

## Nugrout Hi-Spec



### Free Flowing Cementitious Grout

#### Description

A high strength, free flowing cementitious grout based on non-reactive aggregates, shrinkage compensated Portland cements and selected admixtures which produce a chloride free grout. Nugrout Hi-Spec contains a maximum nominal size aggregate of 2mm and is suitable for Motorway grouting, bedding and void filling applications. Ideal for use as a bearing mortar in bridge-jacking operations. Nugrout Hi-Spec has been formulated to comply with MCHW Clause 2601 Part 4 and also conforms with the requirements of EN 1504 Part 3 and Part 6.

#### Advantages


- Non-shrink through controlled expansion
- Very high early compressive & flexural strengths
- Excellent bond strength to reinforcement steel & concrete
- Material can be pumped, poured, vibrated or rodded
- Suitable for thickness 5mm up to 100mm\* (see Limitations)
- Contains no corrosive metallic additives
- Tolerant to freeze/thaw cycles
- Resistant to vibration & impact
- Excellent flowability & placement characteristics

#### Applications

- Repair to spalled & damaged concrete structures
- Production of highway & rail bridge bearing plinths
- Smart Motorway signage, gantries & barriers
- Grouting of starter bars, holding down bolts, etc.
- Bedding of pre-cast concrete beams & crane rails
- Grouting of machinery & turbines

#### Technical Information

Expansion (ASTM C827-01)	0.25-2.5 %
Efflux test/Flow cone	20-45 seconds
Elastic Stability	<1.0 %
Flow under glass plate test	Passed
Compressive strength (EN12390)	> 0 MPa

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EN 1504-3 Concrete repair product for structural repair CC Mortar (based on hydraulic cement) EN 1504-6 Anchoring of reinforcing steel bar	
Compressive strength	Class R4 (>45 MPa)
Chloride ion content	≤0.05 %
Adhesive bond strength	>2.0 MPa
Adhesion after freeze/thaw (50 cycles with salt)	>2.0 MPa
Elastic modulus	>20 GPa
Reaction to fire	Class A1
Pull-out strength displacement	≤0.6 mm @ 75 kN
Dangerous substances	Complies with 5.4

#### Surface Preparation

Surfaces should be clean and free from loose, unsound material and dust. Oil, grease and other contaminants should be fully removed.

A saturated, surface dry condition is required before applying Nugrout Hi-Spec. To achieve this, surfaces should be thoroughly saturated with clean water for a minimum period of 2 hours and any surplus water removed before placement.



## Technical Properties of Nugrout Hi-Spec

Properties	Standard	Performance Requirement	Declared Value
Appearance			Grey powder
Chloride-ion content	EN 1015-17	≤0.05 %	<0.05 %
Maximum aggregate size			2 mm
Layer thickness Minimum/maximum			5mm up to 100mm*
Working time (@ 20°C)			45-60 minutes
Hardening time (@ 20°C)			4-18 hours
Density			2150-2300 kg/m <sup>3</sup>
Mixing water, per 25kg pack			2.75-4.0 litres
Water/cement ratio			0.4 @ 4.0 litres per 25 kg
Temperature for application			5-35°C
Compressive strength @ 20°C	EN 12190	≥45 MPa	34 MPa @ 24 hours 50 MPa @ 3 days 60 MPa @ 7 days 70 MPa @ 28 days
Tensile strength	BS 6319-7		>4.0 MPa
Flexural strength	BS 6319-3		>7.0 MPa
Modulus of elasticity, In flexure	BS 6319-3		>20 GPa
Modulus of Elasticity, In compression	EN 13412	≥20 GPa	≥20 GPa
Adhesion - concrete	EN 1542	≥2.0 MPa	≥2.0 MPa
Adhesion after freeze/thaw (50 cycles with salt)	EN 13687-1	≥2.0 MPa	≥2.0 MPa
Adhesion after thunder showers (30 cycles)	EN 13687-2	≥2.0 MPa	≥2.0 MPa
Adhesion after dry cycling (30 cycles)	EN 13687-4	≥2.0 MPa	≥2.0 MPa
Skid resistance	EN 13036-4		
Carbonation resistance	EN 13295	$d_k \leq \text{ref. concrete}$	$d_k \leq \text{ref. concrete}$
Capillary absorption	EN 13057	$\leq 0.5 \text{ kg/m}^2 \cdot \text{h}^{0.5}$	$\leq 0.5 \text{ kg/m}^2 \cdot \text{h}^{0.5}$
Cracking tendency	Coutinho Ring Test		No cracking after 180 days
Pull-out displacement	EN 1881	≤0.6 mm @ 75 kN	0.39 mm @ 75 kN

\* For applications greater than 75mm please refer to Technical Department.

Strengths are based on 4.0 litres water addition.

Technical data shown are statistical results and do not correspond to guaranteed minima.

Tolerances are those described in appropriate performance standards.

## Mixing

Part mixing of bags is not recommended. The mixer should be of a type that will thoroughly blend the material and water, without leaving residual unmixed material or cause 'balling'. Mixing may be undertaken with a forced action mixer or pan type paddle mixer, the size of which should be suitable for the quantity to be prepared for use at any one time. The use of an appropriate high torque slow speed drill and paddle may be considered for mixing, as an alternative, taking care not to entrain excess air.

Nugrout Hi-Spec requires mixing with clean water only. No other additives are required. The mixer drum should be clean and free from the remains of previous mixes.

1. Thoroughly wet out the mixer drum & discard excess water.
2. Measure out the mixing water; 2.75 - 4 litres per 25kg bag, relevant to intended use.
3. Place two thirds of the required water into the drum.
4. With the drum rotating, add the full contents of the bag and allow to mix for one minute.
5. Add all or part of the remainder of the water and allow to mix for up to a further 4 minutes (depending on the type of mixer used), until a lump-free, homogenous mix is achieved.
6. Pour the mixed grout into a suitable container and allow to de-aerate for 2 - 3 minutes. Agitate before pouring in case of settlement.

**For Trowellable Application.** Nugrout Hi-Spec may be mixed into a mortar-like consistence. Careful control of the water addition is critical. The addition rate is 2 - 2.4 litres per 25kg bag.

## Application Instructions

Nugrout Hi-Spec should be placed by pouring or pumping, remembering that flow decreases with increases of temperature and time. Always mix sufficient material to complete placing in one uninterrupted pour to achieve a monolithic body of material.

Place the product from one side only to avoid air inclusions and to ensure a continuous free flow of the grout.

**For Pumped Application.** we recommend a Putzmeister P11 worm-drive with 25mm minimum hose. Excess water addition is not advised as this can cause segregation of the mix and inhibit pumping. Calibration of water addition can be undertaken on site. Please contact Nufins technical department for advice.

Where formwork is involved, it is essential that all gaps are well sealed to prevent grout loss. Formwork should also be coated with *Chemlease* to obtain an easier strike.

## Cleaning

Mixing equipment and tools should be cleaned regularly through the day to avoid product build up, using clean water.

## Curing

Curing should be employed immediately after finishing, as work progresses. Nugrout Hi-Spec should be protected from rapid drying out, using normal methods of curing such as taped down polythene sheeting, and wet hessian if required, in line with good concreting practise. A UV degradable resin based curing membrane such as *Chemcure R90* may be used, but this must be fully removed by mechanical equipment if the surface is going to receive subsequent treatments.

## Packaging

Nugrout Hi-Spec is available in 25kg polythene lined bags (yield approximate 13 litres).

## Storage

The shelf life is 6 months when stored unopened in dry, normal conditions and away from direct sunlight. Protect from frost.

## Health & Safety

Product Safety Data Sheets (SDS) are available from Nufins. SDS sheets are provided to help customers satisfy their safe handling, use and disposal needs as well as assist with any conformance requirements made locally by health and safety regulations.

SDS are continually updated to provide the latest information to our customers. We therefore recommend contacting our head office to obtain the most recent and accurate SDS before handling and using any product.

## Technical Support

Through our technical department and laboratories we can offer a comprehensive service to specifiers and contractors. Technical contacts are available to provide further information and arrange demonstrations.

## Limitations

When applying material at thicknesses greater than 75mm please refer to Nufins technical department for advice.

Excessive water additions will reduce strengths and can cause segregation within the mix, which may limit the flow.

Grouting works should not proceed in temperatures of 5°C or below, unless steps are taken to protect material and adjacent areas. It is recommended that materials are stored above 10°C and mixing water is warmed at 10-20°C.

In addition, materials should not be installed in temperatures of 3°C or below on a falling scale, without frost protection measures. Protect installed material from adverse weather and frost. If it is necessary, the work area should be tented and heated during and after placement. Contact Nufins technical department for further advice.

## Disclaimer

The information contained herein is to the best of our knowledge true and accurate and is given in good faith but without warranty. The user will be deemed to have satisfied themselves independently as to the suitability of our products for their own particular purpose. In no event shall Nufins be liable for consequential or incidental damages.

Users must always refer to the most recent issue of the Technical Datasheets, copies of which will be supplied on request.