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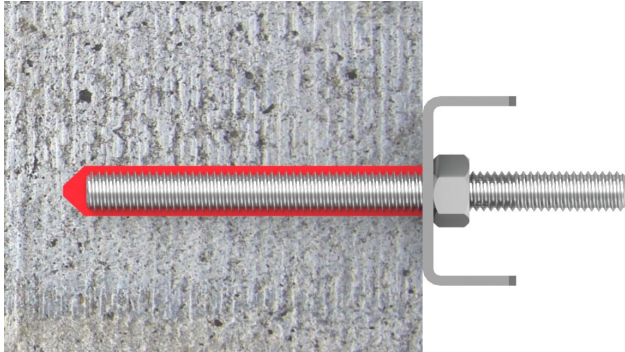
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Fosroc® Lokfix E35S

constructive solutions

Styrene free polyester resin based cartridge system, for anchoring reinforcement and lightweight fixings into a variety of substrates



Uses

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

- Cost effective alternative for the anchoring of threaded rods, reinforcing bars, profiled rod, steel section with undercuts and internal threaded rod sleeves
- Safe application in hollow bricks using a Hollow Block Sleeve
- For horizontal, vertical and overhead application
- Bonding and surface crack sealing applications
- Suitable for dry, wet and flooded concrete

Advantages

- Fast return to service
- May be used with a good quality skeleton gun (300ml size)
- No additional mixing equipment required
- Does not apply expansive force to the substrate
- Enables fixings closer to edges than mechanical anchors
- Resistant to a variety of chemicals
- Low VOC
- Re-usable by replacing the static mixer
- Waterproof, protecting the fixing from corrosion
- Performs over a wide variety of temperatures

Description

Lokfix E35S is a two component Polyester anchoring material, supplied in single component cartridges with a static mixer nozzle. When applied it sets and cures rapidly to firmly secure a variety of steel fixings into concrete and masonry substrates.

Other grades of Lokfix are also available:

Lokfix E55 Resin anchor cartridge system based on styrene free vinyl-ester for medium to heavy duty anchoring.

Lokfix E75 Resin anchor cartridge system based on pure epoxy for heavy duty fixings.

Specification Clause



The anchor grout shall be Fosroc Lokfix E35 cartridge system. The Anchoring grout shall comply with European Technical Assessments, ETA 18/0553 and ETA 18/0552.



Standards Compliance

Lokfix E35S complies with the following standards:

- European approval acc. to EAD 330076-00-0604 product area code: 33 Injection Anchors for use in Masonry (supersedes ETAG TR029)
- European approval acc. to EAD 330499-00-0601 product area code: 33 Injection Anchors for use in uncracked concrete (supersedes ETAG 001 option 5)
- Émissions dans l'air Intérieur : A+
- LEED compliant VOC Level



	
1343	
Fosroc Limited Factory RC1 18 1343- CPR-M 672-1	
ETA-18/0553 EAD-330499-00-0601 Option 7 M8-M24 For use in un-cracked concrete	

	
1343	
Fosroc Limited Factory RC1 18 1343- CPR-M 672-2	
ETA-18/0585 EAD-3300706-00-0604 M8 – M16 For use in masonry	

Fosroc® Lokfix E35S

Material Properties

Table 1 - Material Properties

Compressive Strength (EN196)	70MPa
Flexural Strength (EN196)	30MPa
E Modulus (EN196)	4000MPa
Density	1.74kg/L
Max permanent service temperature	+50°C
Max temporary service temperature	+80°C

Chemical resistance

Lokfix E35S has resistance to a wide variety of chemicals. Consult Fosroc Technical Department for specific data.

Table 2 - Lokfix E35S Gel and *Full Curing Times

For optimal use the cartridge temperature should be between +15 to +30°C

Substrate Temp.	Gel Time (mins)	Fixing Time (mins)
-5°C	90	360
0°C	45	180
+5°C	25	120
+10 °C	20	100
+15 °C	15	80
+20 °C	6	45
+30 °C	4	25
+35 to 40 °C	2	20

Note for Lokfix E35S the cartridge temperature should be between +15 to +30°C for optimal use. The substrate temperature can vary significantly from the ambient temperature.

*The table is for dry conditions. If the substrate is wet double the curing time e.g. for 120 mins dry then 240 mins wet.

Design Criteria

Note table 3 is for dry un-cracked concrete only. For all other conditions including fixings into solid and hollow masonry types, refer to the relevant method statement, or EAD document available through your local technical office.

Table 3 - Setting Parameters – details below

Un-cracked Concrete Threaded Rod Anchor Size				M8	M10	M12	M16	M20	M24	
Edge Distance	$1 \times h_{ef}$	$C_{cr,N}$	mm	80	90	110	125	170	210	
Min. Edge Distance	$5 \times d$	C_{min}		40	50	60	80	100	120	
Axial Distance	$2 \times h_{ef}$	$S_{cr,N}$		160	180	220	250	340	420	
Min. Axial Distance	$5 \times d$	S_{min}		40	50	60	80	100	120	
Embedment Depth		H_{ef}		80	90	110	125	170	210	
Min. part thickness		H_{min}		$H_{ef} + 30mm$			$H_{ef} + 3d_0$			
Drill Diameter		d_0		10	12	14	18	24	28	
Brush Diameter		d_b		12	14	16	20	26	27	
Installation Torque		$T_{inst.}$		Nm	10	20	40	60	120	150
Material Consumption				ml	3	4	5	7	24	35

Fosroc® Lokfix E35S

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 must be designed and applied in compliance with the requirements of the ETA, designers should consult the relevant Fosroc accreditation documents.

Product Installation

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

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

Hole Formation and Preparation

Drill hole with percussive drill ensuring sides of the concrete are rough.

If rebar is struck 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 a hand pump or compressed air insert the nozzle to the back of the hole and blow out 4 times.

Insert a wire cleaning brush to the bottom of the hole and brush out 4 times.

Using a hand pump or compressed air insert the nozzle to the back of the hole and blow out an additional 4 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.

Threaded rod:

Drill bit \varnothing = rod diameter +2mm

Wire brush \varnothing = rod diameter +4mm

Fixings Preparation

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

Installation

Unscrew the fixing cap. Pull the plastic within the tube slightly upwards so that the steel collar is exposed, cut the plastic tube competently removing the metal clip and discard.

Screw the static mixer nozzle onto the cartridge. Place the cartridge into the application gun. Pull the trigger to extrude the Lokfix E35S.

Important: extrude the initial material until the colour becomes grey 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 $\frac{3}{4}$ full. Ensure there are no voids in the resin. If the hole is too deep for the nozzle to reach the back, use a nozzle extender.

In deep, wide or overhead holes a piston plug with a nozzle extender will help reduce slump and ensure a void free application. Mark the required depth on your fixing. 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 3. 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.

Cleaning

Wet resin should be removed from tools and equipment using Fosroc Solvent 102 immediately after use.

Estimating

Supply

Lokfix E35S is supplied in boxes of 12 no. 300ml cartridges, each supplied with a single mixer nozzle.

Fosroc also supply:

- Steel cleaning brushes, in various diameter to clean the hole.
- Dust blower pump, one size, hand held to clean the hole.
- Hollow block sleeves, in a variety of diameters and embedded lengths for hollow bricks and blocks,
- Extension nozzle, essential where the embedment depth is greater than 190mm. In various lengths.
- Piston plugs, required where the hole diameter is >20mm or where embedment depth is >240mm. Must be used with an extension nozzle.
- Application guns, hand held for cartridge application.
- Spare mixer nozzles, required if a cartridge is to be re-used.

Yield

Standard yield estimation is provided in Table 3 based on the hole diameter, fixing size and embedded length. For non-standard consumption the calculation below may be used. Factors such as over-drilling, extrusion from bolt hole, initial gun extrusion and wastage to be considered

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



Fosroc® Lokfix E35S

Limitations

Load calculations to be undertaken by a qualified engineer.

When embedding into hollow masonry it is normally necessary to use hollow block sleeves. Consult separate method statement.

Lokfix E35S is not recommended for the following conditions: seismic; cracked concrete and fire rated, consider Lokfix E55 or Lokfix E75. after referring to the respective technical datasheets.

Storage

300ml cartridges have a maximum shelf life of 12 months when kept in a dry warehouse at between +5 to +25°C.

Precautions

Health & Safety

Observe the information provided on the relevant SDS.

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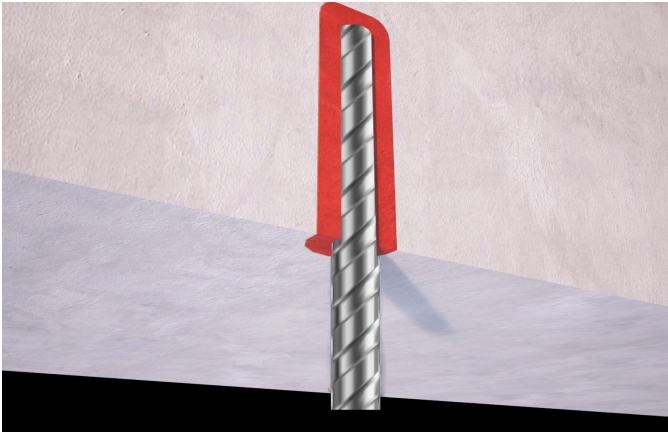




Fosroc® Lokfix E77

(supersedes Lokfix E75)

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 test data for specific conditions

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 E35 Rapid curing resin anchor cartridge system based on styrene free polyester for lightweight anchoring.

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

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.

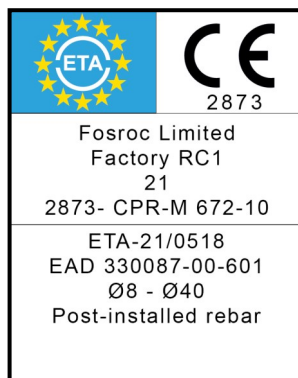
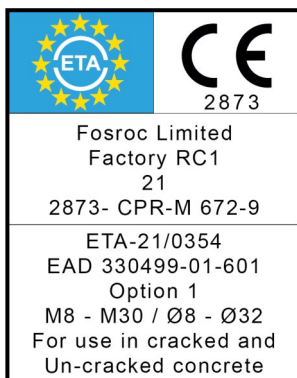
Standards Compliance

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



Fosroc® Lokfix E77



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.

Material Properties

Table 1—Material Properties

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)	0mm
Electrical resistance (IEC93)	8 x10 ¹² Ωm
Thermal Conductivity (EN993-15)	0.50W/m.K

Table 2 - Lokfix E77 Gel & Dry Curing Times

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

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

Fosroc® Lokfix E77

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 struck 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. Remove the plastic stopper.

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 Fosroc Solvent 102 immediately after use.

Estimating

Supply

Lokfix E77 is supplied in boxes of 12 no. 440ml cartridges, each supplied with a single mixer nozzle. It may also be supplied in 585ml cartridges.

Fosroc may also supply:

- Lokfix application gun, suitable for 440 and 585ml sizes.

Fosroc® Lokfix E77

- Various sized steel brushes, to clean the hole.
- 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 test data for specific conditions

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