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le futur en construction

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European Technical Assessment

ETA-18/0197 of 02/05/2018

English translation prepared by CSTB - Original version in French language

General Part

Nom commercial *Trade name*	**SPIT MAXIMA +**
Famille de produit *Product family*	**Cheville à scellement de type "capsule" pour fixation dans le béton non fissuré M8, M10, M12, M14, M16, M20, M22, M24 et M30.** ***Bonded capsule anchor for use in non cracked concrete: sizes M8, M10, M12, M14, M16, M20, M22, M24 and M30***
Titulaire *Manufacturer*	**SPIT SAS** **Route de Lyon** **26500 Bourg-Les-Valence** **FRANCE**
Usine de fabrication *Manufacturing plant*	**Plant 1**
Cette evaluation contient: *This Assessment contains*	12 pages incluant 8 annexes qui font partie intégrante de cette évaluation 11 *pages including 8 annexes which form an integral part of this assessment*
Base de l'ETE *Basis of ETA*	EAD 330499-00-601, Edition juillet 2017 *EAD 330499-00-601, Edition July 2017*
Cette evaluation remplace: *This Assessment replaces*	-

1 Technical description of the product

The SPIT MAXIMA + adhesive system is a bonded anchor system (capsule type) consisting of glass capsule SPIT MAXIMA + with a threaded rod with hexagon nut and washer of sizes M8, M10, M12, M14, M16, M20, M22, M24 and M30.

The standard threaded rod can be made of zinc plated carbon steel, stainless steel or high corrosion resistant stainless steel.

The glass capsule is placed into a rotary/percussion previously drilled hole and the threaded rod is driven by machine with simultaneous hammering and turning.

The anchor rod is anchored via the bond between anchor rod, chemical mortar and concrete.

The illustration and the description of the product are given in Annex A1.

2 Specification of the intended use

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annexes 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, 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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic tension resistance and shear resistance for threaded rods acc. TR029	See Annex C1, C2
Characteristic tension resistance and shear resistance for threaded rods acc. CEN/TS 1992-4-5	See Annex C3, C4
Displacements	See Annex C1, C2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance determined (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances contained in this European Technical Assessment, there may be requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

For Basic Requirement Safety in Use the same criteria are valid as for Basic Requirement Mechanical Resistance and Stability.

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.8 General aspects relating to fitness for use

Durability and Serviceability are only ensured if the specifications of intended use according to Annex B1 are kept.

4 Assessment and Verification of Constancy of Performance (AVCP)

According to the Decision 96/582/EC of the European Commission[1], as amended, the system of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements (which contributes to the stability of the works) or heavy units	—	1

5 Technical details necessary for the implementation of the AVCP system

Technical details necessary for the implementation of the Assessment and verification of constancy of performance (AVCP) system are laid down in the control plan deposited at Centre Scientifique et Technique du Bâtiment.

The manufacturer shall, on the basis of a contract, involve a notified body approved in the field of anchors for issuing the certificate of conformity CE based on the control plan.

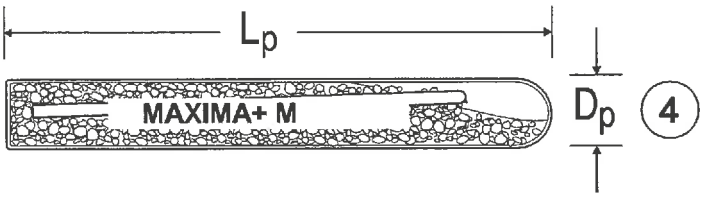
Issued in Marne La Vallée on **02/05/2018** by
Charles Baloche
Directeur technique

The original French version is signed

[1] Official Journal of the European Communities L 254 of 08.10.1996

SPIT MAXIMA + Chemical Capsule Anchor

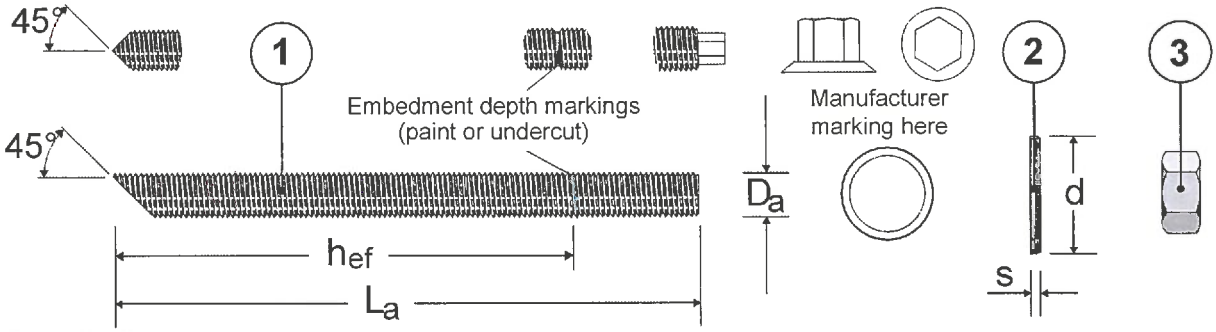
Mortar Capsule



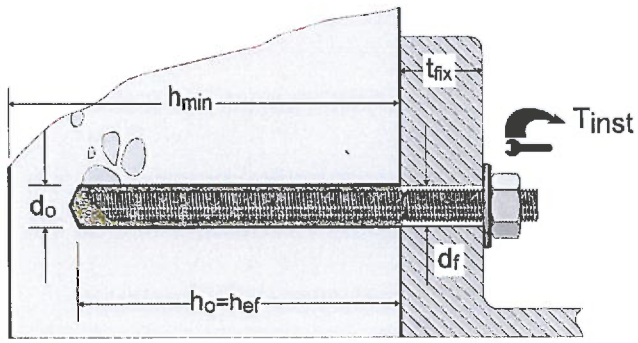
Marking

Manufacturer:	SPIT
Capsule type:	MAXIMA +
Capsule size:	M..

Anchor rod



Installation



SPIT MAXIMA + Anchor chemical capsule	Annex A1
System Description and Installation	

Table A1: Materials

Part	Description	Material			
1	Threaded rod	Carbon steel property class 5.8 or 8.8 EN ISO 898-1		Stainless steel 1.4401, 1.4404 or 1.4571 property class A4-70 or A4-80 EN ISO 3506-1	High corrosion resistant steel 1.4529 or 1.4565 property class 70 EN ISO 3506-1
		Galvanised steel ≥ 5µm acc. to EN ISO 4042	Hot dip galvanised steel EN ISO 10684		
2	Washer	Carbon steel		Stainless steel 1.4401, 1.4404 or 1.4571	High corrosion resistant steel 1.4529 or 1.4565
		Galvanised steel ≥ 5µm acc. to EN ISO 4042	Hot dip galvanised steel EN ISO 10684		
		EN ISO 887 or EN ISO 7089 up to EN ISO 7094			
3	Hexagon nut	Carbon steel property class 4 to 8 EN ISO 20898-2		Stainless steel 1.4401, 1.4404 or 1.4571 property class A4-70 or A4-80 EN ISO 3506-2	High corrosion resistant steel 1.4529 or 1.4565 property class 70 EN ISO 3506-2
		Galvanised steel ≥ 5µm acc. to EN ISO 4042	Hot dip galvanised steel EN ISO 10684		
		EN ISO 4032 or EN ISO 4034			
4	Glass capsule	Glass Quartz Resin Hardener			

Table A2: Dimensions in mm

Part	Description		M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
1	Threaded rod	D_a	M8	M10	M12		M14	M16		M20		M22	M24		M30
		L_a ≥ h_{ef}	95 80	100 90	120 110	175 165	135 120	140 125	205 190	190 170	275 255	210 190	235 210	340 315	320 280
2	Washer	S d	1.6 16	2.1 21	2.5 24		2.5 28	3.0 30		3.0 37		3.0 39	4.0 44		4.0 56
3	Hexagon nut	SW	13	17	19		22	24		30		32	36		46
4	Glass capsule	D_p	9	11	13		15	17		17		22	22		25
		L_p	80	80	95	125	95	95	125	160	250	160	175	245	230

Table B1: Overview use categories and performance categories

Use conditions		Mortar capsule with ...	
		Threaded rods	
			
hammer drilling or compressed air drilling mode.		✓	
Static and quasi static loading, in non-cracked concrete		M8 to M30 Tables C1, C2, C3, C4, C5, C6	
Use category: dry or wet concrete (flooded holes are excluded)		✓	
Installation temperature (minimum)		mortar +5°C, concrete 0°C	
In-service temperature	Temperature range I:	-40°C to +40°C	(max long term temperature +24°C and max short term temperature +40°C)
	Temperature range II:	-40°C to +80°C	(max long term temperature +50°C and max short term temperature +80°C)

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000-12.
- Strength classes C20/25 to C50/60 according to EN 206-1:2000-12.

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions
  (zinc coated steel, stainless steel or high corrosion resistant steel).
- Structures subject to permanently damp internal condition :
  - if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel).
  - with particular aggressive conditions (high corrosion resistant steel).
- Structures subject to external atmospheric exposure including industrial and marine environment :
  - if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel).
  - with particular aggressive conditions (high corrosion resistant 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).
- Overhead installations are permitted

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the forces to be transmitted. The position of the anchor is indicated on the design drawings (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages under static or quasi-static actions are designed in accordance with (please choose the relevant design method): EOTA Technical Report TR 029, Edition September 2010; CEN/TS 1992-4-5

SPIT MAXIMA + Anchor chemical capsule	Annex B2
Installation data	

Table B2: Installation parameters

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Nominal drill hole Ø	d_0	[mm]	10	12	14		16	18		22		24	26		32
Cutting diameter	$d_{cut} \leq$	[mm]	10.5	12.5	14.5		16.5	18.5		22.5		24.5	26.5		32.5
Depth of drill hole	h_0	[mm]	80	90	110	165	120	125	190	170	255	190	210	315	280
Ø of clearance hole in the fixture	d_f	[mm]	9	12	14		16	18		22		24	26		33
Steel brush Ø	D	[mm]	11	13	16		18	20		24		26	28		34
Torque moment	T_{inst}	[Nm]	10	20	40		60	80		120		135	180		300

1) for larger clearance hole in the fixture see TR 029 section 1.1 and/or CEN/TS 1992-4-1:2009, section 1.2.3

Steel brush and installation procedure

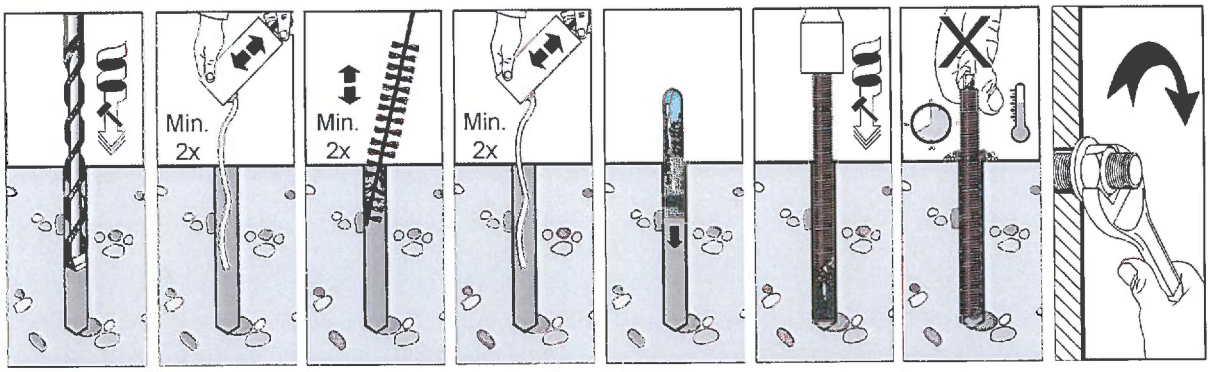


Table B3: Minimum member thickness, edge distance and spacing

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Min. member thickness	h_{min}	[mm]	110	120	140	195	150	160	225	220	300	240	260	370	340
Min. edge distance	c_{min}	[mm]	40	45	55	55	60	65	65	85	85	95	105	105	140
Min. spacing	s_{min}	[mm]	40	45	55	55	60	65	65	85	85	95	105	105	140

Table B4: Minimum curing time

Temperature in the concrete member	Minimum curing time in dry concrete	Minimum curing time in wet concrete
≥ + 0 °C	5 hrs.	10 hrs.
≥ + 5 °C	1 hr.	2 hrs.
≥ + 20 °C	20 min.	40 min.
≥ + 30 °C	10 min.	20 min.

Table C1: Characteristic values of resistance to tension loads. Design method TR 029

Anchor size			**M8**	**M10**	**M12**	**M12 /1,5t**	**M14**	**M16**	**M16 /1,5t**	**M20**	**M20 /1,5t**	**M22**	**M24**	**M24 /1,5t**	**M30**
Steel failure															
Characteristic resistance **property class 5.8**	$N_{Rk,S}$	[kN]	18	29	42		58	78		123		152	177		281
Characteristic resistance **property class 70**	$N_{Rk,S}$	[kN]	26	40	59		81	110		172		212	247		393
Characteristic resistance **property class 8.8 property class 80**	$N_{Rk,S}$	[kN]	29	46	67		92	126		196		242	282		449
Partial safety factor **property class 5.8, 8.8 property class 70 property class 80**	γ_{Ms} [1]	[-]	1.5 1.87 1.60												
Combined Pull-out and Concrete cone failure															
Characteristic bond resistance in non-cracked concrete C20/25															
Temperature range I: 40°C/24°C [2]	$\tau_{Rk,ucr}$	[N/mm²]	12							11					10
Temperature range II: 80°C/50°C [2]	$\tau_{Rk,ucr}$	[N/mm²]	10							9.5					9.0
Partial safety factor	$\gamma_2 = \gamma_{Inst}$	[-]	1.0												1.0
Effective anchorage depth	h_{ef}	[mm]	80	90	110	165	120	125	190	170	255	190	210	315	280
Increasing factors for non-cracked concrete	ψ_c	C25/30	1.06												
		C30/37	1.14												
		C35/45	1.22												
		C40/50	1.26												
		C45/55	1.30												
		C50/60	1.34												
Splitting failure															
Char. edge distance	$c_{cr,sp}$	[mm]	160	135	140	205	150	160	240	215	320	240	265	395	350
Char. spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$												
Partial safety factor	$\gamma_2 = \gamma_{Inst}$	[-]	1.0												1.2

[1] In absence of other national regulations / [2] Maximum short and long term temperatures;

Table C2: Displacements under tension loads

Anchor size			**M8**	**M10**	**M12**	**M12 /1,5t**	**M14**	**M16**	**M16 /1,5t**	**M20**	**M20 /1,5t**	**M22**	**M24**	**M24 /1,5t**	**M30**
Tension load	N	[kN]	9.6	13.5	19.7	29.6	25.1	29.9	45.5	48.3	72.5	59.4	71.6	107.4	94.2
Displacement	δ_{N0}	[mm]	0.17	0.18	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.20	0.20	0.20	0.21
	$\delta_{N\infty}$	[mm]	0.50												

SPIT MAXIMA + Anchor chemical capsule

Annex C1

Design according to TR029
Characteristic values of resistance to tension loads - Displacements

Table C3: Characteristic values of resistance to shear loads. Design method TR 029

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Steel failure without lever arm															
Characteristic resistance **property class 5.8**	$V_{Rk,S}$	[kN]	9	14	21		29	39		61		76	88		140
Characteristic resistance **property class 70**	$V_{Rk,S}$	[kN]	13	20	30		40	55		86		106	124		196
Characteristic resistance **property class 8.8** **property class A4-80**	$V_{Rk,S}$	[kN]	15	23	34		46	63		98		121	141		224
Partial safety factor **property class 5.8, 8.8** **property class 70** **property class A4-80**	γ_{Ms} [1]	[-]	1.25 1.56 1.33												
Steel failure with lever arm															
Char. bending moment **property class 5.8**	$M^0_{Rk,s}$	[Nm]	19	37	66		105	166		325		448	561		1125
Char. bending moment **property class 70**	$M^0_{Rk,s}$	[Nm]	26	52	92		146	233		454		627	786		1574
Char. bending moment **property class 8.8** **property class 80**	$M^0_{Rk,s}$	[Nm]	30	60	105		168	266		519		716	898		1799
Partial safety factor **property class 5.8, 8.8** **property class 70** **property class 80**	γ_{Ms} [1]	[-]	1.25 1.56 1.33												
Concrete pryout failure															
Factor in equation (5.7) of TR 029, Section 5.2.3.3	k	[-]	2.0												
Partial safety factor	$\gamma_2 = \gamma_{Inst}$	[-]	1.0												
Concrete edge failure [2]															
Partial safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1.0												

[1] In absence of other national regulations / [2] Concrete edge failure see chapter 5.2.3.4 of Technical Report TR 029

Table C4: Displacements under shear loads

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Shear load	V	[kN]	5.2	8.3	12.0	12.0	16.4	22.4	22.4	35.0	35.0	43.3	50.4	50.4	80.1
Displacement	δ_{V0}	[mm]	2.0	2.1	2.2	2.2	2.3	2.5	2.5	2.6	2.6	2.8	2.8	2.8	3.0
	$\delta_{V\infty}$	[mm]	2.9	3.1	3.3	3.3	3.5	3.7	3.7	4.0	4.0	4.1	4.1	4.1	4.4

Table C5: Characteristic values of resistance to tension loads. Design acc. CEN/TS 1992-4-5

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Steel failure															
Characteristic resistance **property class 5.8**	$N_{Rk,S}$	[kN]	18	29	42		58	78		123		152	177		281
Characteristic resistance **property class 70**	$N_{Rk,S}$	[kN]	26	40	59		81	110		172		212	247		393
Characteristic resistance **property class 8.8 property class 80**	$N_{Rk,S}$	[kN]	29	46	67		92	126		196		242	282		449
Partial safety factor **property class 5.8, 8.8 property class 70 property class 80**	γ_{Ms} [1]	[-]	1.5 1.87 1.60												
Combined Pull-out and Concrete cone failure															
Characteristic bond resistance in non-cracked concrete C20/25															
Temperature range I: 40°C/24°C [2]	$\tau_{Rk,ucr}$	[N/mm²]	12							11					10
Temperature range II: 80°C/50°C [2]	$\tau_{Rk,ucr}$	[N/mm²]	10							9.5					9.0
Partial safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1.0												1.2
Factor acc. CEN/TS 1992-4-5, § 6.2.2.3	k_{ucr}	[-]	10.1												
Effective anchorage depth	h_{ef}	[mm]	80	90	110	165	120	125	190	170	255	190	210	315	280
Increasing factors for non-cracked concrete	Ψ_c	C25/30	1.06												
		C30/37	1.14												
		C35/45	1.22												
		C40/50	1.26												
		C45/55	1.30												
		C50/60	1.34												
Concrete cone failure															
Factor acc. CEN/TS 1992-4-5, § 6.2.3.1	k_{ucr}	[-]	10.1												
Edge distance	$c_{cr,N}$	[-]	1.5 h_{ef}												
Spacing	$s_{cr,N}$	[-]	3 h_{ef}												
Splitting failure															
Char. edge distance	$c_{cr,sp}$	[mm]	160	135	140	205	150	160	240	215	320	240	265	395	350
Char. spacing	$s_{cr,sp}$	[mm]	$2 \cdot c_{cr,sp}$												
Partial safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1.0												1.2

[1] In absence of other national regulations / [2] Maximum short and long term temperatures;

SPIT MAXIMA + Anchor chemical capsule

Annex C3

Design CEN/TS 1992-4-5:
Characteristic values of resistance to tension loads

Table C6: Characteristic values of resistance to shear loads. Design acc. CEN/TS 1992-4-5

Anchor size			M8	M10	M12	M12 /1,5t	M14	M16	M16 /1,5t	M20	M20 /1,5t	M22	M24	M24 /1,5t	M30
Steel failure without lever arm															
Characteristic resistance **property class 5.8**	$V_{Rk,S}$	[kN]	9	14	21		29	39		61		76	88		140
Characteristic resistance **property class 70**	$V_{Rk,S}$	[kN]	13	20	30		40	55		86		106	124		196
Characteristic resistance **property class 8.8 property class 80**	$V_{Rk,S}$	[kN]	15	23	34		46	63		98		121	141		224
Partial safety factor **property class 5.8, 8.8 property class 70 property class 80**	γ_{Ms} [1]	[-]	1.25 1.56 1.33												
Ductility factor acc. CEN/TS 1992-4-5, § 6.3.2.1	k_2	[-]	0.8												
Steel failure with lever arm															
Char. bending moment **property class 5.8**	$M^0_{Rk,s}$	[Nm]	19	37	66		105	166		325		448	561		1125
Char. bending moment **property class 70**	$M^0_{Rk,s}$	[Nm]	26	52	92		146	233		454		627	786		1574
Char. bending moment **property class 8.8 property class 80**	$M^0_{Rk,s}$	[Nm]	30	60	105		168	266		519		716	898		1799
Partial safety factor **property class 5.8, 8.8 property class 70 property class 80**	γ_{Ms} [1]	[-]	1.25 1.56 1.33												
Concrete pryout failure															
Factor in equation (27) of CEN/TS 1992-4-5, § 6.3.3	k_3	[-]	2.0												
Partial safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1.0												
Concrete edge failure [2]															
Concrete Edge failure, see CEN/TS 1992-4-5, § 6.3.4															
Partial safety factor	$\gamma_2 = \gamma_{inst}$	[-]	1.0												

[1] In absence of other national regulations / [2] Concrete edge failure see chapter 5.2.3.4 of Technical Report TR 029