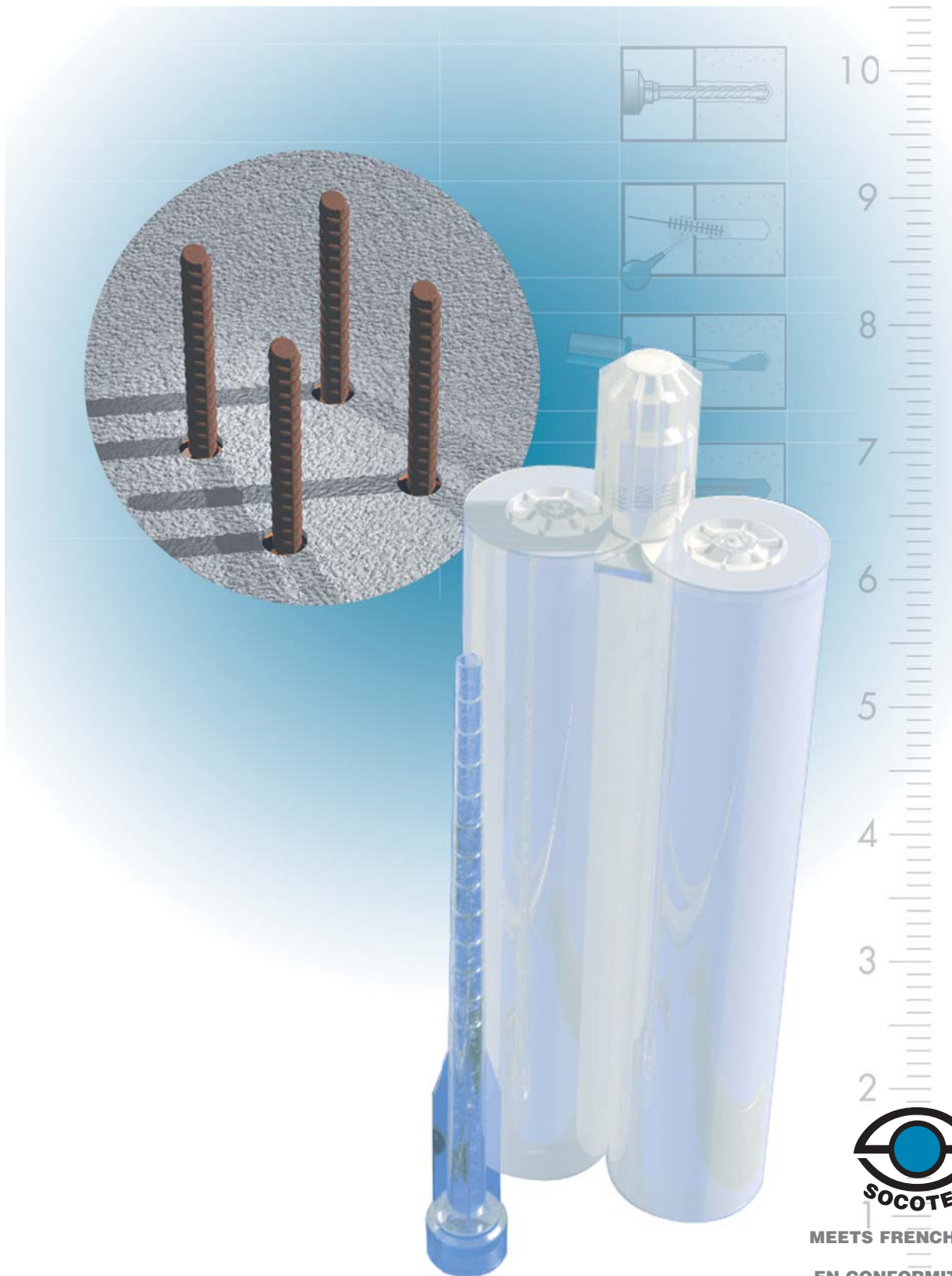


## Loading manual



Specification data sheets accepted  
by SOCOTEC under the N°LX 2058  
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MEETS FRENCH NORMS

EN CONFORMITÉ AVEC  
LES NORMES FRANÇAISES

NF-P 18 831  
NF-P 18 836



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## 1 - Description of injection system

E 5500 is a fixing system ready to use, consisting of a side-by-side cartridge, mixer nozzle and injection gun.

### 1.1 CARTRIDGE

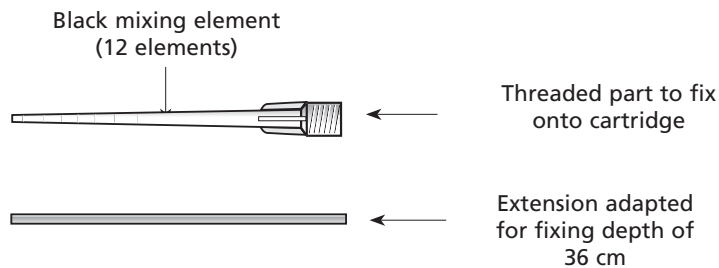
Part A	White	200 ml	Epoxy Resin + Mineral mixture
Part B	Black	200 ml	Hardener + Mineral mixture



400 ml cartridge in PP

### 1.2 MIXERS

Mixer : ref CM12

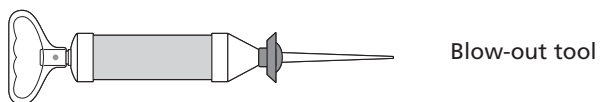
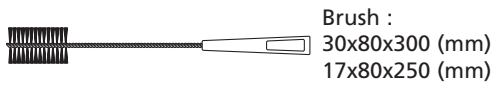


### 1.3 MANUAL GUN

Ref : PM400



### 1.4 ACCESSORIES



### 1.5 HOW IT FUNCTIONS

E 5500 is extruded with a manual gun.  
Subjected to simultaneous pressure from 2 pistons, resin and hardener are forced into mixer.  
The extruded mixture is a non-running mortar, colour grey.

### 1.6 STORING

Store away from sunlight between +5°C and +25°C  
Sell-by date is written on label.  
It is 12 months min. as from date of manufacture.

### 1.7 HYGIENE AND SAFETY

E 5500 was specially formulated to minimise any risks during use.

In any case, please follow usage instructions, wear gloves and protective glasses.

For more info. consult MSDS sheet.

## 2 - AREA OF USE

The present loading manual (in french "cahier des charges") is aimed at using the resin E 5500 to anchor rebar in min. C20/25 concrete.

Anchoring can be applied in either horizontal or vertical positions.

Performance is given for either dry or humid concrete.

After hardening the fixings done with B+B E6 can be immersed under water.

## 2.1 - RESITANCE TO CHEMICAL PRODUCTS (After hardening)

Samples of E 5500 resin were immersed in different chemical products. Weight, elasticity, the visual aspect were checked before and after immersion.

E 5500 can be exposed to different products mentioned below for the duration indicated without any adverse effect on the resin		
Chimic products	Immersion	Short immersion (1 day)
Water	X	
Salt water	X	
Hot water < à 60°C	X	
Petrol	X	
Kerosene	X	
Fuel	X	
Méthanol		X
Acetone		X
Caustic soda 50%		X
Hydrochloric acid 10%		X
Sulphuric acid 20%		X
Phosphoric acid 5%		X
Citrous acid 30%		X
Chlorine	X	
White Spirit		X

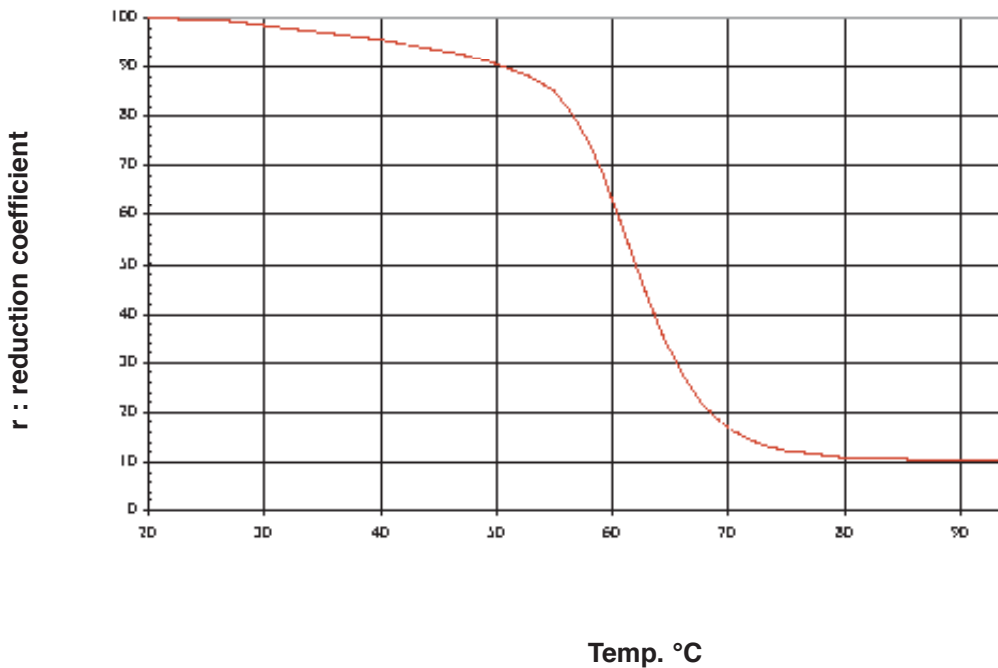
Resin is dense and resistant to water, E 5500 can therefore be used without any risk:

- in maritime areas
- in swimming pools

Once the resin has hardened no toxic risk for the environment.

## 2.2 - TEMPERATURE INFLUENCE

The resistance curve to temperature is taken from results obtained on the evolution of a elasticity module from test taken at high temperature



Calculating the anchor resistance(for ultimate load) at non-permanent temperatures can be determined from the above curve which gives the reduction factor to apply to calculations at ambient temp. For fire behaviour, you can always cross-refer to DTU rules of calculating FB (nomr P92-701) to evaluate the temp. at the chemical fixing.

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### 3 - PERFORMANCE OF MAXIPOXY E5500

#### 3.1 - CEBTP TESTS

E 5500 was tested at CEBTP and at CEMETE (laboratoire EDF effectuant les essais pour la norme NF) according to the following norms :

- Pull-out tests per Norm NF P 18-831 (CEBTP)

Steel bar Fe E 500 type, diam. 12 mm - drilling 18x120 mm

The displacement measured at 45 kN must be less than 0,6 mm

- Creeping tests per standard NF P 18-836 (CEMETE)

Steel bar Fe E 500 type, diam. 12 mm - drilling 18x120 mm

After 6 months under water, total displacement under load of 30 kN must be stable and less than 0,6 mm

#### 3.2 - PULL-OUT TESTS IN HORIZONTAL

Behaviour of E 5500 checked by pull-out tests according to NF P 18-831 (concrete C35/45).

Steel bar Fer Fe E500 type - concrete C35/45 - hammer drill - dry concrete

∅ rebar (mm)	∅8	∅10	∅12	∅16	∅20
∅ rod (mm)	8	10	12	16	20
∅ drill (mm)	12	15	18	22	28
Depth (mm)	80	100	120	160	200
Average breaking load (kN)	33	43	56	111	162
Yield point of rebar (kN)	25	39	56	100	157

These tests allow the use of E 5500 on vertical support and maximal diameters of setting defined in paragraphe 4.3.

## 4 - WORK CONCEPTION

### 4.1 - CHARACTERISTICS OF REBARS

#### Rebar with steel bar type HA Fe E 500

Diam (mm)	8	10	12	14	16	20	25	32	40
Section (mm <sup>2</sup> )	50	78	113	154	201	314	491	804	1257
Yield point (F <sub>1</sub> ) (kN)	25	39	56	77	100	157	245	402	628
Ultimate load (F <sub>2</sub> ) (kN) (F <sub>2</sub> = F <sub>1</sub> /1,15)	21	34	49	66	87	136	213	349	546

### 4.2 - CHARACTERISTICS OF CONCRETE

Type of concrete as per French norms P18-305	B20	B25	B30	B35	B40	B45
Type of concrete as per Eurocode 2	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55
Compressive strength cylinder 15x30 (f <sub>ck</sub> ) - MPa	20	25	30	35	40	45
Compressive strength cube 15x15 - MPa	25	30	37	45	50	55
Tensile strength - MPa	1,8	2,1	2,4	2,7	3,0	3,3

## 4.3 MEASURING RULES

### 4.3.1 General rules

The test results verify the hypothesis that bonding between chemical fixing and concrete is at least equal to that of a rebar HA (high adherence) in the concrete.

The BAEL 91 rules can be equally applied to determine the length of fixings according to drill diam. and the resistance of concrete.

### 4.3.2 Calculation methods

Application of the relative formulaye to the calculations of embedment depth per BAEL 91 seems to

$$\frac{L}{\phi \text{ rebar}} \geq \frac{0,185 \text{ fe}}{K \text{ ft}28} \quad K = \frac{D}{\phi \text{ rebar}}$$

L : embedment depth (mm)

D : drill diameter (mm)

ft28 : tensile strength of concrete after 28 days (Mpa)

fe : yield point of rebar (N/mm<sup>2</sup>)

By simplification we obtained the formula

F : ultimate load in daN applicable on rebar

$$L \geq \frac{F}{\beta \times D} \quad \beta = \frac{\text{ft}28}{2,7}$$

Concrete resistance	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55
$\beta$	0,667	0,778	0,889	1	1,111	1,222

This simplified formula allows to properly calculate the anchor fixing dimension, provided :

- max drill diameters are not exceeded ;
- the ultimate load for steel can never exceed that corresponding to the limit of elasticity Re of the steel, governed by a safety factor of 1,15.

#### 4.2.3 Load applied to rebar

Resin E 5500 - rebar HA Fe E500 - Concrete C25/30

Diam. of rebar  $\phi$ (mm)	Drill diam  D (mm)	Setting depth  L (mm)	Ultimate load applied to rebar  F (kN)	Necessary volume (with 20 % loss)  V(ml)
8	10	mini 80	6,2	3
		maxi 280	21,9	10
	12	mini 80	7,5	6
		maxi 234	21,9	18
10	12	mini 100	9,3	4
		maxi 366	34,1	15
	15	mini 100	11,7	12
		maxi 293	34,1	34
12	14	mini 120	13,1	6
		maxi 451	49,1	22
	18	mini 120	16,8	20
		maxi 351	49,1	60
14	16	mini 140	17,4	8
		maxi 538	66,9	30
	20	mini 140	21,8	27
		maxi 430	66,9	83
16	20	mini 160	24,9	22
		maxi 562	87,4	76
	22	mini 160	27,4	34
		maxi 511	87,4	110
20	25	mini 200	38,9	42
		maxi 702	136,5	149
	28	mini 200	43,6	72
		maxi 627	136,6	227
25	30	mini 250	58,3	65
		maxi 625	145,9	162
32	37	mini 320	92,1	104
		maxi 800	230,2	260

Resin E 5500 - rebar HA Fe E500 - Concrete C35/45

Diam. of rebar  $\phi$ (mm)	Drill diam  D (mm)	Setting depth  L (mm)	Ultimate load applied to rebar  F (kN)	Necessary volume (with 20 % loss)  V(ml)
8	10	mini 80	8,0	3
		maxi 219	21,9	7
	12	mini 80	9,6	6
		maxi 182	21,9	14
10	12	mini 100	12,0	4
		maxi 284	34,1	12
	15	mini 100	15,0	12
		maxi 228	34,1	27
12	14	mini 120	16,9	6
		maxi 351	49,1	17
	18	mini 120	21,6	20
		maxi 273	49,1	46
14	16	mini 140	22,4	8
		maxi 418	66,9	24
	20	mini 140	28,0	27
		maxi 335	66,9	64
16	20	mini 160	32,0	22
		maxi 437	87,4	59
	22	mini 160	35,2	34
		maxi 397	87,4	85
20	25	mini 200	50,0	42
		maxi 546	136,5	116
	28	mini 200	56,0	72
		maxi 488	136,5	176
25	30	mini 250	75,0	65
		maxi 712	213,5	184
32	37	mini 320	118,4	104
		maxi 800	296,0	260

Resin E 5500 - rebar HA Fe E500 - Concrete C45/55

Diam. of rebar  $\phi$ (mm)	Drill diam  D (mm)	Setting depth  L (mm)	Ultimate load applied to rebar  F (kN)	Necessary volume (with 20 % loss)  V(ml)
8	10	mini 80	9,8	3
		maxi 179	21,9	6
	12	mini 80	11,7	6
		maxi 149	21,9	11
10	12	mini 100	14,7	4
		maxi 233	34,1	10
	15	mini 100	18,3	12
		maxi 186	34,1	22
12	14	mini 120	20,5	6
		maxi 287	49,1	14
	18	mini 120	26,4	20
		maxi 223	49,1	38
14	16	mini 140	27,4	8
		maxi 342	66,9	19
	20	mini 140	34,2	27
		maxi 274	66,9	53
16	20	mini 160	39,1	22
		maxi 358	87,4	49
	22	mini 160	43,0	34
		maxi 325	87,4	70
20	25	mini 200	61,1	42
		maxi 447	136,5	95
	28	mini 200	68,4	72
		maxi 399	136,5	144
25	30	mini 250 maxi 582	91,7 213,5	65 151
32	37	mini 320	144,7	104
		maxi 773	349,6	251

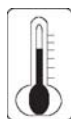
## 5 - SETTING

### 5.1 CURING TIME

Temperature	Working time	Curing time
5°C	30 mn	8h
10°C	15 mn	6h30
15°C	12 mn	5h
20°C	10 mn	3h30
25°C	6 mn	2h45
30°C	4 mn	2h
35°C	3 mn	1h45



-10°C



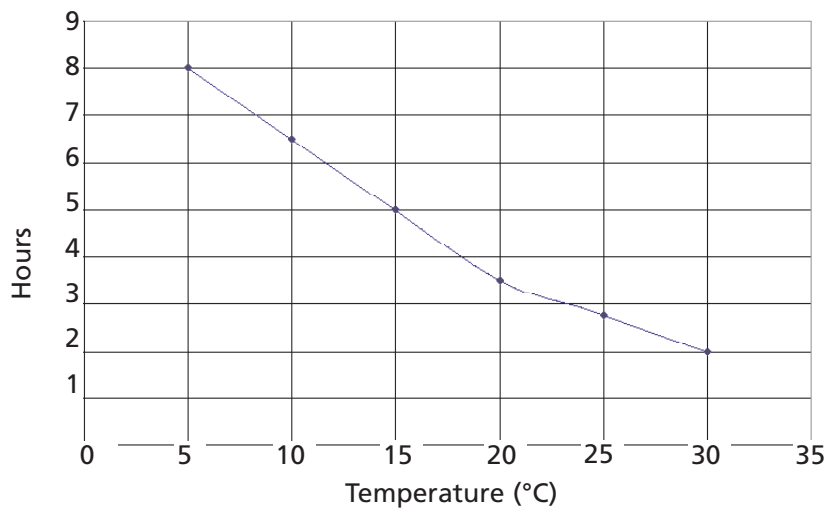
+30°C

At temperatures below 10°C extrusion of mortar can be difficult. In this case it is advisable to keep cartridges to be used in a heated area.

#### Working temperature

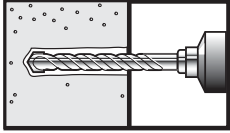
Working time (gelling time) : time during which you can extrude resin from cartridge.

Loading time (hardening time) : time from when you can apply load.

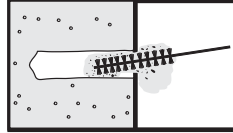


Loading times

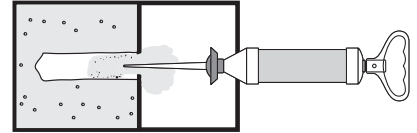
## 5.2 PREPARATION OF CONCRETE BASE



Drill the hole

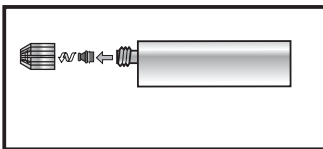


Clean the hole with brush

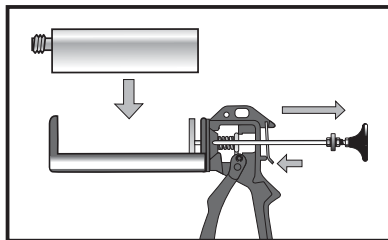


Blow out dust with pump (or compressed air).

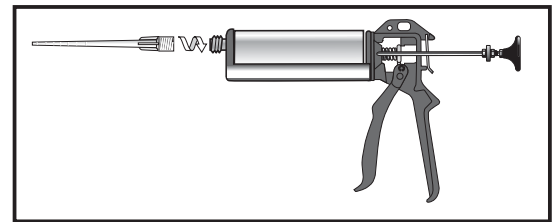
## 5.3 USE OF CARTRIDGE



Unscrew cap and take out red plug.

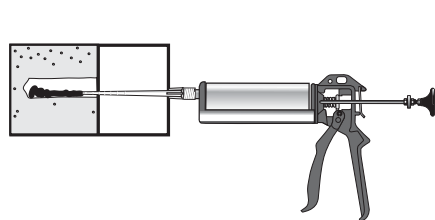


Release catch and pull back piston.  
Place cartridge into gun.

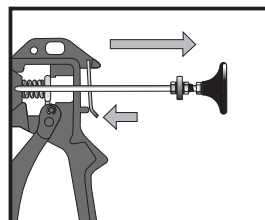


Screw on mixer.  
Don't use first ten centimeters of mix.  
Mixed product is grey..

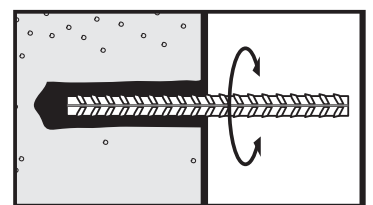
## 5.4 INJECTION OF RESIN



Position mixer at bottom of hole and take out whilst injecting.  
Nozzle must be long enough for hole depth.



Take off catch release piston after filling hole.



Insert rebar to bottom of hole whilst rotating clock-wise.  
Excess mortar must be visible.

## 5.5 RECOMMENDATIONS

Before fixing you should check:

- sell-by date on label (12 month).
- concrete quality.
- both exit holes for 2 components are free before applying nozzle.
- setting temperature.
- base material clean (see 5.2).

During the anchoring you must:

- ignore first cm of mix (approx. 2 pulls on trigger) until obtaining homogenous mix of grey colour.
- respect the amount of product to be injected.
- Insert rebar whilst rotating. Avoid lateral movements.

After anchoring you must:

- Watch loading times which vary according to temp.

Diamond drilling:

- MaxiPoxy has been formulated to allow anchoring after diamond drilling. consult our technical service.

## 6 CHECKS

Product is manufactured per ISO 9001

On each cartridge is a sell-by date and a batch no.

Checks on production are carried out by SOCOTEC Quality.

## 7 VALIDITY OF LOADING MANUAL

As from date of this document, the validity time is limited to August 2008.