

S-IRE – OPTION 1 (cracked concrete)



- *Unique identification code of the product-type:*
SMART S-IRE
- *Type or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):*
See annex 1 to this document
- *Intended uses of the construction product, in accordance with the applicable harmonized technical specification as foreseen by the manufacturer:*

Intended use or uses of the construction product according to ETAG 001 Part 5	
Generic type	Bonded injection type anchor sizes M8, M10, M12, M16, M20, M24, M27, M30 and rebar sizes Ø8mm to Ø32mm.
For use in	<ul style="list-style-type: none"> • For use in cracked and non-cracked concrete with threaded rods and non-cracked concrete with reinforcing bars in the range C20/25 as a minimum up to a maximum of C50/60 according to EN 206-1:2000-12. • Dry or wet concrete or flooded hole
Option / Category	ETAG001 Part 5 Option 1 used as an EAD
Loading	static, quasi static
Use conditions (Environmental conditions)	<ul style="list-style-type: none"> • <u>zinc-plated steel:</u> dry internal conditions only • <u>stainless steel (marking A4):</u> internal and external use without particular aggressive conditions. • <u>highly corrosion resistant steel (marking C):</u> internal and external use with particular aggressive conditions.
Temperature range	Service temperature range: -40°C to +70°C. Maximum short term temperature = +70°C. Maximum long term temperature = +50°C.

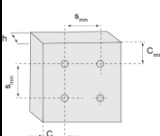
- *Name, registered trade name or registered trade mark and contact address of the manufacturer as required pursuant to Article 11 (5):*
pgb-Polska Sp. z o.o. – ul. Fryderyka Wilhelma Redena 3 – 41-807 Zabrze – Polska
- *System or systems of assessment and verification of constancy of performance of the construction product as set out in Annex V:*
System 1

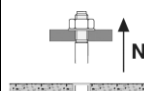
- In case of the declaration of performance concerning a construction product for which European Technical Assessment has been issued:

ETA - 17/0188 issued by	TZUS Praha
Body nr	NB 1020
On the basis of	ETAG001 Part 1 and ETAG001 Part 5
Certificate of Conformity issued by	1020-CPR-090-037839
Under System	1

Declared performance – Essential characteristics – Performances



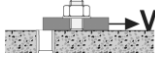
		Installation parameters									
			M8	M10	M12	M16	M20	M24	M27	M30	
	d ₀	Nominal diameter of drill bit	[mm]	10	12	14	18	22	26	30	35
	T _{inst}	Installation torque	[Nm]	10	20	40	80	120	160	180	200
	h _{ef,min}	Minimal effective embedment depth	[mm]	60	60	70	80	90	96	108	120
	h ₀	Depth of drilled hole	[mm]	h _{ef} +5mm							
	S _{min}	Minimum spacing	[mm]	40	40	40	40	50	50	50	60
	C _{min}	Minimum edge distance	[mm]	40	40	40	40	50	50	50	60
	h _{min}	Min. thickness of concrete member	[mm]	h _{ef} + 30 mm ≥ 100 mm			h _{ef} + 2d ₀				
	h _{ef,max}	Maximal effective embedment depth	[mm]	160	200	240	320	400	480	540	600
	h ₀	Depth of drilled hole	[mm]	h _{ef} +5mm							
	S _{min}	Minimum spacing	[mm]	80	100	120	160	200	240	270	300
	C _{min}	Minimum edge distance	[mm]	80	100	120	160	200	240	270	300
	h _{min}	Min. thickness of concrete member	[mm]	h _{ef} + 30 mm ≥ 100 mm			h _{ef} + 2d ₀				


		Tension load: steel failure									
			M8	M10	M12	M16	M20	M24	M27	M30	
	N _{rk,s}	Steel characteristic resistance grade 4.6	[kN]	15	23	34	63	98	141	184	224
	γ _{Ms}	Partial safety factor	[-]	2							
	N _{rk,s}	Steel characteristic resistance grade 5.8	[kN]	18	29	42	79	123	177	230	281
	γ _{Ms}	Partial safety factor	[-]	1,5							
	N _{rk,s}	Steel characteristic resistance grade 8.8	[kN]	29	46	67	126	196	282	367	449
	γ _{Ms}	Partial safety factor	[-]	1,5							
	N _{rk,s}	Steel characteristic resistance grade 10.9	[kN]	37	58	84	157	245	353	459	561
	γ _{Ms}	Partial safety factor	[-]	1,33							
	N _{rk,s}	Steel characteristic resistance A2-70 / A4-70	[kN]	26	41	59	110	172	247	321	393
	γ _{Ms}	Partial safety factor	[-]	1,87							
	N _{rk,s}	Steel characteristic resistance A4-80	[kN]	29	46	67	126	196	282	367	449
	γ _{Ms}	Partial safety factor	[-]	1,6							
	N _{rk,s}	Steel characteristic resistance 1.4529	[kN]	26	41	59	110	172	247	321	393
	γ _{Ms}	Partial safety factor	[-]	1,87							

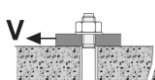
Tension load: combined concrete cone or splitting failure in concrete											
			M8	M10	M12	M16	M20	M24	M27	M30	
	Characteristic bond resistance in UNCRACKED concrete C20/25										
	f_{Rk}	Characteristic bond resistance -40°C to +70°C	[N/mm ²]	14	13	13	12	12	11	10	9
	Dry and wet concrete / flooded holes										
	γ_{Mc}	Partial safety factor	[-]	1,5							
	ψ_C	Increasing factor C25/30	[-]	1,02							
		Increasing factor C30/37		1,04							
		Increasing factor C35/45		1,06							
		Increasing factor C40/50		1,07							
		Increasing factor C45/55		1,08							
		Increasing factor C50/60		1,09							
	Characteristic bond resistance in CRACKED concrete C20/25										
	f_{Rk}	Characteristic bond resistance -40°C to +70°C	[N/mm ²]	8	8	7,5	7,5	7	7	5	5
	Dry and wet concrete / flooded holes										
	γ_{Mc}	Partial safety factor	[-]	1,5							
ψ_C	Increasing factor C25/30	[-]	1,02								
	Increasing factor C30/37		1,04								
	Increasing factor C35/45		1,06								
	Increasing factor C40/50		1,07								
	Increasing factor C45/55		1,08								
	Increasing factor C50/60		1,09								

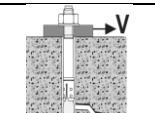
Tension load: splitting failure										
			M8	M10	M12	M16	M20	M24	M27	M30
	$c_{cr,sp}$	Critical edge distance	[mm]	2 · h _{ef}						
	$s_{cr,sp}$	Critical spacing	[mm]	2 · c _{cr,sp}						
	γ_{Msp}	Partial safety factor	[-]	1,8						

Tension load: displacements										
			M8	M10	M12	M16	M20	M24	M27	M30
F_{ucr}	Service tension load in UNCRACKED concrete		[kN]	11,9	14,3	19,0	23,8	35,7	35,7	45,2
δ_{N0}	Displacements under short term		[mm]	0,3	0,3	0,3	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	Displacements under long term		[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
F_{cr}	Service tension load in CRACKED concrete		[kN]	5,7	9,5	14,3	16,7	23,8	28,6	28,6
δ_{N0}	Displacements under short term		[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6
$\delta_{N\infty}$	Displacements under long term		[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0

		Shear load: steel failure without lever arm									
			M8	M10	M12	M16	M20	M24	M27	M30	
	Vrk,s	Steel characteristic resistance grade 4.6	[kN]	7	12	17	31	49	71	92	112
	γ_{Ms}	Partial safety factor	[-]	1,67							
	Vrk,s	Steel characteristic resistance grade 5.8	[kN]	9	15	21	39	61	88	115	140
	γ_{Ms}	Partial safety factor	[-]	1,25							
	Vrk,s	Steel characteristic resistance grade 8.8	[kN]	15	23	34	63	98	141	184	224
	γ_{Ms}	Partial safety factor	[-]	1,25							
	Vrk,s	Steel characteristic resistance grade 10.9	[kN]	18	29	42	79	123	177	230	281
	γ_{Ms}	Partial safety factor	[-]	1,5							
	Vrk,s	Steel characteristic resistance A2-70 / A4-70	[kN]	13	20	30	55	86	124	161	196
	γ_{Ms}	Partial safety factor	[-]	1,56							
	Vrk,s	Steel characteristic resistance A4-80	[kN]	15	23	34	63	98	141	184	224
	γ_{Ms}	Partial safety factor	[-]	1,33							
	Vrk,s	Steel characteristic resistance 1.4529	[kN]	13	20	30	55	86	124	161	196
	γ_{Ms}	Partial safety factor	[-]	1,25							

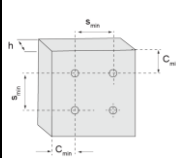
		Shear load: steel failure with lever arm									
			M8	M10	M12	M16	M20	M24	M27	M30	
	Vrk,s	Steel characteristic resistance grade 4.6	[Nm]	7	12	17	31	49	71	92	112
	γ_{Ms}	Partial safety factor	[-]	1,67							
	Vrk,s	Steel characteristic resistance grade 5.8	[Nm]	9	15	21	39	61	88	115	140
	γ_{Ms}	Partial safety factor	[-]	1,25							
	Vrk,s	Steel characteristic resistance grade 8.8	[Nm]	15	23	34	63	98	141	184	224
	γ_{Ms}	Partial safety factor	[-]	1,25							
	Vrk,s	Steel characteristic resistance grade 10.9	[Nm]	18	29	42	79	123	177	230	281
	γ_{Ms}	Partial safety factor	[-]	1,5							
	Vrk,s	Steel characteristic resistance A2-70 / A4-70	[Nm]	13	20	30	55	86	124	161	196
	γ_{Ms}	Partial safety factor	[-]	1,56							
	Vrk,s	Steel characteristic resistance A4-80	[Nm]	15	23	34	63	98	141	184	224
	γ_{Ms}	Partial safety factor	[-]	1,33							
	Vrk,s	Steel characteristic resistance 1.4529	[Nm]	13	20	30	55	86	124	161	196
	γ_{Ms}	Partial safety factor	[-]	1,25							

		Shear load: concrete pryout failure									
			M8	M10	M12	M16	M20	M24	M27	M30	
	k	K factor	[mm]	2							
	γ_{Mpr}	Partial safety factor	[-]	1,5							

		Shear load: concrete edge failure									
			M8	M10	M12	M16	M20	M24	M27	M30	
	See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors										
	γ_{Mc}	Partial safety factor	[-]	1,5							

		Shear load: displacements									
			M8	M10	M12	M16	M20	M24	M27	M30	
V	Service shear load	[kN]	3,5	5,5	8,0	15,0	23,3	33,6	45,7	53,4	
δ_{N0}	Displacements under short term	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	
$\delta_{N\infty}$	Displacements under long term	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	



Installation parameters			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32	
	d ₀	Nominal diameter of drill bit	[mm]	12	14	16	20	25	32	40
	T _{inst}	Installation torque	[Nm]	10	20	40	80	120	180	200
	h _{ef,min}	Minimal effective embedment depth	[mm]	60	60	70	80	90	100	128
	h ₀	Depth of drilled hole	[mm]	hef+5mm						
	s _{min}	Minimum spacing	[mm]	40	40	40	40	50	50	70
	c _{min}	Minimum edge distance	[mm]	40	40	40	40	50	50	70
	h _{min}	Min. thickness of concrete member	[mm]	hef + 30 mm ≥ 100 mm			hef + 2d ₀			
	h _{ef,max}	Maximal effective embedment depth	[mm]	160	200	240	320	400	500	640
	h ₀	Depth of drilled hole	[mm]	hef+5mm						
	s _{min}	Minimum spacing	[mm]	80	100	120	160	200	250	320
	c _{min}	Minimum edge distance	[mm]	80	100	120	160	200	250	320
	h _{min}	Min. thickness of concrete member	[mm]	hef + 30 mm ≥ 100 mm			hef + 2d ₀			

Tension load: steel failure			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
N _{rk,s}	Steel characteristic resistance BSt 500 S	[kN]	28	43	62	111	173	270	442
γ _{M_s}	Partial safety factor	[-]	1,4						

Tension load: combined concrete cone or splitting failure in concrete			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Characteristic bond resistance in UNCRACKED concrete C20/25									
τ _{Rk}	Characteristic bond resistance -40°C to +70°C	[N/mm ²]	12	12	12	11	11	11	7
Dry and wet concrete									
γ _{Mc}	Partial safety factor	[-]	1,5						
Flooded holes									
γ _{Mc}	Partial safety factor	[-]	1,8						
ψ _C	Increasing factor C25/30	[-]	1,02						
	Increasing factor C30/37		1,04						
	Increasing factor C35/45		1,06						
	Increasing factor C40/50		1,07						
	Increasing factor C45/55		1,08						
	Increasing factor C50/60		1,09						
Characteristic bond resistance in CRACKED concrete C20/25									
τ _{Rk}	Characteristic bond resistance -40°C to +70°C	[N/mm ²]	7	10	9	9	8	8	5
Dry and wet concrete									
γ _{Mc}	Partial safety factor	[-]	1,5						
Flooded holes									
γ _{Mc}	Partial safety factor	[-]	1,8						
ψ _C	Increasing factor C25/30	[-]	1,02						
	Increasing factor C30/37		1,04						
	Increasing factor C35/45		1,06						
	Increasing factor C40/50		1,07						
	Increasing factor C45/55		1,08						
	Increasing factor C50/60		1,09						

Tension load: splitting failure									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
$C_{cr,sp}$	Critical edge distance	[mm]	2. h_{ef}						
$S_{cr,sp}$	Critical spacing	[mm]	2. $C_{cr,sp}$						
γ_{Msp}	Partial safety factor	[-]	1,8						

Tension load: displacements									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
F_{Ucr}	Service tension load in UNCRACKED concrete	[kN]	7,6	11,9	16,7	28,6	35,7	45,2	66,7
δ_{N0}	Displacements under short term	[mm]	0,3	0,3	0,4	0,4	0,4	0,5	0,5
$\delta_{N\infty}$	Displacements under long term	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
F_{cr}	Service tension load in CRACKED concrete	[kN]	5,7	9,5	11,9	19,0	23,8	28,6	35,7
δ_{N0}	Displacements under short term	[mm]	0,3	0,4	0,4	0,5	0,5	0,5	0,6
$\delta_{N\infty}$	Displacements under long term	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0

Shear load: steel failure without lever arm									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
$V_{rk,s}$	Steel characteristic resistance Bst 500S	[kN]	14	22	31	55	86	135	221
γ_{Ms}	Partial safety factor	[-]	1,5						

Shear load: steel failure with lever arm									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
$V_{rk,s}$	Steel characteristic resistance Bst 500S	[Nm]	33	65	112	265	518	1013	2122
γ_{Ms}	Partial safety factor	[-]	1,5						

Shear load: concrete pryout failure									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
k	K factor	[mm]	2						
γ_{Mpr}	Partial safety factor	[-]	1,5						

Shear load: concrete edge failure									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors									
γ_{Mc}	Partial safety factor	[-]	1,5						


Shear load: displacements									
			Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
V	Service shear load	[kN]	6,6	10,3	14,8	26,3	41,1	64,3	105,3
δ_{N0}	Displacements under short term	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
$\delta_{N\infty}$	Displacements under long term	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

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

Place and date of issue	Signature	
Melle, 24/02/2017	nv pgb-Europe sa Gontrode Heirweg 170 9090 MELLE BE 0425 888 396	Johannes Heye, product manager 

Annex 1 : Product overview



size	language	pgb code	EAN13	
385	NL-FR	SMCH13385 EP	5902134194714	1
385	EN-DE	SMCH13385EN EP	5902134202037	1
585	NL-FR	SMCH13585 EP	5902134194721	1
585	EN-DE	SMCH13585EN EP	5902134202037	1