



Expangrout* HS

High strength, shrinkage compensated, high flow cementitious grout

Uses

Expangrout* HS is used for free flow precision grouting in a wide range of heavy duty applications

- Machine base plates
- Bridge bearings
- Crane rails, generators, presses, milling machines
- Anchor bolts & rods
- Columns base
- Precast elements

Advantages

- Unique non-metallic dual expansion system compensates for shrinkage in both the plastic and hardened states.
- Excellent initial flow and flow retention
- Low permeability and high strength, ensure durability of the hardened grout
- High early strength facilitates rapid installation and early operation of plants.
- Hydrogen free gaseous expansion
- Chloride free
- Suitable for pumping or pouring over a large range of application consistencies and temperatures.

Description

Expangrout* HS cementitious grout is supplied as a ready to use dry powder. The addition of a controlled amount of clean water produces a flowing non-shrink grout for gap thicknesses from 10 mm to 120 mm. Expangrout* HS is a blend of Portland cement, graded fillers and chemical additives which impart controlled expansion in both plastic and hardened states, whilst minimising water demand. The low water demand ensures high early strength. The graded filler is designed to assist uniform mixing and produce a consistent grout.

Specification

Performance specification

All grouting where shown on the drawing must be carried out with a pre-packaged cement based product which is chloride-free.

It shall be mixed with clean water to the required consistency. The plastic grout must not bleed or segregate.

A positive volumetric expansion shall occur while the grout is plastic by means of a gaseous system.

The compressive strength of the grout must exceed 55 N/mm² at 7 days and 70 N/mm² at 28 days.

The storage, handling and placement of the grout must be in strict accordance with the manufacturer's instructions.

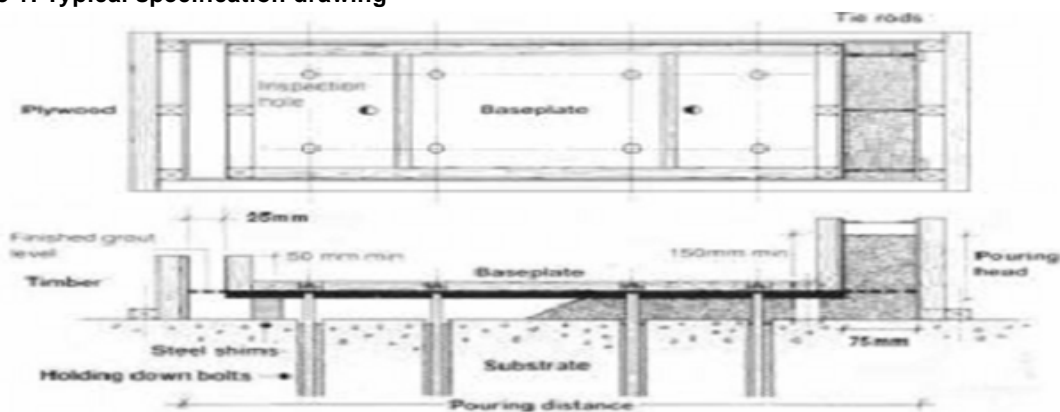
Supplier specification

All grouting where shown on the drawing must be carried out using Expangrout* HS manufactured by Fospak and used in accordance with the manufacturers data sheet.

Standard compliance

Expangrout* HS compliance to ASTM C1107 Grade C CRD C-621-93

Figure 1: Typical specification drawing





CONSTRUCTION CHEMISTRY

Properties

The following results were obtained at water : powder ratio of 0.14 and temperature of 25°C.

Compressive strength

BS 1881 part 116 1983 : 40 N/mm² @ 3 days
: 60 N/mm² @ 7 days
: 75 N/mm² @ 28 days

Flexural strength

BS 4551 1980 : 5 N/mm² @ 3 days
: 8 N/mm² @ 7 days
: 12 N/mm² @ 28 days

Time for expansion

Plastic state Start : 15 minutes
Finish : Initial set

Hardened state Start : Initial set
Finish : Up-to 28 days

Fresh wet density : Approximately 2200 kg/m³
depending on actual consistency used.

Modulus of elasticity

ASTM C 469-02 : >24000 MPa

Expansion characteristics : Up-to 2% in accordance with ASTM C 940-98a

Instruction for use

Preparation

Concrete surface

The substrate surface must be free from oil, grease or any loosely adherent material. If the concrete surface is defective or has laitance, it must be cut back to a sound base. Bolt holes and fixing pockets must be blown clean of any dirt or debris.

Pre-soaking

For a minimum of 2 hours prior to grouting, the area of cleaned substrate should be flooded with fresh water. Immediately before grouting takes place, any free water should be removed. Particular care should be taken to blow out all bolt holes and pockets.

Base plate

It is essential that this is clean and free from oil, grease or scale. Air pressure relief holes should be provided to allow venting of any isolated high spots.

Leveling shims

If these are to be removed after the grout has hardened, they should be treated with a thin layer of grease.

Formwork

The formwork should be constructed to be leak proof. This can be achieved by using foam rubber strip or mastic sealant beneath the constructed formwork and between joints. In some cases it is practical to use sacrificial semi-dry sand and cement formwork. The formwork should include outlets for pre-soaking.

Unrestrained surface area

This must be kept to a minimum. Generally the gap width between the perimeter formwork and the plate edge should not exceed 75 mm on the pouring side and 25 mm on the opposite side. It is advisable where practical to have no gap at the flank sides.

Mixing

For best results a mechanically powered grout mixer should be used. When quantities up to 40 kg are used, a slow speed drill fitted with Mixing Paddle should be used. Larger quantities will require a high shear vane mixer. Do not use a colloidal impeller mixer. To enable the grouting operation to be carried out continuously, it is essential that sufficient mixing capacity and labour are available. The use of a grout holding tank with provision to gently agitate the grout may be required.

Consistency of grout mix

The quantity of clean water required to be added to a 20 kg bag to achieve the desired consistency is given below.

Flowable : 2.80 - 3.20 liters

Fluid : 3.2.0 - 3.80 liters

The selected water content should be accurately measured into the mixer. The total contents of the Expangrout* HS bag should be slowly added and continuous mixing should take place for 5 minutes. This will ensure that the grout has a smooth even consistency.



Placing

At 25°C place the grout within 15 minutes of mixing to gain full benefit of the expansion process.

Expangrout* HS can be placed in thicknesses up to 120 mm in a single pour when used as an under plate grout. For thicker sections it is necessary to fill out Expangrout* HS with well graded 10mm, silt free aggregate to minimise exotherm. If bulking with aggregate is used the ratio shall not exceed 1:1. Contact Expanchem Fospak for details of pre-bagged supply. The properties of a bulked grout will differ from those published in this data sheet.

Any bolt pockets must be grouted prior to grouting between the substrate and the base plate.

Continuous grout flow is essential. Sufficient grout must be prepared before starting. The time taken to pour a batch must be regulated to the time taken to prepare the next one.

Pouring should be from one side of the void to eliminate any air or pre-soaking water becoming trapped under the base plate. It is advisable to pour the grout across the shortest distance of travel. The grout head must be maintained at all times so that a continuous grout front is achieved.

Where large volumes have to be placed Expangrout* HS may be pumped. A heavy duty diaphragm pump is recommended for this purpose. Screw feed and piston pumps may also be suitable.

Curing

On completion of the grouting operation, exposed areas should be thoroughly cured. This should be done by the use of Expancure* curing membrane, or continuous application of water and/or wet hessian.

Cleaning

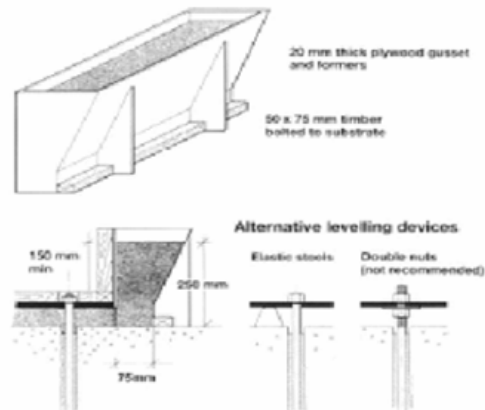
Expangrout* HS should be removed from tools and equipment with clean water immediately after use. Cured material can be removed mechanically, or with Expanchem* Acid Etch.

Sampling procedure

Cementitious grouts cannot be tested as concrete. Special sampling procedure are required refer to your local Expanchem office for further details.

Typical hopper system

Removable hopper: For larger pours the grout may be hand placed or pumped into a removable hopper.



High temperature working

It is suggested that, for temperatures above 35°C, the following guidelines are adopted as good working practice:

- (i) Store unmixed material in a cool (preferably temperature controlled) environment, avoiding exposure to direct sunlight.
- (ii) Keep equipment cool, arranging shade protection if necessary. It is especially important to keep cool those surfaces of the equipment which will come into direct contact with the material itself.
- (iii) Try to eliminate application during the hottest times of the day and in direct sunlight.
- (iv) Make sufficient material, plant and labour available to ensure that application is a continuous process.
- (v) Water (below 20°C) should be used for mixing the grout prior to placement.

Limitations

Grouts should not be placed in any unrestrained situation, i.e. base plate plinths, etc. Failure to comply may lead to crack development in the grout, consult with Fospak.



CONSTRUCTION CHEMISTRY

Estimating

Supply

Expangrout* HS : 20 kg bags

Yield

Flowable : 10.50 liters

Fluid : 11.00 liters

Note:- Allowance should be made for wastage when estimating quantities required.

Storage

Expangrout* HS has a shelf life of 12 months if kept in a dry store in sealed bags. If stored in high temperature and high humidity locations the shelf life will be reduced.

Precautions

Health and safety

Expangrout* HS is alkaline and should not come into contact with skin and eyes. Avoid inhalation of dust during mixing. Gloves, goggles and dust mask should be worn. If contact with skin occurs, wash with water. Splashes to eyes should be washed immediately with plenty of clean water and medical advice sought.

Fire

Expangrout* HS is non-flammable.

* Denotes the trademark registered.

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