

Nordic is a high performance, easily pumpable anchoring grout specifically designed for cold weather applications with temperatures ranging from -10 °C (14 °F) to 5 °C (40 °F). This product is a pre-blended and pre-packaged material that contains very fine natural aggregate and other carefully selected components. Nordic resists water wash-out making it ideal for cold weather applications such as the grouting of bored piles in permafrost and the anchoring of cables, tendons or bolts of various dimensions in different substrates subject to frost.

## FEATURES & BENEFITS

- Excellent compressive strength development in cold weather and permafrost
- Excellent pumpability
- Excellent cohesion and plastic stability
- Excellent resistance to wash-out
- Thixotropic properties reduce material loss in fractured ground
- Improved resistance to sulphate attack
- Very low permeability
- Non-corrosive, non-chloride, non-metallic
- Designed with natural normal-density non-reactive fine aggregate to eliminate potential alkali-aggregate reactivity (AAR)
- All KING products are manufactured using ISO 9001:2015 Certified Processes

## USES

- Structural grout medium for the installation and grouting of bored piles and micro piles used for structures erected on permafrost or other substrates subject to frost
- Structural grout for the construction of grout columns around shafts and standard helical pier foundation system piles
- Grouting of most types of anchors used in permafrost or other substrates subject to frost such as tendons, cables, dowels or bolts
- For applications where ambient temperature is above 5 °C (40 °F), refer to MS Cable or In-Pakt Precision
- Contact your KING Technical Representative for recommendations or information on uses or conditions not listed

## PROCEDURES

**Mixing:** In order to achieve the mechanical and plastic properties listed in the Technical Data section, the plastic temperature of Nordic after mixing must be between 21 °C (70 °F) and 25 °C (77 °F). The pre-packaged bags of Nordic and the batching water used to mix the grout must be maintained in a dry, closed container/environment that is protected from the elements and conditioned to a temperature ranging from 21 °C (70 °F) to 25 °C (77 °F). The temperature of the pre-packaged bags of Nordic and the batching water must be between 21 °C (70 °F) and 25 °C (77 °F) prior to mixing. It is recommended to store and to operate the mixer in a dry and closed container/environment protected from the elements and conditioned to a temperature ranging from 21 °C (70 °F) to 25 °C (77 °F).

**For a 25 KG (55 lb) bag, the recommended volume of water is 5.50 L (1.45 US gallons). Use potable water only.** Introduce the required volume of water into the paddle mixer and gradually add Nordic while operating at medium speed.

Increase mixer speed and continue mixing for 2 minutes. **Mortar style mixers are not recommended for this purpose.** Decrease mixer speed to low and continue mixing while placing the grout. **The time between the mixing and pumping of a batch should not exceed 20 minutes.**

When mixing 2 x 25 KG (55 lb) bags of Nordic or less, it is possible to use a hand-held electrical drill mixer with an appropriate mixing paddle designed to mix a sanded grout.

## TECHNICAL DATA\*

The following data is representative of typical values achievable under laboratory conditions. Results in the field may vary.

### MASS DENSITY

**ASTM C 109** 2150 kg/m<sup>3</sup> (134 lb/ft<sup>3</sup>)

### WORKING/PLACEMENT TIME

20 minutes maximum

### SET TIME

**ASTM C 191** **AMBIENT TEMPERATURE OF 21 °C (70 °F)**  
Initial 1 - 2 hours

### FLOW

**ASTM C 939** **GROUT TEMPERATURE OF 23 °C (73 °F)**  
20 seconds ± 5 seconds

### COMPRESSIVE STRENGTH

**ASTM C 39**  
**100 MM (4") DIAMETER x 200 MM (8") HIGH**

### CYLINDER

**GROUT TEMPERATURE OF 23 °C (73 °F)**  
**CURING TEMPERATURE OF -10 °C (14 °F)**  
**AT 50% R.H.**  
1 Day 30 MPa (4350 psi)  
7 Day 35 MPa (5075 psi)  
28 Day 42 MPa (6000 psi)

### BLEEDING

**ASTM C 940** Nil

### SEGREGATION

Nil

\*The following data was obtained under laboratory conditions with the pre-packaged bags of Nordic, batching water and mixing equipment conditioned to a temperature ranging from 21 °C (70 °F) to 25 °C (77 °F) as recommended in the Procedures section.

### OPTIMUM PERFORMANCE

- It is recommended to use a piston grout pump with a minimum interior hose diameter of 25 mm (1") when pumping Nordic.
- Freshly mixed grout temperature must be between 21 °C (70 °F) and 25 °C (77 °F).
- Not recommended for areas subjected to extremely high vibrations.
- Adhere to recommended water additions. Exceeding water:material ratio will result in reduced compressive strengths and inferior physical properties.
- Not recommended when ambient temperature is greater than or equal to 5 °C (40 °F). Refer to In-Pakt Precision or MS Cable when ambient temperature is greater than or equal to 5 °C (40 °F).

## YIELD

25 KG (55 lb) bag contains approximately 14.0 L (0.49 ft<sup>3</sup>) of fluid grout.

## PACKAGING

Nordic is normally packaged in 25 KG (55 lb) triple-lined bags and polywrapped on wooden pallets. All KING products can be custom packaged to suit specific job requirements.

## STORAGE AND SHELF LIFE

Material should be stored in a dry, covered area, protected from the elements. Unopened bags have a shelf life of 12 months.

## SAFETY PROCEDURES

Nordic contains cement. Normal safety-wear such as rubber gloves, dust mask and safety glasses used to handle conventional cement based products should be worn. Safety Data Sheets are available upon request.

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**Warranty:** This product is designed to meet the performance specifications outlined in this product data sheet. If the product is used in conditions for which it was not intended, or applied in a manner contrary to the written recommendations contained in the product data sheet, the product may not reach such performance specifications. The foregoing is in lieu of any other warranties, representations or conditions, expressed or implied, including, but not limited to, implied warranties or conditions of merchantable quality or fitness for particular purposes, and those arising by statute or otherwise in law or from a course of dealing or usage of trade. [REV.0007\_2458717.5]

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