

## SM1KA001



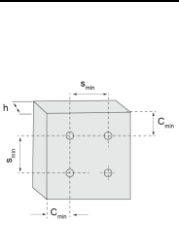
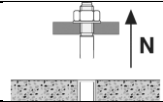
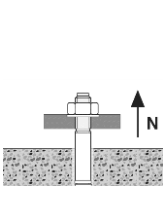
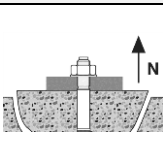
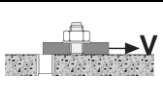
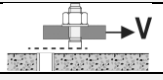
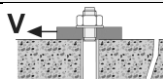
- *Unique identification code of the product-type:*  
**SMART S-KA, SMART S-KAK**
- *Type or serial number or any other element allowing identification of the construction product as required pursuant to Article 11(4):*  
**See annex 1 to this document**
- *Intended uses of the construction product,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

Beoogd gebruik volgens ETAG 001 parts 1 - 2	
Generic type	Torque controlled expansion anchor
Base material	Cracked and non-cracked concrete Reinforced or unreinforced normal weight concrete C20/25 to C50/60 acc. to EN 206-1:2003
Material:	S-KA : Galvanized steel, zinc plated : ISO 4042 A2K $\geq 5\mu\text{m}$ S-KAK: Hot-dip galvanized steel : ISO 10684
Durability	S-KA/ S-KAK : internal dry conditions
Anchorage subject to	Static or quasi-static loads Seismic actions for Performance Category C1 Fire exposure
Fire Resistance	R30-R120
Reaction to fire	A1, in acc. with 96/603/EC
Assumed working life	50 years

- *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. F.W. 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 - 10/0472 issued by	VTT EXPERT SERVICES OY
Body nr	NB 0809
On the basis of	ETAG 001, part 1 and 2
Under System	1
And issued	09/05/2017

Declared performance – Essential characteristics – Performances

STANDARD EMBEDMENT DEPTH							
Installation parameters (ETAG001 part 1 and 2)				M8	M10	M12	M16
	$d_o$	Nominal diameter of drill bit	[mm]	8	10	12	16
	$h_{ef}$	Effective standard embedment depth	[mm]	45	60	70	85
	$d_f$	Fixture clearance hole diameter	[mm]	9	12	14	18
	$T_{inst}$	Nominal installation torque	[Nm]	20/15 <sup>1</sup>	35	50	120
	$h_1$	Depth of drilled hole	[mm]	60	75	90	110
	$h_{min}$	Min. thickness of concrete member	[mm]	100	120	140	170
	$s_{min}$	Minimum spacing	[mm]	50	50	60	70
	$c_{min}$	Minimum edge distance	[mm]	50	50	55	85
	<b>Tension load: steel failure</b>						
	$N_{Rk,s}$	Tension steel characteristic resistance	[kN]	13	26	38	69
	$\gamma_{Ms}$	Partial safety factor <sup>2</sup>	[-]	1,40			
<b>Tension load: concrete cone or splitting failure in concrete</b>							
	$N_{Rk,p}$	Tension characteristic resistance in CRACKED concrete C20/25	[kN]	5	9	12	20
	$N_{Rk,p}$	Tension characteristic resistance in NON-CRACKED concrete C20/25	[kN]	9	16	20	35
	$\gamma_{Mp}$	Partial safety factor	[-]	1,80 <sup>3</sup>			1,50 <sup>4</sup>
	$\psi_c$	Increasing factor C25/30	[-]	1,04			
		Increasing factor C30/37	[-]	1,10			
		Increasing factor C40/50	[-]	1,20			
Increasing factor C50/60		[-]	1,28				
<b>Tension load: concrete cone or splitting failure in concrete</b>							
	$s_{cr,N}$	Critical spacing	[mm]	135	180	210	255
	$s_{cr,sp}$	Critical spacing (splitting)	[mm]	180	240	280	340
	$c_{cr,N}$	Critical edge distance	[mm]	68	90	105	128
	$c_{cr,sp}$	Critical edge distance (splitting)	[mm]	90	120	140	170
	$\gamma_{Mc}$	Partial safety factor <sup>2</sup>	[-]	1,80 <sup>3</sup>			1,50 <sup>4</sup>
<b>Tension load: displacements</b>							
Cracked and non-cracked concrete C20/25 – C50/60	$N$	Tension service load	[kN]	2	3,6	4,8	9,5
	$\delta_{N0}$	Displacements under short term tension loads	[mm]	0,3	0,6	0,6	0,7
	$\delta_{N\infty}$	Displacements under long term tension loads	[mm]	1,8	1,6	2,0	1,4
<b>Shear load: steel failure without lever arm</b>							
	$V_{Rk,s}$	Characteristic resistance	[kN]	10	18	23	44
	$\gamma_{Ms}$	Partial safety factor <sup>2</sup>	[-]	1,25			
	$K_2$	Factor for considering ductility	[-]	1,00			
<b>Shear load: steel failure with lever arm</b>							
	$M^0_{Rk,s}$	Characteristic resistance	[kN]	21	48	72	186
	$\gamma_{Ms}$	Partial safety factor <sup>3</sup>	[-]	1,25			
<b>Shear load: concrete pryout failure</b>							
	$K$	K factor	[-]	1	2		
	$\gamma_{Mpr}$	Partial safety factor <sup>2</sup>	[-]	1,50			

<sup>1</sup> Installation torque for S-KA is 20Nm and for S-KAK 15Nm

<sup>2</sup> In absence of other national regulations

<sup>3</sup> The installation safety factor of  $\gamma_2 = 1,2$  is included

<sup>4</sup> The installation safety factor of  $\gamma_2 = 1,0$  is included

# DECLARATION OF PERFORMANCE



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Installation parameters (ETAG001 part 1 and 2) - continued				M8	M10	M12	M16	
<b>Shear load: concrete edge failure</b>								
	$l_f$	Effective anchorage depth under shear loads	[mm]	45	60	70	85	
	$d_{nom}$	Outside anchor diameter	[mm]	8	10	12	16	
	$\psi_{ucr,V}$	CRACKED concrete without edge reinforcement	[-]	1,00				
		CRACKED concrete with straight edge reinforcement > $\varnothing$ 12mm		1,20				
		CRACKED concrete with edge reinforcement and closely spaced stirrups ( $a \leq 100$ mm) or non-cracked concrete		1,40				
$\gamma_{Mc}$	Partial safety factor <sup>2</sup>	[-]	1,50					
<b>Shear load: displacements</b>								
<i>Cracked and non-cracked concrete C20/25 – C50/60</i>	$V$	Service shear load	[kN]	5,7	10,3	13,1	25,1	
	$\bar{\delta}_{V0}$	Short term displacement under shear loads	[mm]	1,7	1,7	2,4	3,2	
	$\bar{\delta}_{V\infty}$	Long term displacement under shear loads	[mm]	2,6	2,6	3,6	4,8	

Characteristic tension resistance in cracked and non-cracked concrete C20/25 to C50/60 under fire exposure																	
		M8				M10				M12				M16			
<b>SMART THROUGH BOLT</b>																	
<b>Fire resistance duration</b>	<b>R.... [min]</b>	30	60	90	120	30	60	90	120	30	60	90	120	30	60	90	120
<b>Steel failure</b>																	
Characteristic resistance	$N_{Rk,s,fi}$ [kN]	1,3	0,7	0,4	0,3	2,3	1,3	0,8	0,5	3,6	2,0	1,3	0,9	5,3	3,0	1,8	1,3
<b>Pull-out failure</b>																	
Characteristic resistance	$N_{Rk,p,fi}$ [kN]	1,3		1,0		2,3		1,8		3,0		2,4		5,0		4,0	
<b>Concrete cone failure</b>																	
Characteristic resistance	$N^0_{Rk,p,fi}$ [kN]	2,4		2,0		5,0		4,0		7,4		5,9		12,0		9,6	
Spacing	$S_{Cr,N}$ [mm]	4 x $h_{ef}$															
	$S_{min}$ [mm]	50				55				60				70			
Edge distance	$C_{Cr,N}$ [mm]	2 x $h_{ef}$															
	$C_{min}$ [mm]	Fire attack from one side: $C_{min} = 2xh_{ef}$ Fire attack from more than one side: $C_{min} \geq 300$ mm															

In absence of other national regulations the partial safety factor for resistance under fire exposure  $\gamma_{M,fi} = 1,0$  is recommended.



# DECLARATION OF PERFORMANCE



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Characteristic shear resistance in cracked and non-cracked concrete C20/25 to C50/60 under fire exposure																	
SMART THROUGH BOLT		M8				M10				M12				M16			
Fire resistance duration	R... [min]	30	60	90	120	30	60	90	120	30	60	90	120	30	60	90	120
<b>Steel failure without lever arm</b>																	
Characteristic resistance	$V_{Rk,s,fi}$ [kN]	1,3	0,7	0,4	0,3	2,3	1,3	0,8	0,5	3,6	2,0	1,3	0,9	5,3	3,0	1,8	1,3
<b>Steel failure with lever arm</b>																	
Characteristic resistance	$M^0_{Rk,s,fi}$ [Nm]	1,8	1,3	0,8	0,6	3,6	2,6	1,6	1,1	6,4	4,6	2,8	1,9	16,2	11,7	7,2	4,9
<b>Concrete pryout failure</b>																	
K factor	K [-]	1,0				2,0				2,0				2,0			
Characteristic resistance	$V^0_{Rk,cp,fi}$ [kN]	2,4		2,0		10,0		8,0		14,8		11,8		24,0		19,2	
<b>Concrete edge failure</b>																	
The initial value $V^0_{Rk,c,fi}$ of the characteristic resistance in concrete C20/25 to C50/60 under fire exposure may be determined by: $V^0_{Rk,c,fi} = 0,25 \times V^0_{Rk,c}$ ( $\leq R90$ ) $V^0_{Rk,c,fi} = 0,20 \times V^0_{Rk,c}$ (R120) With $V^0_{Rk,c}$ initial value of the characteristic resistance in cracked concrete C20/25 under normal temperature.																	
In absence of other national regulations the partial safety factor for resistance under fire exposure $\gamma_{M,fi} = 1,0$ is recommended.																	



Characteristic values for seismic category C1 (EOTA TR 045)							
SMART S-KA, S-KAK		M8	M10	M12	M16		
<b>Steel failure for tension load</b>							
$N_{Rk,s,seis}$	Characteristic resistance	[kN]	13	26	38	69	
$\gamma_{Ms,seis}$	Partial safety factor	[-]	1,40				
<b>Pull-out failure</b>							
$N_{Rk,p,seis}$	Characteristic tension load in cracked concrete C20/25	[kN]	5	9	12	20	
$\gamma_{Mp,seis}$	Partial safety factor	[-]	1,80			1,50	
<b>Concrete cone failure (see TR 045)</b>							
$h_{ef}$	Effective anchorage depth	[mm]	45	60	70	85	
$\gamma_{Mc,seis}$ $\gamma_{Msp,seis}$	Partial safety factor	[-]	1,80			1,50	
<b>Steel failure for without lever arm</b>							
$V_{Rk,s,seis}$	Characteristic resistance	[kN]	5,6	11,9	15,4	31,2	
$\gamma_{Ms,seis}$	Partial safety factor	[-]	1,25				
<b>Concrete edge failure (see TR 045)</b>							
$l_f = h_{ef}$	Effective anchor length	[mm]	45	60	70	85	
$d_{nom}$	Outside anchor diameter	[mm]	1,50				



- 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, 09/05/2017	nv pgb-Europe sa Gontrode Heirweg 170 9090 MELLE BE 0425 888 396  Johannes Heye, product manager



## Annex 1 : Product overview

### S-KA (zinc plated)

SM1KA/08072 Z	SM1KA/12118 Z
SM1KA/08092 Z	SM1KA/12128 Z
SM1KA/08112 Z	SM1KA/12148 Z
SM1KA/08147 Z	SM1KA/12163 Z
SM1KA/10092 Z	SM1KA/12178 Z
SM1KA/10102 Z	SM1KA/12200 Z
SM1KA/10112 Z	SM1KA/16123 Z
SM1KA/10132 Z	SM1KA/16138 Z
SM1KA/10162 Z	SM1KA/16168 Z
SM1KA/12103 Z	SM1KA/16178 Z
SM1KA/12108 Z	

### S-KAK (hot dip galvanised)

SM1KA/08072 VZ	SM1KA/12118 VZ
SM1KA/08092 VZ	SM1KA/12128 VZ
SM1KA/08112 VZ	SM1KA/12148 VZ
SM1KA/08147 VZ	SM1KA/12163 VZ
SM1KA/10092 VZ	SM1KA/12178 VZ
SM1KA/10102 VZ	SM1KA/12200 VZ
SM1KA/10112 VZ	SM1KA/16123 VZ
SM1KA/10132 VZ	SM1KA/16138 VZ
SM1KA/10162 VZ	SM1KA/16168 VZ
SM1KA/12103 VZ	SM1KA/16178 VZ
SM1KA/12108 VZ	