

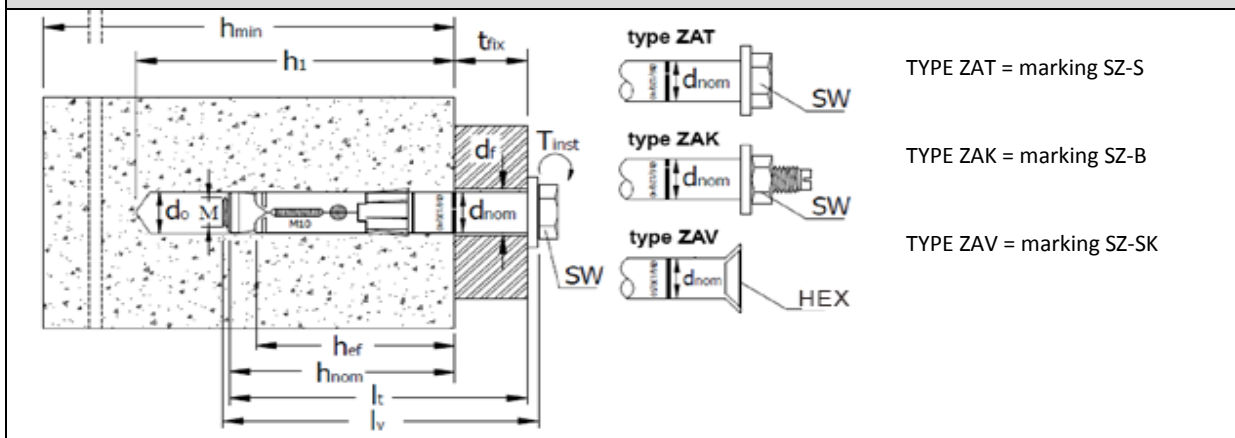
Heavy Duty Anchor SMART



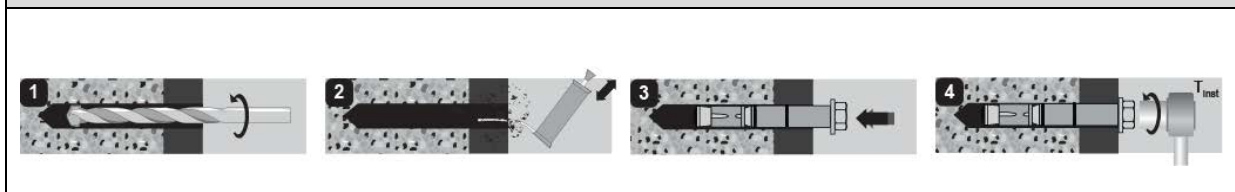
Type SMZAK

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
Seismic action	C1 for M16 an M20, based on design method TR 045
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



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}	Min. allowable spacing ¹	[mm]	50	60	70	80	100	100	125
for c ≥			80	100	120	160	180	180	300
C _{min}	Min. allowable edge distance ¹	[mm]	60	60	70	80	100	100	180
for s ≥			100	120	175	200	220	220	540
t _{fix min}	Fixture thickness SZ-B/S	[mm]	0	0	0	0	0	0	0
t _{fix max}			200	200	200	250	300	300	300
t _{fix min} ²	Fixture thickness SZ-SK	[mm]	8	10	14	18	-	-	-
t _{fix max}			200	200	200	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
γ _{Mp} = γ _{Msp} = γ _{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
$\delta_{N0,ucr}$	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			$\varnothing 10$ M6	$\varnothing 12$ M8	$\varnothing 15$ M10	$\varnothing 18$ M12	$\varnothing 24$ M16	$\varnothing 24$ M16L	$\varnothing 28$ 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_{V0}	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
$N_{rk,c,fi,30}^0$	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
$N_{rk,c,fi,60}^0$	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
$N_{rk,c,fi,90}^0$	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
$N_{rk,c,fi,120}^0$	Tension load - fire 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 x 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 x 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			$\varnothing 10$ M6	$\varnothing 12$ M8	$\varnothing 15$ M10	$\varnothing 18$ M12	$\varnothing 24$ M16	$\varnothing 24$ M16L	$\varnothing 28$ 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
$M_{rk,s,fi,30}^0$	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
$M_{rk,s,fi,60}^0$	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
$M_{rk,s,fi,90}^0$	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
$M_{rk,s,fi,120}^0$	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 determined 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: $V_{Rk,c,fi,(90)}^0 = 0,25 \times V_{Rk,c}^0$ (R30,R60,R90) and $V_{Rk,c,fi,(120)}^0 = 0,20 \times V_{Rk,c}^0$ (R120) With V_{Rk}^0 as an initial value of the characteristic resistance of a single anchor in cracked concrete C20/25		

Performances for seismic action, Category C1, design method A					
			Ø 24 M16	Ø 24 M16L	Ø 28 M20
Tension load					
Steel failure					
$N_{Rk,s,seis}^0$	Characteristic tension resistance	[kN]	126	126	196
$\gamma_{Ms,seis}$	Partial safety factor	[-]	1,5		
Pullout failure					
$N_{Rk,p,seis}^0$	Characteristic resistance in cracked concrete C20/25	[kN]	36	44	50
ψ_c	Increasing factor for $N_{Rk,p,seis}^0$	[-]	1,0		
$\gamma_{Mp,seis}$	Partial safety factor	[-]	1,5		
Shear load					
Steel failure without lever arm					
SZ-B					
$V_{Rk,s,seis}^0$	Characteristic shear resistance	[kN]	51,9	51,9	96,4
$\gamma_{Ms,seis}$	Partial safety factor	[-]	1,25		
SZ-B					
$V_{Rk,s,seis}^0$	Characteristic shear resistance	[kN]	36,3	36,3	36,3
$\gamma_{Ms,seis}$	Partial safety factor	[-]	1,25		
Steel failure with lever arm					
$M_{Rk,s,seis}^0$	Characteristic resistance	[Nm]	No performance determined		
The characteristic seismic resistance $F_{k,seis}$ of a fastening shall be determined as $F_{k,seis} = \alpha_{gap} \cdot \alpha_{seis} \cdot F_{Rk,seis}^0$ where α_{gap} reduction factor to take into account inertia effects due to an annular gap between fastener and fixture in case of shear loading. $= 1,0$ no hole clearance between fastener and fixture $= 0,5$ connections with hole clearance according to Table 1, CEN/TS 1992-4-1 or to Table 4.1, ETAG 001, Annex C α_{seis} reduction factor to take into account the influence of large cracks and scatter of load-displacement curves, see Table 39. $F_{Rk,seis}^0$ basic characteristic seismic resistance to the failure modes given in Table 19, for all other failure modes, the values for static or quasi static action may be applied. $\gamma_{Ms,seis}, \gamma_{Mp,seis}$ partial safety factor for seismic action for the failure modes given in Table 19, for all other failure modes, the values for static or quasi static action may be applied.					

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:

Plaats en datum van uitgave	Ondertekend voor en namens de fabrikant door	
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-performance anchor with threaded rod

CARTON BOX PACKING

size	pgb code	EAN13		
6x67	SMZAK306067 Z	5902134190181	100	
6x77	SMZAK306077 Z	5902134190198	50	
6x97	SMZAK306097 Z	5902134190204	50	
6x117	SMZAK306117 Z	5902134190211	1	
6x167	SMZAK306167 Z	5902134190228	25	
8x80	SMZAK308080 Z	5902134190235	50	
8x90	SMZAK308090 Z	5902134190242	50	
8x110	SMZAK308110 Z	5902134190259	50	
8x130	SMZAK308130 Z	5902134190266	25	
8x180	SMZAK308180 Z	5902134190273	25	
10x96	SMZAK310096 Z	5902134190280	25	
10x111	SMZAK310111 Z	5902134190297	25	
10x121	SMZAK310121 Z	5902134190303	25	
10x141	SMZAK310141 Z	5902134190310	25	
10x191	SMZAK310191 Z	5902134190327	25	
12x112	SMZAK312112 Z	5902134190334	20	

CARTON BOX PACKING

size	pgb code	EAN13		
12x122	SMZAK312122 Z	5902134190341	25	
12x132	SMZAK312132 Z	5902134190358	20	
12x152	SMZAK312152 Z	5902134190365	20	
12x182	SMZAK312182 Z	5902134190372	20	
12x212	SMZAK312212 Z	5902134190389	10	
16x137	SMZAK316137 Z	5902134190396	10	
16x152	SMZAK316152 Z	5902134190402	10	
16x157	SMZAK316157 Z	5902134190419	10	
16x182	SMZAK316182 Z	5902134190426	10	
16x187	SMZAK316187 Z	5902134190433	10	
16x202	SMZAK316202 Z	5902134190440	10	
16x237	SMZAK316237 Z	5902134190457	5	
20x181	SMZAK320181 Z	5902134190464	10	
20x201	SMZAK320201 Z	5902134190471	5	
20x231	SMZAK320231 Z	5902134190488	5	
20x271	SMZAK320271 Z	5902134190495	5	