

Ripple Construction Products Pvt Ltd

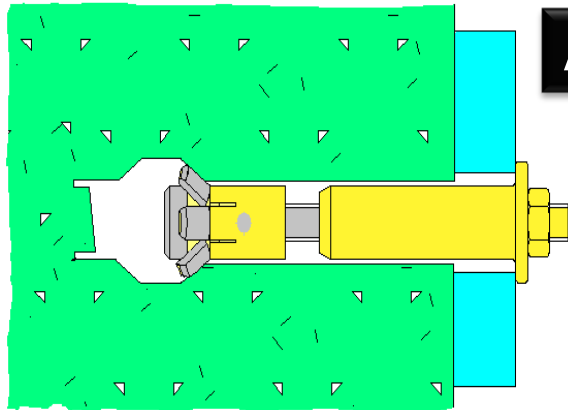
R Fix™ – Chemical Anchoring System

3 November 2014, Hyderabad - India

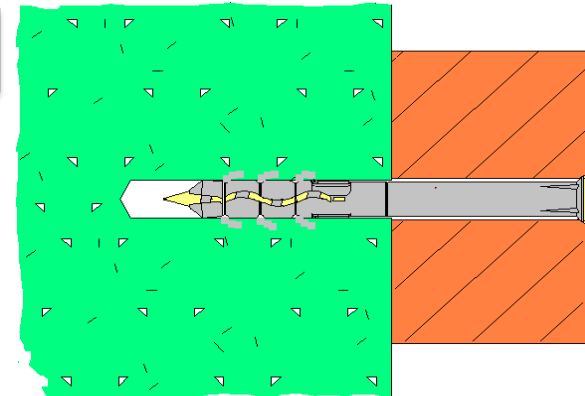
What is an Anchor

An Anchor is a device which safely transfers the subjected load onto the base material on which it is fixed.

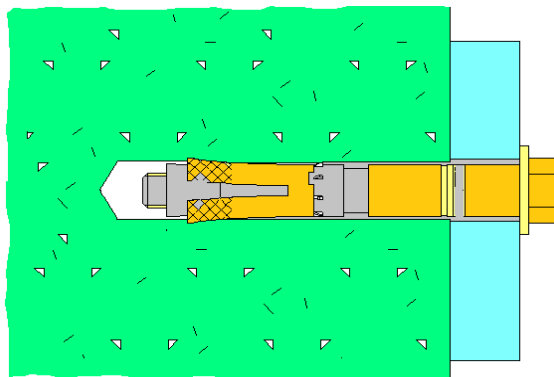
Anchor Principles



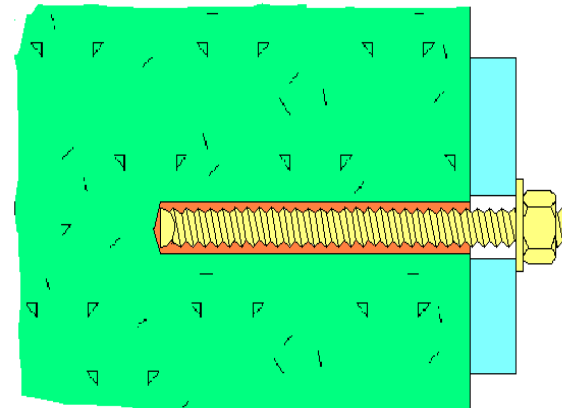
Keying



Friction



Combined Keying & Friction



Adhesion

Anchor Classification

Based on Material

- ❖ Chemical
- ❖ Metal (Mechanical)
- ❖ Polyamide/Nylon



Based on Criticality of Fixing

- Heavy Duty
- Medium Duty
- Light Duty



Anchor Selection



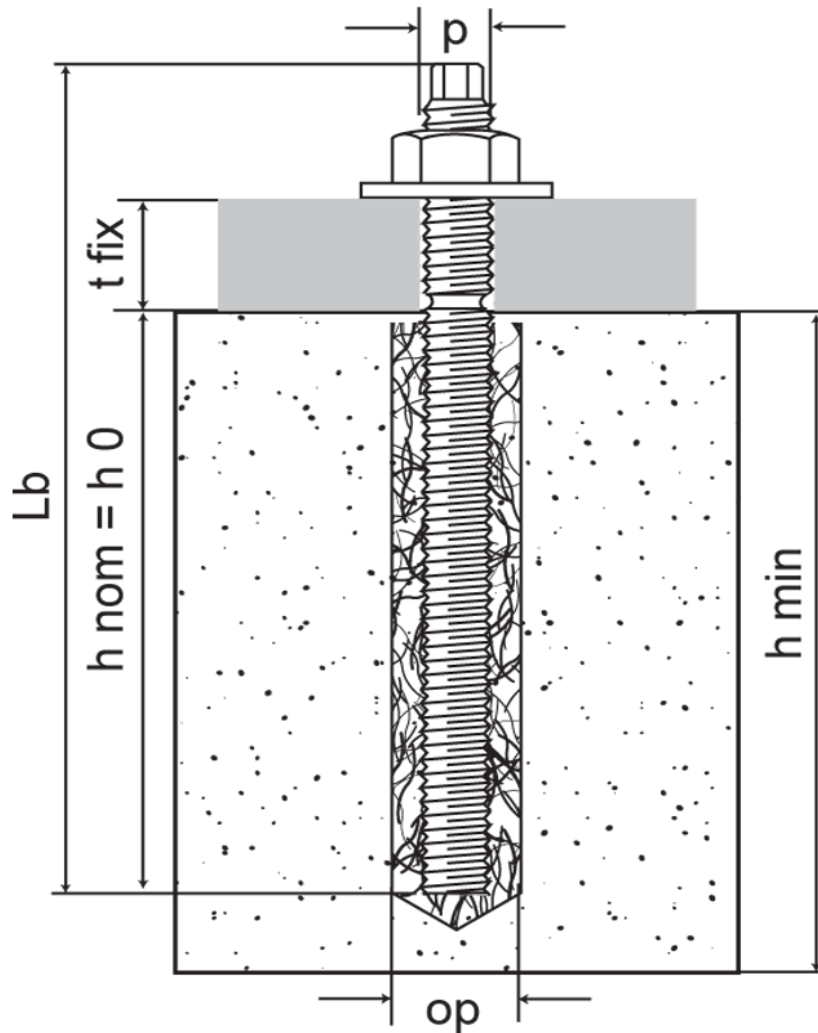
Chemical Anchors are widely used where:

- High tensile & shear loads required
- Dynamic loads are in demand
- Seismic designs are mandatory
- Close to Edges of the Base material
- Less spacing between both anchors
- Chemical Resistance is required
- Reliable and dependable fastening
- No expansion forces on the concrete



Anchoring – Threaded bars

General:



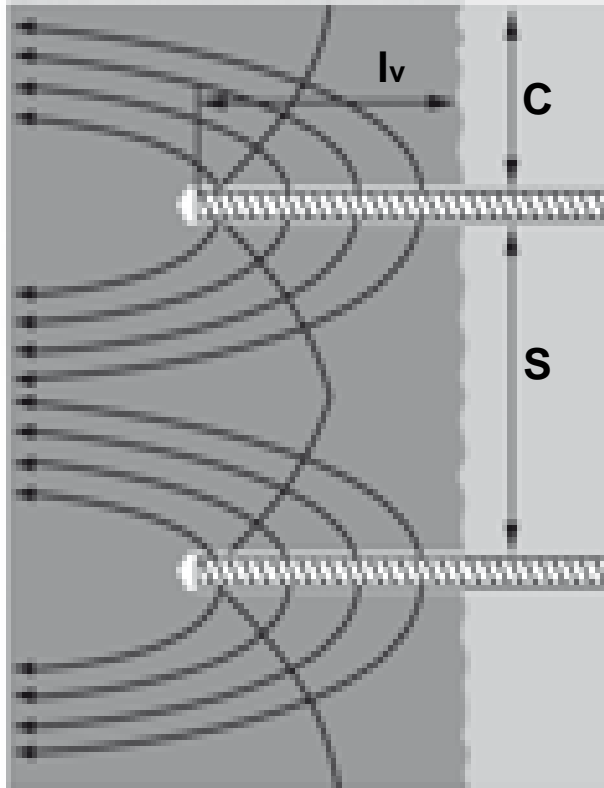
Threaded rods of required lengths and diameters are used in this principle.

The foundation bolts, machinery bolts, Column, Rail, I Beam, Girder etc can be fixed into the concrete using the Chemical Anchoring system in combination of Threaded Rods depending on the Tensile and Shear Loads required.

The pre defined depth of embedment for each diameter governs the tensile and shear load bearing capacity of the installed anchors while the quality of the concrete play bigger role along with the strength of the Threaded bar used.

Dowelling

General:



Dowelling

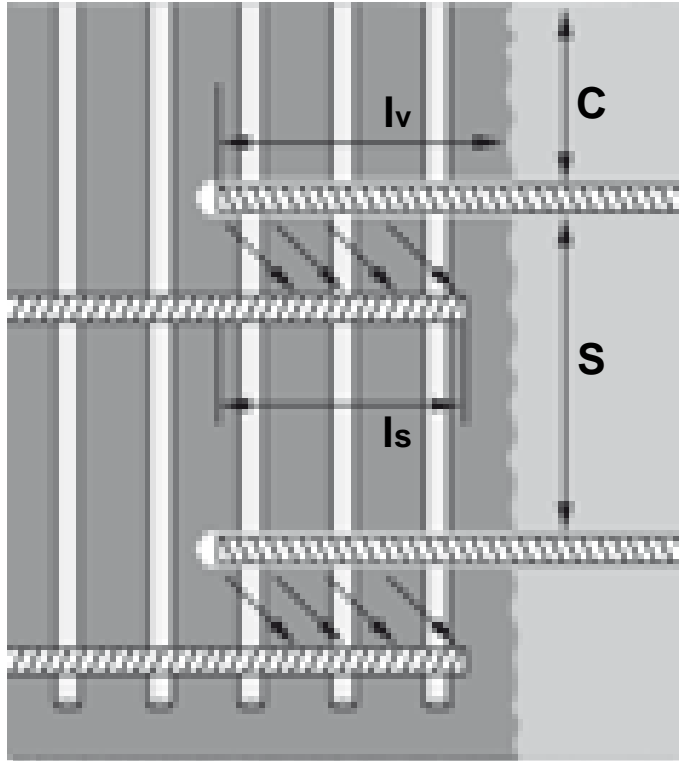
Images are from the DIBt

Reinforcement bars must be set in mortar. The bars act as a transmitter of the external forces such as tensile strength into the concrete. The transfer of the tensile strength is different based on two different applications using reinforcement bars.

Doweling is one application that can be done using reinforcing bars. Using this method, it is possible to apply a shear load on the dowel. In this method the tensile strength is transferred into the concrete. Two failure modes are possible with this application: concrete cone failure and steel failure.

Post Installed Rebars

General:



Post-installed Rebars

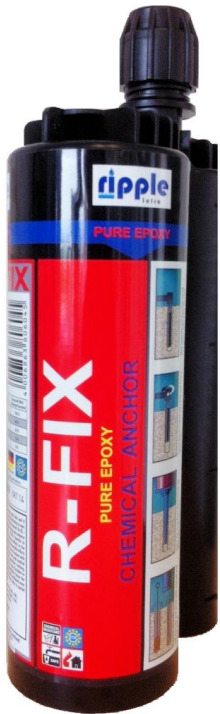
Images are from the DIBt

Reinforcement bars increase the tensile strength of the concrete. Cast in reinforcement bars are positioned prior to pouring concrete into the reinforced iron cast created by the rebar. Post-installed rebar are installed into an existing concrete structure. Post-installed rebar transfer the tensile strength between the neighboring reinforcement bars. It is not possible to add a shear load on a rebar and there are three types of failure modes that can occur with this type of application. These failure modes include:

- (1) failure of mortar or concrete,
- (2) failure of anchor or mortar and
- (3) a combination of different failures. The concrete volume needs to be large enough to accommodate the transfer of tensile strength.

The overlap connection of the reinforcement bars are governed by the Rules for Concrete Building Europe Code 2 (EC2).

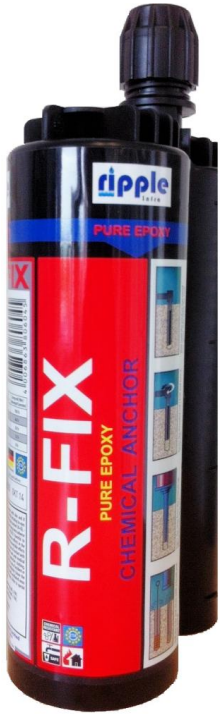
Heavy duty Chemical Anchoring System for cracked concrete



R Fix is a **2 - Component Epoxy Resin** based chemical mortar used for the heavy-duty, dynamic load anchoring

- A fast, secure and **expansion pressure-free anchoring** of the most diverse elements (threaded rods, reinforcing iron, steel profiles, etc) to the most diverse substrates (concrete, rock, stone, masonry, wood etc.)
- Replaces traditional metal anchors and makes new applications possible, especially as a result of an anchoring to **narrow center distances** which are extremely **close to the edge** being possible.
- **R Fix** is suitable for **underwater applications** and use in extreme environments. With the fluidity and nature of Epoxy, it bonds even to **Core drilled smooth holes**.

Heavy duty Chemical Anchoring System for cracked concrete



Mechanical properties acc. to EN 196 Part1

- Density: 1.41 g/cm³
- Compressive strength: 137 N/mm²
- Bending strength: 47 N/mm²
- Dynamic modulus of elasticity: 3240 N/mm²

Approvals:

- ETA accd.to TR 029 in concrete & Seismic design
- Fire Testing by CSTB Report No 26051287
- Civil Aid (Bureau Veritas) India Tested MT:AG/1924(a)



CIVIL-AID
MT:AG/1924(a)





385 ml

585 ml

CE Certified option1

Can be used in Cracked and Un-Cracked concrete



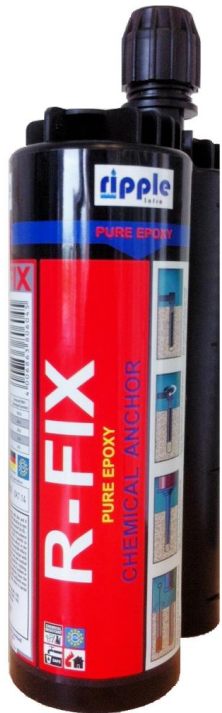
Hard Plastic Body

Protects from transportation damages & material handling

Air Tight Cap

Stop-n-go Applications for repeated usage





Key Salient Features

- Suitable for dynamic loads, Higher embedment depths
- Hammer drilled and diamond drilled holes possible
- Overhead application; water filled bore holes
- Suitable for attachment points close to the edge
- Anchoring is free of expansion forces
- High chemical resistance, low odour
- Shelf Life upto 24 months from the date of manufacture
- Cartridge can be reused up to the end of the shelf life by replacing the static mixer or resealing cartridge with the sealing cap
- Cured R Fix is water-impermeable acc. to DIN EN 12390-8



Key Features

1. Heavy Duty Chemical Anchoring System
2. Ripple R Fix ETA Option 1 Certification
3. F240 Fire Resistance Certification
4. Pure Epoxy Resin based chemical
5. Suitability of applications with various Base Materials
6. Styrene free Chemical anchoring system
7. Slow Curing formula at elevated temperatures

Advantages

1. High dynamic loads & safe Chemical anchoring
2. Reliable fixing in cracked & un-cracked concrete
3. Fire Resistant up to 240 minutes
4. High Bonding, low shrinkage, & high Chemical resistance
5. Excellent compatibility with wide range of Base Material
6. Low odour – can be used in confined area, Ozone friendly
7. Deep embedment, Higher ambient temperatures.

Some Typical Applications

- Heavy Duty Fixings
- Steel & wooden structural Beams & columns
- Cantilevers, Pipe supports
- Pumps, Machines
- Guard rails, Gates
- Heavy duty ladders
- Mechanical Equipments
- Rebar Fixings
- Rock Anchoring
- Percussion / core drilled holes
- Wet / water logged holes



Suitable base materials

- concrete
- solid brick
- honeycomb brick
- cell like clay brick
- light weight honeycomb brick
- dense aggregate block
- hollow light aggregate block
- aerated concrete
- solid stone
- wood



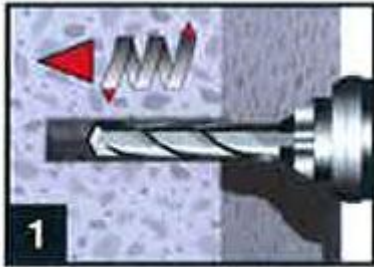
Temperature Range

- Base material temperature range from +5°C up to +40°C at the time of application.
- Cartridge storage temperature min. +5°C; optimal +20°C and under 25°C. Do not expose the cartridges to Sun Light and heat
- Cured mortar can withstand the temperatures of base material ranging from -40°C to +72°C

Reaction Behavior

Base Material	Gelling & Working	Full Curing Time	Full Curing Time
Temperature	Time	Dry Base Material	Wet Base Material
(°C)	(Minutes)	(Hours)	(Hours)
+ 5 °C	120 minutes	50 Hours	100 Hours
+ 10 °C	90 minutes	30 Hours	60 Hours
+ 20 °C	30 minutes	10 Hours	20 Hours
+ 30 °C	20 minutes	6 Hours	12 Hours
+ 40 °C	12 minutes	4 Hours	8 Hours

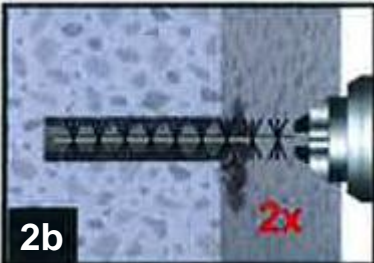
Installation Procedure



Drill a hole into the base material to the size and embedment depth required by the selected rebar/anchor.



blow the hole clean again with compressed air or a hand pump a minimum of two times. The hand-pump can be used for anchor sizes up to hole diameter 20 mm

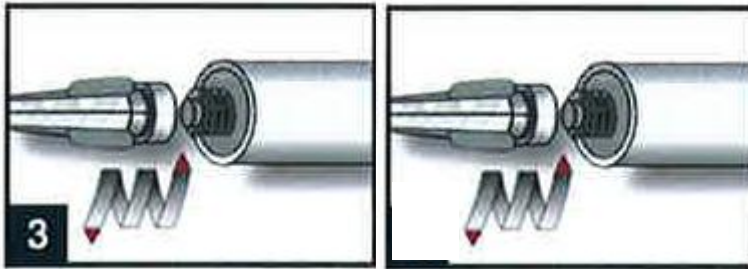


Brush the hole with an appropriate sized wire brush

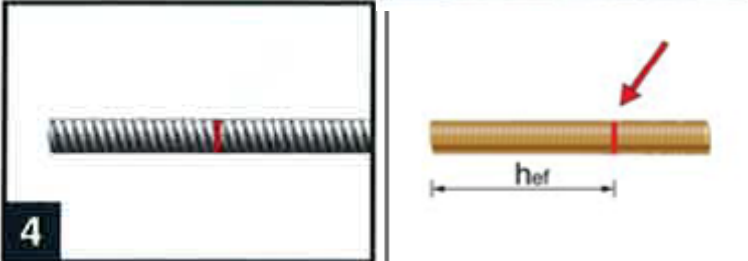


blow the hole clean again with compressed air a min. of two times. For holes larger than 20mm or deeper than 240mm, compressed air (min. 6 bar) must be used.

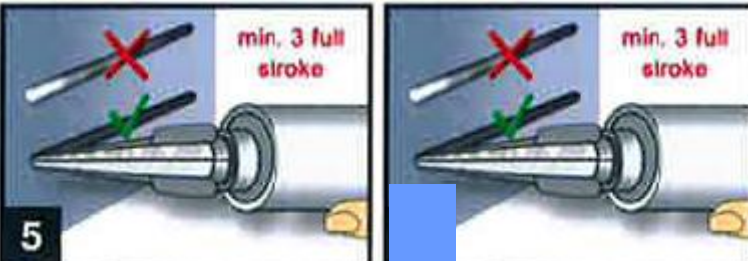
Installation Procedure



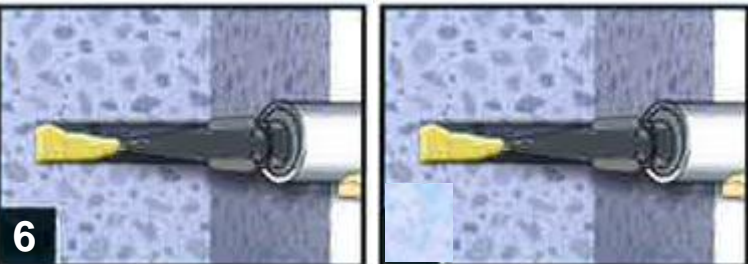
Attach the Static Mixing Nozzle to the cartridge and load the cartridge into the Dispensing Tool.



Prior to inserting the Anchor rod/rebar into the filled drilled hole, the position of the embedment depth shall be marked on the rod.

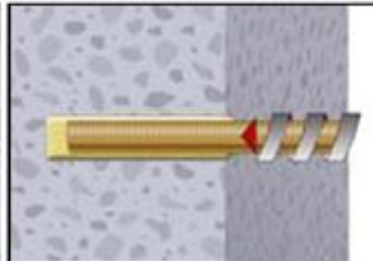


Squeeze out separately a minimum of 2-3 strokes of R Fix and discard non-uniformly mixed adhesive until the mortar shows a consistent Red Color

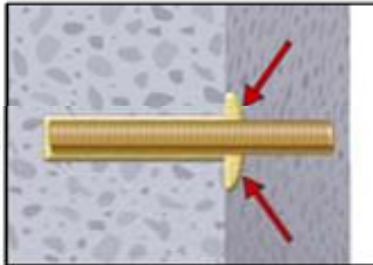
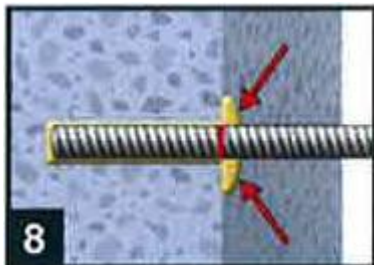


Starting from the bottom or back of the cleaned hole, fill R Fix mortar to 2/3rd of the hole. Avoid creating air pockets. Use extension pipe for deeper holes.

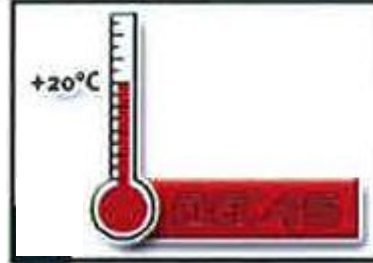
Installation Procedure



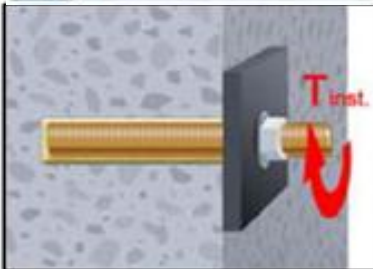
Push the Threaded rod/rebar into the filled hole while turning clockwise rotation slowly until the embedment depth reached. Avoid air entrapment.



Ensure that the rod fully seated at the bottom of the hole & the excess mortar visible at the top. Clean the mortar to neat finish and do not disturb the rod.



Observe the full curing as recommended. Do not disturb the Anchor Rod or Reinforcement bar until achieving the full curing.



After the full curing as recommended, the Fastenable material can be installed with the max. torque by using a calibrated torque wrench.

R Fix Consumption Guide

While using chemical anchoring system, generally there will be a small percentage of wastage depending on the site conditions, the applicator technique, surface / application, temperatures etc. Wastage factor (%) including: initial quantities dispensed till achieving uniform mix, the unused portion of adhesive in the cartridge and nozzle after use, and any adhesive displaced at the top of the drilled hole when the anchor element is inserted.

- Press the dispenser trigger firmly till achieve a uniform bead of the mixed mortar
- Fill the drilled hole with the mixed mortar only 2/3rd of the hole depth
- Fix the Anchor / Rebar into the hole by rotating clockwise direction to avoid air entrapment
- While driving the anchor / rebar into the hole, the mixed mortar will be coming out till the surface
- Smoothen the edges to remove excess mixed mortar and allow the installed mortar to cure

R Fix Consumption Chart – Threaded Bar (Anchor)

Anchor Dia (mm)	Hole Dia (mm)	Volume of Mortar per Hole (ml)*															
		2.9	3.6	4.3	5	5.7	7.1	8.9	10.7								
Ø 8	Ø 10	2.9	3.6	4.3	5	5.7	7.1	8.9	10.7								
Ø 10	Ø 12	3.5	4.4	5.2	6.1	7	8.7	10.9	13.1	15.2							
Ø 12	Ø 14	4.1	5.1	6.2	7.2	8.2	10.3	12.9	15.4	18	20.6						
Ø 16	Ø 18	5.4	6.7	8.1	9.4	10.8	13.5	16.8	20.2	23	26.9	30.3					
Ø 20	Ø 24	13.9	17.4	20.9	24.4	27.9	34.8	43.6	52.3	61	69.7	78.4	87.1				
Ø 24	Ø 28	16.5	20.6	24.7	28.8	32.9	41.2	51.5	61.8	72.1	82.4	92.7	103	113.3			
Ø 27	Ø 32	23.4	29.2	35	40.9	46.7	58.4	73	87.6	102.2	116.8	131.4	146	160.6	175.2		
Ø 30	Ø 35	25.7	32.2	38.6	45	51.5	64.4	80.4	96.5	112.6	128.7	144.8	160.9	177	193.1	209.1	
Ø 33	Ø 37	22.2	27.7	33.3	38.8	44.4	55.4	69.3	83.2	97	110.9	124.7	138.6	152.5	166.3	180.2	194
Ø 36	Ø 42	37.1	46.3	55.6	64.9	74.1	92.7	115.8	139	162.2	185.3	208.5	231.7	254.8	278	301.2	324.3
Ø 40	Ø 46	40.9	51.1	61.3	71.5	81.7	102.2	127.7	153.3	178.8	204.3	229.9	255.4	281	306.5	332	357.6
Depth (mm)		80	100	120	140	160	200	250	300	350	400	450	500	550	600	650	700

R Fix Consumption Chart – Reinforcement Bars (Rebar)

Rebar Dia (mm)	Hole Dia (mm)	Volume of Mortar per Hole (ml)*																	
Ø 8	Ø 10	2.9	3.6	4.3	5	5.7	6.4	7.1	8	8.9	9.8	10.7							
Ø 10	Ø 14	7.6	9.5	11.4	13.3	15.2	17.1	19	21.4	23.8	26.1	28.5	30.4	33.3					
Ø 12	Ø 16	8.9	11.1	13.3	15.5	17.7	20	22.2	24.9	27.7	30.5	33.3	35.5	38.8	44.4				
Ø 16	Ø 22	18.1	22.6	27.1	31.6	36.1	40.6	45.1	50.8	56.4	62.1	67.7	72.2	79	90.3	101.6			
Ø 20	Ø 28	30.4	38	45.6	53.2	60.8	68.4	76	85.5	95	104.5	114	121.7	133.1	152.1	171.1	190.1		
Ø 25	Ø 32	31.6	39.5	47.4	55.3	63.2	71.1	79	88.9	98.8	108.6	118.5	126.4	138.3	158	177.8	197.5	217.3	
Ø 32	Ø 40	45.6	57	68.4	79.8	91.2	102.6	114	128.3	142.6	156.8	171.1	182.5	199.6	228.1	256.6	285.1	313.6	
Ø 40	Ø 50	71.3	89.1	106.9	124.7	142.6	160.4	178.2	200.5	222.8	245	267.3	285.1	311.9	356.4	401	445.5	490.1	
Depth (mm)		80	100	120	140	150	180	200	225	250	275	300	320	350	400	450	500	550	

Setting Parameters – Threaded Bar (Anchor)

Threaded Bars (Anchor rods)	in M25 Concrete *									
Anchor size			M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole diameter	d ₀	mm =	10	12	14	18	24	28	32	35
Effective anchorage depth	he _f , min	mm =	60	60	70	80	90	96	108	120
	he _f , max	mm =	96	120	144	192	240	288	324	360
Diameter of clearance hole in fixture	d _f	mm ≤	9	12	14	18	22	26	30	33
Diameter of steel brush	d _b	mm ≥	12	14	16	20	26	30	34	37
Torque moment	T _{inst}	Nm ≤	10	20	40	80	120	160	180	200
Thickness of fixture	t _{fix} , min	mm ≥	0							
	t _{fix} , max	mm <	1500							
Minimum thickness of member	h _{min}	mm	he _f + 30 mm ≥ 100mm				he _f + 2d ₀			
Minimum spacing	S _{min}	mm	40	50	60	80	100	120	135	150
Minimum edge distance	C _{min}	mm	40	50	60	80	100	120	135	150

* Specific design can be submitted for other Sizes of threaded rods such as M33, M36, M39 etc

Setting Parameters – Reinforcement bars (Rebar)

Reinforcement bars (Rebars) in M25 Concrete											
Rebar Sizes (Ø in mm)			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Nominal drill hole diameter	d ₀	mm =	12	14	16	18	20	24	32	35	40
Effective anchorage depth	hef, min	mm =	60	60	70	75	80	90	100	112	128
	hef, max	mm =	96	120	144	168	192	240	300	336	384
Diameter of steel brush	d _b	mm ≥	14	16	18	20	22	26	34	37	41.5
Minimum thickness of member	h _{min}	mm	hef + 30 mm ≥100mm			hef + 2d ₀					
Minimum spacing	S _{min}	mm	40	50	60	70	80	100	125	140	160
Minimum edge distance	C _{min}	mm	40	50	60	70	80	100	125	140	160

Accessories Program



R Fix in 385 & 585 ml sizes



R Fix Mixing Nozzle



R Fix Extension tube



R Fix Dispensing Gun



Manual Blow Pump

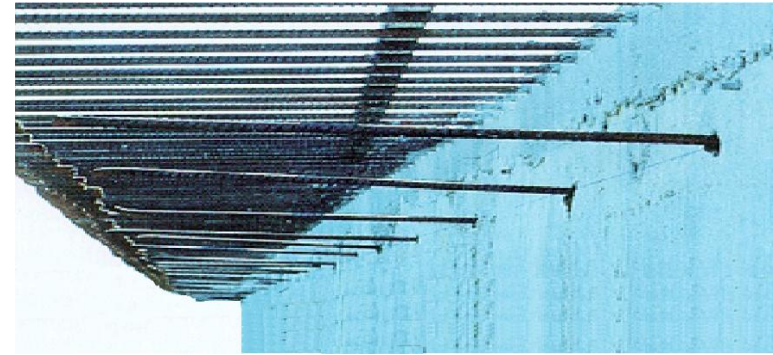
Applications

Rebar Fixing

Rebar grouting in concrete for extension of columns, slabs etc. Fixing of new beams in between existing columns is also made possible.

NOTE

Reinforcing bars are some time used to tie Compressors foundations or other Mechanical Vibrating Equipment Foundations to the Existing Structure.



Applications



JACKETING

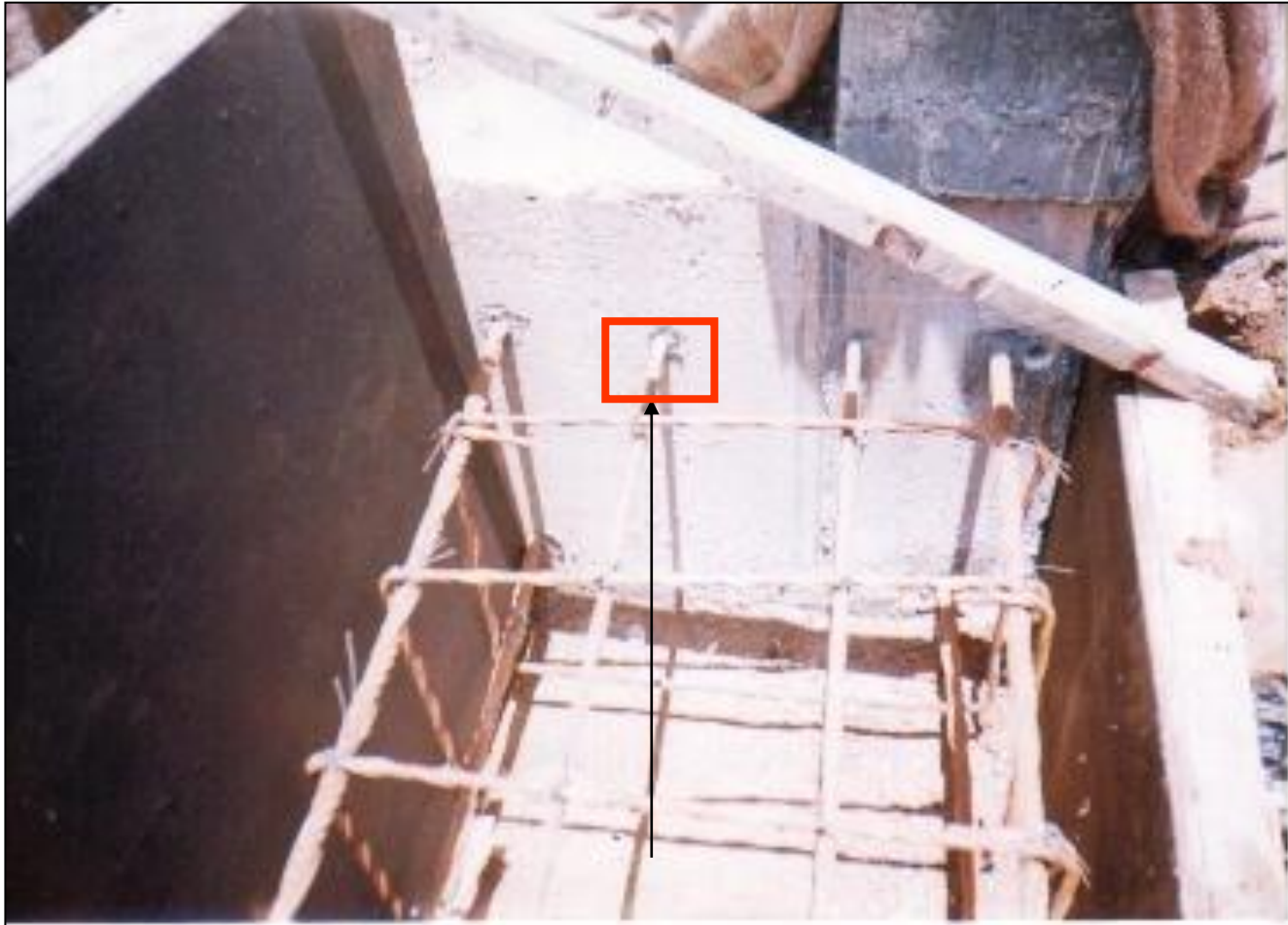


Applications



Connecting dowels

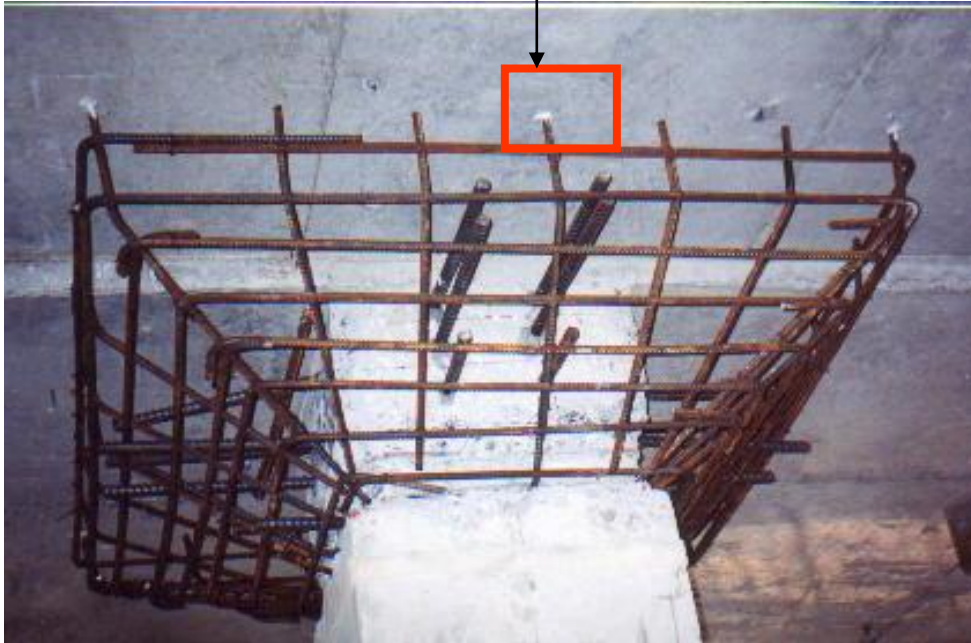
Applications



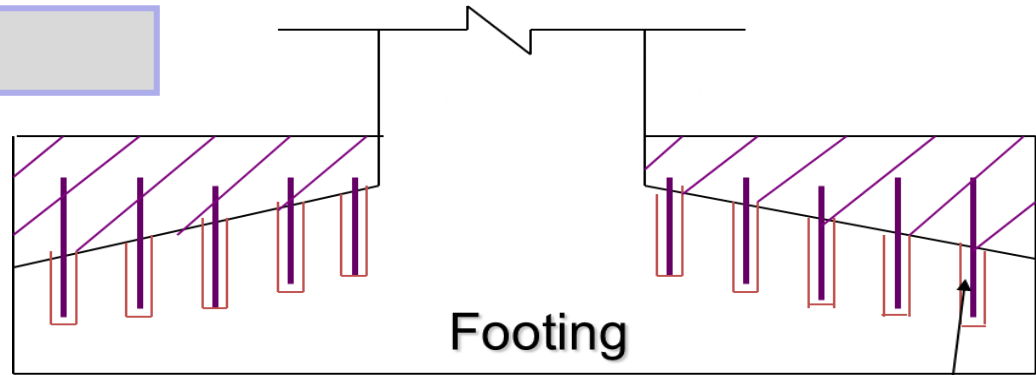
connect Rebar

Applications

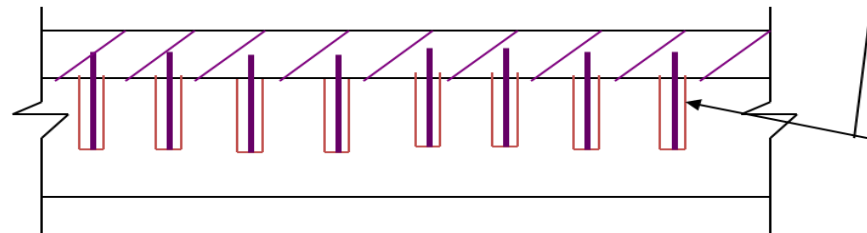
Connecting dowels



Applications



Increasing Thickness of Concrete

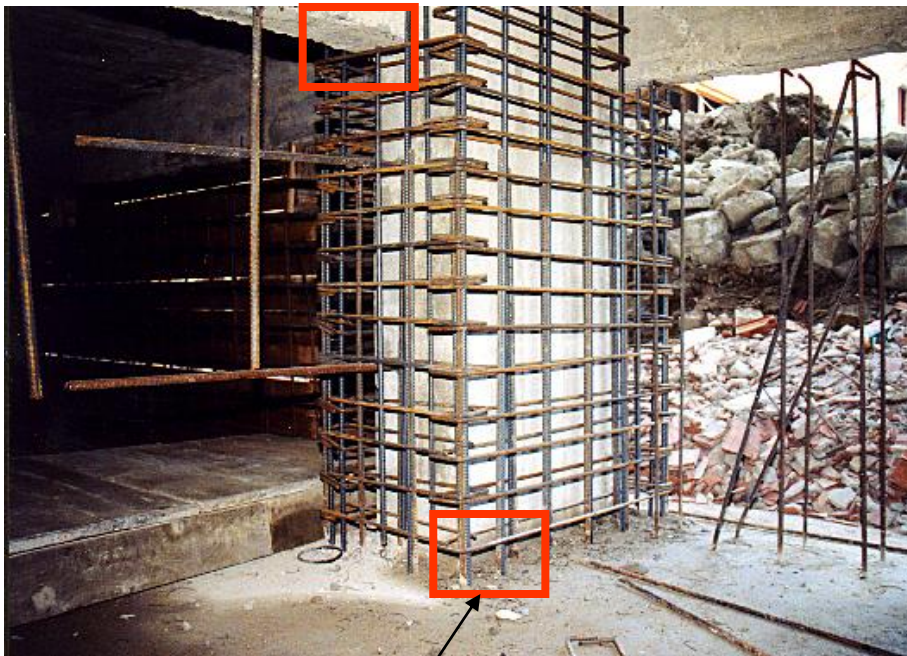


Slab

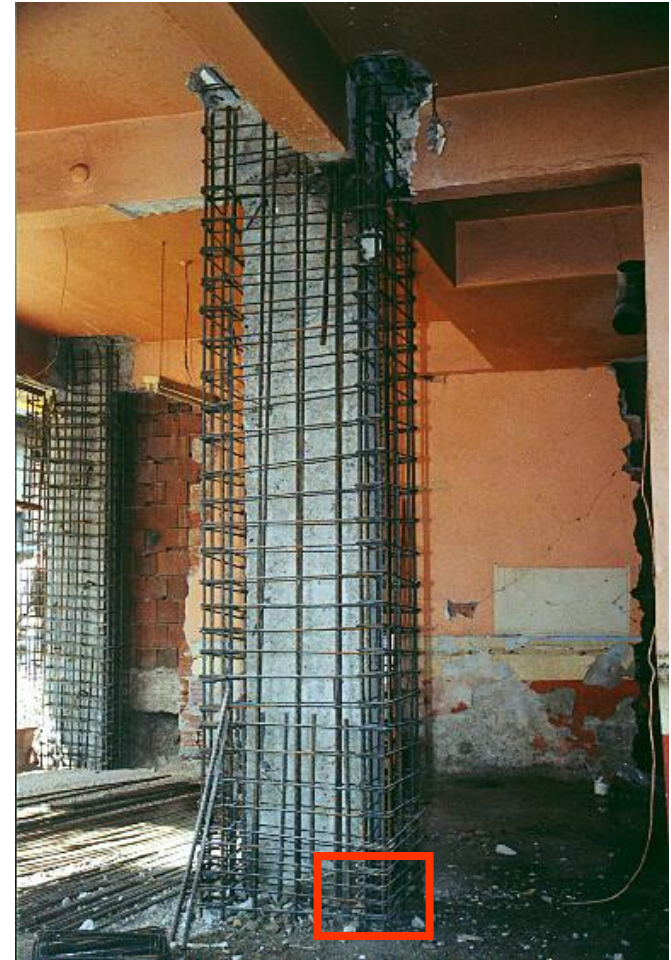


**Shear Connector
embedded to 10 Ø using
epoxy grout**

Applications



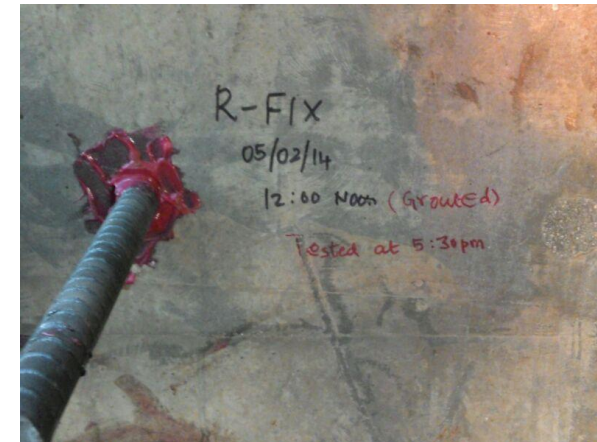
Connecting dowels



Anchor Testing

We also conduct random PULL OUT tests based on our customer's requests at their jobsite for R Fix installations

We issue the Pull Out Test certificate on the tests conducted at our Customer's jobsite for their records



Service

Stock : Ex-Stock Central Ware House Hyderabad

Ready Stocks at our Branch Offices – Mumbai, Bangalore, Kolkata, Delhi, Chennai, Bhubaneswar

Sales Engineers: Available at most major Cities in India

Services including :

Visiting the Jobsite, Understand the needs, recommend, Submit proposals, Brochures, Catalogues, meet consultants to seek their approvals, demonstrations at site, seminars, presentations, design support, On-site training to the application team, Delivery of the products etc.,



The buzz is to **PARTNERING** for **PERFORMANCE** which enhances the **productivity** and the overall **business growth**.

Our Services are focused on achieving the **Consistent** and **Sustainable** business results from all the beneficiaries in long term.



