

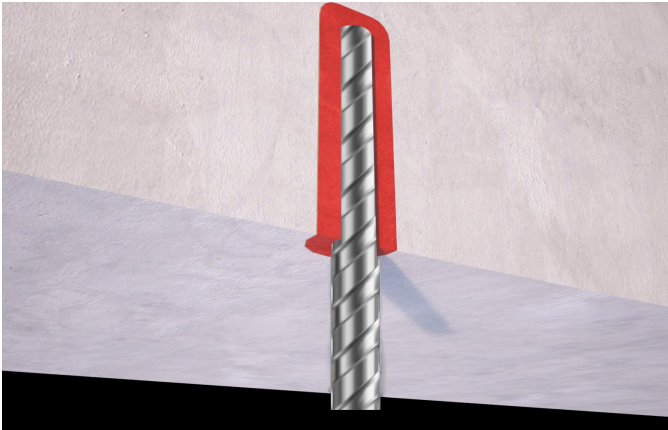
Fosroc® Lokfix E77

(supersedes Lokfix E75)



constructive solutions

High performance pure epoxy 3:1 resin cartridge system, for anchoring reinforcement and fixings into a variety of substrates.



Uses

For concrete (solid, porous and light) and solid masonry.

- Accredited* for use in dry, wet and flooded concrete substrates, internal and external exposure.
- Can be used with cracked concrete
- Fixing of post installed reinforcement
- Anchoring of threaded rod fixings
- Anchoring of internal threaded rod sleeves
- Can be applied to a wide variety of fixing and rebar sizes
- For horizontal, vertical and overhead application
- C1 and C2 seismic resistance*

Advantages

- High durability: Tested to achieve 100 year design life*
- High Bond strengths for heavyweight fixings or economical design.
- No additional mixing equipment required
- Does not apply expansive force to the substrate
- Fixings can be spaced closer together than mechanical anchors
- Enables fixings closer to edges than mechanical anchors
- Low VOC
- Re-usable by replacing sealing cap product may be kept to the end of original shelf life.
- Tested with diamond drilled bore holes*

- Waterproof, protecting the embedded fixing from corrosion and water penetration into the substrate.
- Extended gel times allow for more complex procedures
- Fire rated up to 2 hours*
- 24 month shelf life

**Consult Fosroc technical department for specific data.*

Description

Lokfix E77 is a two-component Epoxy anchoring material, supplied in 3:1 ratio side-by-side cartridges with a static mixer nozzle. When applied it sets and cures to firmly secure a variety of steel fixings into concrete and solid masonry substrates.

Other grades of Lokfix are also available

Lokfix E55/E45 Rapid curing resin anchor cartridge system based on styrene free vinylester for heavy /medium duty anchoring.

Lokfix P, Lokfix S High strength polyester resin anchor grout for non critical fixings.

Lokfix TR High strength carbon steel and Stainless Steel threaded rods of various diameters in customized lengths.

Specification Clause

The anchor grout shall be Fosroc Lokfix E77 cartridge system. The Anchoring grout shall comply with EAD 330087-00-0601, systems for post-installed rebar connections, and EAD 330499-01-0601 for anchoring fixings into cracked and un-cracked concrete.

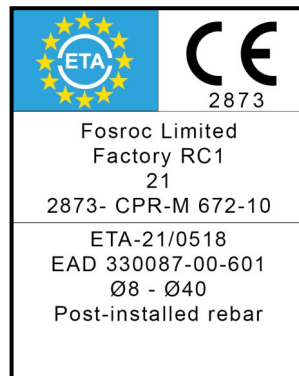
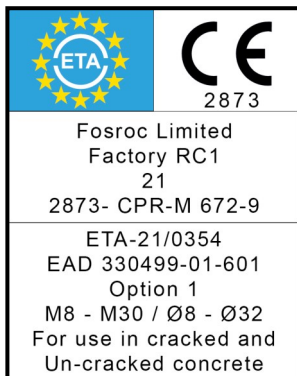
Standards Compliance

Lokfix E77 complies with the following standards:

- European approval to EAD 330499-01-0601, anchoring in cracked and un-cracked concrete (which supersedes ETAG 001 option 5) includes fire testing, (threaded rod only) to 120 minutes and C1 & C2 seismic approval.
- European approval to EAD 330087-00-0601, for use in post-installed rebar connections (supersedes EOTA TR 023).
- Émissions dans l'air intérieur : A+
- LEED compliant VOC Level



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Material Properties

Table 1 — Material Properties

Table 2 — Lokfix E77 Gel & Dry Curing Times.

Compressive Strength (EN196-1)	>110 MPa
Flexural Strength (EN196-1)	>60MPa
E Modulus (ISO 527-2)	>6000 MPa
Axial Tensile Strength (ISO 527-2)	>40
Shore A Hardness (ISO 868)	>90
Shore D Hardness (ISO 868)	>85
Density	~1.5kg/L
Temporary service temp. (<24h)	-40°C to +72°C
Permanent service temp. (>24h)	-40°C to +50°C
Watertightness (EN12390-8)	0 mm
Electrical resistance (IEC93)	8 x10 ¹² Ωm
Thermal Conductivity (EN993-15)	0.50W/m.K

Substrate Temp.	Gel Time (mins)	**Dry Curing Time (hrs)
0°C	90	144
+10 °C	60	28
+20 °C	30	12
+30 °C	12	9
+40°C	8	4

For optimal use the cartridge temperature should be between +5°C to +40°C. Note general storage conditions.

**The stated curing time is for dry conditions. In wet/damp conditions, the curing time will double.

Be aware that the substrate temperature can vary significantly from the ambient temperature.

Chemical resistance

Lokfix E77 has resistance to a wide variety of chemicals.

*Consult Fosroc technical department for specific data.

Design Criteria

Assistance and qualification

Design of fixings and reinforcement must be undertaken by suitably qualified personnel with understanding of the construction and use of the structure, the use of the fixing, as well as being in compliance with local legislation.

In applications where fixings or rebar must be designed and applied in compliance with the requirements of the relevant ETA and EAD, designers should consult the relevant Fosroc accreditation documents.

Fosroc provides software which may be used to aid design, available at www.lokfix.com or through your local technical office.

Note tables 3, 4 and 5 suggestions for use and data provided has been selected based on following criteria: Compressive class C20/25 dry/wet, un-cracked concrete, hammer drilled or compressed air drilled. Rebar class Bst 500, threaded rod 8.8 class. 50 year design life with long/short term service temps maximums of +25/+40°C. Calculations performed to comply with EN1992-4 (2018).

All values in mm unless otherwise stated.

* Data provided does not form part of the EAD

For all other conditions including 100 year design life, increased concrete strength, fixings into solid masonry types, fixings into cracked concrete, fixings subject to seismic conditions and post installation of reinforcement refer to the relevant method statement, EAD document or use the design software www.lokfix.com, also available through your local technical office.

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Table 3 - Rebar Anchoring Setting Parameters – details below

Rebar Anchor Size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø32	Ø36*	Ø40*
Min. Edge Distance	C_{min}	35	40	45	50	50	60	70	70	75	85	180	200
Min. Spacing	S_{min}	40	50	60	70	75	90	120	120	130	150	180	200
Max. Embedment Depth	$h_{ef, max}$	160	200	240	280	320	400	480	500	560	640	720	800
Min. Embedment Depth	$h_{ef, min}$	60	60	70	75	80	90	96	100	112	128	144	240
Min. Part Thickness	h_{min}	$h_{ef} + 30mm \geq 100mm$		$h_{ef} + 2d_0$									
Min. Drill Diameter	$D_{0, min}$	10	12	14	18	20	25	30	30	35	40	45	50
Max. Drill Diameter	$D_{0, max}$	12	14	16	18	20	25	32	32	35	40	45	50

Table 4 - Threaded Rod Anchoring Setting Parameters -details below

Anchor Size		M8	M10	M12	M16	M20	M24	M27	M30	M33*	M36*	M39*	M42*	M48*
Min. Edge Distance	C_{min}	35	40	45	50	60	65	75	80	165	180	195	210	240
Min. Spacing	S_{min}	40	50	60	75	95	115	125	140	165	180	195	210	240
Max. Embedment Depth	$h_{ef, ma}$	160	200	240	320	400	480	540	600	660	720	780	840	960
Min. Embedment Depth	$h_{ef, mi}$	60	60	70	80	90	96	108	120	132	144	156	168	192
Min Part Thickness	h_{min}	$h_{ef} + 30mm \geq 100mm$			$h_{ef} + 2d_0$									
Drill Diameter	d_0	10	12	14	18	22	28	30	35	38	42	45	52	60
Max. Installation Torque	$T_{inst.}$	10	20	40	60	100	170	250	300	330	360	390	460	550

Table 5 - Example Fixing loads

Fixing diameter		8	10	12	14	16	20	24	25	27	28
Embedment depth	h_{ef}	80	90	110	115	125	170	210	210	250	250
Edge distance	C	120	135	165	173	188	255	315	315	375	375
Spacing	S	240	270	330	345	375	510	630	630	750	750
Tension load for Threaded rod (kN)		13.8	20.0	27.0	-	32.7	51.9	71.3	-	92.6	-
Tension load for rebar (kN)		14.3	20.0	27.0	28.9	32.7	51.9	68.8	71.3	-	92.6

Fixing diameter		30	32	33*	36*	39*	40*	42*	48*
Embedment depth	h_{ef}	270	270	320	350	380	380	420	480
Edge distance	C	405	405	480	525	570	570	630	720
Spacing	S	810	810	960	1050	1140	1140	1260	1440
Tension load for Threaded rod (kN)		103.9	-	111.7	127.8	144.6	-	168.0	205.3
Tension load for rebar (kN)		-	103.9	-	127.8	-	144.6	-	-

Note: Greater/lesser loads per fixing are possible depending on embedment depth and other factors. Consult Fosroc technical for advice.

* Data provided does not form part of the EAD

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Product Installation

Full details are available in the application method statement, a copy of which may be obtained from your local Fosroc technical department.

The following methodology is for installation into solid substrates such as reinforced concrete. For other substrates or fixings please request a separate method statement.

Hole Formation and Preparation

Drill hole with percussive drill or compressed air drill ensuring sides of the concrete are rough. If using a hollow drill bit system, additional hole preparation is not generally necessary. If using diamond drill, the hole must be flushed with clean water, cleaned with a wire brush and flushed again before using the cleaning process described below.

If rebar is encountered, immediately stop drilling and seek the advice of the designing engineer.

Clean holes immediately prior to installation of fixings to avoid them becoming re-contaminated.

Standing water in the hole shall be removed prior to preparation. Using compressed air, insert the nozzle to the back of the hole and blow out 2 times.

Insert a wire cleaning brush to the bottom of the hole and brush out 2 times. Cleaning brush should be at least 0.5mm wider than diameter of drill hole.

Using compressed air, insert the nozzle to the back of the hole and blow out an additional 2 times.

If dust is still present, repeat the process until no further dust is visible.

Ensure the drill bit and the cleaning brush are of suitable diameter for the fixing used. Consult tables 3 and 4 for specific diameters.

Fixings Preparation

Fixings shall be free from rust, paint, grease and contaminants which will interfere with the bond.

Mark the required depth on the fixing.

Installation

Lokfix E77 requires a special 3:1 application gun, this can be supplied by Fosroc.

Unscrew the fixing cap from the cartridge.

Screw the static mixer nozzle onto the cartridge. Place the cartridge into the application gun.

Pull the trigger to extrude the Lokfix E77.

Important: extrude the initial material until the colour becomes red and consistent. This typically takes two or three full squeezes. Discard material that is streaky in colour.

Insert the nozzle to the back of the hole and pump the Lokfix material gently pulling back until the hole is $\frac{2}{3}$ to $\frac{3}{4}$ full. Ensure there are no voids in the resin. If the hole is too deep for the nozzle to reach the back, use an extension nozzle.

In wide/overhead holes a piston plug will help reduce slump and ensure a void-free application. This is particularly recommended for holes above 16mm diameter.

Observing the product gel time, insert the fixing into the hole using a gentle twisting motion. Ensure the fixing is inserted to the required depth and is held straight until the resin sets. There should be some extrusion of the Lokfix material from the hole which indicates that there is full embedment.

Do not load or apply tension to the fixing until the product fixing time has been observed, see table 2.

Do not over-tighten fixings. Observe maximum installation torque as stated in table 4.

If the cartridge is to be re-used, remove the mixing nozzle and re-apply the cap. When using again, a new mixing nozzle will be required, ensure product is pre-extruded and of consistent colour before use.

Cleaning

Uncured resin should be removed from tools and equipment using Nitoflor SOL immediately after use.

Estimating

Supply

Lokfix E77 is supplied in box containing 12 no's of 585 ml cartridges, each supplied with a mixer nozzle.

Fosroc may also supply:

- Lokfix TR: High strength carbon steel and Stainless Steel threaded rods of various diameters in customized lengths.
- Lokfix application gun, suitable for 440 and 585ml sizes.
- Various sized steel brushes, to clean the hole.

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- Extension nozzle, essential where the embedment depth is greater than 190mm in various lengths.
- Piston plugs, required where the hole diameter is >18mm or where embedment depth is >250mm. Must be used with an extension nozzle.
- Spare mixer nozzles, required if a cartridge is to be re-used.

Yield

The following calculation of theoretical consumption may be used. Factors such as over-drilling, extrusion from bolt hole, initial gun extrusion and some wastage should also be considered.

Theoretical Consumption:

$(\pi \text{ radius cm hole}^2 - \pi \text{ radius cm bolt}^2) \times \text{hole length cm} = \text{consumption ml.}$

Practical Consumption:

$\pi \text{ radius cm hole}^2 \times \text{hole length cm} \times 0.67 = \text{consumption ml.}$

Limitations

Load calculations should always be undertaken by a qualified engineer.

For designing under conditions where extended service life, seismic forces or fire is a consideration, please consult the relevant certification to make suitable adjustments for loading.

Lokfix E77 may stain natural or decorative stone. Please check suitability before using for such applications.

Where faster gelling or setting times are required, consider using Lokfix E55 or Lokfix E45T.

Storage

Lokfix E77 Cartridges have a maximum shelf life of 24 months when kept in a dry warehouse at between +5 to +35°C. It is possible to allow cartridge temperature to raise to +40°C immediately prior to application.

Further Information

Further product information is available including, EAD certification, SDS, Method Statements and calculation software. This can be found at www.lokfix.com or by contacting your local Fosroc office.

Precautions

Health & Safety

Observe the information provided on the relevant SDS.

**Consult Fosroc technical department for specific data.*

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Notes

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