MasterFlow 936 AN

Pure epoxy (3:1) resin based high performance anchoring grout

MATERIAL DESCRIPTION

MasterFlow 936 AN is a two component (3:1) pure epoxy resin based high performance anchoring grout for use in cracked and uncracked concrete under normal as well as seismic conditions (seismic category C1 and C2).

Designed for post-installed rebar connection applications, **MasterFlow 936 AN** offers a very high load-bearing capacity. The system can be installed in percussive and diamond drilled dry, wet and flooded holes.

TYPICAL APPLICATIONS

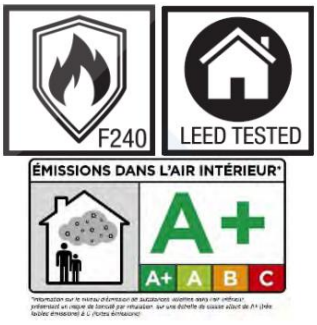
- Structural applications in cracked and uncracked concrete applications in seismic zones (C1 and C2).
- Post installed rebar connections.
- Crash barriers.
- Structural steel.

APPROVALS AND TESTS

- ETA according ETAG 001 Part 1 & 5 Option 1 for anchoring of threaded bars into cracked & uncracked concrete application in seismic zones (C1 and C2).
- ETA according to TR023 for post-installed rebar connections.
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).
- Fire resistance F240 for reinforcing bars.
- A+ as per French VOC Regulation.
- WRAS – Suitable for use with potable water.

ADVANTAGES

- Fixings close to free edges.
- Fire tested.
- Versatile.
- Anchoring without expansion pressure.
- Ultra High load capacities.
- Available in side-by-side cartridges.
- Component volume ratio of 3:1.
- Extended gel/open time.
- Suitable for diamond-drilled holes.
- Suitable for dry and wet holes.



PACKAGING

MasterFlow 936 AN is available in boxes of 12 side-by-side cartridges of 585 ml.

APPLICATION GUIDELINES

Please refer to the method statement or contact Master Builders Solutions Technical Services department.

STORAGE AND SHELF LIFE

Cartridges should be stored in their original packaging, the correct way up and in cool dry conditions (+10°C to +25°C) out of direct sunlight. When stored correctly, the shelf life will be for 12 months from the date of manufacture.

NOTE

Technical support, where provided, does not constitute supervisory responsibility. For additional information contact your local MB Construction Chemicals Solutions South Africa (Pty) Ltd representative. MB Construction Chemicals Solutions South Africa (Pty) Ltd shall not be liable for technical advice provided.

MB Construction Chemicals Solutions South Africa (Pty) Ltd reserves the right to have the true cause of any difficulty determined by accepted test methods. Undertaking such tests is not, and shall not be deemed to be, an admission of liability or an assumption of any risk, loss, damage or liability.

QUALITY AND RESPONSIBLE CARE

All products originating from MB Construction Chemicals Solutions South Africa (Pty) Ltd are manufactured under a management system independently certified to conform to the requirements of the quality standards ISO 9001, environmental and occupational health and safety standards.

* Properties listed are based on laboratory controlled tests.

MasterFlow 936 AN

Pure epoxy (3:1) resin based high performance anchoring grout

TECHNICAL DATA

Working and Loading Times:

Resin cartridge Temperature °C			T Work minutes	Base Material Temperature °C			T Load hrs
+10	to	+15	40	+10	to	+15	18
+15	to	+20	25	+15	to	+20	12
+20	to	+25	18	+20	to	+25	8
+25	to	+30	12	+25	to	+30	6
+30	to	+35	8	+30	to	+35	4
+35	to	+40	6	+35	to	+40	2
Ensure cartridge is >10°C							

Note: T Work is at the highest temperature in the range. T load is at the lowest temperature in the range.

Physical Properties

Property		Unit	Value	Test Standard
Density		g/cm³	1.5	ASTM D 1875 @ +20°C
Compressive Strength	24 hours	N/mm²	75	ASTM D 695 @ +20°C
	7 days	N/mm²	95	
Tensile Strength	24 hours	N/mm²	18	ASTM D 638 @ +20°C
	7 days	N/mm²	23	
Elongation	24 hours	%	6.6	ASTM D 638 @ +20°C
	7 days		5.9	
Tensile Modulus	24 hours	GN/m²	5.7	ASTM D 638 @ +20°C
	7 days	GN/m²	5.5	
Flexural Strength	24 hours	N/mm²	45	ASTM D 790 @ +20°C
HDT	7 days	°C	49	ASTM D 648 @ +20°C
VOC		g/L	4.5	ASTM D 2369

Theoretical Number of Fixings per Cartridge:

Applies to installations in solid substrates only

Cartridge Volume	h_{ef}	Ø8	Ø10	Ø12	Ø16	Ø20	Ø24	Ø27	Ø30
		Drilling Ø 10 mm	Drilling Ø 12 mm	Drilling Ø 14 mm	Drilling Ø 18 mm	Drilling Ø 22 mm	Drilling Ø 26 mm	Drilling Ø 30 mm	Drilling Ø 35 mm
585 ml side by side	8d	218	134	89	47	28	17	11	6
	10d	174	107	71	38	22	14	8	4
	12d	145	89	59	31	18	11	7	4
	20d	87	53	35	19	11	7	4	2

Note: Jobsite/contractor installations usually result in more resin being injected than the theoretical requirement resulting in lower number of fixings per cartridge. The reduction to the number of fixings per cartridge in practice is greater for smaller diameter holes and shallow embedment depths.

MasterFlow 936 AN

Pure epoxy (3:1) resin based high performance anchoring grout

MASTERFLOW 936 AN WITH REINFORCING BARS (ANCHOR THEORY)

Installation parameters

Diameter of rebar (mm)	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Drilled hole diameter (mm)	12	14	16	20	25	32	40

Design Resistance

Rebar size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Effective embedment depth h_{ef} [mm]				80	90	110	125	170	210	300
Non-cracked concrete										
Tension	C20/25	$N_{Rd,p}$	[kN]	17.43	24.50	35.94	47.05	74.62	102.45	160.85
	C50/60	$N_{Rd,p}$	[kN]	18.99	26.71	39.17	54.79	93.14	143.82	175.33
Shear	C20/25	$N_{Rd,s}$	[kN]	9.33	14.67	20.67	36.67	57.33	90.00	147.33
Cracked concrete										
Tension	C20/25	$N_{Rd,p}$	[kN]	10.72	20.49	27.65	33.54	53.20	73.04	124.71
	C50/60	$N_{Rd,p}$	[kN]	11.69	22.60	30.13	45.66	77.62	101.87	142.45
Shear	C20/25	$N_{Rd,s}$	[kN]	9.33	14.67	20.67	36.67	57.33	90.00	147.33

Recommended Resistance

Rebar size				Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø32
Effective embedment depth h_{ef} [mm]				80	90	110	125	170	210	300
Non-cracked concrete										
Tension	C20/25	$N_{Rec,p}$	[kN]	12.45	17.50	25.67	33.61	53.30	73.18	114.89
	C50/60	$N_{Rec,p}$	[kN]	13.57	19.08	27.98	39.14	66.53	102.73	125.23
Shear	C20/25	$N_{Rec,s}$	[kN]	6.67	10.48	14.76	26.19	40.95	64.29	105.24
Cracked concrete										
Tension	C20/25	$N_{Rec,p}$	[kN]	7.66	14.64	19.75	23.96	38.00	52.17	89.08
	C50/60	$N_{Rec,p}$	[kN]	8.35	16.14	21.52	32.61	55.44	72.77	101.75
Shear	C20/25	$N_{Rec,s}$	[kN]	6.67	10.48	14.76	26.19	40.95	64.29	105.24

Steel strength must also be considered and the lowest value controls.
Partial safety factor γ1.4
For resistance values in higher temperatures, please contact Master Builders Solutions' Technical Services.
All the above resistance values are considering combined pull out and concrete cone failure in tension and steel failure in shear.
The above load values are for long term temperature of -40°C to +50°C and short-term temperature of +70°C.

MasterFlow 936 AN

Pure epoxy (3:1) resin based high performance anchoring grout

MASTERFLOW 936 AN WITH THREADED RODS

Installation parameters

Diameter of rebar (mm)	M8	M10	M12	M16	M20	M24	M30
Drilled hole diameter (mm)	10	12	14	18	22	26	35

Design Resistance

Rebar size				M8	M10	M12	M16	M20	M24	M30
Effective embedment depth h_{ef} [mm]				80	90	110	128	170	210	270
Non-cracked concrete										
Tension	C20/25	$N_{Rd,p}$	[kN]	22.79	28.27	38.84	48.75	74.62	102.45	149.36
	C50/60	$N_{Rd,p}$	[kN]	24.84	30.82	45.20	56.10	93.14	138.07	175.67
Shear	C20/25	$N_{Rd,s}$	[kN]	7.20	12.00	16.80	31.20	48.80	70.40	112.00
Cracked concrete										
Tension	C20/25	$N_{Rd,p}$	[kN]	13.40	18.85	27.65	34.76	53.20	73.04	101.79
	C50/60	$N_{Rd,p}$	[kN]	14.61	20.55	30.13	44.42	69.86	103.55	110.95
Shear	C20/25	$N_{Rd,s}$	[kN]	7.20	12.00	16.80	31.20	48.80	70.40	112.00

Recommended Resistance

Rebar size				M8	M10	M12	M16	M20	M24	M30
Effective embedment depth h_{ef} [mm]				80	90	110	128	170	210	270
Non-cracked concrete										
Tension	C20/25	$N_{Rec,p}$	[kN]	16.28	20.20	27.74	34.82	53.30	73.18	106.69
	C50/60	$N_{Rec,p}$	[kN]	17.74	22.01	32.29	40.07	66.53	98.62	125.48
Shear	C20/25	$N_{Rec,s}$	[kN]	5.14	8.57	12.00	22.29	34.86	50.29	80.00
Cracked concrete										
Tension	C20/25	$N_{Rec,p}$	[kN]	9.57	13.46	19.75	24.83	38.00	52.17	72.71
	C50/60	$N_{Rec,p}$	[kN]	10.44	14.68	21.52	31.73	49.90	73.97	79.25
Shear	C20/25	$N_{Rec,s}$	[kN]	5.14	8.57	12.00	22.29	34.86	50.29	80.00

Steel strength must also be considered and the lowest value controls.
Partial safety factor γ1.4
Design resistance and recommended resistance in tension are only valid for single anchors without close edge considerations for combined pull-out and concrete cone failure and concrete cone failure. Steel failure is not considered by these calculations.
Design resistance and recommended resistance in shear are only valid for single anchors for steel failure without lever arm.
The above load values are for long term temperature of -40°C to +50°C and short-term temperature of +70°C.