Zwaluw® Fix-O-Chem

Application Guidelines

Product Descriptions

Fix-O-Chem is a two-component chemical anchoring system based on styrene free polyester resins for very fast anchoring with high firmness, hardening through chemical process. For anchoring dynamically stressed structures, building components, engineering equipment or scaffolding. Suitable for heavy-duty anchorage in stone, concrete, light anchoring in aerated concrete and lightweight concrete, or for moderate to heavy loads when securing wood, steel structures, sections, rails, bars, water main fixtures, etc. Liquid cartridge anchors can be used throughout the entire recommended period of use simply by replacing the application nozzle and securely closing the cartridge cover.

Applications

Zwaluw Fix-O-Chem can be used for chemical anchoring of steel bars, prop base and screws, anchoring into the bases from concrete, breeze-blocks, full masonry, cavity bricks etc. Zwaluw Fix-O-Chem can be used in both solid based as well as hollow, indoor and outdoor, vertical and horizontal.

Additional Information

Base		Stryrene free polyester
Consistency		Thixotropic paste
Density	g/ml	1,80
Thermal resistance	°C	-15
Application temperature	°C	-5 / +35
Application rate		See table

Limitations

Zwaluw Fix-O-Chem is not suitable for PE, PP, PC, PMMA, PTFE.

Cleaning

See table 3, Cleaning

Colours

- Grey

Packaging

- Cartridge 280 ml

Shelf Life

In unopened original packaging between +5°C and +25°C, shelf life till 12 months after date of production, stored in a dry place.

Health & Safety

Product Health and Safety Data Sheet must be read and understood before use. These are available on request and via the Den Braven websites.

Warranty & Guarantee

Den Braven warrants that its product complies, within its shelf life, to its specification.

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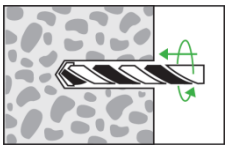
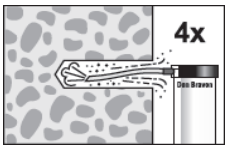
Solid surfaces

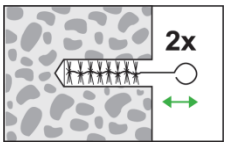
Drill all holes. Make sure you use the correct drill diameter according table 1, installation parameters



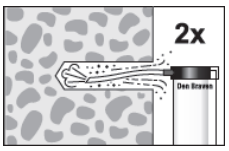
Remove dust using an air pump



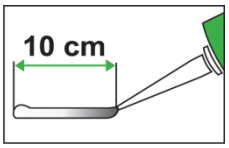
Remove all incoherent and loose particles and dust by using the cleaning brush according table 3, cleaning



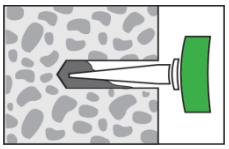
Remove last dust residues by using an air pump again



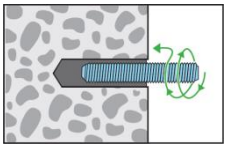
Apply at least 10 cm of material to reach a homogeneous mix Zwalw Fix-O-Chem before applying the adhesive in the drilled holes



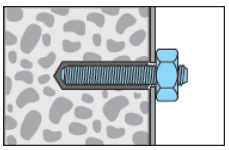
Fill hole roughly 50% with Zwaluw Fix-O-Chem



Insert anchor by using the rotary movement in the direction of thread

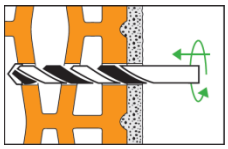


The element may be placed once the material has fully cured according table 2, minimum curing time

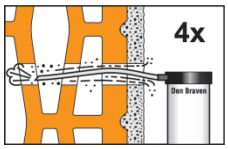


Hollow surfaces

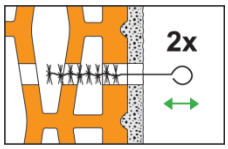
Drill all holes. Make sure you use the correct drill diameter according table 1, installation parameters



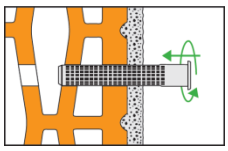
Remove dust using an air pump



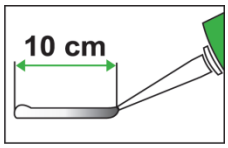
Remove all incoherent and loose particles and dust by using the cleaning brush according table 3, cleaning



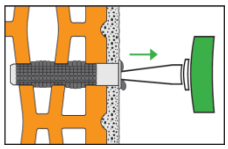
Remove last dust residues by using an air pump again



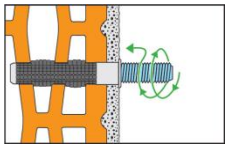
Apply at least 10 cm of material to reach a homogeneous mix Zwalw Fix-O-Chem before applying the adhesive in the drilled holes



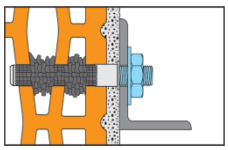
Fill hole roughly 50% with Zwaluw Fix-O-Chem



Insert anchor by using the rotary movement in the direction of thread



The element may be placed once the material has fully cured according table 2, minimum curing time



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Application Guidelines

Installation parameters								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	24	28
Depth of drill hole	h_0	[mm]	80	90	110	125	170	210
Edge distance	$C_{cr,N}$	[mm]	80	90	110	125	170	210
Minimum edge distance	C_{min}	[mm]	40	50	60	80	100	120
Spacing	$S_{cr,N}$	[mm]	160	180	220	250	340	420
Minimum spacing	S_{min}	[mm]	40	50	60	80	100	120
Minimum thickness of member	h_{min}	[mm]	110	120	140	160	215	260
Torque moment	T_{inst}	[mm]	10	20	40	60	120	150

Table 1, Installation parameters

Minimum curing time							
Temperature of base material (°C)	**-5 to 0**	**0 to +5**	**+5 to +10**	**+10 to +20**	**+20 to +30**	**+30 to +35**	**+35**
Gelling and working time (min.)	90	45	25	15	6	4	2
Full curing time (min.)	360	180	120	80	45	25	20

Table 2, minimum curing time

Cleaning								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	24	28
Diameter of brush	d_b	[mm]	12,0	14,0	16,3	20,0	26,0	30,0
Minimum brush diameter	$d_{b,min}$	[mm]	10,5	12,5	14,5	18,5	24,5	28,5
Brush length	L	[mm]	170	170	170	200	250	300
Cleaning			4 x blow out 4 x brush out 4 x blow out					

Table 3, cleaning

Steel failure – Characteristic resistance								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade **4.8**	$N_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	2*					
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177
Partial safety factor	γ_{Ms}	[-]	1,5*					
Stainless steel grade **A4-70**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms}	[-]	1,9*					
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms}	[-]	1,6*					

Table 4, Steel failure – Characteristic resistance

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Application Guidelines

Combined pull out and concrete cone failure in non-cracked concrete C20/25								
Size				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Characteristic resistance in non-cracked concrete	$N_{Rk,p}$	[kN]		16	35	35	50	75	95
Partial safety factor	γ_{Mc}	[-]		1,8*					
Factor for concrete	ψ_c	[-]	C30/37	1,08					
			C40/50	1,15					
			C50/60	1,19					

Table 5, Combined pull out and concrete cone failure in non-cracked concrete C20/25

Splitting failure								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Edge distance	$c_{cr,sp}$	[mm]	120	135	165	188	255	315
Spacing	$s_{cr,sp}$	[mm]	240	270	330	375	510	630
Partial safety factor	γ_{Msp}	[-]	1,8*					

Table 6, Splitting failure

Steel failure without lever arm								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade **4.8**	$V_{Rk,s}$	[kN]	7	12	17	31	49	71
Partial safety factor	γ_{Ms}	[-]	1,67*					
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88
Partial safety factor	γ_{Ms}	[-]	1,25*					
Stainless steel grade **A4-70**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124
Partial safety factor	γ_{Ms}	[-]	1,56*					
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms}	[-]	1,33*					

Table 7, Steel failure without lever arm

Steel failure with lever arm								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade **4.8**	$M^{o}_{Rk,s}$	[kN]	15	30	52	133	260	449
Partial safety factor	γ_{Ms}	[-]	1,66*					
Steel grade **5.8**	$M^{o}_{Rk,s}$	[kN]	19	37	66	166	325	561
Partial safety factor	γ_{Ms}	[-]	1,25*					
Stainless steel grade **A4-70**	$M^{o}_{Rk,s}$	[kN]	26	52	92	233	454	786
Partial safety factor	γ_{Ms}	[-]	1,56*					
Stainless steel grade **A4-80**	$M^{o}_{Rk,s}$	[kN]	30	60	105	266	519	898
Partial safety factor	γ_{Ms}	[-]	1,33*					

Table 8, Steel failure with lever arm

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Concrete pry out failure								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Factor *k* from TR 029 Design of bonded anchors, Part 5.2.3.3			2					
Partial safety factor	γ_{Mp}	[-]	1,5*					

Table 9, Concrete pry out failure

Concrete edge failure			
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors			
Partial safety factor	γ_{Mc}	[-]	1,5*

Table 10, Concrete edge failure

Displacement under tension and shear load								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Tension load	F	[kN]	6,3	13,9	13,9	19,8	29,8	37,7
Displacement	δN0	[mm]	0,3	0,3	0,3	0,4	0,5	0,6
Shear load	F	[kN]	4,2	6,6	9,6	17,9	28,0	40,3
Displacement	δV0	[mm]	0,3	0,3	0,5	0,7	0,9	1,2
	δV∞	[mm]	0,5	0,5	0,8	1,1	1,4	1,8

Table 11, Displacement under tension and shear load