DECLARATION OF PERFORMANCE

Regulation (EU) no 305/2011

SK-E_DOP_190100

1. Unique identification code of the product-type:

Metal anchor for use in concrete SKR-E, SKS-E

2. Intended use/es:

Metal anchor for use in concrete
and subjected to static, quasi-static and seismic loads (performance category C1 and C2).

3. Manufacturer:

Rotho Blaas srl - via dell'Adige 2/1 - 39040 Cortaccia (BZ) – Italy

4. Authorised representative:

not relevant

5. System/s of AVCP:

System 1

6a. Harmonised standard:

not relevant

6b. European Assessment Document:

EAD 330232-00-0601 (2016-10)

European Technical Assessment:

ETA 19/0100 (2019-04-04)

Technical Assessment Body:

DIBt-Deutsches Institut für Bautechnik

Notified Body/ies:

Technický a zkušební ústav stavební Praha, s.p. (NB 1020)

7. Declared performance/s:

Mechanical resistance and stability (BWR 1)

Essential characteristics	**Performance**
Characteristic resistance to tension load (static and quasi-static loading and for seismic performance categories C1 and C2)	Table C1)
Characteristic resistance to shear load (static and quasi-static loading and for seismic performance categories C1 and C2)	Table C2)
Displacements	Table C5)

Safety in case of fire (BWR 2)

Essential characteristics	**Performance**
Reaction to fire:	Class A1
Resistance to fire:	*tension load* Table C3) - *shear load* Table C4)

The performance of the product identified above is in conformity with the set of declared performance/s.. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

The original document is in Italian. Versions in other languages have been translated from this document.

Signed for and on behalf of the manufacturer by:

Robert Blaas
Legal Representative

Cortaccia, 13.08.2019

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C1) Characteristic resistance to tension load (static and quasi-static loading and for seismic performance categories C1 and C2)						
Type of anchor / Size			**SK-E Ø8/6**	**SK-E Ø10/8**	**SK-E Ø12/10**	**SK-E Ø16/14**
Steel failure						
Characteristic resistance (static and quasi-static loading and for seismic performance categories C1 and C2)	$N_{Rk,s} = N_{rk,s,seis}$	[kN]	20	35	50	95
Partial factor	γ_{Ms}	-	1,5			
Pull-out failure						
Effective embedment depth	h_{ef}	[mm]	48	56	64	85
Characteristic Resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	16	20	25	40
Characteristic Resistance in cracked concrete C20/25			4	7,5	9	16
Characteristic resistance in seismic performance category C1			NPD	6	6,3	16
Characteristic resistance in seismic performance category C2			NPD	NPD	2,7	7,2
Increasing factors for $N_{Rk,p}$ for cracked and uncracked concrete	Ψ_c	C30/37	1,22			
		C40/50	1,41			
		C50/60	1,58			
Installation safety factor	γ_{inst}	-	1,4	1,2	1,4	
Concrete cone failure and splitting failure						
Effective embedment depth	h_{ef}	[mm]	48	56	64	85
Factor for k1 uncracked concrete	k_{ucr}	-	11,0			
Factor for k1 cracked concrete	k_{cr}	-	7,7			
Spacing	$s_{cr,N}$	[mm]	3 x h_{ef}			
Edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}			
Spacing (splitting)	$s_{cr,sp}$	[mm]	160	175	195	255
Edge distance (splitting)	$c_{cr,sp}$	[mm]	80	85	95	130
Installation safety factor	γ_{inst}	-	1,4	1,2	1,4	

C2) Characteristic resistance to shear load (static and quasi-static loading and for seismic performance categories C1 and C2)						
Type of anchor / Size			**SK-E Ø8/6**	**SK-E Ø10/8**	**SK-E Ø12/10**	**SK-E Ø16/14**
Steel failure without level arm						
Characteristic Resistance for static and quasi-static action	$V_{Rk,s}$	[kN]	9,4	20,1	32,4	56,9
Characteristic Resistance for seismic action in Performance category C1		[kN]	NPD	12,1	19,1	39,8
Characteristic Resistance for seismic action in Performance category C2		[kN]	NPD	NPD	17,7	39,8
Partial safety factor	γ_{Ms}	-	1,5			
Steel failure with level arm						
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	19	44	83	216
Ductility factor	k_7		0,8			
Partial safety factor	γ_{Ms}	-	1,5			
Concrete pryout failure						
Effective embedment depth	h_{ef}	[mm]	48	56	64	85
Factor for pryout failure	$k = k_8$	-	1		2	
Installation safety factor	γ_{inst}	-	1,4	1,2	1,4	
Concrete edge failure						
Effective anchorage length	l_{ef}	[mm]	48	56	64	85
Effective diameter of the anchor	d_{nom}	[mm]	6	8	10	14
Installation safety factor	γ_{inst}	-	1,4	1,2	1,4	
Factor for annular gap	α_{gap}	0,5				

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C3) Performances under fire exposure: tension load						
Type of anchor / Size			**SK-E Ø8/6**	**SK-E Ø10/8**	**SK-E Ø12/10**	**SK-E Ø16/14**
Duration of fire resistance = 30min						
Steel Failure						
Characteristic Resistance	$N_{Rk,s,fi,30}$	[kN]	0,28	0,73	1,51	2,85
Pull-out failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,p,fi,30}$	[kN]	1,00	1,87	2,25	4,0
Concrete cone failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,c,fi,30}$	[kN]	2,87	4,23	5,90	12,0
Duration of fire resistance = 60min						
Steel Failure						
Characteristic Resistance	$N_{Rk,s,fi,60}$	[kN]	0,25	0,64	1,13	2,14
Pull-out failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,p,fi,60}$	[kN]	1,00	1,87	2,25	4,0
Concrete cone failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,c,fi,60}$	[kN]	2,87	4,22	5,90	12,0
Duration of fire resistance = 90min						
Steel Failure						
Characteristic Resistance	$N_{Rk,s,fi,90}$	[kN]	0,19	0,49	0,98	1,85
Pull-out failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,p,fi,90}$	[kN]	1,00	1,87	2,25	4,0
Concrete cone failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,c,fi,90}$	[kN]	2,87	4,22	5,90	12,0
Duration of fire resistance =120min						
Steel Failure						
Characteristic Resistance	$N_{Rk,s,fi,120}$	[kN]	0,14	0,39	0,75	1,43
Pull-out failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,p,fi,120}$	[kN]	0,8	1,5	1,8	3,20
Concrete cone failure						
Characteristic Resistance in concrete C20/25 to C50/60	$N_{Rk,c,fi,120}$	[kN]	2,30	3,38	4,72	9,59
Spacing	$s_{cr,N}$	[mm]	$4 \times h_{ef}$			
	s_{min}		45	50	60	80
Edge distance	$c_{cr,N}$		$2 \times h_{ef}$			
	c_{min}		$c_{min} = 2 \times h_{ef}$; If fire attack comes from more than one side, the edge distance of the anchor has to be ≥ 300 mm or ≥ $2 \times h_{ef}$			

C4) Performances under fire exposure: shear load						
Type of anchor / Size			**SK-E Ø8/6**	**SK-E Ø10/8**	**SK-E Ø12/10**	**SK-E Ø16/14**
Duration of fire resistance = 30min						
Characteristic resistance	$V_{Rk,s,fi,30}$	[kN]	0,28	0,73	1,51	2,85
Characteristic bending resistance	$M_{Rk,s,fi,30}$	[Nm]	0,24	0,87	2,22	5,76
Duration of fire resistance = 60min						
Characteristic resistance	$V_{Rk,s,fi,60}$	[kN]	0,25	0,64	1,13	2,14

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Characteristic bending resistance	$M_{Rk,s,fi,60}$	[Nm]	0,22	0,75	1,66	4,32
Duration of fire resistance = 90min						
Characteristic resistance	$V_{Rk,s,fi,90}$	[kN]	0,19	0,49	0,98	1,85
Characteristic bending resistance	$M_{Rk,s,fi,90}$	[Nm]	0,17	0,58	1,44	3,74
Duration of fire resistance = 120min						
Characteristic resistance	$V_{Rk,s,fi,120}$	[kN]	0,14	0,39	0,75	1,43
Characteristic bending resistance	$M_{Rk,s,fi,120}$	[Nm]	0,12	0,46	1,11	2,88
Concrete pryout failure						
The characteristic resistance $V_{rk,cp,fi,Ri}$ in concrete C20/25 a C50/60 is determinated by: $V_{Rk,c,fi(90)} = k \times N_{Rk,c,fi(90)}$ (≤ R90) and $V_{Rk,c,fi(120)} = k \times N_{Rk,c,fi(120)}$ (up to R120)						
Factor k	k_8	-	1	1	2	2
Concrete edge failure						
The characteristic resistance $V_{rk,cp,fi,Ri}$ in concrete C20/25 a C50/60 is determinated 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 $V^0_{Rk,c}$ as an initial value of the characteristic resistance of a single anchor in cracked concrete C20/25						

C5) Displacements						
Type of anchor / Size			**SK-E Ø8/6**	**SK-E Ø10/8**	**SK-E Ø12/10**	**SK-E Ø16/14**
Service tension load in uncracked concrete C20/25	N_{ucr}	[kN]	7,62	8,89	11,90	13,61
Displacements	$\delta_{N0,ucr}$	[mm]	0,76	0,74	0,63	0,74
	$\delta_{N\infty,ucr}$	[mm]	0,29	0,34	0,23	0,41
Service tension load in cracked concrete C20/25	N_{cr}	[kN]	1,90	4,17	4,29	5,44
Displacements	$\delta_{N0,cr}$	[mm]	0,27	0,39	0,45	0,79
	$\delta_{N\infty,cr}$	[mm]	0,53	0,77	0,97	1,05
Service shear load in cracked and uncracked concrete C20/25	V	[kN]	4,50	9,60	15,40	27,10
Displacements	δ_{V0}	[mm]	0,94	1,47	1,87	3,00
	$\delta_{V\infty}$	[mm]	1,41	2,20	2,81	4,50
Seismic performance category C2						
Damage limit state – Tension load	$\delta_{N,eq(DLS)}$	[mm]	NPD	NPD	0,16	0,56
Damage limit state – Shear load	$\delta_{V,eq(DLS)}$	[mm]	NPD	NPD	5,65	5,54
Ultimate limit state – Tension load	$\delta_{N,eq(ULS)}$	[mm]	NPD	NPD	1,02	2,23
Ultimate limit state – Shear load	$\delta_{V,eq(ULS)}$	[mm]	NPD	NPD	10,08	8,78

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INSTALLATION INFORMATION

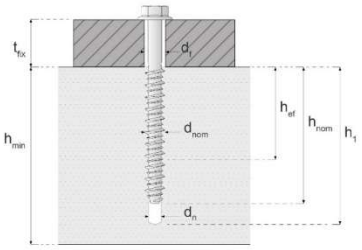
a) Context of use	
Anchorages subject to:	- Static and quasi-static loads: Ø8 to Ø16 - Seismic action for Performance Category C1 and C2: Ø 16 and Ø 12 - Seismic action for Performance Category C1: Ø 10 - Fire exposure: Ø8 to Ø16
Base materials:	- Reinforced or unreinforced normal weight concrete, strength classes C20/25 to C50/60, according to EN 206-1. Cracked or uncracked concrete: Ø8 to Ø16
Use conditions:	- Anchorages subject to dry internal conditions
Installation:	- Hole drilling by rotary plus hammer mode only - In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application. After installation further turning of the anchor is not possible

b) Anchor types

Type		**SKR-E**	**SKS-E**
Description		Hexagonal flanged washer head screw	Flat countersunk head
f_y	[Mpa]	640	
f_u	[Mpa]	750	
Rivestimento		Materials galvanised ≥ 5µm according to ISO 4042	

c) Installation instructions

d_{nom}	Outside diameter of the anchor
d_{cut}	Maximum cutting diameter of the drill bit
t_{fix}	Thickness of the fixtures
d_0	Diameter of the drill hole
d_f	Diameter of the clearance hole in the fixture
h_{min}	Minimum thickness of the concrete member
h_{nom}	Overall anchor embedment depth
h_{ef}	Anchorage depth



Denominazione		**SK-E Ø8/6[1)]**	**SK-E Ø10/8[2)]**	**SK-E Ø12/10[3)]**	**SK-E Ø16/14[4)]**
Nominal drill hole diameter	d_o = [mm]	6	8	10	14
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	6.40	8.45	10.45	14.50
Effective anchorage depth	h_{ef} = [mm]	48	56	64	85
Depth of drill hole	h_1 = [mm]	75	85	100	140
Diameter of clearance in the fixture	d_f = [mm]	9	12	14	18
Overall anchor embedment depth in the concrete	h_{nom}=[mm]	60	70	80	110
Minimum thickness of concrete member	h_{min} = [mm]	100	110	130	170
Outside diameter of anchor	d_{nom} = [mm]	8	10	12	16
Wrench size SKR-E	SW = [mm]	10	13	15	21
Six lobe recess SKS-E	T	T30	T40	T50	-
Minimum edge distance	c_{min} = [mm]	45	50	60	80
Minimum spacing	s_{min} = [mm]	45	50	60	80

1) Setting requires an impact wrench with maximum 20 Nm
2) Setting requires an impact wrench with maximum 50 Nm
3) Setting requires an impact wrench with maximum 80 Nm
4) Setting requires an impact wrench with maximum 160 Nm

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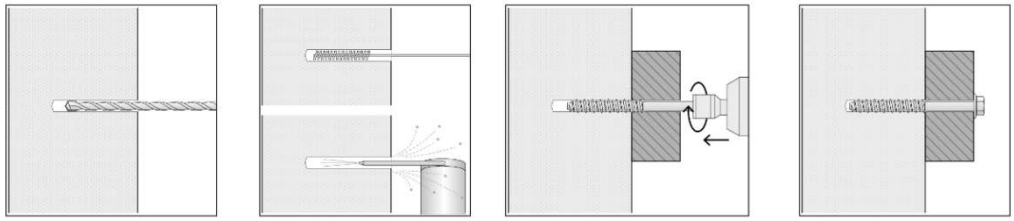
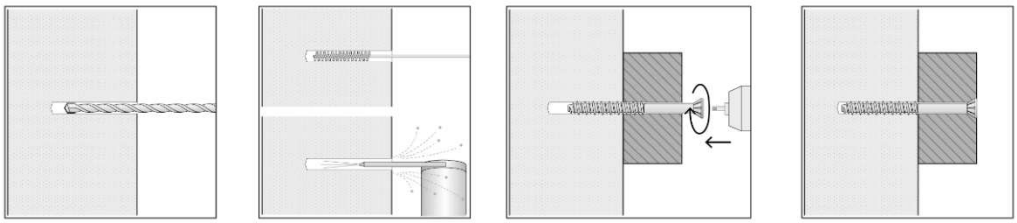
SKR-E



SKS-E



Step 1	Drill a hole into the concrete in rotary plus hammer mode. The hole must be 2 [mm] less than the outside diameter of the anchor
Step 2	Remove the dust into the hole using 2 times a brush and 2 times a blowing pump
Step 3	Place the fixture
Step 4	Install the anchor using an impact screwdriver

d) Setting tools

Drill Bit

SK-E	Item code	
Ø 8	SDS PLUS - Ø6	
Ø 10	SDS PLUS - Ø8	
Ø 12	SDS PLUS - Ø10	

Blowing pump

Item code	
PONY	

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