

SMZAK001



- *Unique identification code of the product-type:*
SMART S-ZAK
- *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 EAD 330232-00-0601	
Generic type	High load 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:	Zinc plated steel, min 5 µm
Durability	Internal dry conditions
Anchorage subject to	Static or quasi-static loads Seismic actions for Performance Category C1 and C2 <u>Fire exposure</u>
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 - 17/0784 issued by	DIBt
Body nr	1343
On the basis of	EAD 330232-00-0601
Under System	1
And issued	06/10/2017

Declared performance – Essential characteristics – Performances

Installation parameters									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
d ₀	Nominal diameter of drill bit	[mm]	10	12	15	18	24	24	28
h _{ef}	Effective embedment depth	[mm]	50	60	71	80	100	115	125
d _f	Fixture clearance hole diameter	[mm]	12	14	17	20	26	26	31
T _{inst}	Installation torque	[Nm]	15	30	50	80	160	160	280
h ₁	Depth of drilled hole	[mm]	65	80	95	105	130	145	160
T _{fix}	Fixture thickness	[mm]	0-200	0-200	0-200	0-250	0-300	0-300	0-300
h _{min}	Min. thickness of concrete member	[mm]	100	120	140	160	200	230	250
S _{min,cr}	Minimum spacing cracked concrete	[mm]	50	50	60	70	100	100	125
	for c ≥	[mm]	50	80	120	140	180	180	300
C _{min,cr}	Minimum edge distance cracked concrete	[mm]	50	55	60	70	100	100	180
	for s ≥	[mm]	50	100	120	160	220	220	540
S _{min,ucr}	Minimum spacing uncracked concrete	[mm]	50	60	60	70	100	100	125
	for c ≥	[mm]	80	100	120	140	180	180	300
C _{min,ucr}	Minimum edge distance uncracked concrete	[mm]	50	60	60	70	100	100	180
	for s ≥	[mm]	100	120	120	160	220	220	540
Tension load: steel failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
N _{rk,s}	Steel characteristic resistance	[kN]	16	29	46	67	126	126	196
γ _{Ms}	Partial safety factor	[-]	1,5						
Tension load: pull out failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
N _{rk,p,cr}	Characteristic resistance in CRACKED concrete C20/25	[kN]	5	12	16	ND	ND	ND	ND
γ _{Mp}	Partial safety factor	[-]	1,5						
ψ _C	Increasing factor C30/37	[-]	1,22						
ψ _C	Increasing factor C40/50	[-]	1,41						
ψ _C	Increasing factor C50/60	[-]	1,58						
N _{rk,p,ucr}	Characteristic resistance in NON-CRACKED concrete C20/25	[kN]	ND	20	ND	ND	ND	ND	ND
γ _{Mp}	Partial safety factor	[-]	1,5						
ψ _C	Increasing factor C30/37	[-]	1,22						
ψ _C	Increasing factor C40/50	[-]	1,41						
ψ _C	Increasing factor C50/60	[-]	1,58						

Tension load: splitting failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
case 1									
N ⁰ _{Rk,sp}	Characteristic resistance in uncracked concrete C20/25	[kN]	12	16	25	30	40	70	50
C _{cr,sp}	Critical edge distance	[mm]	75	90	107	120	150	173	188
case 2									
N ⁰ _{Rk,sp}	Characteristic resistance in uncracked concrete C20/25	[kN]	17,4	20,0	29,4	35,2	49,2	60,7	68,8
C _{cr,sp}	Critical edge distance	[mm]	125	150	178	200	250	288	313
Tension load: concrete cone failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
h _{ef}	Effective embedment depth	[mm]	50	60	71	80	100	115	125
k _{cr,N,cr}	Factor k1 for cracked concrete	[-]	7,7						
k _{cr,N,ucr}	Factor k1 for uncracked concrete	[-]	11,0						
Tension load: displacements									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
F _{cr}	Service tension load in CRACKED concrete	[kN]	2,4	5,7	7,6	12,3	17,1	21,1	24
δ _{N0}	Displacements under short term	[mm]	0,5	0,5	0,5	0,7	0,8	0,7	0,9
δ _{N∞}	Displacements under long term	[mm]	2	2	1,3	1,3	1,3	1,3	1,4
F _{ucr}	Service tension load in UNCRACKED concrete	[kN]	8,5	9,5	14,3	17,2	24	29,6	34
δ _{N0}	Displacements under short term	[mm]	0,8	1	1,1	1,1	1,1	1,3	0,3
δ _{N∞}	Displacements under long term	[mm]	3,4	3,4	1,7	1,7	1,7	2,3	1,4

Shear load: steel failure without lever arm									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
V _{rk,s}	Steel characteristic resistance	[kN]	16	25	36	63	91	91	122
γ _{M_s}	Partial safety factor	[-]	1,25						
Shear load: steel failure with lever arm									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
M ⁰ _{Rk,s}	Characteristic resistance	[Nm]	12	30	60	105	266	266	519
γ _{M_s}	Partial safety factor	[-]	1,25						
Shear load: concrete pryout failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
k _s	K factor	[-]	1,8	2,0	2,0	2,0	2,0	2,0	2,0

DECLARATION OF PERFORMANCE



DoP SMZAK001 page 4 / 6 – rev01

Shear load: concrete edge failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
l_f	Effective anchorage length under shear loads	[mm]	50	60,0	71,0	80,0	100,0	115,0	125,0
d_{nom}	Outside anchor diameter	[mm]	10	12	15	18	24	24	28
Shear load: displacements									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
V	Service shear load	[kN]	9,1	14,0	20,7	35,1	52,1	52,1	77,0
δ_{N0}	Displacements under short term	[mm]	2,5	2,1	2,7	3,0	5,1	5,1	4,3
$\delta_{N\infty}$	Displacements under long term	[mm]	3,8	3,1	4,1	4,5	7,6	7,6	6,5

Characteristic resistance in cracked and non-cracked concrete C20/25 to C50/60 under fire exposure



Tension load: steel failure									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
$N_{Rk,s,fi}$	Characteristic resistance								
	R30	[kN]	1,0	1,9	4,3	6,3	11,6	11,6	18,3
	R60	[kN]	0,8	1,5	3,2	4,6	8,6	8,6	13,5
	R90	[kN]	0,6	1,0	2,1	3,0	5,0	5,0	7,7
	R120	[kN]	0,4	0,8	1,5	2,0	3,1	3,1	4,9
Shear load: steel failure without lever arm									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
$V_{Rk,s,fi}$	Characteristic resistance								
	R30	[kN]	1,0	1,9	4,3	6,3	11,6	11,6	18,3
	R60	[kN]	0,8	1,5	3,2	4,6	8,6	8,6	13,5
	R90	[kN]	0,6	1,0	2,1	3,0	5,0	5,0	7,7
	R120	[kN]	0,4	0,8	1,5	2,0	3,1	3,1	4,9
Shear load: steel failure with lever arm									
			Ø 10/ M6	Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
$V_{Rk,s,fi}$	Characteristic resistance								
	R30	[Nm]	0,8	2,0	5,6	9,7	24,8	24,8	42,4
	R60	[Nm]	0,6	1,5	4,1	7,2	18,3	18,3	29,8
	R90	[Nm]	0,4	1,0	2,7	4,7	11,9	11,9	17,1
	R120	[Nm]	0,3	0,8	1,9	3,1	6,6	6,6	10,7



DECLARATION OF PERFORMANCE



DoP SMZAK001 page 5 / 6 – rev01



Characteristic values for seismic action

Tension load: steel failure								
			Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
$N_{Rk,s,eq,C1}$	Characteristic tension resistance category C1	[kN]	29	46	67	126	126	196
$N_{Rk,s,eq,C2}$	Characteristic tension resistance category C2	[kN]	29	46	67	126	126	196
γ_{Ms}	Partial safety factor	[-]	1,5					
Tension load: pull out failure								
			Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
$N_{Rk,p,eq,C1}$	Characteristic tension resistance category C1	[kN]	12	16	25	36	44,4	50,3
$N_{Rk,p,eq,C2}$	Characteristic tension resistance category C2	[kN]	5,4	16,4	22,6	29	41,2	43,6
γ_{Mc}	Partial safety factor	[-]	1,5					
Tension load: displacements								
			Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
Category C2								
N	Service tension load	[kN]	9,5	14,3	17,2	24,0	29,6	34,0
$\delta_{N,eq}$ (DLS)	Displacement for DLS	[mm]	3,3	3,0	5,0	3,0	3,0	4,0
$\delta_{N,eq}$ (ULS)	Displacement for ULS	[mm]	12,2	11,3	16	9,2	9,2	13,8
Shear load: steel failure without lever arm								
			Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
$V_{Rk,s,eq,C1}$	Characteristic shear resistance category C1	[kN]	18	27,1	43,4	51,9	51,9	96,4
$V_{Rk,s,eq,C2}$	Characteristic shear resistance category C2	[kN]	12,7	20,5	31,5	50,1	50,1	67,1
γ_{Mc}	Partial safety factor	[-]	1,25					
Shear load: displacements								
			Ø 12/ M8	Ø 15/ M10	Ø 18/ M12	Ø 24/ M16	Ø 24/ M16L	Ø 28/ M20
Category C2								
V	Service shear load	[kN]	14,0	20,7	35,1	52,1	52,1	77,0
$\delta_{V,eq}$ (DLS)	Displacement for DLS	[mm]	2,3	3,1	3,0	2,6	2,6	1,6
$\delta_{V,eq}$ (ULS)	Displacement for ULS	[mm]	4,8	6,4	6,1	6,6	6,6	4,8

- 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, 07/10/2017	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> nv pgb-Europe sa Gontrode Heirweg 170 9090 MELLE BE 0425 888 396 </div> Johannes Heye, product manager 



Annex 1 : Product overview

SMZAK/06067 Z	SMZAK/12122 Z
SMZAK/06077 Z	SMZAK/12132 Z
SMZAK/06097 Z	SMZAK/12152 Z
SMZAK/06117 Z	SMZAK/12182 Z
SMZAK/06167 Z	SMZAK/12212 Z
SMZAK/08080 Z	SMZAK/16137 Z
SMZAK/08090 Z	SMZAK/16152 Z
SMZAK/08110 Z	SMZAK/16157 Z
SMZAK/08130 Z	SMZAK/16182 Z
SMZAK/08180 Z	SMZAK/16187 Z
SMZAK/10096 Z	SMZAK/16202 Z
SMZAK/10111 Z	SMZAK/16237 Z
SMZAK/10121 Z	SMZAK/20181 Z
SMZAK/10141 Z	SMZAK/20201 Z
SMZAK/10191 Z	SMZAK/20231 Z
SMZAK/12112 Z	SMZAK/20271 Z