



**HYCHEM**  
EPOXY SYSTEMS

# IIS-PF9-HP/EG

High strength, high temperature, high flow epoxy grout

IIS-PF9-HP/EG is a solvent free pre-filled high performance epoxy resin grout. The grout is supplied as a three component mix design which can be adjusted to suit environmental conditions and flow requirements. The grout is based on the proven HYCHEM E200 epoxy grout with an adjusted curing compound, which achieves longer pot life and low exothermic temperatures.

## USE

It is recommended for:

- Precision grouting of machinery, chock grouting, compressors and any machinery requiring long pot life and experiencing thermal expansion and vibration
- Crusher mills, coke ovens, slab tables, holding down bolts and other equipment in heavy industry
- Mining, chemical, paper manufacturing and any chemical resistant grouting applications
- High early and seven day strengths with low exothermic temperature
- Rail/crane mountings, plinths and footings
- Bridge bearing pads.

## FEATURES AND BENEFITS

- High flow characteristics which can be adjusted to suit conditions
- Higher temperature resistance than normal grouts
- Chemical resistance
- High compressive strength
- Excellent creep resistance ensuring it maintains its multi-dimensional support under constant load
- Low exothermic temperature
- Excellent adhesion to concrete and steel
- Fast turn around for shutdowns
- Faster curing and higher strength than cementitious grouts.

## PRELIMINARY SPECIFICATIONS

The tests were carried out on non standard blocks of 65mm x 65mm x 50mm. These blocks were mixed at 13°C and left to cure at this temperature for 4 hours and then for 3 hours at 15°C. Tests to date have shown:

7 hrs	38.5 MPa
8 hrs	67.0 MPa
9 hrs	97.0 MPa
24 hrs	148.0 MPa

These test blocks were mixed with the equivalent of 40 kg of F6 epoxy graded fillers per 30 litre kit of epoxy mixed grout. This mixture was free flowing and had a pot life of 1.5-2.0 hours.

**Note:** the above data is typical for that observed for the two tests carried out at these temperatures. The data is based on a standard test of three litres of epoxy grout and 4 kg of F6 graded fine fillers. Test results may vary depending on temperature, amount of filler and flow characteristics required.

## TYPICAL PERFORMANCE

Epoxy grouts have much higher physical performance capabilities than cement grouts, with 3 times the compressive strength and up to 10 times the tensile strength. They are also more impact resistant and withstand cracking due to mechanical vibrations. Individual epoxy grouts vary depending on whether they are formulated for high or low temperature use, minimal cost or specific flow and creep properties.

The placement depth of an epoxy grout is dependent on the heat released during cure and the resultant shrinkage and cracking forces that occur.

## APPLICATION GUIDELINES

The grouting area needs to be protected from cold, hot and wet conditions before grouting start and for at least 24 hours after grout placement.

### Surface preparation

- Concrete shall be fully cured for a minimum of 28 days and with a compressive strength of 25 MPa and surface tensile strength of 2.0 MPa minimum.
- Remove surface laitance, contaminants, coating, curing compound and all weak and loose materials.
- Roughen concrete surface by Chipping, Diamond Grinding, Scarifying or Grit Blasting to provide the appropriate surface profile for optimum bonding. 50% of the surface should be exposed aggregate.

If the grout will extend out horizontally beyond the machinery base by more than about 25cm then edge lifting may become an issue. If this is the case there are a number of ways to combat it including installing dowels. Consult a Hychem representative for further information.

### Base plate preparation

- Base plate surfaces that will be in contact with the grout should be sandblasted to white metal surface. No oil, grease.
- The plate can be coated with an epoxy primer if the grouting is not happening immediately. If left for more than a few weeks then the surface should be prepared again.
- Sharp edges in contact with grout should be rounded reduce stress concentration in the grout. Sharp edges can result in stress cracks in the grout.

Anchoring bolts, rebar, dowels and inserts in concrete, rock and brickwork. The following guidelines are suggested.

### Hole diameter

Should generally be 1.5 times the insert diameter. This can be reduced for large insert diameters above 100mm.

## APPLICATION GUIDELINES CONTINUED...

### Depth of embedment

Concrete tensile strength and the depth of bolt embedment determines the pull-out load. The anchor depth should be designed to provide bolt failure when tested in tension.

### Hole spacing

Hole spacing is important to avoid stress interaction caused by holes spaced too closely together or near the edge of the structure. A good guide for minimum spacing is 10 times the bolt diameter for bolt spacing and five times the bolt diameter for edge spacing.

### Epoxy grout placement

To avoid air entrapment, the liquid grout should be filled bottom up using enough head pressure to achieve the desired flow rate and distance.

### Form work

- Use good quality form material and ensure it is strong and leak proof. Any gaps should be sealed with an appropriate material such as silicone sealant. The forms should be coated multiple times with a grease or floor wax to aid removal after curing.
- Forms should rise about 25mm above the base plate to contain the flowing grout.
- Forms at the sides of the plate should be placed at about 40mm from base plate edge. Forms at the grout entry and exit ends should be placed at least 75mm out to allow room for flow and manoeuvring. To aid the placement of grout under sizeable base plates it is beneficial to use a moveable header box. This controls the flow of grout and directs it forward under the machine while minimising the incorporation of air. It should be slanted away at an angle of 45 degrees.
- When grouting long sections it is recommended to install expansion joints. This reduces the chance of cracks, due to differences in linear thermal expansion and contraction between the grout and concrete.

### Placing of grout

- Grout should be placed immediately after mixing
- Check for any leakage regularly, leakage can cause voids.

### Aggregate ratio

The standard ratio of F6 graded fine filler is 40kg per 30 litre kit of epoxy resin grout. This may be extended up to 60kg depending on thermal conditions and flow ability required.

### CHEMICAL RESISTANCE

Chemical resistance is comparable to Hychem E-200 epoxy grout and is resistant to non-oxidising mineral acids and salts, caustics, dilute oxidising acids and salts, solvents and some organic acids. Coke and coal wash, even at elevated temperatures, has limited effect on the grout. However, sharp particles may abrade the surface if flow is constantly occurring.

### FILL RATIO

The pre filled nature of the grout means that the fillers may be omitted if required at elevated temperatures and time requirements of the grouting application. To achieve lower exothermic temperatures, 40 kg to 60 kg of F6 graded fillers may be added to a 30 litre kit of the grout to yield 45 litres to 52 litres of mixed grout respectively. This mix will extend the pot life and exothermic reaction of the mix.

### MIXING

Mix the entire contents of each kit as supplied. Do not attempt to split units unless accurate measuring can be assured. The two components of the grout must be mixed together after separate mixing. Use a slow running grout mixer and mix for 5 minutes. Slowly add the Part C (fillers) to the mixed material while still mixing. Mechanically mix the grout for a further two minutes and allow resting for five minutes for digestion and entrapped air to escape.

### APPLICATION

The grout is handled like a conventional grout such as Hychem E-200. It may be poured under base plates via a header box or extended head flow. A continuous flow of grout must be maintained or pumped. The use of rods, straps or chains will assist in the correct bearing of the base plate and help eliminate any air entrapment.

### THICKNESS

The grout may be applied at thicknesses of 150mm with the addition of fillers. When pour thickness exceeds 150mm, reinforcement steel is recommended. Flow requirements below 12mm will not require the use of fillers, however, the grout usage and hence costs will increase.

### CLEANING

Gun wash thinners are suitable for cleaning of equipment. It should never be used for thinning the grout.

### SAFETY

Refer to the Material Safety Data Sheets for handling procedures. As with all epoxy grouts, protective equipment including gloves, eye wear and overalls should be utilised.

### PACKAGING

The grout is available in 30 litre kits which consist of 2 x 10 litre containers of resin and 1 x 10 litre container of hardener. Epoxy grade F6 fillers are available in 20 kg bags.

### SHELF LIFE

Shelf life of 12 months from date of manufacture if stored under shelter and at 25°C in original un-opened container.



## WARNING - ENVIRONMENTAL CONDITIONS

Temperature and the surrounding atmospheric conditions will play a part in the curing process of all epoxy products. Under conditions of low temperatures and high humidity the final cured surface finish can be adversely affected potentially resulting in poor gloss retention, discolouration over time, poor overcoatability and intercoat adhesion. Quite often these conditions will result in the formation of a white film over the surface often evident after contact with water. This chemical reaction with the atmosphere is commonly referred to as "amine bloom" or "amine blush".

If this occurs then the existing coating will need to be abraded to completely remove the affected surface to ensure the adhesion of subsequent applications. In some cases partial or complete re-priming may be necessary.

Attention also needs to be paid to the substrate temperature which should be at least 3°C and preferably 5°C above the dew point during the curing phase.

Industry standards recommend the accurate recording of times and dates, batch numbers, consumption rates and environmental conditions including substrate and air temperatures, humidity levels and dew point readings during both the application and curing processes. Full material warranties cannot be provided unless all the relevant data has been recorded accurately.

If in doubt consult the Hychem technical department for advice.

### **NOTE: Customer responsibility**

*The technical information and application advice given here is based on the best information available at the time of print. As the information herein is of a general nature, no assumption can be made as to the products suitability for a particular use or application and no warranty as to its accuracy, reliability or completeness either expressed or implied is given other than those required by Commonwealth or State Legislation.*

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*If unsure contact Hychem for further technical advice before proceeding.*

