SPAX International GmbH & Co. KG
GRUPO ALTENLOH, BRINCK & CO DESDE 1823

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DECLARACIÓN DE RENDIMIENTO

SEGÚN EL REGLAMENTO (UE) 305/2011

DoP SX-BS_1

1.0	Código de identificación único del tipo de producto	Tornillo para hormigón SPAX, SX-BS, formas de cabeza HS, SK, RK, RKG, IG, AG	
2.0	Números de tipo, de lote o de serie según el artículo 11, apartado 4	Distintivo según ETA-20/0859, número de artículo y código EAN, véase la tabla de la página 2	
3.0	Uso previsto	Tornillo para hormigón para su uso en hormigón fisurado y no fisurado Componentes bajo condiciones interiores secas	
4.0	Fabricante	SPAX International GmbH & Co. KG, Kölner Straße 71 – 77, 58256 Ennepetal, Germany	
5.0	Sistema para la evaluación y la comprobación de la resistencia de rendimiento (según 97/176/CE)	Sistema 1	
6.0	Documento europeo de evaluación: Evaluación técnica europea: Organismo de evaluación técnica: Organismo(s) notificado(s): Certificado de conformidad:	EAD 330232-00-0601 y EAD 330011-00-0601 ETA-20/0859; 2021-02-02 ITB Varsovia 1488 – ITB Varsovia 1488-CPR-0917/W	
7.0	Rendimiento declarado		
7.1	Características esenciales	Rendimiento	Especificación técnica
	Capacidad de carga por tracción característica (efectos estáticos y semiestáticos)	Véase el anexo, en especial las tablas C1 y C2	ETA-20/0859
	Capacidad de carga transversal característica (efectos estáticos y semiestáticos)	Véase el anexo, en especial las tablas C1 y C2	
	Desplazamientos (efectos estáticos y semiestáticos)	Véase el anexo, en especial las tablas C1 y C2	
	Resistencia característica y desplazamientos para categorías de rendimiento sísmico C1 y C2	Véase el anexo, en especial las tablas C3 y C4	
	Comportamiento en caso de incendio	El tornillo cumple los requisitos de la clase A1	
	Resistencia al fuego	Véase el anexo, en especial la tabla C5	

El rendimiento del producto según los números 1 y 2 se corresponde con el rendimiento declarado conforme al número 6.
El fabricante es el único responsable de la elaboración de la declaración de rendimiento.

Firmada para el fabricante y en nombre del mismo:

Ennepetal, en enero de 2023 Christian Abke
(Director/COO)

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ANEXO

DoP SX-BS_1

Lista de productos

Número SPAX	Ø	Longitud	Código EAN
1701010500505	5,0	50	4003530270338
1701010500755	5,0	75	4003530270345
1701010600605	6,0	60	4003530270369
1701010600755	6,0	75	4003530270376
1701010800605	8,0	60	4003530270383
1701010800755	8,0	75	4003530270390
1701010800905	8,0	90	4003530270406
1701010801005	8,0	100	4003530270413
1701010801305	8,0	130	4003530270420
1701010801505	8,0	150	4003530270437
1701011000655	10,0	65	4003530270444
1701011000755	10,0	75	4003530270451
1701011000855	10,0	85	4003530270468
1701011001005	10,0	100	4003530270475
1701011001205	10,0	120	4003530270482
1701011001405	10,0	140	4003530270499
1701011001605	10,0	160	4003530270505
1701011002005	10,0	200	4003530270512
1701011200755	12,0	75	4003530270529
1701011201005	12,0	100	4003530270536
1701011201305	12,0	130	4003530270543
1701011201505	12,0	150	4003530270550

Número SPAX	Ø	Longitud	Código EAN
1701011400805	14,0	80	4003530270567
1701011401155	14,0	115	4003530270574
1701011401355	14,0	135	4003530270581
1741010600505	6,0	50	4003530270598
1741010600605	6,0	60	4003530270604
1741010600755	6,0	75	4003530270611
1741010601005	6,0	100	4003530270628
1741010601205	6,0	120	4003530270635
1741010601405	6,0	140	4003530270642
1741010800605	8,0	60	4003530270659
1741010800755	8,0	75	4003530270666
1741010800905	8,0	90	4003530270673
1741011000655	10,0	65	4003530270680
1741011000755	10,0	75	4003530270697
1741011000905	10,0	90	4003530270703
1741011001005	10,0	100	4003530270710
1741011001205	10,0	120	4003530270727
1721010600505	6,0	50	4003530270765
1721010600755	6,0	75	4003530270772
1731010600605	6,0	60	4003530270796
1761010600555	6,0	55	4003530270819
1751010600555	6,0	55	4003530270833

Table C1: Characteristic resistance in cracked and uncracked concrete C20/25 to C50/60, design method A

Anchor size				**SX-BS-05**	**SX-BS-06**		**SX-BS-08**		**SX-BS-10**		**SX-BS-12**		**SX-BS-14**	
Nominal embedment depth		h_{nom}	[mm]	43	43	55	50	70	55	85	60	100	75	120
Adjustment														
Total max. thickness of adjustment layers		t_{adj}	[mm]	10	-	10	-	10	-	10	-	10	-	10
Max. number of adjustments		n_s	[-]	2	-	2	-	2	-	2	-	2	-	2
Steel failure														
Characteristic resistance*		$N_{Rk,s}$	[kN]	20,9	28,6		49,5		67,4		92,1		128,3	
Partial safety factor		γ_{Ms} [1)]	[-]	1,4	1,4		1,4		1,4		1,4		1,5	
Pull-out failure														
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	7,0	-) [2)]	12,0	-) [2)]	-) [2)]	-) [2)]	-) [2)]	-) [2)]	-) [2)]	-) [2)]	-) [2)]
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p}$	[kN]	4,5	-) [2)]	7,0	7,0	13,0	8,0	-) [2)]	7,0	-) [2)]	13,0	-) [2)]
Installation safety factor		γ_{inst}	[-]	1,2	1,0		1,0		1,0		1,0		1,0	
Increasing factor	concrete C30/37	ψ_c	[-]	1,08	1,08		1,08		1,08		1,08		1,08	
	concrete C40/50		[-]	1,15	1,15		1,15		1,15		1,15		1,15	
	concrete C50/60		[-]	1,19	1,19		1,19		1,19		1,19		1,19	
Concrete cone failure and splitting failure														
Effective embedment depth		h_{ef}	[mm]	32	32	42	36	53	40	65	42	76	54	92
Factor for uncracked concrete		$k_{ucr,N}$	[-]	11,0	11,0		11,0		11,0		11,0		11,0	
Factor for cracked concrete		$k_{cr,N}$	[-]	7,7	7,7		7,7		7,7		7,7		7,7	
Installation safety factor		γ_{inst}	[-]	1,2	1,0		1,0		1,0		1,0		1,0	
Characteristic spacing	concrete cone failure	$s_{cr,N}$	[mm]	90	90	126	112	160	120	196	126	228	165	276
	splitting failure	$s_{cr,sp}$	[mm]	90	90	126	112	160	136	222	126	228	188	312
Characteristic edge distance	concrete cone failure	$c_{cr,N}$	[mm]	45	45	63	56	80	60	98	63	114	83	138
	splitting failure	$c_{cr,sp}$	[mm]	45	45	63	56	80	68	111	63	114	94	156

[1)] In the absence of other national regulations

[2)] Pull-out failure is not decisive

* Values different from ETA-20/0859

SPAX concrete screw SX-BS	**Annex C1**
Performances Characteristic resistance for tension loads.	of European Technical Assessment ETA-20/0859

Table C2: Characteristic resistance in cracked and uncracked concrete C20/25 to C50/60, design method A

Anchor size			**SX-BS-05**	**SX-BS-06**		**SX-BS-08**		**SX-BS-10**		**SX-BS-12**		**SX-BS-14**	
Nominal embedment depth	h_{nom}	[mm]	43	43	55	50	70	55	85	60	100	75	120
Steel failure without lever arm													
Characteristic resistance	$V_{Rk,s}$	[kN]	12,7	17,7		30,2		41,2		57,0		78,5	
Factor considering ductility	k_7	[-]	0,8	0,8		0,8		0,8		0,8		0,8	
Partial safety factor	γ_{Ms} [1)]	[-]	1,5	1,5		1,5		1,5		1,5		1,5	
Steel failure with lever arm													
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	19,0	31,8		72,4		123,6		203,3		329,6	
Partial safety factor	γ_{Ms} [1)]	[-]	1,5	1,5		1,5		1,5		1,5		1,5	
Concrete pry-out failure													
Factor	k_8	[-]	1,0	1,0		1,0		1,0	2,0	1,0	2,0	1,0	2,0
Installation safety factor	γ_{inst}	[-]	1,0	1,0		1,0		1,0		1,0		1,0	
Concrete edge failure													
Outside diameter on anchor	d_{nom}	[mm]	5	6		8		10		12		14	
Effective length of anchor under shear loads	l_f	[mm]	43	43	55	50	70	55	85	60	100	75	120
Installation safety factor	γ_{inst}	[-]	1,0	1,0		1,0		1,0		1,0		1,0	
Minimum member thickness	h_{min}	[mm]	100	100	100	100	110	100	130	110	155	110	190
Displacements													
Tension load in uncracked concrete C20/25 to C50/60													
Tension load	N	[kN]	2,9	5,6		11,0		14,9		18,1		23,1	
Short term tension displacement	δ_{N0}	[mm]	0,3	0,3		0,4		0,4		0,5		0,5	
Long term tension displacement	$\delta_{N\infty}$	[mm]	0,85	0,9		1,0		1,0		1,2		1,25	
Tension load in cracked concrete C20/25 to C50/60													
Tension load	N	[kN]	2,3	4,4		6,7		10,2		12,4		17,7	
Short term tension displacement	δ_{N0}	[mm]	0,4	0,4		0,5		0,5		0,6		0,7	
Long term tension displacement	$\delta_{N\infty}$	[mm]	2,0	2,0		2,0		2,0		2,0		2,0	
Shear load in cracked and uncracked concrete C20/25 to C50/60													
Shear load	V	[kN]	5,6	8,1		11,9		18,7		27,1		35,2	
Short term shear displacement	δ_{V0}	[mm]	1,4	1,5		2,5		2,5		2,5		2,5	
Long term shear displacement	$\delta_{V\infty}$	[mm]	2,1	2,25		3,75		3,75		3,75		3,75	

[1)] In the absence of other national regulations

Table C3: Characteristic values for seismic performance category C1

Anchor size			**SX-BS-08**	**SX-BS-10**	**SX-BS-14**
Nominal embedment depth	h_{nom}	[mm]	70	85	120
Steel failure for tension and shear load					
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	60,4	82,4	157,0
	$V_{Rk,s,eq}$	[kN]	15,1	27,4	52,3
Pullout failure					
Characteristic resistance	$N_{Rk,p,eq}$	[kN]	5,4	13,5	19,2
Concrete cone failure					
Effective embedment depth	h_{ef}	[mm]	53	65	92
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}		
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}		
Installation safety factor	γ_{inst}	[-]	1,0		
Concrete pry-out failure					
Factor	k_8	[-]	1,0	2,0	2,0
Concrete edge failure					
Outside diameter on anchor	d_{nom}	[mm]	8	10	14
Effective length of anchor under shear loads	l_f	[mm]	70	85	120

Table C4: Characteristic values for seismic performance category C2

Anchor size			**SX-BS-08**	**SX-BS-10**	**SX-BS-14**
Nominal embedment depth	h_{nom}	[mm]	70	85	120
Steel failure for tension and shear load					
Characteristic resistance	$N_{Rk,s,eq}$	[kN]	60,4	82,4	157,0
	$V_{Rk,s,eq}$	[kN]	9,9	20,6	35,1
Pullout failure					
Characteristic resistance	$N_{Rk,p,eq}$	[kN]	1,57	4,91	14,87
Concrete cone failure					
Effective embedment depth	h_{ef}	[mm]	53	65	92
Characteristic edge distance	$c_{cr,N}$	[mm]	$1{,}5\ h_{ef}$		
Characteristic spacing	$s_{cr,N}$	[mm]	$3\ h_{ef}$		
Installation factor	γ_{inst}	[-]	1,0		
Concrete pry-out failure					
Factor	k_8	[-]	1,0	2,0	2,0
Concrete edge failure					
Outside diameter on anchor	d_{nom}	[mm]	8	10	14
Effective length of anchor under shear loads	l_f	[mm]	70	85	120
Displacements					
Displacements under tension load					
Displacement DLS	$\delta_{N,eq}$	[mm]	0,10	0,20	0,63
Displacement ULS	$\delta_{N,eq}$	[mm]	0,50	0,73	3,94
Displacements under shear load					
Displacement DLS	$\delta_{V,eq}$	[mm]	2,00	3,44	4,22
Displacement ULS	$\delta_{V,eq}$	[mm]	3,04	5,04	7,15

Table C5: Characteristic resistance under fire exposure in cracked and uncracked concrete C20/25 to C50/60

Anchor size				**SX-BS-05**	**SX-BS-06**		**SX-BS-08**		**SX-BS-10**		**SX-BS-12**		**SX-BS-14**	
Nominal embedment depth		h_{nom}	[mm]	43	43	55	50	70	55	85	60	100	75	120
Steel failure for tension and shear load $F_{Rk,s,fi} = N_{Rk,s,fi} = V_{Rk,s,fi}$														
Characteristic resistance	R30	$F_{Rk,s,fi}$	[kN]	0,20	0,28	0,28	0,75	0,75	1,57	1,57	2,26	2,26	3,08	3,08
	R60	$F_{Rk,s,fi}$	[kN]	0,18	0,25	0,25	0,65	0,65	1,18	1,18	1,70	1,70	2,31	2,31
	R90	$F_{Rk,s,fi}$	[kN]	0,14	0,20	0,20	0,50	0,50	1,02	1,02	1,47	1,47	2,00	2,00
	R120	$F_{Rk,s,fi}$	[kN]	0,10	0,14	0,14	0,40	0,40	0,79	0,79	1,13	1,13	1,54	1,54
	R30	$M^0_{Rk,s,fi}$	[Nm]	0,15	0,25	0,25	0,90	0,90	2,36	2,36	4,07	4,07	6,47	6,47
	R60	$M^0_{Rk,s,fi}$	[Nm]	0,13	0,23	0,23	0,78	0,78	1,77	1,77	3,05	3,05	4,85	4,85
	R90	$M^0_{Rk,s,fi}$	[Nm]	0,10	0,18	0,18	0,60	0,60	1,53	1,53	2,65	2,65	4,20	4,20
	R120	$M^0_{Rk,s,fi}$	[Nm]	0,07	0,13	0,13	0,48	0,48	1,18	1,18	2,04	2,04	3,23	3,23
Pull-out failure														
Characteristic resistance	R30	$N_{Rk,p,fi}$	[kN]	1,13	1,38	1,75	1,88	3,25	2,00	4,75	1,75	6,50	3,25	8,50
	R60	$N_{Rk,p,fi}$	[kN]	1,13	1,38	1,75	1,88	3,25	2,00	4,75	1,75	6,50	3,25	8,50
	R90	$N_{Rk,p,fi}$	[kN]	1,13	1,38	1,75	1,88	3,25	2,00	4,75	1,75	6,50	3,25	8,50
	R120	$N_{Rk,p,fi}$	[kN]	0,90	1,10	1,40	1,50	2,60	1,60	3,80	1,40	5,20	2,60	6,80
Concrete cone failure														
Characteristic resistance	R30	$N_{Rk,c,fi}$	[kN]	0,89	0,89	2,06	1,50	3,68	1,82	6,13	2,06	9,06	4,04	14,61
	R60	$N_{Rk,c,fi}$	[kN]	0,89	0,89	2,06	1,50	3,68	1,82	6,13	2,06	9,06	4,04	14,61
	R90	$N_{Rk,c,fi}$	[kN]	0,89	0,89	2,06	1,50	3,68	1,82	6,13	2,06	9,06	4,04	14,61
	R120	$N_{Rk,c,fi}$	[kN]	0,71	0,71	1,65	1,20	2,94	1,46	4,91	1,65	7,25	3,23	11,69
Edge distance														
R30 to R120		$c_{cr,fi}$	[mm]	$2 \cdot h_{ef}$										
In case of fire attack from more than one side, the minimum edge distance shall be ≥ 300 mm.														
Anchor spacing														
R30 to R120		$s_{cr,fi}$	[mm]	$4 \cdot h_{ef}$										
Concrete pry-out failure														
R30 to R120		k	[-]	1,0	1,0	1,0	1,0	1,0	1,0	2,0	1,0	2,0	1,0	2,0