INSTYTUT TECHNIKI BUDOWLANEJ

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

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European Technical Assessment

ETA-12/0272 of 05/03/2025

General Part

Technical Assessment Body issuing the European Technical Assessment	Instytut Techniki Budowlanej
Trade name of the construction product	KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG
Product family to which the construction product belongs	Plastic anchors for redundant non-structural systems in concrete and masonry.
Manufacturer	KLIMAS Sp. z o.o. ul. Wincentego Witosa 135/137 Kuźnica Kiedrzyńska PL 42-233 Mykanów Poland
Manufacturing plant	Plant no 1, plant no 2 Poland
This European Technical Assessment contains	39 pages including 3 Annexes which form an integral part of this Assessment
This European Technical Assessment is issued in accordance with regulation (EU) No 305/2011, on the basis of	European Assessment Document EAD 330284-00-0604 „Plastic Anchors for redundant non-structural systems in concrete and masonry”
This version replaces	ETA-12/0272 issued on 19/09/2022

This European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other language shall fully correspond to the original issued document and shall be identified as such.

Specific Part

1 Technical description of the product

The KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG anchors consist of a plastic sleeve made of polyamide and an accompanying specific screw made of galvanised or stainless steel.

The plastic sleeve is expanded by screwing in the specific screw which presses the sleeve against the wall of the drilled hole.

The description of the products is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The performances given in clause 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer or Technical Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

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

3.1 Performance of the product

3.1.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	Annex C2

3.1.2 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Resistance to steel failure under tension and shear loading	Annex C1
Resistance to pull-out or concrete failure under tension loading (base material group a)	Annex C2
Resistance in any load direction without lever arm (base material group b, c and d)	Annex C4
Edge distance and spacing	Annex B3, B4
Displacements under short-term and long-term loading	Annex C3, C5

3.1.3 Aspects of durability

Essential characteristic	Performance
Durability – corrosion of metal parts	- Anchor sleeve – no metal parts - Screw – see Annex A15 and B1
Durability – high alkalinity of plastic sleeve	No influence of high alkalinity

3.2 Methods used for the assessment

The assessment has been made in accordance with EAD 330284-00-0604.

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base.

According to the Decision 97/463/EC of the Commission of 27 june 1997 the system 2+ of assessment and verification of constancy of performance (see Annex V to regulation (EU) No 305/2011) applies.

5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)

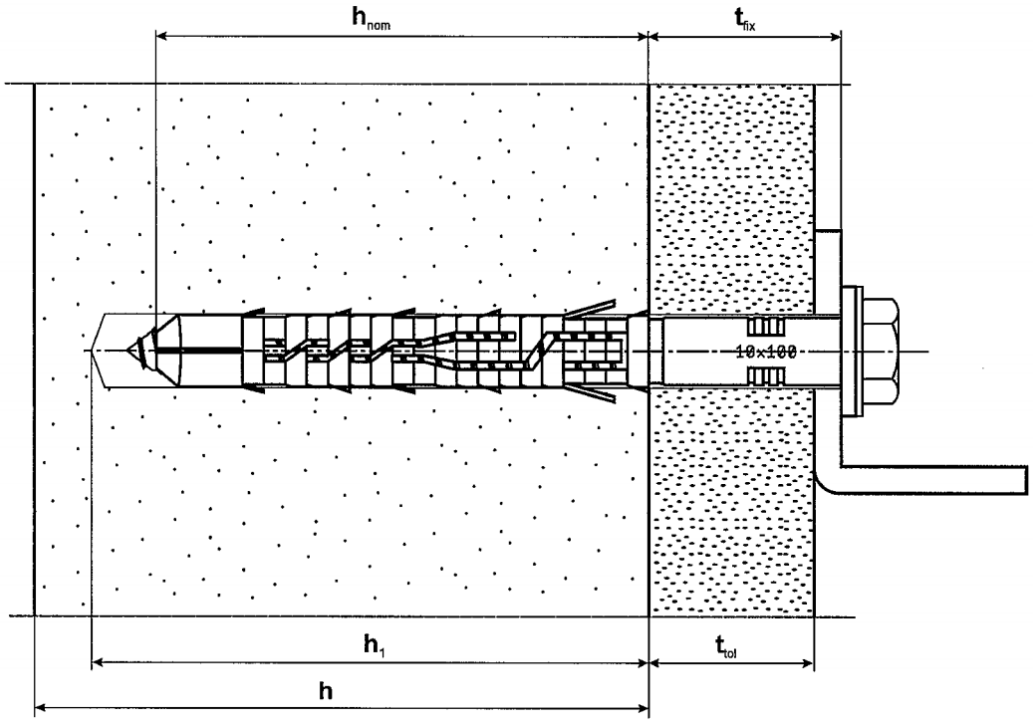
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej

For the type testing the results of the tests performed as part of the assessment for the European technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut techniki Budowlanej and notified body.

Issued in Warsaw on 19/09/2022 by Instytut techniki Budowlanej

Krzysztof Kuczyński

Deputy Director of ITB



Intended Use

Fixing in concrete and in different types of masonry.

Legend

h_{nom} = overall plastic anchor embedment depth in the base material

h_1 = depth of drill hole to deepest point

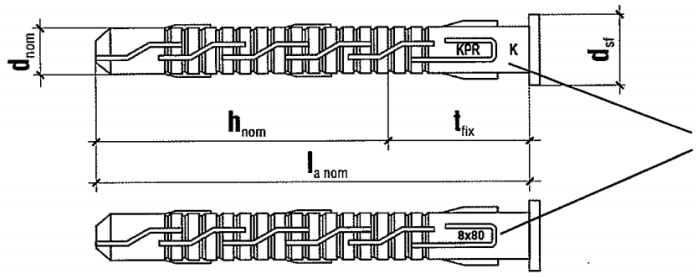
h = thickness of member (wall)

t_{fix} = t_{tol} + thickness of fixture

t_{tol} = thickness of equalizing layer or non-load-bearing coating

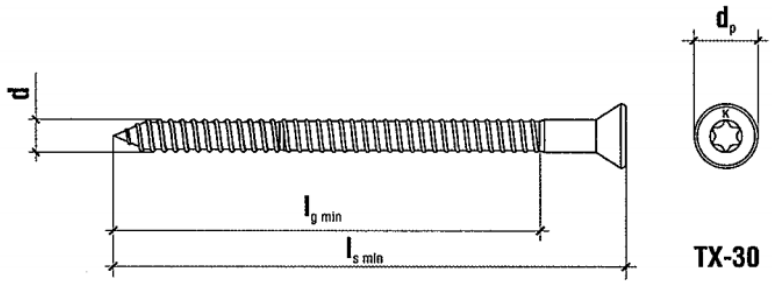
KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A1**
Product description Intended use	of European Technical Assessment ETA-12/0272

Sleeve KPR

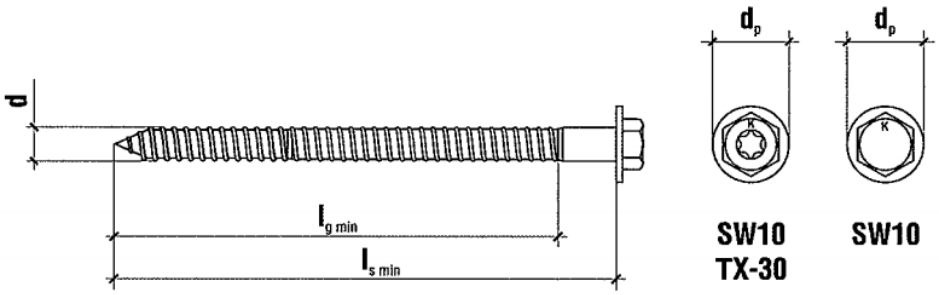


Marking of the producer, type, size, e.g. K, KPR, 8x80, colour grey

Screw KS

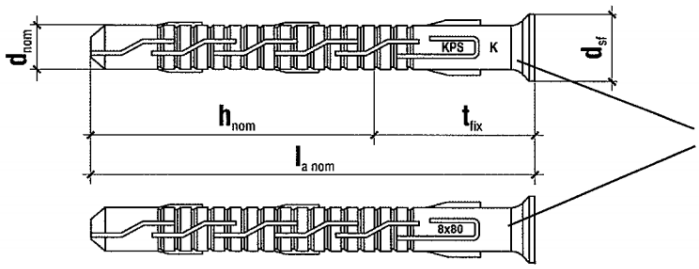


Screw KK



KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A2**
Product description KPR-FAST 8/50 and 8/70 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPS



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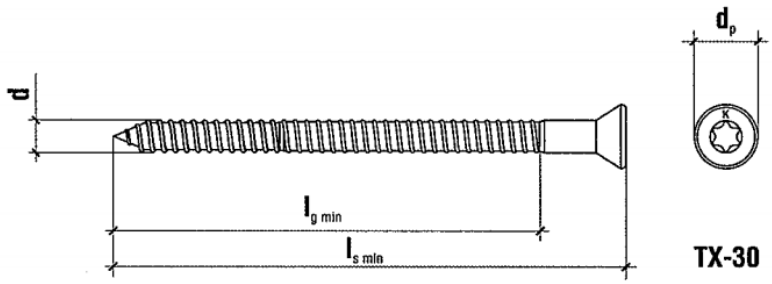

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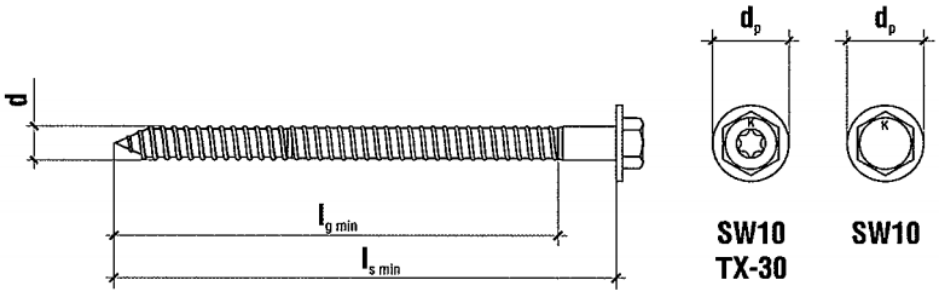
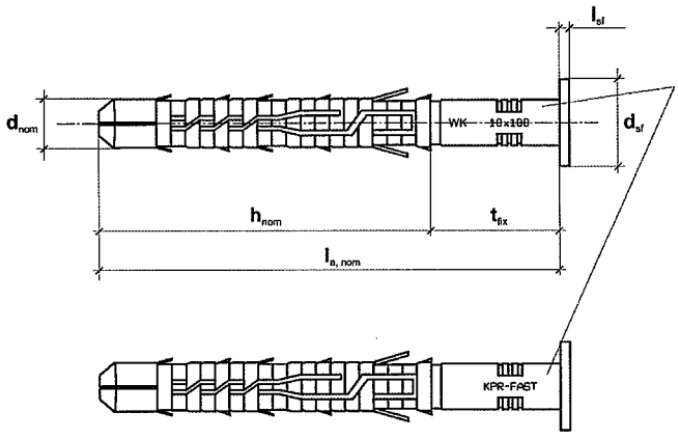


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A3**
Product description KPR-FAST 8/50 and 8/70 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPR



Marking of the producer, type, size, e.g. WK, KPR-FAST, 10x100, colour red

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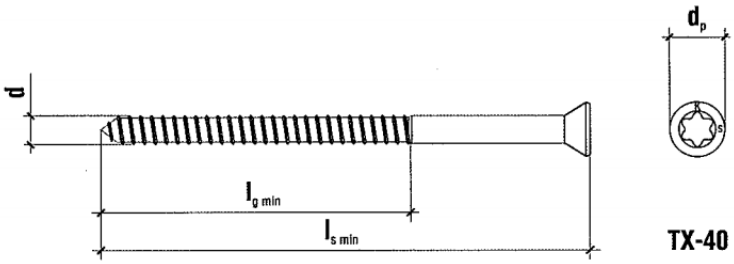

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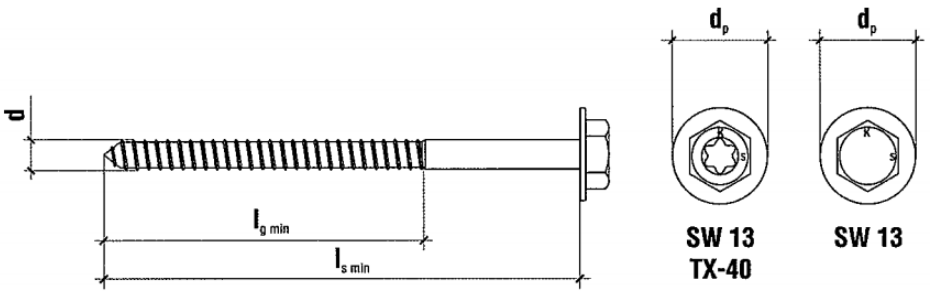
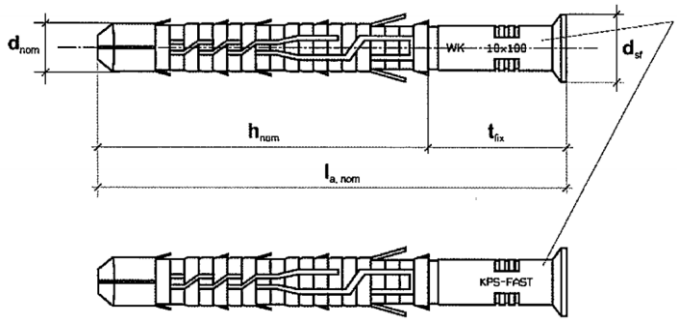


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A4**
Product description KPR-STRONG 10 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPS



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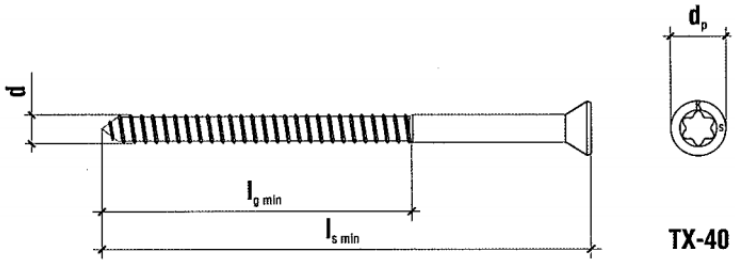
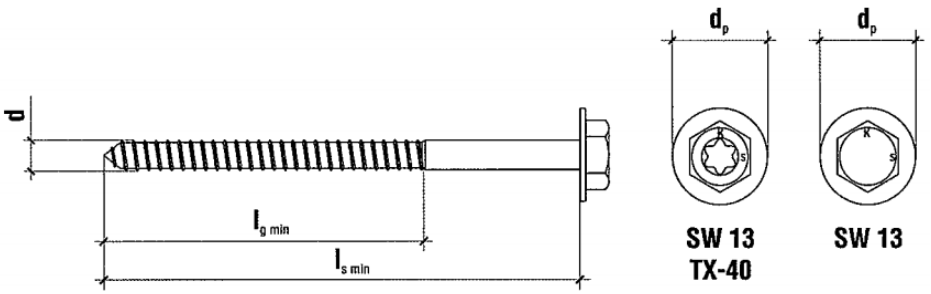
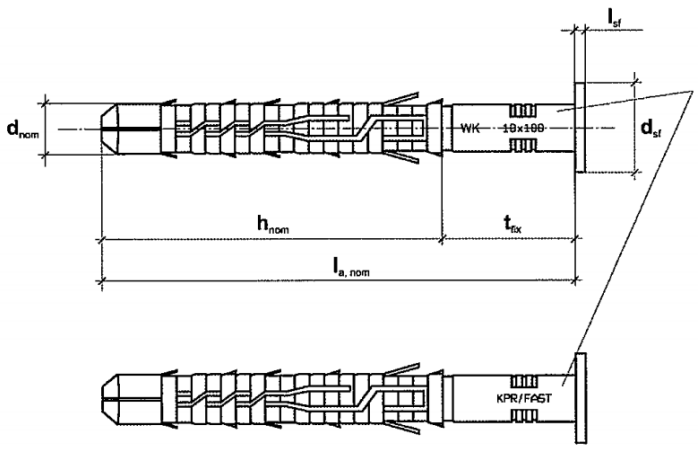


Screw KKS



KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A5**
Product description KPS-STRONG 10 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPR



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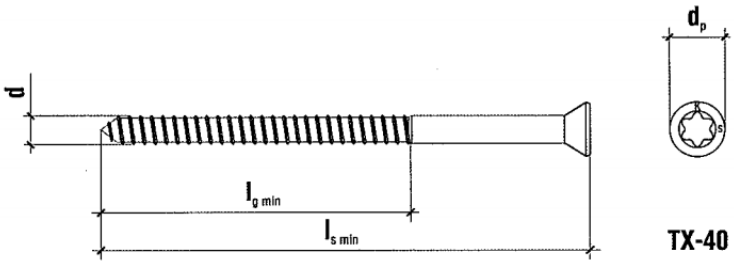

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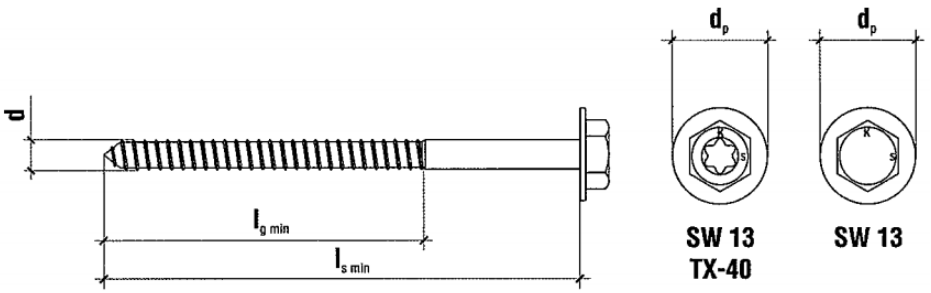
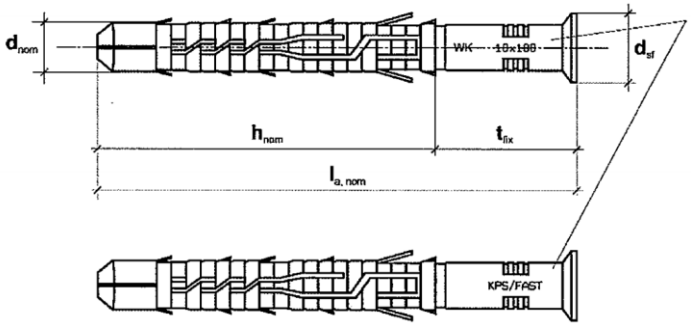


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A6**
Product description KPR/FAST 10 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPS



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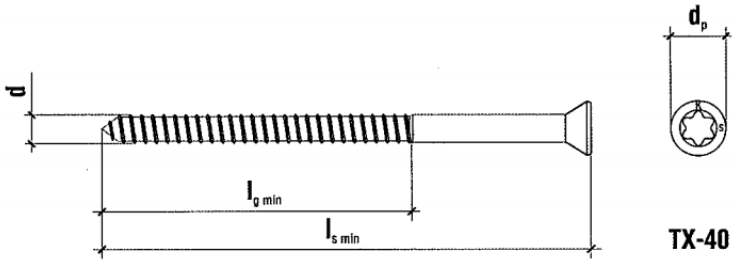

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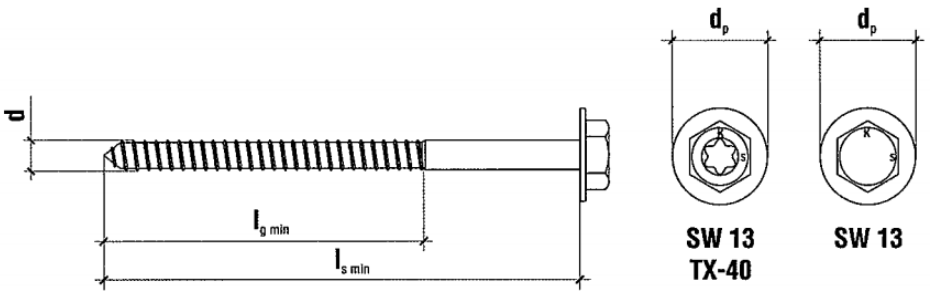
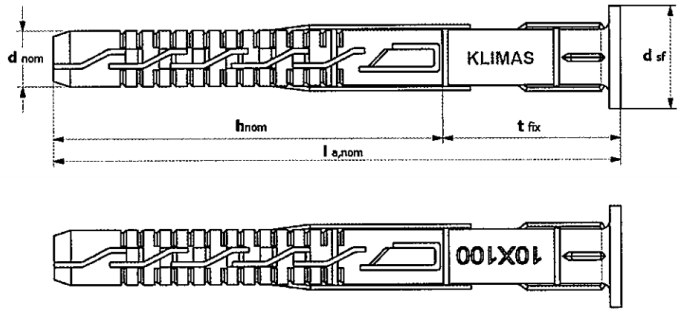


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A7**
Product description KPS/FAST 10 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPR



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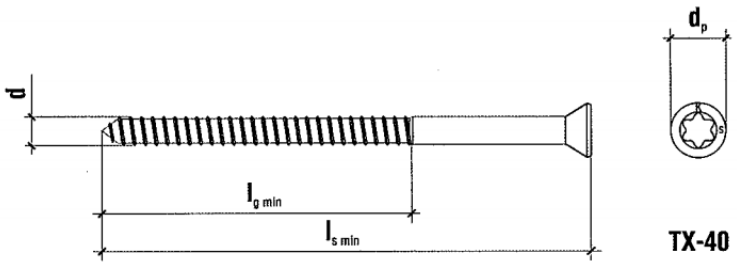

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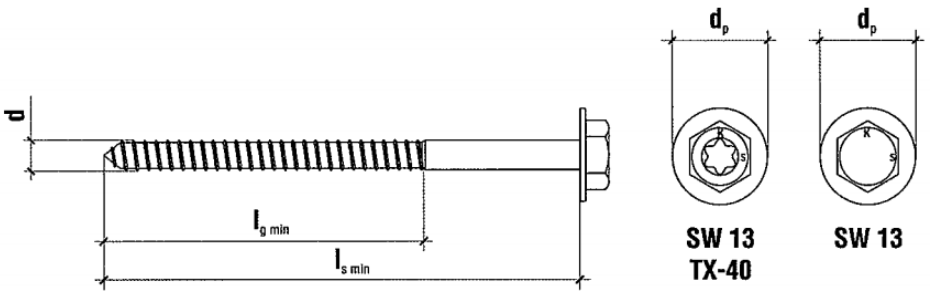
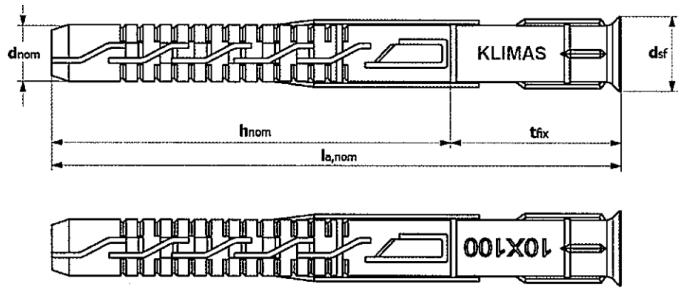


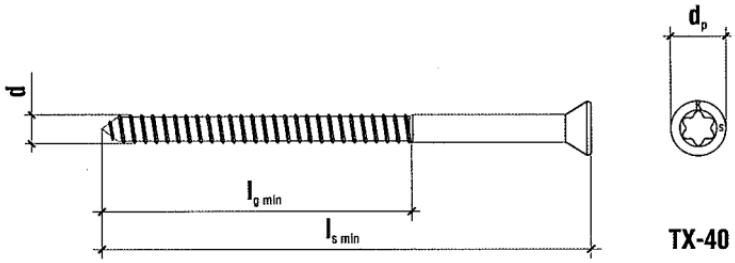
KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A8**
Product description KPR-FAST 10/50 and 10/70 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPS



Marking of the producer, type, size, e.g. KLIMAS, KPS-FAST, 10x100, colour grey

Screw KS



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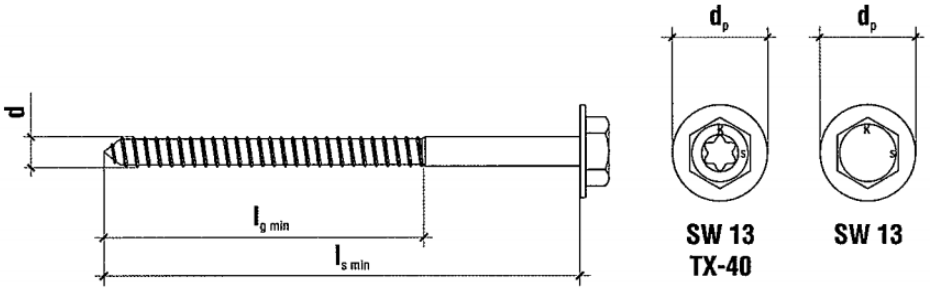
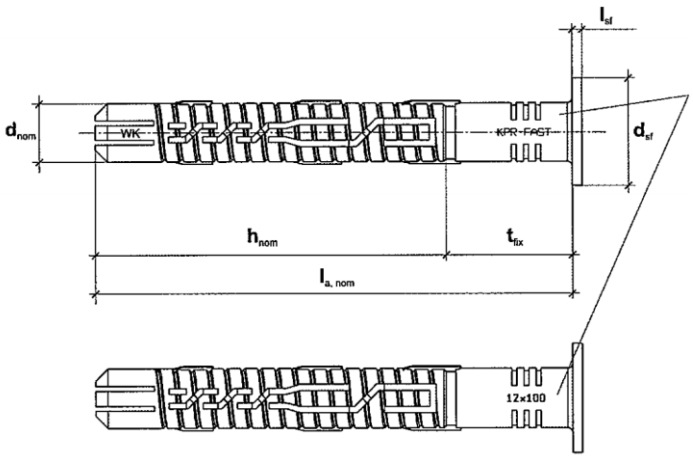


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A9**
Product description KPS-FAST 10/50 and 10/70 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPR



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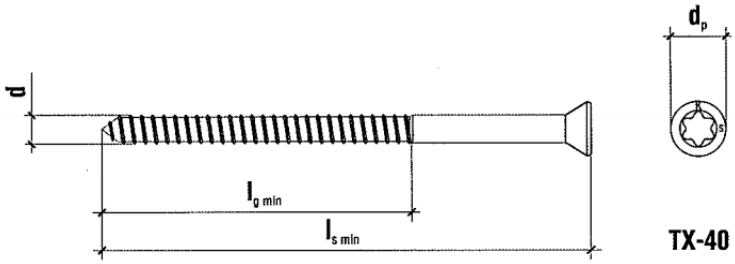
Screw KS



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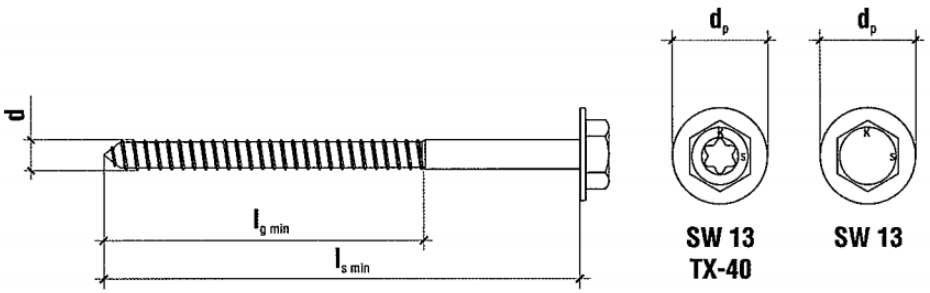
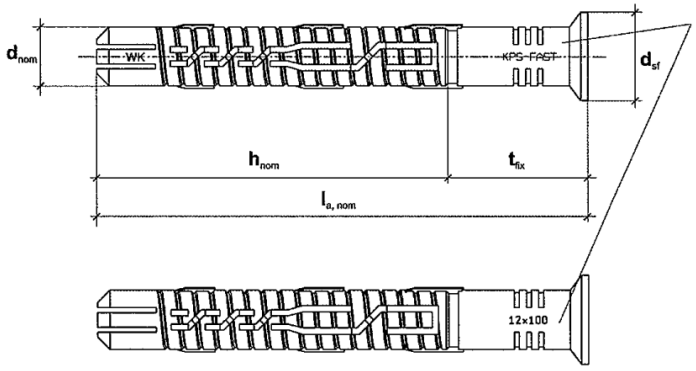


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A10**
Product description KPR-FAST 12 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPS



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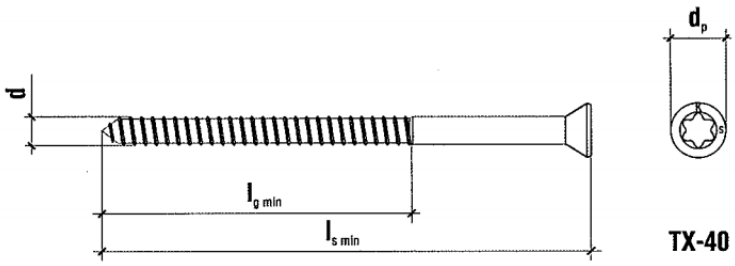

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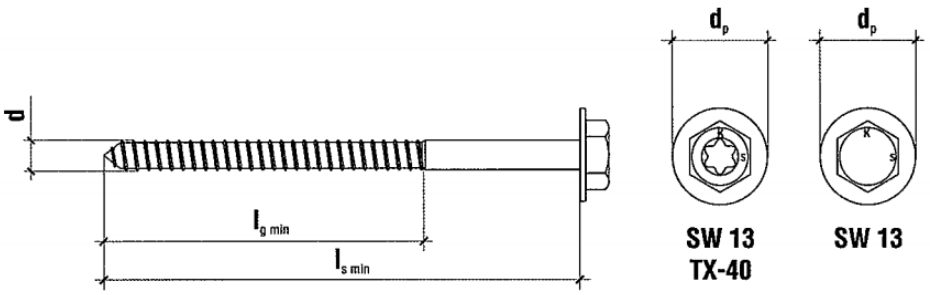
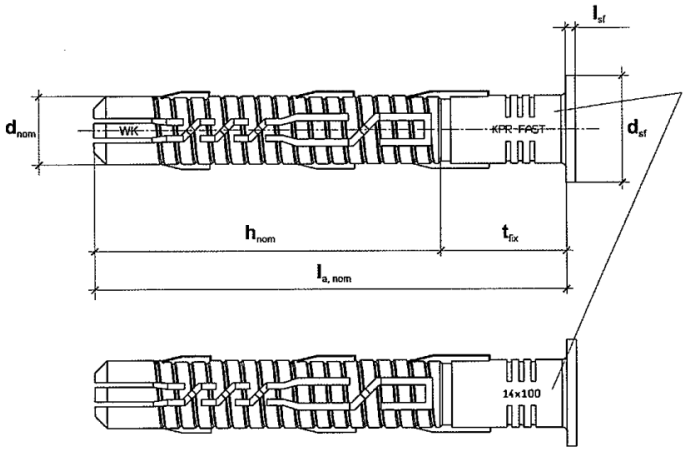


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A11**
Product description KPS-FAST 12 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPR



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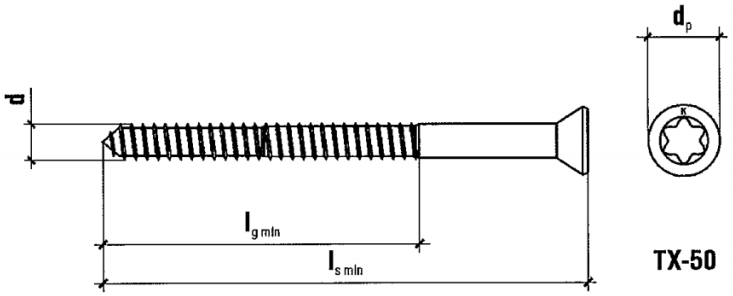

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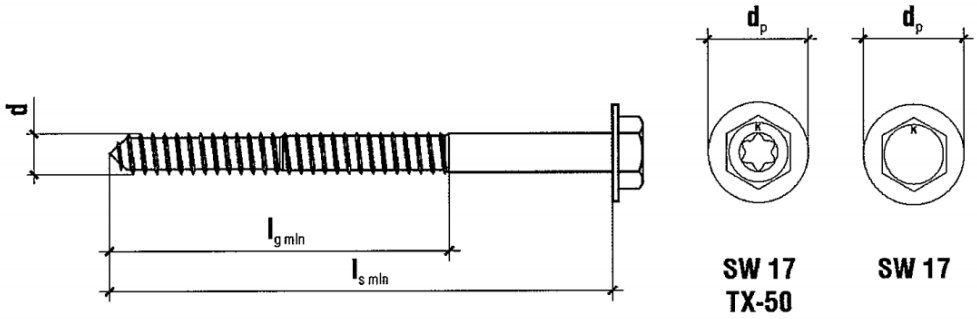
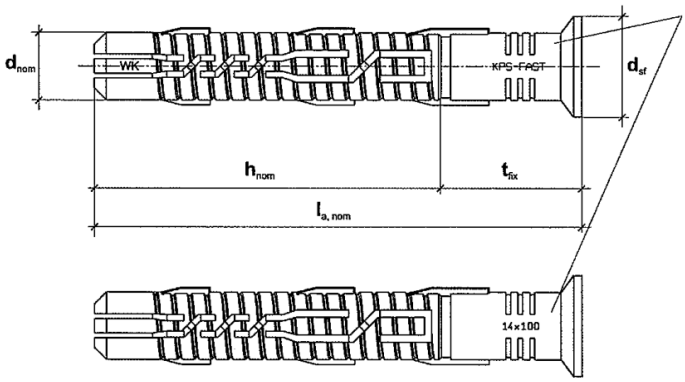


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A12**
Product description KPR-FAST 14 anchors	of European Technical Assessment ETA-12/0272

Sleeve KPS



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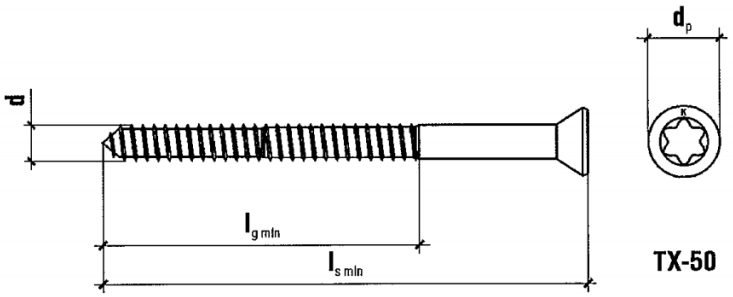

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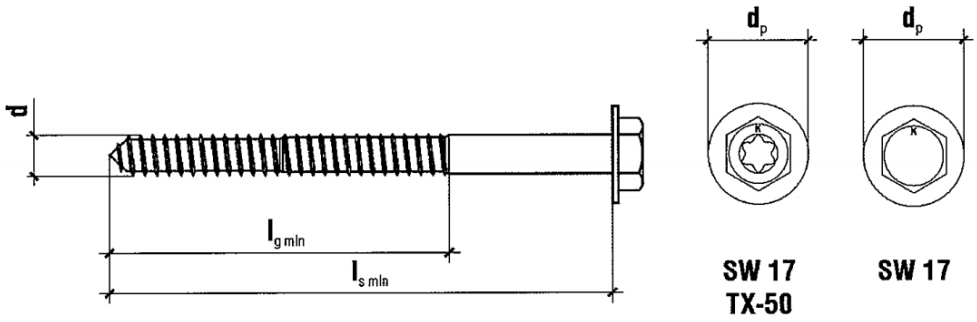


KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex A13**
Product description KPS-FAST 14 anchors	of European Technical Assessment ETA-12/0272

Table A1: Anchor types and dimensions

Anchor type	Anchor sleeve[1)]					Screw[1)]				
	d_{nom} [mm]	d_{sf} [mm]	h_{nom} [mm]	$l_{a,nom}$ [mm]	l_{sf} [mm]	d [mm]	$l_{g,min}$ [mm]	$l_{s,min}$ [mm]	d_p [mm] KK KKS[2)]	d_p [mm] KS KSS[2)]
KPR-FAST 8/50	8	15	50	60-220	2	6.0	50	$l_{a,nom}$+5 mm	13	11
KPS-FAST 8/50	8	12	50	60-220	-	6.0	50	$l_{a,nom}$+5 mm	13	11
KPR-FAST 8/70	8	15	70	80-220	2	6.0	70	$l_{a,nom}$+5 mm	13	11
KPS-FAST 8/70	8	12	70	80-220	-	6.0	70	$l_{a,nom}$+5 mm	13	11
KPR-STRONG 10[2)]	10	18	70	80-300	2	7.0	65	$l_{a,nom}$+5 mm	18[2)]	14[2)]
KPS-STRONG 10[2)]	10	15	70	80-300	-	7.0	65	$l_{a,nom}$+5 mm	18[2)]	14[2)]
KPR/FAST 10	10	18	70	80-300	2	7.0	65	$l_{a,nom}$+5 mm	18	14
KPS/FAST 10	10	15	70	80-300	-	7.0	65	$l_{a,nom}$+5 mm	18	14
KPR-FAST 10/50	10	18	50	60-300	2	7.0	50	$l_{a,nom}$+5 mm	18	14
KPS-FAST 10/50	10	13	50	60-300	-	7.0	50	$l_{a,nom}$+5 mm	18	14
KPR-FAST 10/70	10	18	70	80-300	2	7.0	70	$l_{a,nom}$+5 mm	18	14
KPS-FAST 10/70	10	13	70	80-300	-	7.0	70	$l_{a,nom}$+5 mm	18	14
KPR/FAST 12	12	18	70	80-360	2	8.0	70	$l_{a,nom}$+5 mm	18	14
KPS/FAST 12	12	15	70	80-360	-	8.0	70	$l_{a,nom}$+5 mm	18	14
KPR/FAST 14	14	22	70	80-360	2	10.0	60	$l_{a,nom}$+10 mm	22	20
KPS/FAST 14	14	22	70	80-360	-	10.0	60	$l_{a,nom}$+10 mm	22	20

1) The anchor (plastic sleeve and special screw) shall only be packaged and supplied as a complete unit

2) With special screw KKS and KSS

Table A2: materials

Element	Material		
	KPR-FAST 8 KPS-FAST 8 KPR/FAST 10 KPS/FAST 10 KPR-FAST 10 KPS-FAST 10	KPR-STRONG 10 KPS-STRONG 10	KPR-FAST 12 KPS-FAST 12 KPR-FAST 14 KPS-FAST 14
Anchor Sleeve	polyamide, PA6 colour grey	polyamide, PA6 colour red	polyamide, PA6 colour grey
Specific screw	steel ($f_{y,k} \geq 480$ Mpa, $f_{u,k} \geq 600$ Mpa)		steel ($f_{y,k} \geq 320$ Mpa, $f_{u,k} \geq 400$ Mpa)
	a) Electroplated coating ≥ 5 µm according to EN ISO 4042 or non-electrolytically applied zinc flake coating ≥ 5 µm according to EN ISO 10683; b) Hot dip galvanised coating ≥ 40 µm according to EN ISO 10684; c) „SQ-ceramic“ non-electrolytically applied zinc flake coating ≥ 10 µm according to EN ISO 10683; d) Zinc diffusion coating ≥ 30µm according to EN 13811 and EN ISO 17668		
	or stainless steel grade 1.4301, 1.4306, 1.4307, 1.4567 (AISI 304) or 1.4401, 1.4404, 1.4571, 1.4362, 1.4578 (AISI 316) according to EN 10088 ($f_{y,k} \geq 450$ Mpa, $f_{u,k} \geq 580$ Mpa)		

Specification of intended use

Anchorages subject to:

- Static and quasi-static loads.
- Multiple fixing of non-structural applications.

Base materials:

- Reinforced or unreinforced normal weight concrete with strength classes ≥ C12/15 (base material group a), according to EN 206.
- Thin-wall concrete elements, reinforced or unreinforced, with strength classes ≥ C16/20 and wall thickness ≥ 30 mm (base material group a).
- Solid masonry (base material group b), according to Annex C3.
  Note: The characteristic resistance is also valid for larger size and larger compressive strength of the masonry unit.
- Hollow or perforated masonry (base material group c), according to Annex C3.
- Autoclaved aerated concrete (use material group d), according to Annex C3.
- Mortar strength class of the masonry M2.5 at minimum according to EN 998-2.
- For other base materials of the base material group a, b, c and d the characteristic resistance of the anchor may be determined by job site tests according to TR 051:2018-04.

Temperature range:

- -20°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)

Use conditions (environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- Structures subject to external atmospheric exposure, if anchor is not directly subjected to this exposure, i.e. external cladding elements screen the anchor, and the head of screw is additionally protected by permanently elastic coating which precludes corrosion from occurring and prevents moisture from entering into plastic sleeve (zinc coated steel).
- Structures subject to external atmospheric exposure including industrial and marine environment (stainless steel).
- Structures subject to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).
  Note: particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- The anchorages are designed in accordance with the TR 064:2018-05 under the responsibility of engineer experienced in anchorages and masonry work.
- Verifiable calculation of the base materials and the dimensions of the anchorage members as well as of the relevant and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The positions of the anchor is indicated on the design drawings.
- Anchors are only to be used for multiple fixing for non-structural application, according to TR 064:2018-05

Installation:

- Hole shall be drilled by the drill modes given in Annexes C2 and C3 for use categories a, b, c and d; the influence of other drilling methods may be determined by job side tests according to TR 051:2018-04.
- Anchor installation shall be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation shall be executed in temperature from -20°C to +40°C.
- Exposure to UV due to solar radiation of the anchor not protected by rendering shall not exceed ≤ 6 weeks

KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex B1**
Intended use Specifications	of European Technical Assessment ETA-12/0272

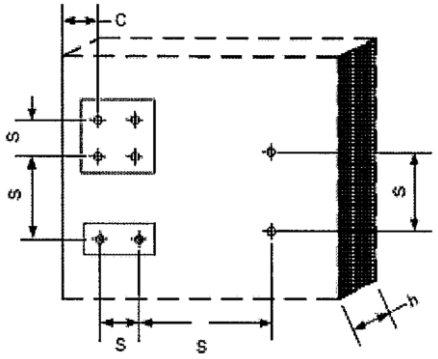
Table B1: Installation parameters

Anchor type		KPR-FAST 8/50 KPS-FAST 8/50	KPR-FAST 8/70 KPS-FAST 8/70	KPR/FAST 10 KPS/FAST 10 KPR-FAST 10/70 KPS-FAST 10/70 KPR-STRONG 10 KPS-STRONG 10	KPR-FAST 10/50 KPS-FAST 10/50	KPR-FAST 12 KPS-FAST 12	KPR-FAST 14 KPS-FAST 14
Drill hole diameter	d_o[mm]	8	8	10	10	12	14
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	8.45	8.45	10.45	10.45	12.45	14.45
Depth of drill hole to deepest point	$h_1 \geq$ [mm]	60	80	80	60	80	85
Overall plastic anchor embedment depth in the base material	$h_{nom} \geq$ [mm]	50	70	70	50	70	70
Diameter of clearance hole in the fixture	$d_1 \leq$ [mm]	8.5-9.0	8.5-9.0	10.5-11.0	10.5-11.0	12.5-13.0	14.5-15.0
Thickness of fixture - minimum	$t_{fix,min} \geq$ [mm]	1	1	1	1	1	1
Thickness of fixture - maximum	$t_{fix,max} \leq$ [mm]	170	150	230	250	290	290
Installation temperature	°C	-20 to +40					

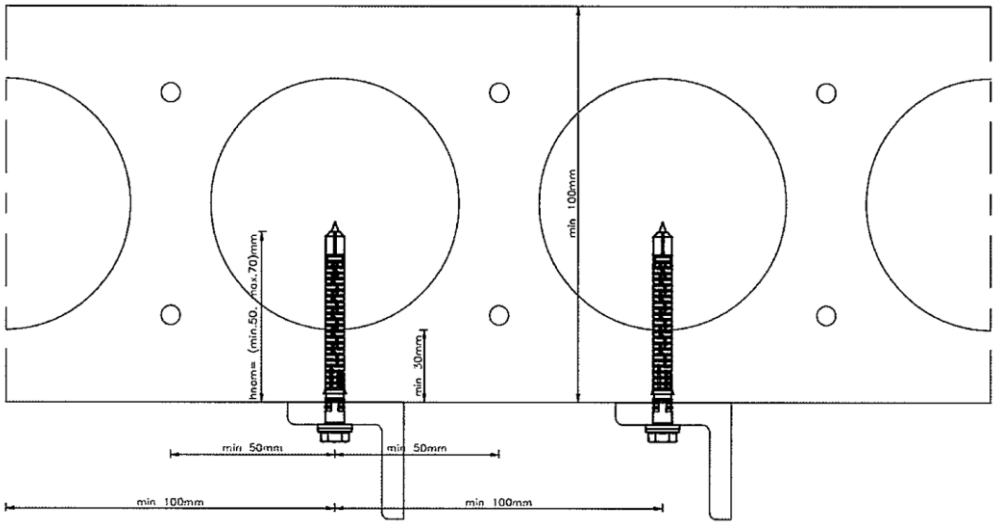
Table B2: Minimum thickness of member, edge distance and spacing in concrete

Anchor type	Base material	h_{min} [mm]	$c_{cr,N}$ [mm]	$s_{cr,N}$ [mm]	c_{min} [mm]	s_{min} [mm]
KPR-FAST 8/50 KPS-FAST 8/50	Concrete ≥ C16/20	100	70	70	50	50
	Concrete ≥ C12/15	100	100	95	70	70
KPR-FAST 8/70 KPS-FAST 8/70	Concrete ≥ C16/20	100	100	80	60	60
	Concrete ≥ C12/15	100	140	115	80	80
KPR/FAST 10 KPS/FAST 10	Concrete ≥ C16/20	100	100	75	60	60
	Concrete ≥ C12/15	100	140	105	80	80
KPR-FAST 10/50 KPS-FAST 10/50	Concrete ≥ C16/20	100	100	75	50 for s ≥ 150 mm	50 for s ≥ 100 mm
	Concrete ≥ C12/15	100	140	105	70 for s ≥ 210 mm	70 for s ≥ 140 mm
	Thin wall concrete elements ≥ C16/20	30	100	100	100	100
KPR-FAST 10/70 KPS-FAST 10/70	Concrete ≥ C16/20	100	100	110	50 for s ≥ 150 mm	50 for s ≥ 100 mm
	Concrete ≥ C12/15	100	140	150	70 for s ≥ 210 mm	70 for s ≥ 150 mm
	Thin wall concrete elements ≥ C16/20	30	100	100	100	100
KPR/FAST 12 KPS/FAST 12	Concrete ≥ C16/20	100	100	85	100	100
	Concrete ≥ C12/15	100	140	120	140	140
KPR/FAST 14 KPS/FAST 14	Concrete ≥ C16/20	100	100	115	100	100
	Concrete ≥ C12/15	100	140	160	140	140

Scheme of edge distance spacing in concrete



Scheme of edge distance and spacing in thin-wall concrete elements



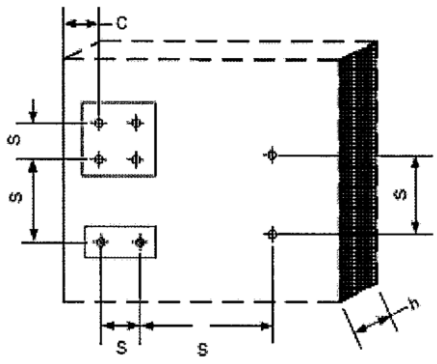
KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex B3**
Intended use Minimum thickness of member, edge distance and spacing in concrete	of European Technical Assessment ETA-12/0272

Table B3: Minimum thickness of member, edge distance and spacing in masonry

Anchor diameter	Base material	Type of element	Single anchor			Anchor group [1]	
			h_{min} [mm]	c_{min} [mm]	s_{min} [mm]	s_{min1} [2] [mm]	s_{min2} [3] [mm]
Ø8	Masonry made of ceramic, calcium silicate and lightweight aggregate concrete elements	Solid	120	100	100	100	200
		Perforated or hollow	180	100	100	100	200
	Masonry made of autoclaved aerated concrete elements	-	100	100	100	100	200
Ø10	Masonry made of ceramic, calcium silicate and lightweight aggregate concrete elements	Solid	120	100	100	100	200
		Perforated or hollow	180	100	100	100	200
	Masonry made of autoclaved aerated concrete elements	-	100	100	100	100	200
Ø12	Masonry made of ceramic, calcium silicate and lightweight aggregate concrete elements	Solid	120	100	100	100	200
		Perforated or hollow	180	100	100	100	200
	Masonry made of autoclaved aerated concrete elements	-	100	100	100	100	200
Ø14	Masonry made of ceramic, calcium silicate and lightweight aggregate concrete elements	Solid	120	100	100	100	200
		Perforated or hollow	180	100	100	100	200
	Masonry made of autoclaved aerated concrete elements	-	100	100	100	100	200

[1] the design method valid for single anchor and groups with two or four anchors
[2] in direction perpendicular to free edge
[3] in direction parallel to free edge

Scheme of edge distance and spacing in masonry



KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex B4**
Intended use Minimum thickness of member, edge distance and spacing in masonry	of European Technical Assessment ETA-12/0272

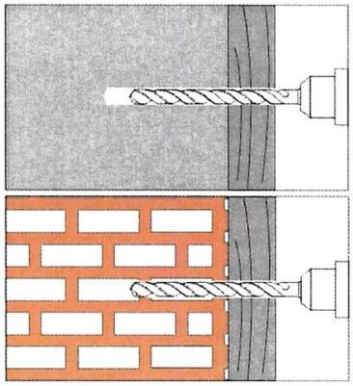
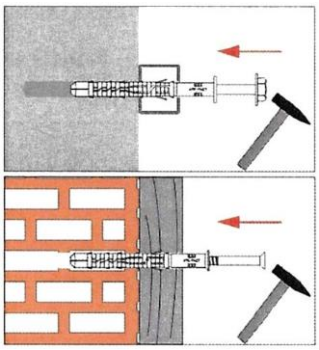
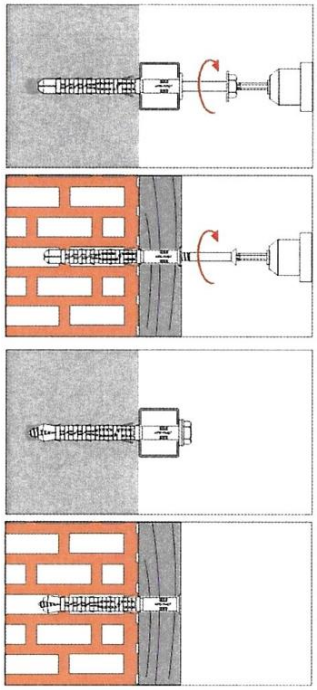
	Drill the hole considering the drilling method and clean the hole of drilling dust.
	Insert the plastic sleeve and special screw into the hole through the fixture by slight hammer blows
	Screw-in special screw until the head of the screw touches the sleeve; the anchor is correct mounted, if there is no turn-through of the plastic sleeve in the drill hole and if slightly move on turning of the screw is impossible.

Table C1.1: Characteristic bending resistance of the specific screw in concrete and masonry

Anchor diameter		**Ø8**	**Ø10**	**Ø12**	**Ø14**
Characteristic bending resistance	$M_{Rk,s}$ [Nm]	10.5 [1)] (10.2) [2)]	16.8 [1)] (16.3) [2)]	16.2 [1)] (23.4) [2)]	34.4 [1)] (49.8) [2)]
Partial safety factor	γ_{Ms} [3)]	1.25[1)] / 1.29[2)]	1.25[1)] / 1.29[2)]	1.25[1)] / 1.29[2)]	1.25[1)] / 1.29[2)]

[1)] galvanised steel
[2)] stainless steel
[3)] in the absence of other national regulations

Table C1.2: Characteristic resistance of the screw for use in concrete – failure of expansion element (specific screw)

Anchor diameter		**Ø8**	**Ø10**	**Ø12**	**Ø14**
Characteristic tension resistance	$N_{Rk,s}$ [kN]	13.2 [1)] (12.8) [2)]	18.1 [1)] (17.5) [2)]	15.4 [1)] (22.3) [2)]	25.4 [1)] (36.9) [2)]
Partial safety factor	γ_{Ms} [3)]	1.50[1)] / 1.55[2)]	1.50[1)] / 1.55[2)]	1.50[1)] / 1.55[2)]	1.50[1)] / 1.55[2)]
Characteristic shear resistance	$V_{Rk,s}$ [kN]	6.6 [1)] (6.4) [2)]	9.1 [1)] (8.8) [2)]	7.70 [1)] (11.2) [2)]	12.7 [1)] (18.4) [2)]
Partial safety factor	γ_{Ms} [3)]	1.25[1)] / 1.29[2)]	1.25[1)] / 1.29[2)]	1.25[1)] / 1.29[2)]	1.25[1)] / 1.29[2)]

[1)] galvanised steel
[2)] stainless steel
[3)] in the absence of other national regulations

Table C2.1: Characteristic resistance for use in concrete, pull-out failure (plastic sleeve); hammer drilling

Anchor type		KPR-FAST 8/50 KPS-FAST 8/50	KPR-FAST 8/70 KPS-FAST 8/70	KPR/FAST 10 KPS/FAST 10	KPR-FAST 10/50 KPS-FAST 10/50	KPR-FAST 10/70 KPS-FAST 10/70	KPR-STRONG 10 KPS-STRONG 10	KPR-FAST 12 KPS-FAST 12	KPR-FAST 14 KPS-FAST 14
Temperature range	**°C**	**-20 to +80**							
Concrete ≥ C16/20									
Characteristic resistance	**$N_{Rk,p}$ [kN]**	**3.5**	**4.5**	**4.0**	**4.0**	**8.5**	**6.0**	**5.0**	**7.5**
Partial safety factor	**γ_{Ms} 1)**	**1.8**							
Concrete C12/15									
Characteristic resistance	**$N_{Rk,p}$ [kN]**	**2.5**	**3.0**	**3.0**	**3.0**	**6.0**	**4.5**	**3.5**	**5.0**
Partial safety factor	**γ_{Ms} 1)**	**1.8**							
Thin-wall concrete elements C16/20, h ≥ 30 mm									
Characteristic resistance	**$N_{Rk,p}$ [kN]**	**-**	**-**	**-**	**4.0**	**4.0**	**-**	**-**	**-**
Partial safety factor	**γ_{Ms} 1)**	**1.8**							

1) in the absence of other national regulations

Table C3.1: Displacement under tension and shear loading in concrete [1), 2)]

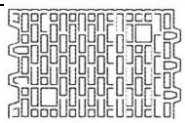
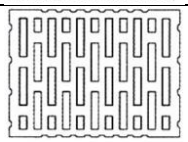
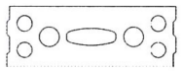
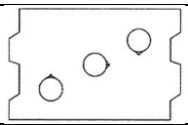
Anchor type	Tension load			Shear load		
	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
KPR-FAST 8/50 KPS-FAST 8/50	1.4	0.34	0.68	3.7	3.16	4.47
KPR-FAST 8/70 KPS-FAST 8/70	1.78	0.29	0.58	3.7	3.16	4.47
KPR/FAST 10 KPS/FAST 10	1.6	0.26	0.73	7.2	3.6	5.39
KPR/FAST 10 KPS/FAST 10 STRONG	2.38	0.35	0.7	7.2	3.6	5.39
KPR/FAST 12 KPS/FAST 12	1.98	0.37	0.55	8.39	3.83	5.74
KPR/FAST 14 KPS/FAST 14	3.0	0.31	0.86	12.91	5.77	8.65
KPR-FAST 10/50 KPS-FAST 10/50	1.6	0.3	0.6	7.2	3.6	5.39
KPR-FAST 10/70 KPS-FAST 10/70	3.37	0.3	0.6	7.2	3.6	5.39

[1)] valid for all ranges of temperatures
[2)] intermediate values by linear interpolation

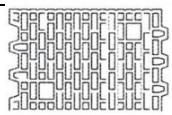
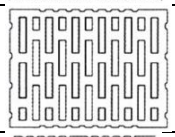
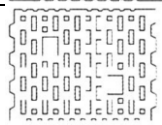
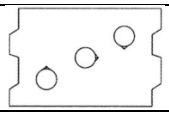
Table C3.2: Characteristic values F_{Rk} in any load direction under fire exposure in concrete C20/25 to C50/60, no permanent centric tension load and shear load with lever arm, for fixing of facade systems

Anchor type	Fire resistance class	F_{rk}, kN
KPR/FAST 10, KPS/FAST 10 KPR-STRONG 10, KPS-STRONG 10 KPR-FAST 10, KPS-FAST 10	R90	0.8

Table C4.1: Characteristic resistance for use in masonry

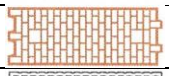
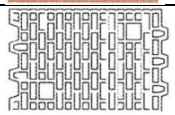
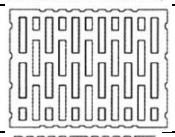
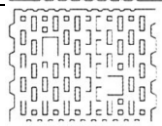
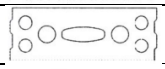
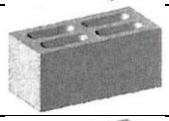
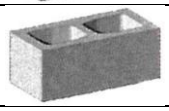
Anchor type / Base material	Bulk density class [kg/dm³]	Mean compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [16] [kN]
KPR-FAST 8/50 and KPS-FAST 8/50					
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	3.0
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.0
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.0
KPR-FAST 8/70 and KPS-FAST 8/70					
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	2.5
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.0
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.0
Perforated ceramic brick [1), 9)]	≥ 0.80	≥ 15		Rotary drilling only	1.2
Perforated ceramic brick [1), 10)]	≥ 0.80	≥ 15		Rotary drilling only	1.2
Calcium silicate hollow block [2), 12)]	≥ 1.60	≥ 12		Rotary drilling only	2.5
Hollow lightweight aggregate concrete element [3), 13)]	≥ 0.80	≥ 2		Rotary drilling only	2.0
Autoclaved aerated concrete element AAC 2 [4)]	≥ 0.35	≥ 2	-	Rotary drilling only	0.6
Autoclaved aerated concrete element AAC 7 [4)]	≥ 0.65	≥ 6.5	-	Rotary drilling only	2.0

Extension of Table C4.1:

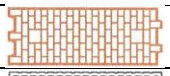
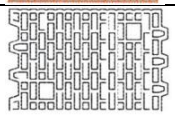
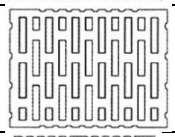
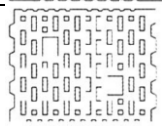
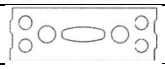
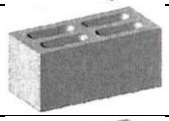
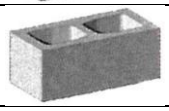
Anchor type / Base material	Bulk density class [kg/dm³]	Mean compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [16] [kN]
KPR/FAST 10 and KPS/FAST 10					
Clay brick [1), 5)]	≥ 1.70	≥ 10		hammer	3.5
Clay brick [1), 5)]	≥ 1.70	≥ 20		hammer	3.5
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	3.5
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.5
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.5
Perforated ceramic brick [1), 9)]	≥ 0.80	≥ 15		Rotary drilling only	0.9
Perforated ceramic brick [1), 10)]	≥ 0.80	≥ 15		Rotary drilling only	0.9
Perforated ceramic brick [1), 11)]	≥ 1.20	≥ 12		Rotary drilling only	2.0
Calcium silicate hollow block [2), 12)]	≥ 1.60	≥ 12		Rotary drilling only	2.5
Hollow lightweight aggregate concrete element [3), 13)]	≥ 0.80	≥ 2		Rotary drilling only	2.0
Autoclaved aerated concrete element AAC 2 [4)]	≥ 0.35	≥ 2	-	Rotary drilling only	0.6
Autoclaved aerated concrete element AAC 7 [4)]	≥ 0.65	≥ 6.5	-	Rotary drilling only	1.5
KPR-STRONG 10 and KPS-STRONG 10					
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	3.5
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.5
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.5

KPR-FAST, KPS-FAST, KPR/FAST, KPS/FAST, KPR-STRONG and KPS-STRONG	**Annex C4**
Performances Characteristic resistance in masonry (base material group b, c and d)	of European Technical Assessment ETA-12/0272

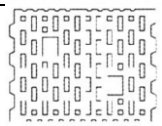
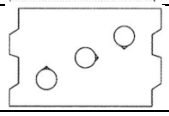
Extension of Table C4.1:

Anchor type / Base material	Bulk density class [kg/dm³]	Mean compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [16] [kN]
KPR-FAST 10/50 and KPS-FAST 10/50					
Clay brick [1), 5)]	≥ 1.70	≥ 10		hammer	1.5
Clay brick [1), 5)]	≥ 1.70	≥ 20		hammer	2.0
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	2.0
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.0
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.0
Perforated ceramic brick [1), 8)]	≥ 0.80	≥ 15		Rotary	1.2
Perforated ceramic brick [1), 9)]	≥ 0.80	≥ 15		Rotary	2.5
Perforated ceramic brick [1), 10)]	≥ 0.80	≥ 15		Rotary	2.5
Perforated ceramic brick [1), 11)]	≥ 1.20	≥ 12		Rotary	1.5
Calcium silicate hollow block [2), 12)]	≥ 1.60	≥ 12		Rotary	2.5
Lightweight concrete blocks [3)]	≥ 0.80	≥ 2		Rotary	1.5
Aggregate concrete masonry units [3), 14)]	≥ 1.5	≥ 25		Rotary	3.5
Aggregate concrete masonry units [3), 15)]	≥ 1.0	≥ 20		Rotary	4.0

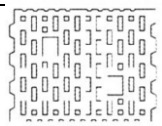
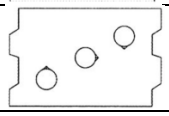
Extension of Table C4.1:

Anchor type / Base material	Bulk density class [kg/dm³]	Mean compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [16] [kN]
KPR-FAST 10/70 and KPS-FAST 10/70					
Clay brick [1), 5)]	≥ 1.70	≥ 10		hammer	2.0
Clay brick [1), 5)]	≥ 1.70	≥ 20		hammer	3.5
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	2.0
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.0
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.0
Perforated ceramic brick [1), 8)]	≥ 0.80	≥ 15		Rotary	1.0
Perforated ceramic brick [1), 9)]	≥ 0.80	≥ 15		Rotary	1.0
Perforated ceramic brick [1), 10)]	≥ 0.80	≥ 15		Rotary	1.0
Perforated ceramic brick [1), 11)]	≥ 1.20	≥ 12		Rotary	1.5
Calcium silicate hollow block [2), 12)]	≥ 1.60	≥ 12		Rotary	2.5
Lightweight concrete blocks [3)]	≥ 0.80	≥ 2		Rotary	1.5
Aggregate concrete masonry units [3), 14)]	≥ 1.5	≥ 25		Rotary	3.5
Aggregate concrete masonry units [3), 15)]	≥ 1.0	≥ 20		Rotary	4.0
Autoclaved aerated concrete element AAC 2 [4)]	≥ 0.35	≥ 2	-	Rotary	0.9
Autoclaved aerated concrete element AAC 7 [4)]	≥ 0.65	≥ 6.5	-	Rotary	2.0

Extension of Table C4.1:

Anchor type / Base material	Bulk density class [kg/dm³]	Mean compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [16] [kN]
KPR-FAST 12 and KPS-FAST 12					
Clay brick [1), 5)]	≥ 1.70	≥ 10		hammer	2.5
Clay brick [1), 5)]	≥ 1.70	≥ 20		hammer	3.5
Clay brick [1), 6)]	≥ 2.00	≥ 10		hammer	3.5
Clay brick [1), 6)]	≥ 2.00	≥ 20		hammer	3.5
Clay silicate brick [2), 7)]	≥ 2.00	≥ 20		hammer	3.5
Perforated ceramic brick [1), 11)]	≥ 1.20	≥ 12		rotary	2.0
Calcium silicate hollow block [2), 12)]	≥ 1.60	≥ 12		rotary	3.0
Hollow lightweight aggregate concrete element [3), 13)]	≥ 0.80	≥ 2		rotary	2.0
Autoclaved aerated concrete element AAC 2 [4)]	≥ 0.35	≥ 2	-	rotary	0.75
Autoclaved aerated concrete element AAC 7 [4)]	≥ 0.65	≥ 6.5	-	rotary	3.0

Extension of Table C4.1:

Anchor type / Base material	Bulk density class [kg/dm³]	Mean compressive strength class [N/mm²]	Picture	Drill method	F_{Rk} [16] [kN]
KPR-FAST 12 and KPS-FAST 12					
Clay brick [1), 5)]	**≥ 1.70**	**≥ 10**		**hammer**	**4.0**
Clay brick [1), 5)]	**≥ 1.70**	**≥ 20**		**hammer**	**4.0**
Clay brick [1), 6)]	**≥ 2.00**	**≥ 10**		**hammer**	**4.0**
Clay brick [1), 6)]	**≥ 2.00**	**≥ 20**		**hammer**	**4.0**
Clay silicate brick [2), 7)]	**≥ 2.00**	**≥ 20**		**hammer**	**4.0**
Perforated ceramic brick [1), 11)]	**≥ 1.20**	**≥ 12**		**rotary**	**2.0**
Calcium silicate hollow block [2), 12)]	**≥ 1.60**	**≥ 12**		**rotary**	**3.5**
Hollow lightweight aggregate concrete element [3), 13)]	**≥ 0.80**	**≥ 2**		**rotary**	**2.0**
Autoclaved aerated concrete element AAC 2 [4)]	**≥ 0.35**	**≥ 2**	**-**	**rotary**	**0.9**
Autoclaved aerated concrete element AAC 7 [4)]	**≥ 0.65**	**≥ 6.5**	**-**	**rotary**	**3.0**
Partial safety factor Υ_{Mm} [17)]	**2.5 / 2.0**				

1) According to EN 771-1
2) According to EN 771-2
3) According to EN 771-3
4) According to EN 771-4
5) Polish clay brick; (L x W x H) = 250 x 120 x 65 mm
6) German clay brick MZ Rd 2.0/20; (L x W x H) = 250 x 120 x 65 mm
7) For example Kalksandstein KS NF 20-2.0 Vollstein according to DIN 106; (L x W x H) = 250 x 115 x 71 mm
8) For example Porotherm 18.8; (L x W x H) = 468 x 188 x 238 mm
9) For example Porotherm 25 P+W; (L x W x H) = 250 x 373 x 238 mm
10) For example MAX 250; (L x W x H) = 250 x 373 x 238 mm
11) For example HZL Rd1 1.2/12 according to DIN 105; (L x W x H) = 308 x 240 x 238 mm
12) For example KSL-R(P)8DF Lochstein according to DIN 106; (L x W x H) = 498 x 115 x 245 mm
13) For example Hbl 2/0.8 Leichtbetonhohlstein according to DINV 18 151-100; (L x W x H) = 365 x 247 x 238 mm
14) For example TeknoAmerBlok PK17,8; (L x W x H) = 178 x 390 x 190 mm
15) For example TeknoAmerBlok PK19; (L x W x H) = 190 x 390 x 190 mm
16) Characteristic resistance F_{Rk} for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchor with a spacing equal or larger than the minimum spacing s_{min} according to table B3 (Annex B4)
17) Partial safety factor for use in masonry Υ_{Mm} = 2,5 and partial safety factor for use in autoclaved aerated concrete Υ_{MAAC} = 2,0 in absence of other national regulations.

Table C5.1: Displacements under tension and shear loading in masonry

Anchor type	Base material	Tension load			Shear load		
		F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
KPR-FAST 8/50 KPS-FAST 8/50	Clay brick [1), 6)]	0.86	1.71	3.42	0.86	1.71	3.42
	Clay silicate brick [3), 7)]	0.86	0.19	0.38	0.86	0.19	0.38
KPR-FAST 8/70 KPS-FAST 8/70	Clay brick [1), 6)]	0.86	0.35	0.70	0.86	0.35	0.70
	Clay silicate brick [2), 7)]	0.86	0.20	0.40	0.86	0.20	0.40
	Perforated ceramic brick [1), 9)]	0.34	0.23	0.46	0.34	0.23	0.46
	Perforated ceramic brick [1), 10)]	0.34	0.23	0.46	0.34	0.23	0.46
	Calcium silicate hollow block [2), 12)]	0.71	0.31	0.62	0.71	0.31	0.62
	Hollow lightweight aggregate concrete element [3), 13)]	0.43	1.10	2.20	0.57	1.10	2.20
	Autoclaved aerated concrete element AAC 2 [4)]	0.21	0.42	0.84	0.21	0.42	0.84
	Autoclaved aerated concrete element AAC 7 [4)]	0.71	0.30	0.60	0.71	0.30	0.60

Extension of Table C5.1:

Anchor type	Base material	Tension load			Shear load		
		F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
KPR/FAST 10 KPS/FAST 10	Clay brick [1), 5)]	1.00	0.20	0.40	1.00	0.83	1.25
	Clay brick [1), 6)]	1.00	1.07	2.13	1.00	0.83	1.25
	Clay silicate brick [3), 7)]	1.00	0.09	0.18	1.00	0.83	1.25
	Perforated ceramic brick [1), 9)]	0.30	0.73	1.46	0.26	0.51	0.77
	Perforated ceramic brick [1), 10)]	0.30	0.73	1.46	0.26	0.51	0.77
	Perforated ceramic brick [1), 11)]	0.60	1.38	2.75	0.57	1.14	1.71
	Calcium silicate hollow block [2), 12)]	0.70	0.55	1.09	0.71	1.43	2.14
	Hollow lightweight aggregate concrete element [3), 13)]	0.43	1.35	2.70	0.57	1.14	1.71
	Autoclaved aerated concrete element AAC 2 [4)]	0.20	0.15	0.29	0.21	0.43	0.64
	Autoclaved aerated concrete element AAC 7 [4)]	0.50	0.02	0.04	0.54	1.07	1.61
KPR-STRONG 10 KPS-STRONG 10	Clay brick [1), 6)]	1.00	1.10	2.20	1.00	0.83	1.25
	Clay silicate brick [2), 7)]	1.00	0.15	0.30	1.00	0.83	1.25

Extension of Table C5.1:

Anchor type	Base material	Tension load			Shear load		
		F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
KPR-FAST 10/50 KPS-FAST 10/50	Clay brick [1), 5)]	0.6	0.1	0.2	0.6	0.9	0.6
	Clay brick [1), 6)]	0.9	0.5	1.0	0.7	1.1	0.7
	Clay silicate brick [3), 7)]	0.9	0.3	0.6	0.7	1.1	0.7
	Perforated ceramic brick [1), 8)]	0.7	0.6	1.2	0.7	0.6	0.9
	Perforated ceramic brick [1), 9)]	0.7	1.0	2.0	0.7	0.5	0.8
	Perforated ceramic brick [1), 10)]	0.7	1.0	2.0	0.7	0.5	0.8
	Perforated ceramic brick [1), 11)]	0.4	0.5	1.0	0.4	0.4	0.6
	Calcium silicate hollow block [2), 12)]	0.7	0.6	1.2	0.7	0.5	0.8
	Lightweight concrete blocks [3)]	0.4	1.1	2.2	0.4	1.0	1.5
	Aggregate concrete masonry units [3), 14)]	1.0	0.4	0.8	1.0	0.5	0.75
	Aggregate concrete masonry units [3), 15)]	1.1	0.4	0.8	1.1	0.5	0.75

Extension of Table C5.1:

Anchor type	Base material	Tension load			Shear load		
		F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
KPR-FAST 10/70 KPS-FAST 10/70	Clay brick [1), 5)]	1.0	0.3	0.6	1.0	0.8	1.2
	Clay brick [1), 6)]	0.9	0.8	1.6	0.9	0.7	1.1
	Clay silicate brick [3), 7)]	0.9	0.2	0.4	0.9	0.7	1.1
	Perforated ceramic brick [1), 8)]	0.3	0.5	1.0	0.3	0.4	0.6
	Perforated ceramic brick [1), 9)]	0.3	0.6	1.2	0.3	0.4	0.6
	Perforated ceramic brick [1), 10)]	0.3	0.6	1.2	0.3	0.4	0.6
	Perforated ceramic brick [1), 11)]	0.4	0.6	1.2	0.4	0.4	0.6
	Calcium silicate hollow block [2), 12)]	0.7	0.7	1.4	0.7	1.4	2.1
	Lightweight concrete blocks [3)]	0.4	1.0	2.0	0.4	1.0	1.5
	Autoclaved aerated concrete element AAC 2 [4)]	0.3	0.2	0.4	0.3	0.5	0.8
	Autoclaved aerated concrete element AAC 7 [4)]	0.7	0.3	0.6	0.7	0.7	1.1
	Aggregate concrete masonry units [3), 14)]	1.0	0.4	0.8	1.0	0.5	0.75
	Aggregate concrete masonry units [3), 15)]	1.1	0.4	0.8	1.1	0.6	0.9

Extension of Table C5.1:

Anchor type	Base material	Tension load			Shear load		
		F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{NO} [mm]	$\delta_{N\infty}$ [mm]
KPR-FAST 12 KPS-FAST 12	Clay brick [1), 5)]	1.00	0.36	0.72	1.00	0.83	1.25
	Clay brick [1), 6)]	1.00	0.27	0.54	1.00	0.83	1.25
	Clay silicate brick [3), 7)]	1.00	0.28	0.56	1.00	0.83	1.25
	Perforated ceramic brick [1), 11)]	0.57	0.72	1.44	0.57	1.14	1.71
	Calcium silicate hollow block [2), 12)]	0.86	0.43	0.86	0.86	1.71	2.57
	Hollow lightweight aggregate concrete element [3), 13)]	0.43	0.06	0.12	0.57	1.14	1.71
	Autoclaved aerated concrete element AAC 2 [4)]	0.27	0.39	0.78	0.27	0.57	0.80
	Autoclaved aerated concrete element AAC 7 [4)]	1.07	0.36	0.72	1.07	2.14	3.21
KPR-FAST 14 KPS-FAST 14	Clay brick [1), 5)]	1.14	0.28	0.56	1.14	0.95	1.43
	Clay brick [1), 6)]	1.14	0.27	0.54	1.14	0.95	1.43
	Clay silicate brick [3), 7)]	1.14	0.09	0.18	1.14	0.95	1.43
	Perforated ceramic brick [1), 11)]	0.57	0.13	0.26	0.57	1.14	1.71
	Calcium silicate hollow block [2), 12)]	1.00	0.16	0.32	1.00	2.00	3.00
	Hollow lightweight aggregate concrete element [3), 13)]	0.57	0.09	0.18	0.57	1.14	1.71
	Autoclaved aerated concrete element AAC 2 [4)]	0.32	0.39	0.78	0.32	0.64	0.96
	Autoclaved aerated concrete element AAC 7 [4)]	1.07	0.17	0.34	1.07	2.14	3.21

1) According to EN 771-1
2) According to EN 771-2
3) According to EN 771-3
4) According to EN 771-4
5) Polish clay brick; (L x W x H) = 250 x 120 x 65 mm
6) German clay brick MZ Rd 2.0/20; (L x W x H) = 250 x 120 x 65 mm
7) For example Kalksandstein KS NF 20 - 2.0 Vollstein according to DIN 106; (L x W x H) = 250 x 115 x 71 mm
8) For example Porotherm 18.8; (L x W x H) = 468 x 188 x 238 mm
9) For example Porotherm 25 P+W; (L x W x H) = 250 x 373 x 238 mm
10) For example MAX 250; (L x W x H) = 250 x 373 x 238 mm
11) For example HZL Rd1 1.2/12 according to DIN 105; (L x W x H) = 308 x 240 x 238 mm
12) For example KSL-R(P)8DF Lochstein according do DIN 106; (L x W x H) = 498 x 115 x 245 mm
13) For example Hbl 2/0.8 Leichtbetonhohlstein according do DINV 18 151-100; (L x W x H) = 365 x 247 x 238 mm
14) For example TeknoAmerBlok PK17.8; (L x W x H) = 178 x 390 x 190 mm
15) For example TeknoAmerBlok PK19; (L x W x H) = 190 x 390 x 190 mm