanized bars;
APPLICATIONS	· Anchoring of base plates, brackets, consoles when load-bearing capacity is less critical. · Fastenings in safety related non-structural applications e.g. handrails, guard rails , canopies, cantilevers, etc. · DIY anchoring applications into wide variety of building materials e.g. sanitary ware, fencing, gates, boilers, bicycle racks, awnings, etc. · Design method according to EOTA Technical Report TR029, EN-1992-4:2018 and ETAG 029/Annex C/Design method A.

*product available on request

MONT BLANC		
300 ml	5°C to 30°C	WCF-PESF-300
300 ml	10°C to 45°C	WCF-PESF-E-300*
300 ml	-10°C to 30°C	WCF-PESF-C-300
410 ml	10°C to 45°C	WCF-PESF-E-410*

*product available on request

STYRENE-FREE
Being free of styrene is well suited and safe for use indoors and in confined spaces.

NO STRESS IN SUBSTRATE DURING INSTALLATION
By avoiding mechanical expansion, they do not introduce during installation stress into the substrate and can be installed close to each other and to substrate edges.

FAST CURING
Resin is designed to cure fast so you can load the fastening point earlier.

CONTENT 410 ml - COAXIAL CARTRIDGE
Increased volume - 410 ml for larger work scopes, the coaxial cartridge allows for easier portioning and allows for use of every cm^3 of the product.

MONT BLANC (WCF-PESF / WCF-PESF-E / WCF-PESF-C) - Polyester injection anchors - FOR LOW AND MEDIUM LOADS (THREADED RODS - CONCRETE SUBSTRATE)

TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
300ml	WCF-PESF-300	5 to 30	12
	WCF-PESF-E-300*	10 to 45	12
	WCF-PESF-C-300	-10 to 30	12
410ml	WCF-PESF-E-410*	10 to 45	12

*product available on request

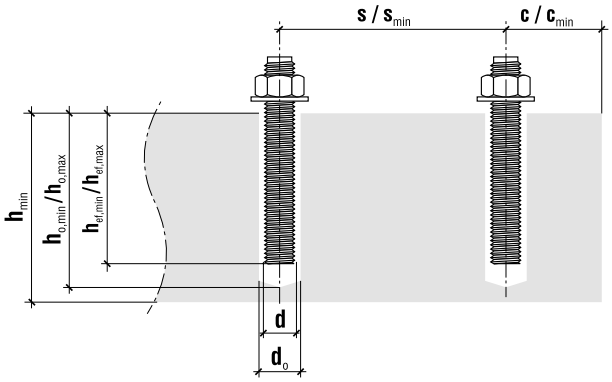
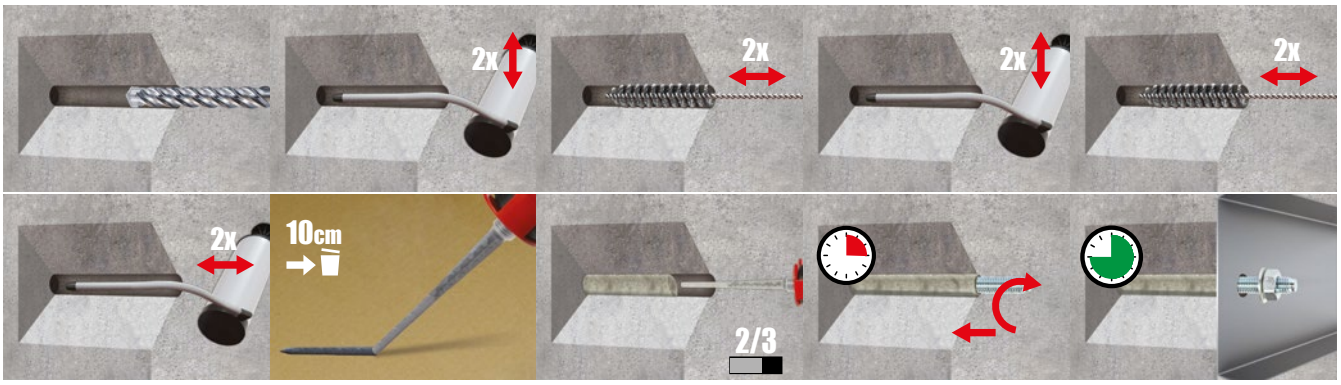


TABLE 2. INSTALLATION PARAMETERS - THREADED RODS - CONCRETE SUBSTRATE

Parameters				THREADED ROD SIZE					
				M8	M10	M12	M16	M20	M24
Threaded rod diameter		d	[mm]	8	10	12	16	20	24
Hole diameter		d_0	[mm]	10	12	14	18	22	26
For minimum embedment depth = 8d	Min. embedment depth	$h_{ef,min}$	[mm]	64	80	96	128	160	192
	Min. hole depth	h_0,min	[mm]	69	85	101	133	165	197
	Min. edge distance	c_{min}	[mm]	35	40	50	65	80	96
	Min. spacing	s_{min}	[mm]	35	40	50	65	80	96
Maximum embedment depth = 12d	Max. embedment depth	$h_{ef,max}$	[mm]	96	120	144	192	240	288
	Max. hole depth	$h_{0,max}$	[mm]	101	125	149	197	245	293
	Min. edge distance	c_{min}	[mm]	50	60	70	95	120	145
	Min. spacing	s_{min}	[mm]	50	60	70	95	120	145
Min. base material thickness		h_{min}	[mm]	h_{ef}+30 mm ≥ 100 mm				h_{ef}+2*d_0	
Installation torque		T_{inst}	[Nm]	10	20	40	80	150	200

TABLE 3. CURING TIME

Substrate temp [˚C]	Resin type	-10 to -5	-5 to 5	5	5 to 10	10	10 to 20	20 to 25	25 to 30	30	30 to 35	35 to 40	40 to 45	45
Working time [min.]	PESF	-	-	18	10	-	6	5	4	4	-	-	-	-
	PESF-E	-	-	-	-	30	15	10	7,5	-	5	3,5	2,5	2,5
	PESF-C	5	5	-	3,5	-	2	1,5	1	1	-	-	-	-
Minimum curing time [min.]	PESF	-	-	145	145	-	85	50	40	35	-	-	-	-
	PESF-E	-	-	-	-	300	300	145	85	-	50	40	35	12
	PESF-C	240	125	-	60	-	40	20	15	10	-	-	-	-



MONT BLANC (WCF-PESF / WCF-PESF-E / WCF-PESF-C) - Polyester injection anchors - FOR LOW AND MEDIUM LOADS (THREADED RODS - MASONRY)

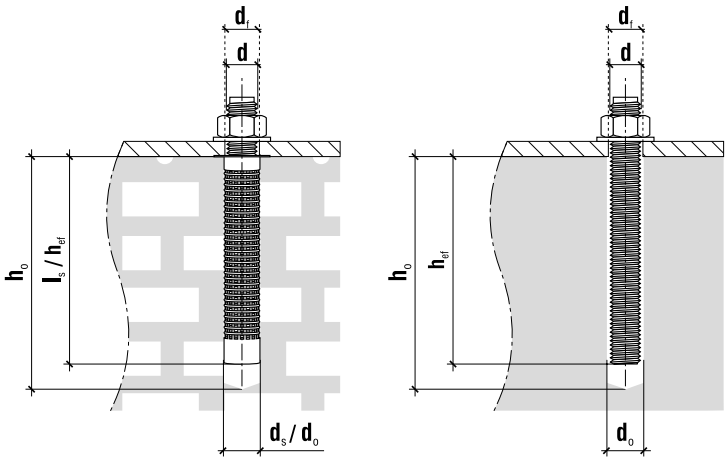


TABLE 1. SELECTION TABLE

	Code	[˚C]	Pcs.
300 ml	WCF-PESF-300	5 to 30	12
	WCF-PESF-E-300*	10 to 45	12
	WCF-PESF-C-300	-10 to 30	12

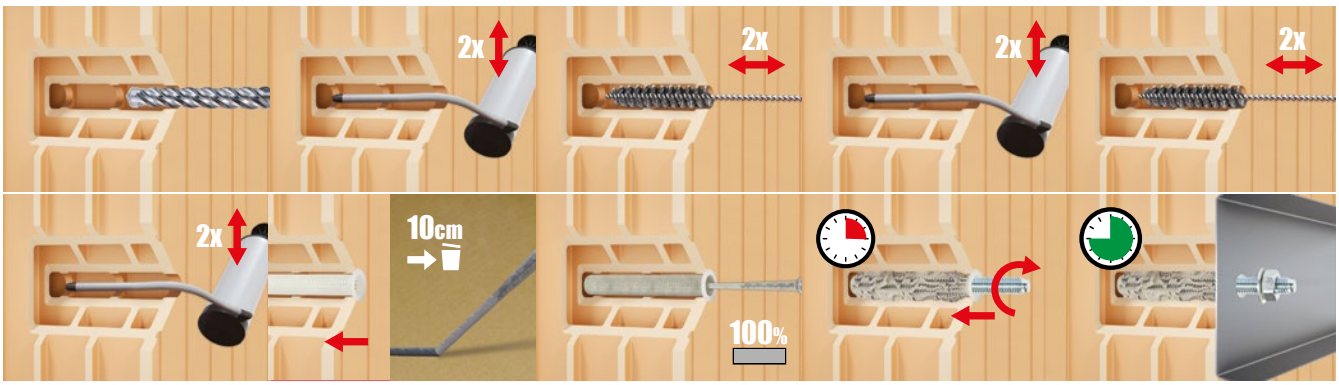
*product available on request

TABLE 2.INSTALLATION PARAMETERS - THREADED RODS - MASONRY

Parameters			THREADED RODS					
Substrate			Full ceramic bricks			Hollow bricks		
Threaded rod diameter	d	[mm]	M8	M10	M12	M8	M10	M12
Sleeve length	l_s	[mm]	-	-	-	85	85	85
Sleeve diameter	d_s	[mm]	-	-	-	15	15	20
Hole diameter	d_0	[mm]	15	15	20	15	15	20
Depth of the drill hole	h_0	[mm]	90					
Effective anchorage depth	h_{ef}	[mm]	85					
Diameter of clearance hole in the fixture	$d_{f\leq}$	[mm]	9	12	14	9	12	14
Installation torque	$T_{inst\leq}$	[Nm]	2					

TABLE 3. CURING TIME

Substrate temp [˚C]	Resin type	-10 to -5	-5 to 5	5	5 to 10	10	10 to 20	20 to 25	25 to 30	30	30 to 35	35 to 40	40 to 45	45
Max. working time [min.]	PESF	-	-	18	10	-	6	5	4	4	-	-	-	-
	PESF-E	-	-	-	-	30	15	10	7,5	-	5	3,5	2,5	2,5
	PESF-C	5	5	-	3,5	-	2	1,5	1	1	-	-	-	-
Minimum curing time [min.]	PESF	-	-	145	145	-	85	50	40	35	-	-	-	-
	PESF-E	-	-	-	-	300	300	145	85	-	50	40	35	12
	PESF-C	240	125	-	60	-	40	20	15	10	-	-	-	-

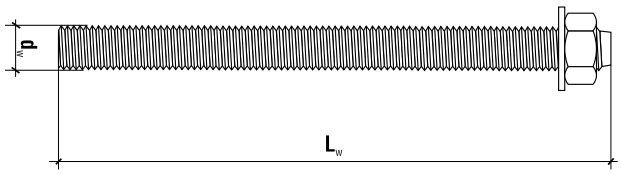


Anchor rods for injection anchors

KPG
KPGA2

Zn WHITE | A2 INOX

FOR USE WITH INJECTION ANCHORS	· WCF-PESF-300, WCF-PESF-E-300, WCF-PESF-C-300, WCF-PESF-E-410 · WCF-EASF-410, WCF-EASF-E-410, WCF-EASF-C-410 · WCF-XS-410, WCF-XS-E-410, WCF-XS-C-410 · WCF-VESF-300, WCF-VESF-E-300, WCF-VESF-410, WCF-VESF-E-410 · WCF-E3-585
SUBSTRATE	Reinforced and non-reinforced concrete, solid brick, hollow brick, perforated brick, lightweight concrete blocks, etc.
CORROSION PROTECTION	· Galvanized · Stainless Steel A2



SELECTION TABLE

	Product code Class 5.8	d_w x L_w [mm]	Hole diameter (installation into concrete and solid masonry substrate) [mm]	Unit pack quantity [pcs.]
Galvanized	KPG-M08	M8 x 110	10	10
	KPG-M10	M10 x 130	12	10
	KPG-M12	M12 x 160	14	10
	KPG-M16	M16 x 190	18	10
	KPG-M20	M20 x 260	22	10
	KPG-M24	M24 x 300	26	5
A2 - Stainless steel	KPGA2-M08*	M8 x 110	10	10
	KPGA2-M10*	M10 x 130	12	10
	KPGA2-M12*	M12 x 160	14	10
	KPGA2-M16*	M16 x 190	18	10
	KPGA2-M20*	M20 x 260	22	10
	KPGA2-M24*	M24 x 300	26	5

*product available on request

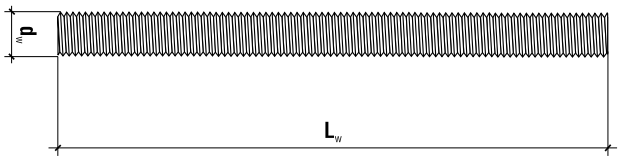
Threaded rods for injection anchors

PG0 / PG05/ PG08
PG0A2 / PG0A4

Threaded rods allow wide range of anchoring applications, in combination with expansion elements e.g. installation of wire hanging systems or in combination with resin act as embedded metal part placed into pre-drilled hole in base material

Zn WHITE | A2 INOX | A4 INOX

FOR USE WITH INJECTION ANCHORS	· WCF-PESF-300, WCF-PESF-E-300, WCF-PESF-C-300, WCF-PESF-E-410 · WCF-EASF-410, WCF-EASF-E-410, WCF-EASF-C-410 · WCF-XS-410, WCF-XS-E-410, WCF-XS-C-410 · WCF-VESF-300, WCF-VESF-E-300, WCF-VESF-410, WCF-VESF-E-410 · WCF-E3-585
SUBSTRATE	Reinforced and non-reinforced concrete, solid brick, hollow brick, perforated brick, lightweight concrete blocks, etc.



SELECTION TABLE

	Product code						d_w x L_w [mm]	Hole diameter (installation into concrete and solid masonry substrate) [mm]	Unit pack quantity [pcs.]
	Galvanized Grade 4.6/4.8	Galvanized Grade 5.8	Galvanized Grade 8.8	A2 - Stainless steel	A4 - Stainless steel				
M8	PG0-081000	PG05-081000	PG08-081000	PG0A2M8-100*	PG0A4M8-100*	Threaded rods with different coatings or different materials available on request	8x1000	10	1
	PG0-082000	-	-	-	-		8x2000	10	1
M10	PG0-101000	PG05-101000	PG08-101000	PG0A2M10-100*	PG0A4M10-100*		10x1000	12	1
	PG0-102000	-	-	-	-		10x2000	12	1
M12	PG0-121000	PG05-121000	PG08-121000	PG0A2M12-100*	PG0A4M12-100*		12x1000	14	1
	PG0-122000	-	-	-	-		12x2000	14	1
M16	PG0-161000	PG05-161000	PG08-161000	PG0A2M16-100*	PG0A4M16-100*		16x1000	18	1
	PG0-162000	-	-	-	-		16x2000	18	1
M20	PG0-201000	PG05-201000	PG08-201000	PG0A2M20-100*	PG0A4M20-100*		20x1000	22	1
	PG0-202000	-	-	-	-		20x2000	22	1
M24	PG0-241000	PG05-241000	PG08-241000	PG0A2M24-100*	PG0A4M24-100*		24x1000	26	1
	PG0-242000	-	-	-	-		24x2000	26	1
M27	-	-	PG08-271000*	-	-		27x1000	30	1
	-	-		-	-				
M30	-		PG08-301000*				30x1000	35	1
	-								

*product available on request

Hexagonal nuts - DIN 934

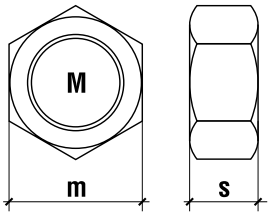
NM / NM8

Nuts for use with metric screws and metric rods.

COMPATIBLE WITH THREADED RODS

Due to the fact that the nut is made in accordance with DIN 934, it is compatible with all rods having appropriate diameter of metric thread.

Zn
WHITE



SELECTION TABLE

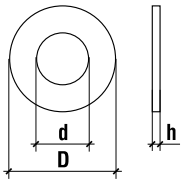
Product code					s x m [mm]	M
Galvanized Class 5	kg	Galvanized Class 8	kg			
NM-08	4	**NM8-08**	5	Nuts with different coatings or different materials available on request	6.5 x 13	8
NM-10	4	**NM8-10**	5		8 x 17	10
NM-12	3	**NM8-12**	5		10 x 19	12
NM-16	3	**NM8-16**	5		13 x 24	16
NM-20	3	**NM8-20**	5		16 x 30	20
NM-24	3	**NM8-24**	5		19 x 36	24
-	-	**NM8-27**	5		22 x 41	27
-	-	**NM8-30**	5		25 x 46	30

Washers DIN 125A / ISO 7089

PON

Zn WHITE

200HV grade washers for use with: - screws of classes A and B and grades of up to 8.8, hexagonal nut of class A and B and the class of up to 8 as well as with hardened screws.



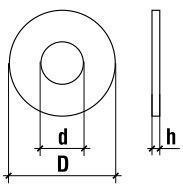
Product code			d x D [mm]	h [mm]
Galvanized / Class 8	kg			
PON-08	4	Washers with different coatings or different materials available on request	8.4 x 16	1.6
PON-10	4		10.5 x 20	2.0
PON-12	4		13 x 24	2.5
PON-16	4		17 x 30	3.0
PON-20	4		21 x 37	3.0
PON-24	4		25 x 44	4.0
PON-27	4		28 x 50	4.0
PON-30	4		31 x 56	4.0

Flat washers large DIN 9021A / ISO 7093-1

POD

Zn WHITE

200HV grade washers for use with: - screws of classes A and B and grades of up to 8.8, hexagonal nut of class A and B and the class of up to 8 as well as with hardened screws.



Product code			d x D [mm]	h [mm]
Galvanized / Class 8	kg			
POD-08	4	Washers with different coatings or different materials available on request	8.4 x 24	2.0
POD-10	4		10.5 x 30	2.5
POD-12	4		13 x 37	3.0
POD-16	4		17 x 50	3.0
POD-20	4		22 x 60	4.0
POD-24	4		26 x 72	5.0
POD-27	4		30 x 85	6.0
POD-30	4		33 x 92	6.0

Injection anchor dispensers

DCF-300 / DCF-410 / DCF-585

Dispensers are used for resin injection into anchor holes. Dispenser number markings are in accordance with resin cartridge content markings.

DCF-300

DCF-585

FEATURES AND ADVANTAGES

- Simple and intuitive handling - Ideal fit for compatible cartridges working principle same as in dispensers for silicones make these injection anchor dispensers simple and intuitive.
- Easier injection - Special dispenser design allows for application without using much force to extrude the resin - compared to other commercially available dispensers.
- Long service life - High quality materials used in dispenser production ensure long and no-failure operation.

FOR USE WITH INJECTION ANCHORS

- DCF-310: WCF-PESF-300, WCF-PESF-E-300, WCF-PESF-C-300, WCF-VESF-E-300, WCF-VESF-300
- DCF-410: WCF-EASF-410, WCF-EASF-E-410, WCF-EASF-C-410 , WCF-XS-410, WCF-XS-E-410, WCF-XS-C-410, WCF-PESF-E-410, WCF-VE-SF-410, WCF-VESF-E-410
- DCF-585: WCF-E3-585.

Metal mesh sleeve for hollow materials

TSM

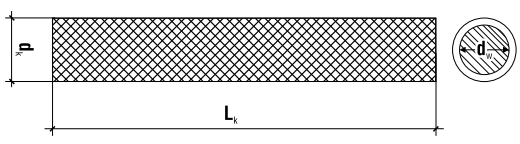
Mesh sleeve is used for anchoring in masonry substrates with voids , such as hollow bricks, perforated bricks, hollow lightweight concrete blocks. Metal mesh sleeve is available in a length of 100 cm, which allows it to be used in drill hole with any depth. To prepare metal mesh sleeve for insertion into drill hole it is necessary to cut the sleeve to the appropriate length and to block its end to secure collection of resin inside the sleeve.

FEATURES AND ADVANTAGES

- Universality - The 1m long metal mesh sleeves can be cut to meet individual needs depending on drill hole depth.
- Used in masonry with voids - Special mesh design of the sleeve ensures , that resin evenly spreads through the perforations once threaded rod is inserted.

FOR USE WITH INJECTION ANCHORS

- WCF-PESF-300, WCF-PESF-E-300, WCF-PESF-C-300, WCF-PESF-E-410
- WCF-EASF-410, WCF-EASF-E-410, WCF-EASF-C-410



	Product code	d_k x L_k [mm]	d_w [mm]	[pcs.]
Ø12	TSM-12	12 x 1000	8	1
Ø16	TSM-16	16 x 1000	10 - 12	1
Ø22	TSM-22	22 x 1000	16	1
Ø26	TSM-26	26 x 1000	20	1

Nylon mesh sleeves for fastening in hollow base materials

TSN

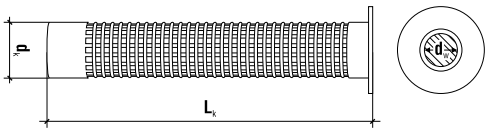
Installation in hollow base materials requires the use of mesh sleeves. TSN is a nylon mesh sleeve. Intended for standard installations at a depth of up to 130 mm.

FEATURES AND ADVANTAGES

- Proper setting of threaded rod - The centering cap ensures, that threaded rod is guided centrically towards the end of sleeve and reduce spreading of resin in the direction of mouth of the hole.
- Reliability and durability of the installation - NYLON has been used in manufacturing of the mesh sleeve - it has stable mechanical properties for the temperature range of: - 40ºC to + 200ºC - it is resistant to UV and aggressive environments - it is resistant to aging and oxidation, it can be used outdoors - it is durable and flexible, increasing the anchor parameters - it has high fire resistance, it is hard to ignite and is self-extinguishing.
- Used in masonry with voids - Special mesh design of the sleeve ensures , that resin evenly spreads through the perforations once threaded rod is inserted.

FOR USE WITH INJECTION ANCHORS

- WCF-PESF-300, WCF-PESF-C-300, WCF-PESF-E-300,
- WCF-PESF-E-410
- WCF-EASF-410, WCF-EASF-C-410 , WCF-EASF-E-410



	Product code	d_k x L_k [mm]	d_w [mm]	[pcs.]
Ø12	TSN-01	12 x 50	6 - 8	50
Ø16	TSN-02	16 x 85	10 - 12	20
	TSN-03	16 x 130	10 - 12	20
Ø20	TSN-04	20 x 85	14 - 16	20

Mixing nozzle

MCF

The mixing nozzle has an inner thread allowing for installation on the resin cartridge mouth. Mixing nozzle has an internal helix mixer designed to ensure consistent mixing of resin components and to reduce start-up waste. Correct mixing is necessary to achieve expected proper performance level of the anchorage.

FEATURES AND ADVANTAGES

- Universality - One type of mixing nozzle for various resin types.
- Extruding control - Transparent plastic allows you to control the movement of resin in the mixer.

FOR USE WITH INJECTION ANCHORS

- WCF-EASF-410, WCF-EASF-E-410, WCF-EASF-C-410, WCF-XS-410, WCF-XS-E-410, WCF-XS-C-410, WCF-PESF-300, WCF-PESF-E-300, WCF-PESF-C-300, WCF-PESF-E-410, WCF-VESF-300, WCF-VESF-E-300, WCF-VESF-410, WCF-VESF-E-410.
- WCF-E3-585

Hole cleaning pump

PCF

Blow-out pump is an essential element of anchor installation. Correct hole cleaning from dust and debris enables to provide proper performance parameters of anchorage.

Code	pcs.
PCF	1

Hole cleaning brush

SCF

The brush is one of the basic tools required to properly prepare the installation hole. After blowing the dust out of the hole you should repeat the cleaning process at least 2 times, cleaning dust away from the surface of the hole using brush , then blowing the hole with compressed air or pump again. SCF brush could be utilised for standard anchoring applications with embedment depth limited to length of brush .

Min. hole diameter [mm]	Product code	pcs.
Ø10	SCF-13	1
Ø14	SCF-18	1
Ø22	SCF-28	1

Deep hole cleaning brush

SCF-H / SCF-E / SCF-B

The brush is one of the basic tools required to properly prepare the installation hole. After blowing the dust out of the hole you should repeat the cleaning process at least 2 times, cleaning dust away from the surface of the hole using brush, then blowing the hole with compressed air or pump again. Compatible connecting threads on each brush element offer versatility as installers can combine elements to reach required length according to drill hole depth.

Min. hole diameter [mm]	Product code	pcs.
Ø12	SCF-B-12	1
Ø14	SCF-B-14	1
Ø16	SCF-B-18	1
Ø18	SCF-B-22	1
Ø25	SCF-B-27	1
Ø32	SCF-B-35	1
Ø35	SCF-B-38	1
Ø40	SCF-B-43	1

Available on request

Product code	pcs.
SCF-H	1

Available on request

Product code	pcs.
SCF-E	1

Available on request

SCF-H - Brush handle

SCF-E - Brush extension

SCF-B
Brush

Extension hose

MCF-P

The hose is used as a mixing nozzle extension for deep holes.
Extension hose has to be cut to the required length.

Product code	For use with mixing nozzle	meters per unit pack
MCF-P	MCF	30

Available on request

Extension tube

MCF-PK

Extension tube is used to extend the mixing nozzle to allow filling of deep drill holes. Enable reaching the bottom of the hole before starting injecting the resin.

Product code	For use with mixing nozzle	pcs.
MCF-PK	MCF	12

Resin stopper

TCF

Resin stopper is placed on the end of the extension hose previously installed on the mixing nozzle, which is already filled with properly mixed resin. Filling the drill hole can begin after inserting extension hose into the hole , when resin stopper will reach the bottom. The resin stopper ensures, that resin injected into the drilled hole is consistent and free of air voids and provides more accurate injection of estimated chemical resin volume simultaneously minimising wastage. Appropriate resin stoppers should be used depending on the diameter of the drilled hole. The resin stopper is reusable.

Min. hole diameter [mm]	Product code	pcs.
Ø20	TCF-18	1
Ø25	TCF-22	1
Ø32/35	TCF-30	1
Ø40	TCF-36	1

Available on request

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FASTENER TECHNOLOGIES

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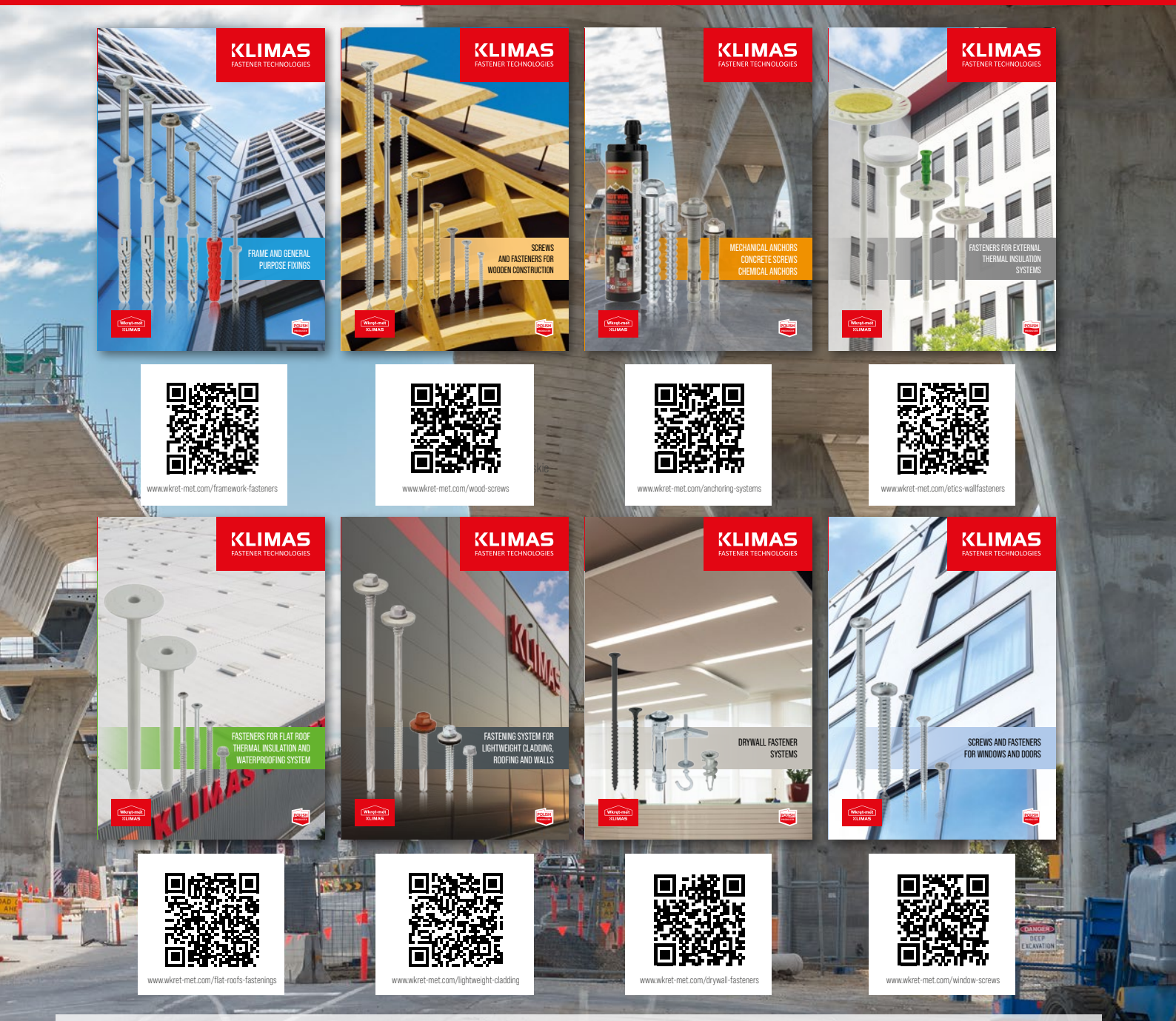

KLIMAS Sp. z o.o.
ul. Wincentego Witosa 135/137,
Kuźnica Kiedrzyńska
42-233 Mykanów, POLAND
www.klimas.com

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