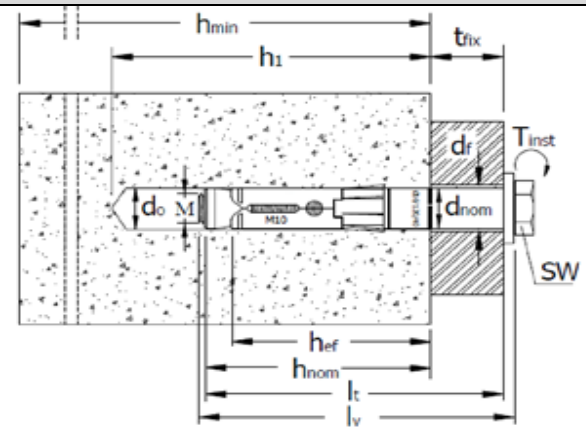
Heavy Duty Anchor SMART

Type SMZAV

Beoogd gebruik volgens ETAG 001 parts 1 - 2	
Generic type	Torque controlled metal expansion anchor for use in concrete
Base material	Cracked and non-cracked concrete C20/25 to C50/60 acc.to EN 206:2000-12
Material	Galvanized steel
Durability	internal dry conditions
Loading	static and quasi-static loads
Fire Resistance	R120
Fire reaction	A1 according to 96/603/EC amended by 2000/605/EC
ETA	ETA 02/0030
On the basis of	ETAG001 part 1 and 2
Attestation of conformity	0756-CPD-0006
Under system	1

Anchor types and installation parameters

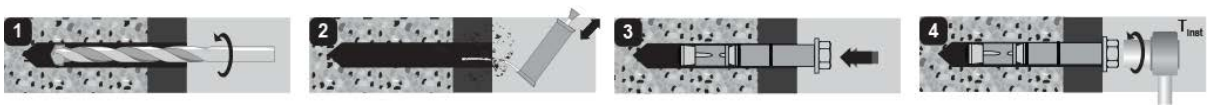


TYPE ZAT = marking SZ-S

TYPE ZAK = marking SZ-B

TYPE ZAV = marking SZ-SK

Installation scheme



Performances according to ETAG 001 part 1 and part 2									
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
SW	Wrench size SZ-S/B	[mm]	10	13	17	19	24	24	30
HEX	Hex. Socket size SZ-SK	[mm]	4	5	6	8	-	-	-
h_{ef}	Effective anchorage depth	[mm]	50	60	71	80	100	115	125
h_{nom}	Overall embedment depth	[mm]	60	70	85	95	120	135	150
h_{min}	Min. Concrete member thickness	[mm]	100	120	140	160	200	230	250
h_1	Drill hole depth	[mm]	65	80	95	105	130	145	160
T_{inst}	Installation torque moment SZ-S/B	[Nm]	15	30	50	80	160	160	280
T_{inst}	Installation torque moment SZ-SK	[Nm]	10	25	55	70	-	-	-
s_{min} for c ≥	Min. allowable spacing [1]	[mm]	50 80	60 100	70 120	80 160	100 180	100 180	125 300
c_{min} for s ≥	Min. allowable edge distance [1]	[mm]	60 100	60 120	70 175	80 200	100 220	100 220	180 540
$t_{fix\ min}$ $t_{fix\ max}$	Fixture thickness SZ-B/S	[mm]	0 200	0 200	0 200	0 250	0 300	0 300	0 300
$t_{fix\ min}$ [2] $t_{fix\ max}$	Fixture thickness SZ-SK	[mm]	8 200	10 200	14 200	18 250	- -	- -	- -
Steel failure to tension load									
$N_{rk,s}$	Characteristic resistance to tension load	[mm]	16	29	46	67	126	126	196
γ_{Ms}	Partial safety factor	[-]	1,5 [3]						
Pull-out failure to tension load									
$N_{rk,p,cr}$	Characteristic resistance to tension load in cracked concrete	[kN]	5	12	16	25	36	44	50
$N_{rk,p,ucr}$	Characteristic resistance to tension load in non-cracked concrete	[kN]	18	20	30	35	50	78	72
ψ_c	Increasing factor for concrete C30/37	[-]	1,22						
ψ_c	Increasing factor for concrete C40/50	[-]	1,41						
ψ_c	Increasing factor for concrete C50/60	[-]	1,55						
Concrete cone failure and Splitting failure									
h_{ef}	Effective anchorage depth	[mm]	50	60	71	80	100	115	125
$N^0_{Rk,sp}$	Characteristic resistance for C20/25	[kN]	12	16	25	30	40	70	50
$S_{cr,N}$	Critical spacing (concrete cone failure)	[mm]	150	180	213	240	300	345	375
$C_{cr,N}$	Critical edge distance (concrete cone failure)	[mm]	75	80	106,5	120	150	172,5	187,5
$S_{cr,sp}$	Critical spacing (splitting)	[mm]	150	180	213	240	300	345	375
$C_{cr,sp}$	Critical edge distance (splitting)	[mm]	75	80	106,5	120	150	172,5	187,5
$\gamma_{Mp} = \gamma_{Msp} = \gamma_{Mc}$	Partial safety factor	[-]	1,5						

[1] Intermediate values by linear interpolation.

[2] Depending on the existing shear load, the fixture thickness may be reduced to the thickness of the countersunk washer t_{sk}. It must be verified that the present shear load can be transferred completely into the distance sleeve (bearing of hole).

[3] In absence of national regulations

Displacement under tension loads									
N_{cr}	Service tension load in cracked concrete C20/25	[kN]	2,4	5,7	7,6	12,3	17,1	21,1	24
$\delta_{N0,cr}$	Short term displacement under tension load in cracked concrete C20/25	[mm]	0,5	0,5	0,5	0,7	0,8	0,7	0,9
$\delta_{N\infty,cr}$	Long term displacement under tension load in cracked concrete C20/25	[mm]	2,0	2,0	1,3	1,3	1,3	1,3	1,4
N_{ucr}	Service tension load in non-cracked concrete C20/25	[kN]	8,5	9,5	14,3	17,2	24	29,6	34
$\delta_{NO,ucr}$	Short term displacement under tension load in non-cracked concrete C20/25	[mm]	0,8	1,0	1,1			1,3	0.3
$\delta_{N\infty,ucr}$	Long term displacement under tension load in non-cracked concrete C20/25	[mm]	3,4		1,7			2,3	1,4
Steel failure to shear load			**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 failure without lever arm SZ-B SZ-S / SZ-SK	[kN]	 16 18	 25 30	 36 48	 63 73	 91 126	 91 126	 122 150
$M^0_{rk,s}$	Steel failure with lever arm	[mm]	12	30	60	105	266	266	519
γ_{Ms}	Partial safety factor	[-]	1,25						
Concrete pryout failure									
k	Factor in equation 5.6 of the guideline's Annex C	[-]	1.8	2	2	2	2	2	2
γ_{Mcp}	Partial safety factor	[-]	1,5						
Concrete edge failure									
d_{nom}	Effective external diameter of the anchor	[mm]	60	+0	81	80	100	115	125
l_{ef}	Effective anchorage length	[mm]	10	12	15	18	24	24	28
γ_{Mc}	Partial safety factor	[-]	1,5						
Displacements under shear loads									
V	Service tension load in cracked and non-cracked concrete C20/25 SZ-B SZ-S / SZ-SK	[kN]	 9,1 10,1	 14 17,1	 20,7 27,5	 35,1 41,5	 52,1 72	 52,1 72	 77 77
δ_{VO}	Short term displacement under shear load in cracked and non-cracked concrete C20/25 SZ-B SZ-S / SZ-SK	[mm]	 2,5 2,9	 2,1 2,5	 2,7 3,6	 3,0 3,5	 5,1 7,0	 5,1 7,0	 4,3 4,3
$\delta_{V\infty}$	Long term displacement under shear load in cracked and non-cracked concrete C20/25 SZ-B SZ-S / SZ-SK	[mm]	 3,8 4,4	 3,1 3,8	 4,1 5,4	 4,5 5,3	 7,6 10,5	 7,6 10,5	 6,5 6,5

Characteristic resistance to tension loads under fire exposure in cracked and non-cracked concrete									
$N_{rk,s,fi,30}$	Tension load - fire duration = 30 min - steel failure	[kN]	1,0	1,9	4,3	6,3	11,6	11,6	18,3
$N_{rk,p,fi,30}$	Tension load- fire duration = 30 min - pull-out failure	[kN]	1,3	3,0	4,0	6,3	8,8	8,8	15,9
$N^0_{rk,c,fi,30}$	Tension load- fire duration = 30 min -concrete cone failure	[kN]	3,1	5,0	7,6	10,3	18,0	18,0	31,4
$N_{rk,s,fi,60}$	Tension load - fire duration = 60 min -steel failure	[kN]	0,8	1,5	3,2	4,6	8,6	8,6	13,5
$N_{rk,p,fi,60}$	Tension load - fire duration = 60 min - pull-out failure	[kN]	1,3	3,0	4,0	6,3	8,8	8,8	15,9
$N^0_{rk,c,fi,60}$	Tension load - fire duration = 60 min - concrete cone failure	[kN]	3,1	5,0	7,6	10,3	18,0	18,0	31,4
$N_{rk,s,fi,90}$	Tension load - fire duration = 90 min - steel failure	[kN]	0,6	1,0	2,1	3,0	5,0	5,0	7,7
$N_{rk,p,fi,90}$	Tension load -fire duration = 90 min- pull-out failure	[kN]	1,3	3,0	4,0	6,3	8,8	8,8	15,9
$N^0_{rk,c,fi,90}$	Tension load - fire duration = 90 min- concrete cone failure	[kN]	3,1	5,0	7,6	10,3	18,0	18,0	31,4
$N_{rk,s,fi,120}$	Tension load - fire duration = 120 min - steel failure	[kN]	0,4	0,8	1,5	2,0	3,1	3,1	4,9
$N_{rk,p,fi,120}$	Tension load - fire duration = 120 min -pull-out failure	[kN]	1,0	2,4	3,2	5,0	7,0	7,0	12,7
$N^0_{rk,c,fi,120}$	Tension load- f ire duration = 120 min- concrete cone failure	[kN]	2,5	4,0	6,1	8,3	14,4	14,4	25,1
Spacing and edge distance									
$S_{cr,N,fi}$	Spacing	[mm]	$4 \times h_{ef}$						
S_{min}	Min. spacing under fire exposure from 1 side	[mm]	50	60	70	80	100	100	125
S_{min}	Min. spacing under fire exposure from more than 1 side	[mm]	50	60	70	80	100	100	125
$C_{cr,N,fi}$	Edge distance	[mm]	$2 \times h_{ef}$						
C_{min}	Min. edge distance under fire exposure from 1 side	[mm]	50	60	70	80	100	100	180
C_{min}	Min. edge distance under fire exposure from more than 1 side	[mm]	$C_{min} > 300mm$						

Characteristic resistance to shear loads under fire exposure in cracked and non-cracked concrete			**Ø 10 M6**	**Ø 12 M8**	**Ø 15 M10**	**Ø 18 M12**	**Ø 24 M16**	**Ø 24 M16L**	**Ø 28 M20**
$V_{rk,s,fi,30}$	Shear load without lever arm- fire duration = 30 min	[kN]	1,0	1,9	4,3	6,3	11,6	11,6	18,3
$M^0_{rk,s,fi,30}$	Shear load with lever arm- fire duration = 30 min	[Nm]	0,8	2,0	5,6	9,7	24,8	24,8	42,4
$V_{rk,s,fi,60}$	Shear load without lever arm -fire duration = 60 min	[kN]	0,8	1,5	3,2	4,6	8,6	8,6	13,5
$M^0_{rk,s,fi,60}$	Shear load with lever arm - fire duration = 60 min	[Nm]	0,6	1,5	4,1	7,2	18,3	18,3	29,8
$V_{rk,s,fi,90}$	Shear load without lever arm- fire duration = 90 min	[kN]	0,6	1,0	2,1	3,0	5,0	5,0	7,7
$M^0_{rk,s,fi,90}$	Shear load with lever arm -fire duration = 90 min	[Nm]	0,4	1,0	2,7	4,7	11,9	11,9	17,1
$V_{rk,s,fi,120}$	Shear load without lever arm- fire duration = 120 min	[kN]	0,4	0,8	1,5	2,0	3,1	3,1	4,9
$M^0_{rk,s,fi,120}$	Shear load with lever arm -fire duration = 120 min	[Nm]	0,3	0,8	1,9	3,1	6,6	6,6	10,7

Concrete pryout failure		
The initial value $V_{Rk,cp,fi}$ of the characteristic resistance in concrete C20/25 to C50/60 under fire exposure may be deterimined by: $V_{rk,c,fi} = k \times N_{Rk,c,fi}$ With k=2,0 (1,8 for M6) of ETAG 001		
Concrete edge failure		
The characteristic resistance $V_{rk,cp,fi,ri}$ in concrete C20/25 to C50/60 is determined by: $V^0_{rk,c,fi,(90)} = 0,25 \times V^0_{rk,c}$ (R30,R60,R90) and $V^0_{rk,c,fi,(120)} = 0,20 \times V^0_{rk,c}$ (R120) With V^0_{rk} as an initial value of the characteristic resistance of a single anchor in cracked concrete C20/25		

De prestaties van het in de punten 1 en 2 omschreven product zijn conform de in punt 9 aangegeven prestaties. Deze prestatieverklaring wordt verstrekt onder de exclusieve verantwoordelijkheid van de in punt 4 vermelde fabrikant:

Place and date of issue	Signature
Melle, 01/04/2014	nv pgb-Europe sa Gontrode Heirweg 170 9090 MELLE BE 0425 888 396 Johannes Heye, product manager

Annex 1 : Product overview

High-perforamance anchor with countersunk head screw

CARTON BOX PACKING

size	pgb code	EAN13		
6x70	SMZAV306070 Z	5902134190709	50	
6x85	SMZAV306085 Z	5902134190716	50	
6x100	SMZAV306100 Z	5902134190723	50	
8x80	SMZAV308080 Z	5902134190730	50	
8x95	SMZAV308095 Z	5902134190747	50	
8x120	SMZAV308120 Z	5902134190754	25	
10x100	SMZAV310100 Z	5902134190761	25	
10x110	SMZAV310110 Z	5902134190778	25	
10x120	SMZAV310120 Z	5902134190785	25	
10x135	SMZAV310135 Z	5902134190792	25	
12x115	SMZAV312115 Z	5902134190808	20	
12x135	SMZAV312135 Z	5902134190815	20	