

polymer admixture for thin section high strength waterproof mortars and fine concretes

Description

Ronafix is a single part modified styrene butadiene liquid additive for cement mortars which enhances physical and chemical properties, allows mortars to be placed in thin section, provides waterproofing and resistance to frost and promotes adhesion to building surfaces.

Mortars containing Ronafix are used for a wide range of applications where thin high strength high performance mortars are required. Typical minimum application depth is 6mm.

Ronafix is supplied as a single component white liquid. According to its specified use within mortars it is diluted with water and added to cement, sand (and aggregate) to provide the required performance characteristics. As a priming or bonding coat Ronafix is used with cement only to provide adhesion between substrate and mortar.

Applications For Ronafix Include:

- Floor screeds
- Concrete repair
- Waterproof renders
- Slurry coats/levelling and protective
- Heavy duty floor toppings
- Protection of steel reinforcement
- Bedding and bonding mortars
- Tanking and waterproofing

This data sheet contains general information on the use of Ronafix together with laboratory test results and technical data. For detailed specification guidance and specific mixing and application instructions for each use of Ronafix please refer to the following Ronafix Specification leaflets:

- The use of Ronafix for floor screeds, toppings, fine concretes and floor repair
- The use of Ronafix for concrete repair
- The use of Ronafix for waterproof renders
- The use of Ronafix for bedding mortars
- The use of Ronafix for slurry coats

Working Time And Mixing

Mortars containing Ronafix should be used within the same time scale as conventional mortars; Ronafix does not act as an accelerator or retarder. In warm conditions Ronafix modified mortars may achieve a false set on the surface as a result of the polymer film drying. Reworking the mortars without the use of extra liquid will overcome this.

Ronafix mortars and primers will remain workable for 30-45 minutes depending on material and ambient temperature. In warm conditions this time may reduce.

Advantages:

- Mortars can be applied in thin section
- High compressive, tensile and flexural strengths
- Monolithic adhesion to building substrates
- Cured mortars are waterproof and resistant to freeze/thaw cycling
- Mortars, toppings and renders are more resistant to mild chemical attack
- Proven track record since 1969
- Endorsed by British Board of Agreement Certificates.

Working Temperatures

Ronafix can be used in most weather conditions and in wide temperature range, from +3°C and rising to 25°C and above. At high ambient temperature the working time will reduce; it will increase at lower temperatures.

Health & Safety

Ronafix is non-hazardous although protective clothing such as goggles, overalls and gloves are recommended to prevent any effect from prolonged skin contact, inhalation or ingestion.

In the event of skin contact, wash with soap and water. Seek medical advice if irritation or pain occurs. In the event of eye contact, irrigate with plenty of clean water and seek immediate medical advice. In the event of ingestion, do not induce vomiting. Seek immediate medical advice.

Mix Components of Ronafix Mortars

For standard applications Ronafix is used with cement, sand and water or with cement, sand, aggregate and water. The mix design is determined by the application and standard mixes are contained in this data sheet. Ronafix has been tested with cements conforming to BSEN197 CEM1 42.5 (and others) and sands to BS882. To ensure optimum performance sands and aggregates used must be clean, and well graded.

Mortars and fine concretes based on aggregates with excessive fines will produce a higher water/cement ratio and may result in shrinkage cracking, curling, de-bonding and possible application failure. This is of particular concern when laying Ronafix mix B or B1.

Notes:

1. Cements containing calcium chloride should not be used.
2. Any pigments added must be inorganic and not contain carbon black. The rate of addition should be less than 5% by weight of cement.
3. When colour matching allow mortar to fully dry out before comparison.
4. When colour matching white cement and coloured sands may be used.
5. Do not attempt to add Ronafix to mortars which are already plasticised.
6. Ronafix mortars are not to be used below 3°C; if work must proceed at low temperatures consult the Ronacrete Technical Department.
7. Ronafix mortars can be spray applied; consult the Ronacrete Technical Department.
8. The mix designs quoted assume a strong sound substrate; consult the Ronacrete Technical Department when applying material to surfaces which are particularly porous or low strength.

Ronafix Priming Coat

In most situations Ronafix mortars are bonded to the substrate; exceptions are floating screeds using mix design F and brickwork pointing mortar using mix design A. The bonding/primer coat is a mix of Ronafix and cement in equal proportions measured by weight or volume. The same cement is used in the primer coat and the mortar.

The primer coat is applied to the surface after preparation and (in most cases) after dampening the surface with clean water. The mortar must be applied to the primer coat before it dries. If it does dry it must be either removed or thoroughly cross hatch scratched and reapplied.

Batching Ronafix Mortars

The performance of Ronafix modified mortars is dependent on correct site batching of the mix components. Cement, sand and aggregate must be properly measured by weight (using scales) or by volume (using gauge boxes) and the correct proportion of Ronafix and water then added.

The amount of water used must be adjusted according to the moisture content of the sand and aggregate; the mix designs quoted are based on dry sands and aggregates. Mixes based on damp/wet sand and aggregates will require the addition of less water than the standard mixes quoted; in all circumstances the quantity of water added must be kept to the minimum compatible with workability and to achieve good compaction.

Mixing Ronafix Mortars

Ronafix modified mortars can be mixed by hand or machine. Machine mixing will more easily provide a mortar with even dispersion of mix components and a lower water/cement ratio. The use of a forced action mixer (eg. Creteangle or Screedmaster) will provide optimum performance; free fall mixers cause the mortar to ball up with a resultant reduction in performance and must not be used.

For optimum performance, dry mix the cement, sand (and aggregate). Damp the mix with a small quantity of water and then add the full amount of Ronafix. Continue mixing, adding water up to the specified amount until the required workability has been achieved.

Depending on the quality of mixer used and the moisture content of sands and aggregates it may not be necessary to add the full amount of water specified in the mix design. When using an efficient mixer, a mixing time of 2-3 minutes is normally sufficient. Do not overwork the mix as this will entrain air and may affect performance. Once mixed the mortar should be used as quickly as possible.

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Curing Ronafix Mortars

To minimise moisture loss and resultant crazing and cracking Ronafix mortars must be properly cured, especially in conditions of strong drying winds, high temperature and direct sunlight.

Mortars should be cured using either spray applied Monocure 50 (suitable for overcoating and painting), Monocure 90 or tight fitting polythene. Curing should commence as soon as possible after finishing the mortar when to do so will not damage the surface and continue for 24-48 hours.

Hardening And Strength Gain

Typically at 20°C Ronafix mortars and fine concretes will have gained reasonable strength after 1-2 days. For heavy stress applications refer to technical data for rate of strength gain. When overlaying with floor finishes or applying paints, coatings or other materials which may be affected by retained moisture within the screed, the relative humidity at the surface and moisture levels must be measured until sufficiently low to accommodate the floor finish.

Substrate Preparation

The substrate on which a Ronafix mortar is being placed must be structurally sound and stable and suitable to receive a high strength mortar. Any defect or weakness in the substrate may result in failure of the topping or mortar placed in contact with it.

Surfaces should be scabbled or mechanically abraded to expose the aggregate and provide a mechanical key. The substrate must be cut back to allow the minimum thickness of mortar to be placed without feather edging. Depending on mix design and application the minimum application thickness for a Ronafix modified mortar is 6mm.

All grease, oil and other contamination which may prevent good adhesion must be removed by steam or chemical washing and cleaning. Loose dirt and deleterious material must be removed, preferably by vacuuming.

For floor screeds and toppings the recommendations given in BS8204 Part 3:1993 should be followed to assess the suitability of the substrate and maximise the performance of the screed/topping. Testing should be carried out after surface preparation is complete.

Where sufficient preparation cannot be carried out or where good adhesion cannot be assured it may be necessary to mechanically secure the mortar to the substrate. This may involve fixing a suitable reinforcing mesh to the substrate, with spacers, and applying the mortar through the mesh. Specific design advice should be obtained from the Ronacrete Technical Department.

After preparing surfaces the substrate is damped with clean water, soaking for up to 24 hours if necessary, and excess water removed. The surface must remain damp.

Surface Preparation - Reinforcing Steel

When repairing concrete around exposed reinforcing steel, the concrete should be removed along the length of the steel until clean steel has been exposed. Exposed reinforcing steel must be cleaned to remove loose rust and scale by wire brushing the face of the bar and using emery cloth or sand paper on the sides and rear of the bar, or similar. When levels of chloride exceed 0.4% ion concentration steel must be blasted back to bright steel; in these circumstances the Ronacrete Technical Department should be consulted.

The minimum repair depth around reinforcing steel is 15mm.

Priming Concrete (and Steel When Present)

Surfaces receiving the Ronafix modified mortar must be primed with a priming coat of 1:1 Ronafix:cement. Reinforcing steel must receive two wet on wet coats of primer, ensuring that the first coat is not removed by the application of the second. The Ronafix mortar is applied to the wet/tacky primer; if the primer

dries it must be either removed or thoroughly scarified and reapplied.

For detailed specification guidance and specific mixing and application instructions for each use of Ronafix please refer to the following Ronafix Specification Leaflets:

- The use of Ronafix for floor screeds, toppings, fine concrete and floor repair
- The use of Ronafix for concrete repair
- The use of Ronafix for waterproof renders
- The use of Ronafix for bedding mortars
- The use of Ronafix for slurry coats

Packaging

Ronafix is supplied in 5 litre, 25 litre and 230 litre containers.

Storage

Ronafix should be stored unopened between 5°C and 25°C in dry warehouse conditions away from direct heat and sunlight. Shelf life is approximately 9 months in unopened containers.

Chemical Resistance

Ronafix modified mixes have better resistance to chemical attack than control samples but they should not be used where a two pack resin system or chemical proof brick is normally laid. However, by substituting Ronascreed Powder for ordinary Portland cement in a flooring mix resistance is obtained to low concentrations of organic and inorganic acids, salt solutions, sugars and sugar derivatives.

Agreement Certificate Nos. 89/2149, 89/2150, 89/2151, 86/1651

Agreement Certificates were awarded by the Board in 1977 and 1978 for three major applications: thin section screeding, concrete repair and bonding brick slips. These first certificates quoted minimum durability as being 10 years. Renewal certificates have been issued stating (brick slips) "no failure has been reported to the Board" (screeding) "Ronafix can provide superior performance to conventional materials", (concrete repair) "a repair incorporating Ronafix will have at least the life of the surrounding concrete".

In the 1989 renewal, past research is confirmed. Additional information on the behaviour of Ronafix mortars in fire conditions is also included. In 1986, Agreement Certificate 86/1651 was awarded covering the use of Ronafix for waterproof renders.

Site Attendance

When on site Ronacrete representatives are able, if asked, to give a general indication of the correct method of installing a Ronacrete product. It is important to bear in mind that Ronacrete Ltd is a manufacturer and not an application contractor and it is therefore the responsibility of the contractor and his employer to ensure he is aware of and implements the correct practices and procedures to ensure the correct installation of the product and that liability for its correct installation lies with the contractor and not with Ronacrete Ltd.

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TECHNICAL DATA

1. Compression, tension and flexure. BS 12: 1972, BS 882 + 1201: 1965. BS 4551:1970

Compression tests : 100mm cubes
 Flexural tests: 100 x 25mm x 25mm prisms
 Tensile tests: dumbbell specimens

Test Authority: British Precast Concrete Federation
 CMC Laboratories
 W & C French Ltd
 Ronacrete Laboratories

Laboratory Results: Results shown are in N/mm². Maximum laboratory strengths are achieved by casting and curing cubes in ideal working conditions; site strengths will be lower.

Ronafix Mix Designs	A			B			C,D,E			F			G			
	Age	comp	tens	flex	comp	tens	flex	comp	tens	flex	comp	tens	flex	comp	tens	flex
1 day	38	-	-	37	-	-	22	-	-	16	-	-	23	-	-	-
3 day	45	-	-	n/a	-	-	34	-	-	n/a	-	-	-	-	-	-
7 day	56	5.0	12.9	59	5.7	9.8	42	5.7	15.8	36	3.3	7.7	47	-	-	-
14 day	n/a	-	-	63	-	-	n/a	-	-	n/a	-	-	n/a	-	-	-
28 day	70	7.1	16.2	71	6.7	11.5	53	8.4	19.1	47	4.5	9.5	58	-	-	-

2. Dynamic Modulus BS 1881: Part 5 : 1970

Electrodynamical Method

Test Authority: British Precast Concrete Federation.

Days	Ronafix Mix A	Ronafix/Ferrocrete	Ronafix/concrete	Control
	KN/mm ²	KN/mm ²	KN/mm ²	KN/mm ²
1	25.0	29.5	39.0	15
7	24.8	29.5	41.3	30
28	24.8	29.0	41.0	40

3. Heat Ageing. BS 4551:1970, BS 12 : 1972

Test Authority: Ronacrete Laboratories.

Heat ageing tests are employed to obtain data which has a bearing on long term performance. A general guide is that 1 week at 70°C approximates to 5 years

3:1 mortar + 9 litres Ronafix/50kg cement. Control 3:1 mortar. Temp 70°C				
	Flexural Strength N/mm ²		Tensile Strength N/mm ²	
Days	Sample	Control	Sample	Control
28	10.5	7.0	3.5	0.7
56	15.5	4.9	3.0	0.0
112	14.7	5.5	2.0	0.0
364	14.1	5.4	2.3	0.0

4. Water Permeability BS 1881: Part 5 : 1970

Test Authority: British Precast Concrete Federation.

3:1 mortar Gauging liquid 5:4 Ronafix/water, w/c ratio 0.32			
Time	Top Surface	Laitence removed	"Accepted level"
0-10 mins	0.007	0.028	0.250
10-30 mins	0.003	0.019	0.150
30-60 mins	0.000	0.000	

5. Water Vapour Permeability.

BS 3177 : 1959 Temperature Test

Test Authority: R H Stanger Laboratories.

Samples: 73mm dia x 11mm. 25°C and RH 75%		
	gm/m ² /day	% reduction*
2:1 sand/cement control	42.20	
3:1 sand/cement control*	46.90	
3:1 sand/cement p/c = 1:20	3.60	92.3*
3:1 sand/cement p/c = 1:10	3.90	91.7*
3:1 sand/cement p/c = 1:7	1.88	96.0*

6. Freeze/thaw cycling. BS 4551: 1970 : Clause 10

Test Authority: British Precast Concrete Federation.

3:1 mortar, p/c = 1:10. 24 hours -18°C/+20°C					
Flexural Strength	N/mm ²				
	Cycles	Sample 1	Sample 2	Control 1	Control 2
0	10.8	11.6	7.2	6.0	
15			4.5	3.2	
30	10.5		0	0	
60		11.0			
120	10.9	10.5			

7. Thermal Coefficient of Linear Expansion

Test Authority: R H Harry Stanger Laboratories.

Prisms : 165 x 50 x 50mm		
	Temperature range	
per °C x 10 ⁻⁶	+20°C/+60°C	-20°C/+20°C
Control	12.8	12.7
Ronafix sample	12.9	12.8

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8. Water Penetration

Test Authority: Ronacrete Laboratories.
30 metre head 3 days nil

9. Potable Water Tests

United Kingdom Water Fittings Byelaw Scheme
Items which have passed full tests of effect on water quality
Ronafix waterproof bonding additive
8802073 Ronacrete Limited
"Ronafix waterproof bonding additive has passed the tests of effect on water quality and is suitable for use in contact with potable water and is listed in the Water Fittings and Materials Directory."

10. Water Immersion. BS 12 : 1971

Test Authority: Ronacrete Laboratories.

Dumbell specimens. 3:1 sand/cement. p/c 1:10 *tested dry N/mm ²							
Days	Initial	28	56	84	112	140	168
Tension	3.5	3.2	3.5	3.5	4.9*	3.4	3.4
control	1.4	3.4	3.2	3.3	3.9*	3.8	3.8
Adhesion	3.1	2.2	2.3	2.6	3.3*	2.7	2.6
control	1.1	1.5	1.7	1.9	2.5*	2.1	2.2

11. Fire Resistance. BS 476: Part 8 : 1976

Test Authority: Warrington Research Centre (Report 9388)
Test a British Precast Concrete Federation Test b + c
Sample a: Glass Panawall (Insulite) Ronafix Mix C Stability: 77 minutes
Sample b: 70 x 70 x 25mm Ronafix mortar panel. 3:1 sand/cement p/c ratio 1:10. 60 minutes. 900°C. Sample degraded 1-3mm.
Sample c: 12mm Ronafix/sand/cement render bonded with Weldmesh. Maximum furnace temperature 1335°C at 80 minutes.

12. Steam at 100°C. BS 4551 : 1970 Clause 10

Test Authority: British Precast Concrete Federation
Samples: 250 x 25 x 25mm sand/cement. p/c 1:10
Steam jet played on surface for 1 hour. Flexural strength tested after 1 and 5 cycles. No loss or gain in strength.

13. Shrinkage 100°C. BS 1881 : Part 5 1970

Samples: 300 x 75 x 75mm prisms		
p/c ratio (control)	w/c ratio	shrinkage %
1:18	0.40	0.07
1:13	0.34	0.02
1:9	0.30	0.01

14. "Brick Slips" GLC Scientific Branch Test Series

PT 109, 110, 111, 112, 113, BS 4551: 1970
Test Authority: W & C French Ltd. Construct Test Services
Samples: Calcium silicate and clay brick slips bonded with Ronafix Mix C to concrete. Mild steel stud bonded to face of brick with epoxy resin.
Test Method: Tensile stress/failure mode.

	Ca. sil. brick N/mm ²	Clay brick N/mm ²
Normal cure 20°C	1.05 stud	1.55 stud
Immersed in CaCO ₃	0.50 stud	1.07 stud
Freeze/thaw 50 cycles	0.71 brick	1.03 stud
Thermal cycling	0.81 stud	1.28 stud

Standard consistence 13.2
Consistence retentivity 80%
Water retentivity 100%
No Slump

In no circumstances did the bond fracture between the Ronafix mortar/concrete or the Ronafix mortar/brick

RONAFIX MIX DESIGNS

Application	Ronafix mix	thickness/notes	Application	Ronafix mix	thickness/notes
floor screeds and screed repairs	A	6mm - 50mm	renders	A	weatherproof
floor screeds and screed repairs	A1	26mm+	renders	E	watertight and tanking
floor toppings and topping repairs	B	15mm - 25mm	bedding brick slips, copings	C	6mm - 12mm typical
floor toppings and topping repairs	B1	26mm+	fine concretes	G	25mm+ typical
floating floor screeds	F	38mm+	slurry coats	SC	1mm - 3mm typical
concrete repair	D	over reinforcing steel			
concrete repair	A	no reinforcing steel			
renders	E	watertight and tanking			

RONAFIX MIX DESIGNS		cement	medium sharp sand	6-3mm granite chips	10-5mm pea shingle	10-5mm granite chips	Ronafix	water (approx)	yield m ³ (approx)	coverage (approx)
MIX DESIGN A	by weight	50kg	125kg	-	-	-	9 litres	9 litres	0.1	10m ² @10mm
	by volume	1	2	-	-	-	1:1 with water	-	-	-
MIX DESIGN A1	by weight	50kg	150kg	-	-	-	4.5 litres	14 litres	0.1	10m ² @10mm
	by volume	1	2.5	-	-	-	1:3 with water	-	-	-
MIX DESIGN B	by weight	50kg	75kg	75kg	-	-	9 litres	9 litres	0.1	10m ² @10mm
	by volume	1	1.25	1.25	-	-	1:1 with water	-	-	-
MIX DESIGN B1	by weight	50kg	75kg	-	-	75kg	4.5 litres	14 litres	0.1	7m ² @15mm
	by volume	1	1.25	-	-	1.25	1:3 with water	-	-	-
MIX DESIGN C, D, & E	by weight	50kg	125kg	-	-	-	14 litres	4 litres	0.1	10m ² @10mm
	by volume	1	2	-	-	-	3:1 with water	-	-	-
MIX DESIGN F	by weight	50kg	150kg	-	-	-	4.5 litres	13.5 litres	0.1	10m ² @10mm
	by volume	1	2.5	-	-	-	1:3 with water	-	-	-
MIX DESIGN G	by weight	50kg	100kg	-	100kg	-	4.5 litres	14 litres	0.14	5.6m ² @25mm
	by volume	1	1.5	-	1.5	-	1:3 with water	-	-	-
SLURRY COAT	by weight	50kg	50kg	-	-	-	35 litres	-	0.1	105-122m ²
	by volume	1	1	-	-	-	-	-	-	-