

# InsuGrout 330

High strength, non-shrink cementitious grout .

## DESCRIPTION OF PRODUCT

InsuGrout 330 is a ready-to-use product in powder form, which requires only the on-site addition of water to produce a shrinkage compensated micro concrete of predictable performance.

## APPLICATIONS

InsuGrout 330 is formulated for use at any consistency from fluid to damp-pack, and may be used with confidence for bedding, grouting and precision bearing operations such as:

- Gas or steam turbines.
- Generators.
- Presses.
- Crane rails.
- Milling machines.
- Precast elements.
- Anchor bolts.

## ADVANTAGES

- Non-shrink.
- Adjustable consistency.
- Proven and predictable performance.
- Excellent workability retention, even at high ambient temperatures.
- High bond strength to steel and concrete.
- Early strength development, even at fluid consistency.
- Good fatigue and impact resistance.
- Micro silica content enhances strength and durability.
- Impermeable.

## PACKAGING

InsuGrout 330 is supplied in 25 kg moisture resistant bags.

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InsuGrout 330 is approved by the Water Research Council Complies with CRD-C 621 ASTM C1107 - Grade B.

## STANDARDS

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## APPLICATION PROCEDURE PREPARATION

be free of oil, dust, dirt, paint, curing compounds, etc. Soak area to be grouted with water for 24 hours prior to grouting to minimise localised absorption and to assist in the free flow of the grout. Surfaces should be damp but free of standing water.

Particular attention should be paid to bolt holes to ensure that these are water-free. Use oil-free compressed air to blow out bolt holes and pockets as necessary.

Base plate and anchor bolts must be clean and free of oil, grease and paint etc. Set and align equipment. If shims are to be removed after the grout has set lightly grease them for easy removal.

Ensure formwork is secure and watertight to prevent movement and leaking during the placing and curing of the grout. The area should be free of excessive vibration. Shut down adjacent machinery until the grout has hardened.

In hot weather, base plates and foundations must be shaded from direct sunlight. Bags of grout should be stored in the shade prior to use. In cold weather, the temperature of base plates and foundations should be raised to >10°C.

## MIXING

In hot weather, use cool water to bring the mixed grout temperature to <30°C. In cold weather, use warm water to raise the mixed grout temperature to >10°C.

Damp down the inside of the grout mixer with water prior to mixing the initial batch of InsuGrout 330.

Ensure the mixer is damp but free of standing water. Add the pre-measured quantity of water. Slowly add the InsuGrout 330, mixing continuously. Mix for at least five minutes until a smooth, uniform, lump-free consistency is achieved.

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## PLACING

Lengths of metal strapping laid in the formwork prior to placing may be necessary to assist grout flow over large areas and in compacting and eliminating air pockets. Pour the grout continuously. Maintain a constant hydrostatic head, of at least 15cm.

On the side where the grout is to be poured, allow 10cm clearance between the side of the form and the base plate of the machine.

On the opposite side, allow 5-10cm clearance between the formwork and the base plate. InsuGrout grouts are suitable for use with most types of pumping equipment. Immediately after InsuGrout 330 grout is placed, cover all exposed grout with clean damp hessian, and keep moist until grout is firm enough to accept a curing membrane.

Immediately after placing InsuGrout 330 grout, cover all exposed grout with clean damp hessian and keep moist until grout is firm enough to accept a curing membrane. We recommend the use of a curing membrane from our InsuKure range.

## SHOULDERS

Due to differences in temperature between the grout under the base plate, and exposed shoulders that are subject to more rapid temperature changes, de-bonding and/or cracking can occur. Avoid shoulders wherever possible. If shoulders are required, they should be firmly anchored with reinforcing to the substrate to prevent de-bonding.

## TYPICAL WATER REQUIREMENTS

Application	Consistency	Flow Table	FLOW CONE	mix water Ltr/25kg	
				min	max
Grouting machinery:	Fluid	-	20-30	4.5	5
Grouting machinery:	Flowable	130	-	3.5	4
Bedding pre-cast:	Plastic	60	-	3	3.5
Filling tiebar voids:	Dry-pack	-	-	2	2.5

## FLOWABLE GROUTING TECHNIQUES

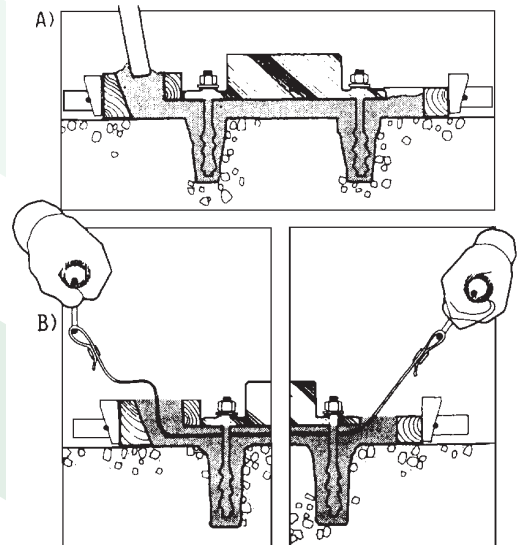


Diagram A illustrates the use of grout surcharge to ensure complete filling under a base. Diagram B shows that straps can be used to aid grout flow under a wider base. A gentle "sawing" action with the strap allows the grout to flow without segregation for greater distances.

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## TYPICAL PROPERTIES STRENGTH DEVELOPMENT

The strength of grout is dependent on many factors, which include mixing, water addition, curing, temperature and humidity. The table below gives typical average strengths of InsuGrout 330 at 25°C, when mixed with 3.3 litres (flowable) and 3.75 litres (fluid) per 25 Kg bag.

Time	Compressive Strength		
	Flowable N/mm <sup>2</sup>	Fluid N/mm <sup>2</sup>	Flexural N/mm <sup>2</sup>
1 day	34	28	0.7
3 days	43	35	8.5
7 days	51	45	10
28 days	64	58	11.5

Table 2 shows compressive strength of 100mm cubes and flexural strength of 40 x 40 x 160mm prisms.

## BLEED WATER

No bleed water is apparent (ASTM C-232) at recommended water addition rates.

## EXPANSION

Tests were made following both ASTM Standard C-878, on the use of expansive cements and Corps of Engineers Standard for grout. Tests made as prescribed by ASTM Standard C-878 show an expansion value of about 0.05%. Tests in conformity with Corps of Engineers show an expansion value of 0.3%, that is lower than the maximum value (0.4%) fixed by the same standards. Moreover, InsuGrout 330 expansion occurs both in the plastic and in the early hardened state. However, the expansion action of InsuGrout 330 exhausts mainly during the first 12 hours of curing.

## MODULUS OF ELASTICITY

The static modulus of elasticity, measured by applying a load corresponding to 1/3 of the strength, is approximately 25,000N/mm<sup>2</sup> at 7 days and 30,000 N/mm<sup>2</sup> at 28 days.

## FATIGUE RESISTANCE

Cube samples, produced with InsuGrout 330 and cured 28 days, underwent fatigue tests of 2,000,000 pulsing stresses ranging between 20 and 50N/mm<sup>2</sup> at a frequency of 500 cycles/min. Tested specimens were undamaged and their compressive strength was higher than that of similar specimens that were not subjected to fatigue tests.

## BOND TO CONCRETE

After a 28-day curing period, the InsuGrout 330 concrete bond was determined (about 6.5N/mm<sup>2</sup>) by the load applied to cause the disbondment from the contact surface.

## BOND TO STEEL

The bond of **InsuGrout 330** to steel, calculated by applying loads to the bars undergoing pull-out tests and by the grout-steel contact surface, is 3N/mm<sup>2</sup> at 7 days and 4N/mm<sup>2</sup> at 28 days for plain bars; 20N/mm<sup>2</sup> at 7 days and 30N/mm<sup>2</sup> at 28 days for deformed bars.

## WORKABILITY

Tests at the fluid consistency performed according to ASTM C939; show compliance with the requirements of CRD-C 621-82. Flowable and plastic consistency tests were made using ASTM C230 apparatus.

## CAPILLARY PORES AND PERMEABILITY

Even under a pressure of 20 atm, water does not penetrate InsuGrout 330 specimens. The permeability factor is calculated to be, therefore, lower than 1.10-12 cm/sec.

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## RESISTANCE TO CHEMICAL ATTACK

Due to its water tightness, InsuGrout 330 grout is protected against environmental aggressive agents in solution.

## RESISTANCE TO LOW TEMPER

After 300 freezing and thawing cycles, the modulus of elasticity decreases only 5%. This indicates that InsuGrout 330 is highly resistant to the disrupting action of frost.

## STORAGE

Store out of direct sunlight, clear of the ground, on pallets protected from rainfall. Avoid excessive compaction.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice, consult Insumat's Technical Services Department.

## HELP LIFE

Up to 12 months if stored in unopened containers according to manufacturer's instructions.

## PRECAUTIONS

The temperature of both the grout and elements coming into contact with the grout should be in the range of >10°C to >35°C. Do not use water in an amount or at a temperature that will produce a consistency more than fluid or cause mixed grout to bleed or segregate. InsuGrout 330 should be laid at a minimum thickness of 10mm and to a maximum depth of 80mm.

For applications above 80mm, consider the use of InsuGrout 330. For applications below 10mm, consult Insumat's Technical Services Department for advice.

To simulate on-site conditions it is necessary to restrain cubes for the first 24 hours immediately after casting.

**DO NOT OVERWORK AND AVOID USING MECHANICAL VIBRATION.**

**UNDER NO CIRCUMSTANCES SHOULD InsuGrout 330 BE RE-TEMPERED BY THE LATER ADDITION OF WATER.**

It is essential that a mechanically powered grout mixer is used to obtain the optimum properties.

## YIELD/CONSUMPTION

12.6 - 12.95/30kg bag dependent on water addition rate 78 x 25 kg bags/m<sup>3</sup>

## WARNING

As with other products containing Portland cement, the cementitious material in InsuGrout 330 grout may cause irritation. Avoid contact with eyes and prolonged irritation. In case of contact with eyes, immediately flush with plenty of water for at least 15 minutes. Call a physician. In case of contact with skin, wash skin thoroughly.

REQUEST AND REFER TO RECOMMENDED INSTALLATION PROCEDURES FOR **InsuGrout** EPOXY GROUTS PRIOR TO USE.

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### NOTE

Field service, where provided, does not constitute supervisory responsibility. For additional information, contact Insumat's representative.

Insumat reserves the right to have the true cause of any difficulty determined by accepted test methods.

### QUALITY STATEMENT

All products manufactured by Insumat Egypt, are manufactured to procedures certified to conform to the quality, environment, health & safety management systems described in the ISO 9001:2015, standard.

\* Properties listed are based on laboratory controlled tests.

Actual measured data may vary due to circumstances beyond Insumat's control.

Manufacturing Insulating Materials and Products Company

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