

Mix and place polyester resin anchoring grouts

Uses

High strength corrosion resistant heavy duty anchoring. These anchors include bolts, tendons or dowels in drilled or formed holes located in concrete masonry, brickwork or natural rock.

Permanent installation of reinforcement starter bars, foundation bolts, ballustrading, barriers and safety fences, railway tracks, ground anchors for towers, cranes, dock sills etc.

Advantages

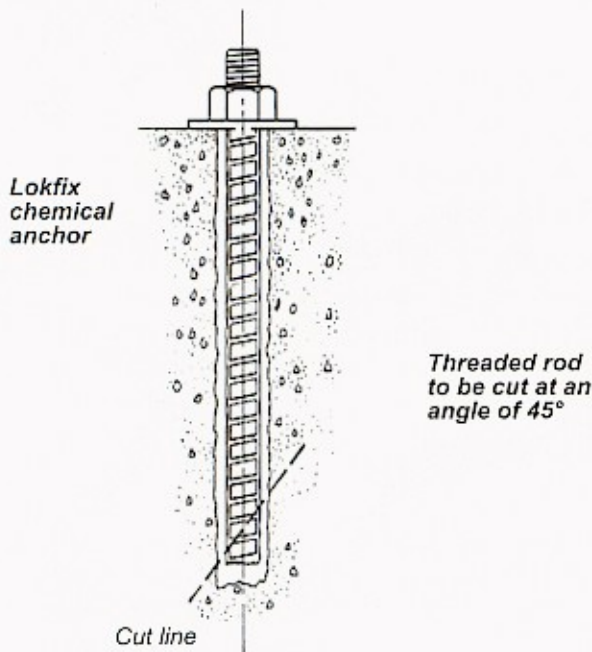
- Ultra rapid strength gain
- Vibration resistant
- Corrosion resistant
- Tolerant of wet and damp conditions
- Can be placed underwater and in damp conditions
- Non expansive
- Pre-weighed components ensure consistent performance of the grout

Description

The Lokfix range consists of pre-measured, two pack, filled polyester resin grouts. The two components are polyester resin and a catalysed filler. The standard version, having longer gel times suited to hot weather working conditions, comprises of Lokfix S80 for vertical downward holes and Lokfix P80 for horizontal and overhead holes

Typical permanent fixing

Figure 1: Threaded bar anchored with Lokfix



Typical semi-permanent fixing

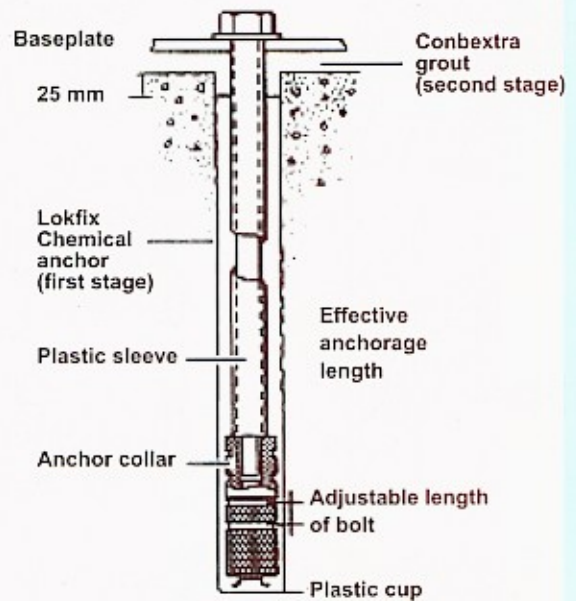


Figure 2: Hexagon headed bolt with removable nut and tie bar anchored with Lokfix

Technical support

Fosroc offers a comprehensive range of high performance, high quality concrete repair and construction products. In addition, Fosroc offers a technical support package to specifiers, end-users and contractors, as well as on-site technical assistance in locations all over the world.

Design criteria

The version of Lokfix grout to be used will depend upon ambient temperature and anchor conditions.

The high strength of the cured resin permits strong anchors to be created. The ultimate bond strength developed depends upon:

- Strength of host material
- Length of resin bond to bar
- Hole preparation and formation
- Type and dimension of bar

The following formula may be used to determine the minimum depth of installation for Type 1 rebar bolts, to ensure the shear stress within the concrete is kept within the limits set out in BS 8110.

$$\text{Minimum hole depth (mm)} = \frac{0.6Y}{S} \cdot \frac{d_1^2}{d_2} = \frac{0.15Yd_1^2}{Sd_2}$$

where Y is characteristic yield strength of steel (460 N/mm²)

S is permitted shear stress in concrete (N/mm²)

d₁ is bar diameter (mm)

d₂ is hole diameter (mm)

This formula is used typically as shown in Table 1.

Table 1

| <i>Minimum hole depth</i> | | | | | | |
|---|-------------------|---------------------------|--------------------------------|------|------|-----|
| <i>Characteristic concrete strength (N/mm²):</i> | | | | | | |
| | 20 | 25 | 30 | > 40 | | |
| <i>Permitted concrete shear stress using Type One Bar (N/mm²):</i> | | | | | | |
| | 1.8 | 2.0 | 2.2 | 2.5 | | |
| <i>Bar diameter (tonnes)</i> | <i>Yield (mm)</i> | <i>Hole diameter (mm)</i> | <i>Minimum hole depth (mm)</i> | | | |
| 12 | 5.2 | 20 | 280 | 250 | 225 | 200 |
| 16 | 9.3 | 20 | 490 | 445 | 400 | 355 |
| 20 | 14.5 | 25 | 615 | 555 | 500 | 440 |
| 25 | 22.6 | 32 | 750 | 675 | 615 | 540 |
| 32 | 37.0 | 38 | 1035 | 930 | 845 | 745 |
| 40 | 57.8 | 45 | 1365 | 1225 | 1115 | 980 |

Properties

Typical results

Gel time

| | | | | |
|-----------------------|---|-----|----|----|
| <i>Temperature °C</i> | : | 10 | 20 | 30 |
| <i>Minutes</i> | : | 100 | 40 | 15 |

Compressive strength (N/mm²)

BS 6319 part 2 1983

| | | |
|-----------------|---|-----|
| <i>1 hour</i> | : | 70 |
| <i>3 hours</i> | : | 85 |
| <i>24 hours</i> | : | 100 |
| <i>7 days</i> | : | 115 |

Tensile strength (N/mm²)

BS 6319 part 2 & 3 1985

| | | |
|---------------|---|----|
| <i>3 days</i> | : | 12 |
| <i>7 days</i> | : | 14 |

Flexural strength (N/mm²)

BS 6319 part 3 1990

| | | |
|---------------|---|----|
| <i>3 days</i> | : | 26 |
| <i>7 days</i> | : | 30 |

Shear Strength : 36N/mm²

BS 2782: Pt 2

Specification clauses

Supplier specification

Mix and place grout where shown on the drawings shall be Lokfix manufactured by Fosroc. It shall be used in accordance with the manufacturer's current application instructions.

Performance specification

Mix and place grout where shown on the drawings shall be a two component polyester resin system. When fully cured it shall exhibit a compressive strength in excess of 90 N/mm², a flexural strength in excess of 28 N/mm² and a tensile strength in excess of 12 N/mm² at 7 days.

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

Application instructions

Hole preparation and formation

Three methods of hole formation are possible.

1. Optimum performance of Lokfix grouts requires rough sided, dust free holes. These can be made by using rotary percussive drills followed by oil-free air or water flushing.
2. Diamond drilled holes should be underreamed.
3. Cast holes should be of inverse dovetail configuration. If parallel sided holes are cast, they should be rough enough to provide an adequate mechanical key.

Bar preparation

1. All bars should be deformed. This will ensure good bond between the bar and the grout.
2. Bars should be degreased and any mill scale or flaky rust removed.

Mixing

Only a complete pack of resin and catalysed filler should be mixed in one operation. Mixing may be carried out manually or mechanically. When a smooth, even consistency is achieved, the grout is ready for use. It must be placed well within the gel time of the grout.

Placing

The mixed grout should be poured or pumped steadily into the prepared anchor holes. The anchor bar should then be pressed into the hole to the required depth. Slight agitation of the bar will greatly assist in achieving a complete bond.

The bar should be left undisturbed in the required position until the grout has hardened fully.

Cleaning

Any mixing drums, pumps etc should be cleaned within the pot life of the grout. Fosroc Solvent 102 is recommended for this purpose.

Limitations

1. At permanent operating temperatures above 40°C, creep of the cured grout may become significant.
2. Resin anchors should not be used where structural load bearing performances have to be maintained in anchors subjected to fire conditions.
3. For use at temperatures below 5°C, seek advice from Fosroc.

Estimating

Supply

Lokfix S80, P80 : 1 litre packs

Volume of Lokfix grout required in ml for each 100 mm of bond length.

(200 mm bond length is the minimum recommended.)

| Hole diameter mm | Bolt diameter mm | | | | | |
|---------------------|------------------|----|-----|-----|-----|-----|
| | 12 | 16 | 20 | 25 | 32 | 40 |
| 20 | 25 | | | | | |
| 25 | 50 | 40 | 25 | | | |
| 32 | 80 | 70 | 60 | 40 | | |
| 38 | 100 | | 100 | 75 | 45 | |
| 45 | 150 | | | 130 | 100 | 45 |
| 50 | 180 | | | | 150 | 90 |
| 62 | 280 | | | | | 225 |

These figures allow for a 25% wastage factor.

If the anchor is in very old concrete, masonry or brickwork the wastage factor should be increased.

No of bolts/200 mm deep hole which can be fixed using a 2.5 litre pack of Lokfix

| Hole diameter mm | Bolt size mm | | | | | | | |
|---------------------|--------------|----|----|----|----|----|----|---|
| | 12 | 16 | 20 | 25 | 32 | 40 | | |
| 20 | 50 | | | | | | | |
| 25 | 25 | 31 | 50 | | | | | |
| 32 | 15 | 17 | 21 | 31 | | | | |
| 38 | 12 | | 12 | 16 | 27 | | | |
| 45 | 8 | | | 9 | 12 | 27 | | |
| 50 | 6 | | | | 8 | 9 | 13 | |
| 62 | 4 | | | | | 4 | 5 | 5 |

Storage

Shelf life

All products have a shelf life of 12 months at 20°C if kept in a dry store in the original, unopened packs.

The shelf life will be reduced at higher ambient temperatures.

Storage conditions

Store in dry conditions away from high temperatures and high humidity. Keep away from sources of heat and naked flames.

Precautions

Health and safety

Lokfix products and Fosroc Solvent 105 are flammable. Keep away from sources of ignition - no smoking. In the event of fire extinguish with CO₂ or foam.

Some people are sensitive to resins and solvents. Avoid contact with skin and eyes. Ensure adequate ventilation and avoid inhalation of vapours. Wear suitable protective clothing, gloves and eye/face protection. Barrier creams provide additional skin protection. Should accidental skin contact occur, wash immediately with a resin removing cream, followed by soap and water. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice - **do not** induce vomiting.

For additional information see the relevant Material Safety Data Sheet.

Additional Information

Fosroc manufactures a wide range of complementary products which include :

- waterproofing membranes & waterstops
- joint sealants & filler boards
- cementitious & epoxy grouts
- specialised flooring materials

Fosroc additionally offers a comprehensive package of products specifically designed for the repair and refurbishment of damaged concrete. Fosroc's 'Systematic Approach' to concrete repair features the following :

- hand-placed repair mortars
- spray grade repair mortars
- fluid micro-concretes
- chemically resistant epoxy mortars
- anti-carbonation/anti-chloride protective coatings
- chemical and abrasion resistant coatings

For further information on any of the above, please consult your local Fosroc office - as below.

* Denotes the trademark of Fosroc International Limited

† See separate data sheet

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Important note

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