SOUDAL

Technical Data Sheet

SOUDAFIX VE400-SF

Technical Data:

Base	Vinylester styrene free		
Consistency	Stable paste		
Curing system	Chemical reaction		
(1) Cartridge temperature = 15°C (2) Curing time on dry surface (20°C/65% R.H.) (x2 on wet surface)	Temperature ≥-10°C (1) ≥-5°C ≥0°C ≥5°C ≥10°C ≥20°C ≥30°C ≥35°C ≥40°C	Start 90 min 90 min 45 min 25 min 15 min 6 min 4 min 2 min 1,5 min	Full Cure (2) 24 u 14 u 7h 2 u 80 min 45 min 25 min 20 min 15 min
Specific Gravity	1,77 g/cm³		
Temperature Resistance	- 40°C to + 120°C		
Elasticity modulus	14000 N/mm²		
Maximum bending strength	15 N/mm²		
Maximum compression strength	100 N/mm²		

Product:
SOUDAFIX VE400-SF is a two-component anchoring resin for the pressure-free securing of threaded rods (ETA: M8-M30), studs, reinforcement bars (ETA: Ø8-Ø32), threaded collars, profiles etc in various solid and hollow materials, such as cracked and uncracked concrete, solid brick, hollow brick, porous concrete, natural stone (see remarks), plasterboard walls, etc…

Characeristics:
- Easy to use and to apply
- Fast cure
- Wide application area, even in wet drill holes, under water (ne sea water) and at temp. as low as –10°C
- Overhead installation allowed
- Styrene free (low odour)
- Cartridge re-usable by simply exchanging static mixer
- Watertight and impermeable fixing
- High chemical resistance
- Fire Resistance class F120 (M8-M30)
- European Technical Assessment ETA-10/0167 based on EAD 330499-00-0601 for application in cracked and uncracked concrete.
- European Technical Assessment ETA-12/0558 based on EAD 330087-00-0601 for application in post-installed rebar connections.
- Indoor air emission class A+

Application area:
Securing of heavy loads in solid and hollow building materials. Pressure free anchoring even close to edges. Can be used as repair mortar.

Packaging:
Colour: dark grey after mixing
Cartridge: 280 ml cartridge for standard skeleton gun, 380 ml for use with special two-component gun.

Shelf life:
18 months in original packaging. Store at cool and dry place at temperatures between +5°C en +25°C.

Substrates:
Type: All usual porous building substrates, poor adhesion on smooth non-porous materials.
State: Clean, free of dust and grease.

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Application:
Application method: standard skeleton gun for 280 ml cartridge, special 2 component gun for 380 ml, preferably heavy duty.
Application temperature: -10°C to +40°C
Clean:
Before cure: wipe off excess of product and clean afterwards with white spirit or acetone.
After cure: it is recommended to let the product fully cure, so that it can easily be removed mechanically with hammer and chisel.
Repair: with the same material

Safety recommendations:
Apply the usual industrial hygiene precautions.
Only use in well ventilated spaces.
Consult the label for more information.

Remarks:
There is a risk of staining on porous substrates such as natural stone.

Instructions for use:
- Drill hole at recommended depth
- Clean drill hole with brush and air pump thoroughly
- Screw static mixer onto cartridge
- Dispense the first 10 cm of the product to waste (on piece of cardboard) until an even colour (dark grey) is achieved, and the product is well mixed
- Solid stone: fill the drill hole from bottom up. Hollow brick: insert sleeve and fill it bottom up, so that the resin is pressed through the tiny holes of the sleeve
- Insert anchoring rod with twisting left-right motion
- Inspect the drill hole for adequate filling
- Observe hardening time. Don't move the anchoring rod during curing
- Leave the excess of product to cure as well. Remove it mechanically with hammer and chisel once cured
- Install component, applying the right torque

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Installation parameters threaded rods:

Diameter threaded rod	**d**	**mm**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Drill diameter	D_0	mm	10	12	14	18	24	28	32	35
Min. anchorage depth	$h_{ef,min}$	mm	60	60	70	80	90	96	108	120
Max. anchorage depth	$h_{ef,max}$	mm	160	200	240	320	400	480	540	600
Min. edge distance	c_{min}	mm	40	50	60	80	100	120	135	150
Min. axial distance	s_{min}	mm	40	50	60	80	100	120	135	150
Tightening torque	T_{inst}	Nm	10	20	40	80	120	160	180	200

Installation parameters reinforcement bars:

Diameter reinforcement bar	**d**	**mm**	**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø25**	**Ø28**	**Ø32**
Drill diameter	D_0	mm	12	14	16	18	20	24	32	35	40
Min. anchorage depth	$h_{ef,min}$	mm	60	60	70	75	80	90	100	112	128
Max. anchorage depth	$h_{ef,max}$	mm	160	200	240	280	320	400	500	580	640
Min. edge distance	c_{min}	mm	40	50	60	70	80	100	125	140	160
Min. axial distance	s_{min}	mm	40	50	60	70	80	100	125	140	160

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Table C1: Characteristic values for steel tension and shear resistance of threaded rods										
Diameter threaded rods			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Characteristic values for tension, steel failure										
Characteristic tensile strength, steel class 4.6 en 4.8	N_{Rks}	kN	15	23	34	63	98	141	184	224
Characteristic tensile strength, steel class 5.6 en 5.8	N_{Rks}	kN	18	29	42	78	122	176	230	280
Characteristic tensile strength, steel class 8.8	N_{Rks}	kN	29	46	67	125	196	282	368	449
Characteristic tensile strength, stainless steel A2, A4 and HCR class 50	N_{Rks}	kN	18	29	42	79	123	177	230	281
Characteristic tensile strength, stainless steel A2, A4 and HCR class 70	N_{Rks}	kN	26	41	59	110	171	247	-	-
Characteristic tensile strength, stainless steel A4 and HCR class 80	N_{Rks}	kN	29	46	67	126	196	282	-	-
Characteristic values for tension, partial factor										
Partial factor steel class 4.6	$\gamma_{Ms,N}$ [1]		2.0							
Partial factor steel class 4.8	$\gamma_{Ms,N}$ [1]		1.5							
Partial factor steel class 5.6	$\gamma_{Ms,N}$ [1]		2.0							
Partial factor steel class 5.8	$\gamma_{Ms,N}$ [1]		1.5							
Partial factor steel class 8.8	$\gamma_{Ms,N}$ [1]		1.5							
Partial factor stainless steel A2, A4 and HCR class 50	$\gamma_{Ms,N}$ [1]		2.86							
Partial factor stainless steel A2, A4 and HCR class 70	$\gamma_{Ms,N}$ [1]		1.87							
Partial factor stainless steel A4 and HCR class 80	$\gamma_{Ms,N}$ [1]		1.6							
Characteristic shear resistance, steel failure										
Steel failure without lever arm										
Characteristic shear resistance, steel class 4.6 and 4.8	V^0_{Rks}	kN	7	12	17	31	49	71	92	112
Characteristic shear resistance, steel class 5.6 and 5.8	V^0_{Rks}	kN	9	15	21	39	61	88	115	140
Characteristic shear resistance, steel class 8.8	V^0_{Rks}	kN	15	23	34	63	98	141	184	224
Characteristic shear resistance, stainless steel A2, A4 and HCR class 50	V^0_{Rks}	kN	13	20	30	55	86	124	115	140
Characteristic shear resistance, stainless steel A2, A4 and HCR class 70	V^0_{Rks}	kN	13	20	30	55	86	124	115	140
Characteristic shear resistance, stainless steel A4 and HCR class 80	V^0_{Rks}	kN	13	20	30	55	86	124	115	140
Steel failure with lever arm										
Characteristic shear resistance, steel class 4.6 and 4.8	M^0_{Rks}	kN	7	12	17	31	49	71	92	112
Characteristic shear resistance, steel class 5.6 and 5.8	M^0_{Rks}	kN	9	15	21	39	61	88	115	140
Characteristic shear resistance, steel class 8.8	M^0_{Rks}	kN	15	23	34	63	98	141	184	224
Characteristic shear resistance, stainless steel A2, A4 and HCR class 50	M^0_{Rks}	kN	13	20	30	55	86	124	115	140
Characteristic shear resistance, stainless steel A2, A4 and HCR class 70	M^0_{Rks}	kN	13	20	30	55	86	124	115	140
Characteristic shear resistance, stainless steel A4 and HCR class 80	M^0_{Rks}	kN	13	20	30	55	86	124	115	140
Characteristic shear resistance, partial factor										
Partial factor steel class 4.6	$\gamma_{Ms,V}$ [1]		1.67							
Partial factor steel class 4.8	$\gamma_{Ms,V}$ [1]		1.25							
Partial factor steel class 5.6	$\gamma_{Ms,V}$ [1]		1.67							
Partial factor steel class 5.8	$\gamma_{Ms,V}$ [1]		1.25							
Partial factor steel class 8.8	$\gamma_{Ms,V}$ [1]		1.25							
Partial factor stainless steel A2, A4 and HCR class 50	$\gamma_{Ms,V}$ [1]		2.38							
Partial factor stainless steel A2, A4 and HCR class 70	$\gamma_{Ms,V}$ [1]		1.56							
Partial factor stainless steel A4 and HCR class 80	$\gamma_{Ms,V}$ [1]		1.33							

[1] In absence of national regulation

Remark: The directives contained in this documentation are the result of our experiments and of our experience and have been submitted in good faith. Because of the diversity of the materials and substrates and the great number of possible applications which are out of our control, we cannot accept any responsibility for the results obtained. In every case it is recommended to carry out preliminary experiments.

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Tabel C2: Characteristic values of tension loads under static, quasi-static and seismic action												
Diameter threaded rod				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Characteristic values of tension loads, steel failure											
Characteristic tension resistance		$N_{Rk,s}$	kN	**See table C1**							
		$N_{Rks,eq}$	kN	**1,0 * $N_{Rk,s}$**							
Partial factor		$\gamma_{Ms,N}$	-	**See table C1**							
Combined pull-out and concrete failure											
Characteristic bond resistance in non-cracked concrete C20/25											
Dry and wet concrete	Temperature range I: 40°C to 24°C	τ_{Rkucr}	N/mm²	10	12	12	12	12	11	10	9
	Temperature range II: 80°C to 50°C	τ_{Rkucr}	N/mm²	7.5	9	9	9	9	8.5	7.5	6.5
	Temperature range III: 120°C to 72°C	τ_{Rkucr}	N/mm²	5.5	6.5	6.5	6.5	6.5	6.5	5.5	5.0
Flooded bore hole	Temperature range I: 40°C tot 24°C	τ_{Rkucr}	N/mm²	7.5	8.5	8.5	8.5	No performance declared			
	Temperature range II: 80°C tot 50°C	τ_{Rkucr}	N/mm²	5.5	6.5	6.5	65				
	Temperature range III: 120°C tot 72°C	τ_{Rkucr}	N/mm²	4.0	5.0	5.0	5.0				
Characteristic bond resistance in cracked concrete C20/25											
Dry and wet concrete	Temperature range I: 40°C to 24°C	$\tau_{Rk,cr}$	N/mm²	4,0	5,0	5,5	5,5	5,5	5,5	6,5	6,5
		$\tau_{Rk,cr,eq}$	N/mm²	2,5	3,1	3,7	3,7	3,7	3,8	4,5	4,5
	Temperature range II: 80°C to 50°C	$\tau_{Rk,cr}$	N/mm²	2,5	3,5	4,0	4,0	4,0	4,0	4,5	4,5
		$\tau_{Rk,cr,eq}$	N/mm²	1,6	2,2	2,7	2,7	2,7	2,8	3,1	3,1
	Temperature range III: 120°C to 72°C	$\tau_{Rk,cr}$	N/mm²	2,0	2,5	3,0	3,0	3,0	3,0	3,5	3,5
		$\tau_{Rk,cr,eq}$	N/mm²	1,3	1,6	2,0	2,0	2,0	2,1	2,4	2,4
Flooded bore hole	Temperature range I: 40°C to 24°C	$\tau_{Rk,cr}$	N/mm²	4,0	4,0	5,5	5,5	No performance declared			
		$\tau_{Rk,cr,eq}$	N/mm²	2,5	2,5	3,7	3,7				
	Temperature range II: 80°C to 50°C	$\tau_{Rk,cr}$	N/mm²	2,5	3,0	4,0	4,0				
		$\tau_{Rk,cr,eq}$	N/mm²	1,6	1,9	2,7	2,7				
	Temperature range III: 120°C to 72°C	$\tau_{Rk,cr}$	N/mm²	2,0	2,5	3,0	3,0				
		$\tau_{Rk,cr,eq}$	N/mm²	1,3	1,6	2,0	2,0				
Increasing factors for concrete (only static and quasi-static action) Ψ_c		C25/30		1.02							
		C30/37		1.04							
		C35/45		1.07							
		C40/50		1.08							
		C45/55		1.09							
		C50/60		1.10							
Concrete conce failure											
Non-cracked concrete		$k_{ucr,N}$	-	11,0							
Cracked concrete		$k_{cr,N}$	-	7,7							
Edge distance		$C_{cr,N}$	mm	$1,5 \cdot h_{ef}$							
Axial distance		$S_{cr,N}$	mm	$2 \cdot c_{cr,N}$							
Splitting											
Edge distance	$h/h_{ef} \geq 2,0$	$C_{cr,sp}$	mm	$1,0 \cdot h_{ef}$							
	$2,0 > h/h_{ef} > 1,3$	$C_{cr,sp}$	mm	$2 \cdot h_{ef} (2,5 - h/h_{ef})$							
	$h/h_{ef} \leq 3,0$	$C_{cr,sp}$	mm	$2,4 \cdot h_{ef}$							
Axial distance		$S_{cr,sp}$	mm	$2 \cdot c_{cr,sp}$							
Installation factor (dry and wet concrete)		γ_{inst}		1.0	1.2						
Installation factor (flooded bore hole)		γ_{inst}		1,4				No performance declared			

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Table C3: Characteristic values of shear loads under static, quasi-static and seismic action										
Diameter threaded rod			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel failure without lever arm										
Characteristic shear resistance	$V^0_{Rk,s}$	kN	See table C1							
	$V_{Rk,s,eq}$	kN	$0,70 \cdot V^0_{Rk,s}$							
Partial factor	$\gamma_{Ms,V}$	-	See table C1							
Ductility factor	k_7	-	1,0							
Steel failure with lever arm										
Characteristic bending moment	$M^0_{k,s}$	Nm	See table C1							
	$M^0_{k,s,eq}$	Nm	No performance declared							
Partial factor	$\gamma_{Ms,V}$		See table C1							
Concrete pry-out failure										
Factor	k_8	-	2.0							
Installation factor	γ_{inst}	-	1.0							
Concrete edge failure										
Effective length of fastener	l_f	mm	$l_f = min(h_{ef}; 8\,d_{nom})$							
Outside diameter of fastener	d_{nom}	mm	8	10	12	16	20	24	27	30
Installation factor	γ_{inst}	-	1.0							
Factor for annular gap	α_{gap}	-	0,5 (1,0)[1)]							

[1)] Value between brackets: see ETA-10/0167

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Table C6: Characteristic values of tension loads under static, quasi-static and seismic action													
Diameter reinforcing bar				**Ø 8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
Steel failure												
Characteristic tension resistance		$N_{Rk,s}$	kN	$A_s \times f_{uk}$ [1]								
		$N_{Rk,s,eq}$	kN	$1,0 \cdot A_s \times f_{uk}$ [1]								
Cross section area		A_s	mm²	50	79	113	154	201	314	491	616	804
Partiële veiligheidsfaktor		$\gamma_{Ms,N}$		1,4 [2]								
Combined pull-out and concrete failure												
Characteristic bond resistance in non-cracked concrete C20/25												
Dry and wet concrete	Temperature range I: 40°C to 24°C	$\tau_{Rk,ucr}$	N/mm²	10	12	12	12	12	12	11	10	8.5
	Temperature range II: 80°C to 50°C	$\tau_{Rk,ucr}$	N/mm²	7.5	9	9	9	9	9	8.0	7.0	6.0
	Temperature range III: 120°C to 72°C	$\tau_{Rk,ucr}$	N/mm²	5.5	6.5	6.5	6.5	6.5	6.5	6.0	5.0	4.5
Flooded bore hole	Temperature range I: 40°C to 24°C	$\tau_{Rk,ucr}$	N/mm²	7.5	8.5	8.5	8.5	8.5	No performance declared			
	Temperature range II: 80°C to 50°C	$\tau_{Rk,ucr}$	N/mm²	5.5	6.5	6.5	6.5	6.5				
	Temperature range III: 120°C to 72°C	$\tau_{Rk,ucr}$	N/mm²	4.0	5.0	5.0	5.0	5.0				
Characteristic bond resistance in cracked concrete C20/25												
Dry and wet concrete	Temperature range I: 40°C to 24°C	$\tau_{Rk,ucr}$	N/mm²	4,0	5,0	5,5	5,5	5,5	5,5	5,5	6,5	6,5
	Temperature range I: 40°C to 24°C	$\tau_{Rk,ucr,eq}$	N/mm²	2,5	3,1	3,7	3,7	3,7	3,7	3,8	4,5	4,5
	Temperature range II: 80°C to 50°C	$\tau_{Rk,ucr}$	N/mm²	2,5	3,5	4,0	4,0	4,0	4,0	4,0	4,5	4,5
	Temperature range II: 80°C to 50°C	$\tau_{Rk,ucr,eq}$	N/mm²	1,6	2,2	2,7	2,7	2,7	2,7	2,8	3,1	3,1
	Temperature range III: 120°C to 72°C	$\tau_{Rk,ucr}$	N/mm²	2,0	2,5	3,0	3,0	3,0	3,0	3,0	3,5	3,5
	Temperature range III: 120°C to 72°C	$\tau_{Rk,ucr,eq}$	N/mm²	1,3	1,6	2,0	2,0	2,0	2,0	2,1	2,4	2,4
Flooded bore hole	Temperature range I: 40°C to 24°C	$\tau_{Rk,ucr}$	N/mm²	4,0	4,0	5,5	5,5	5,5	No performance declared			
	Temperature range I: 40°C to 24°C	$\tau_{Rk,ucr,eq}$	N/mm²	2,5	2,5	3,7	3,7	3,7				
	Temperature range II: 80°C to 50°C	$\tau_{Rk,ucr}$	N/mm²	2,5	3,0	4,0	4,0	4,0				
	Temperature range II: 80°C to 50°C	$\tau_{Rk,ucr,eq}$	N/mm²	1,6	1,9	2,7	2,7	2,7				
	Temperature range III: 120°C to 72°C	$\tau_{Rk,ucr}$	N/mm²	2,0	2,5	3,0	3,0	3,0				
	Temperature range III: 120°C to 72°C	$\tau_{Rk,ucr,eq}$	N/mm²	1,3	1,6	2,0	2,0	2,0				
Increasing factors for concrete (only static or quasi-static actions) Ψ_c		C25/30		1.02								
		C30/37		1.04								
		C35/45		1.07								
		C40/50		1.08								
		C45/55		1.09								
		C50/60		1.10								
Concrete cone failure												
Non-cracked concrete		$k_{ucr,N}$	-	11,0								
Cracked concrete		$k_{cr,N}$	-	7,7								
Edge distance		$C_{cr,N}$	mm	$1,5 \cdot h_{ef}$								
Axial distance		$S_{cr,N}$	mm	$2 \cdot c_{cr,N}$								
Splitting												
Edge distance	$h/h_{ef} \geq 2,0$	$C_{cr,sp}$	mm	$1,0 \cdot h_{ef}$								
	$2,0 > h/h_{ef} > 1,3$	$C_{cr,sp}$	mm	$2 \cdot h_{ef} (2,5 - h/h_{ef})$								
	$h/h_{ef} \leq 3,0$	$C_{cr,sp}$	mm	$2,4 \cdot h_{ef}$								
Axial distance		$S_{cr,sp}$	mm	$2 \cdot c_{cr,sp}$								
Installation factor (dry and wet concrete)		γ_{inst}		1.0	1.2							
Installation factor (flooded bore hole)		γ_{inst}		1,4					No performance declared			

[1] f_{uk} shell be taken from the specifications of reinforcing bars

[2] In absence of national regulation

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Tabel C7: Characteristic values of shear loads under static, quasi-static and seismic action										
Diameter reinforcing bar			**Ø 8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
Steel failure without lever arm											
Characteristic shear resistance	$V_{Rk,s}$	kN	$0{,}50 \times A_s \times f_{uk}$ [1]								
	$V_{Rk,s,eq}$	kN	$0{,}35 \times A_s \times f_{uk}$ [1]								
Cross section area	A_s	mm²	50	79	113	154	201	214	491	616	804
Partial factor	$\gamma_{Ms,V}$	-	1,5 [2]								
Ductility factor	k_7	-	1,0								
Steel failure with lever arm											
Characteristic bending moment	$M^0_{Rk,s}$	Nm	$1{,}2 \times W_{el} \times f_{uk}$ [1]								
	$M^0_{Rk,s,eq}$	Nm	No performance declared								
Elastic section modulus	W_{el}	mm³	50	98	170	269	402	785	1534	2155	3217
Partial factor	$\gamma_{Ms,V}$		1,5 [2]								
Concrete pry-out failure											
Factor	k_8	-	2.0								
Installation factor	γ_{inst}	-	1,0								
Concrete edge failure											
Effective length of fastener	l_f	mm	$l_f = \min(h_{ef}; 8\, d_{nom})$								
Outside diameter of fastener	d_{nom}	mm	8	10	12	14	16	20	25	28	32
Installation factor	γ_{inst}	-	1.0								
Factor for annular gap	α_{gap}	-	0,5 (1,0) [3]								

[1] f_{uk} shall be taken from the specifications of reinforcing bars

[2] In absence of national regulation

[3] Value in brackets: see ETA-10/0167