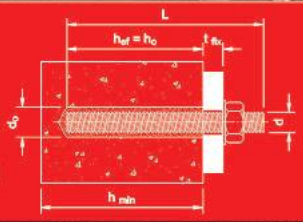
R Fix™

Pure Epoxy Resin based Chemical Anchoring System



Seismic C1
Can be used in Seismic, cracked & un cracked concrete

Hard Plastic Body
Protects from transportation damages & material handling

Air Tight Cap
Stop-n-go Applications for repeated usage

ÉMISSIONS DANS L'AIR INTÉRIEUR* A+ (A+ A B C)

FIRE RESISTANCE Rebars Ø8-Ø32 F 240

LEED tested

C1 SEISMIC

ETA CE European Technical Assesment ETA-14/0203 Post installed rebar

ETA CE European Technical Assesment ETA-14/0207 Bonded Anchor

CIVIL-AID MT:AG/1/924(a)

Quality Solutions For Rebar & Anchoring Applications

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www.rippleindia.in

R Fix™
Pure Epoxy Chemical Anchoring System

Available in
- **585 ml Side by Side** Cartridge 3:1 ratio
- **385 ml Side by Side** Cartridge 3:1 ratio

Seismic C1 for cracked concrete

Certified for use in seismic areas

ÉMISSIONS DANS L'AIR INTÉRIEUR A+ A B C

LEED tested

ETA European Technical Assesment ETA-14/0203 Post installed rebar

FIRE RESISTANCE Rebars Ø8-Ø32 F 240

ETA European Technical Assesment ETA-14/0207 Bonded Anchor

C1 SEISMIC

CIVIL AID MLAG1924(a)

CE CERTIFIED SEISMIC C1
Can be used in Seismic C1 zone, Cracked and Un-Cracked Concrete

HARD PLASTIC BODY
Protects from transportation damages & material handling

AIR TIGHT CAP
Stop-n-go Applications for repeated usage

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

585 ml 385 ml

Ripple R Fix is a Pure Epoxy based chemical designed specially for critical applications including anchoring of threaded rods, Post- Installed reinforcing bars or internal threaded rod sleeves into concrete (normal, porous, light & solid masonry).

Ripple R Fix being pure epoxy resin based mortar having very high bond strength to concrete failure used in rotary hammer drilled & diamond core drilled holes and are suitable for extreme loads & with high embedment depths. Ideally suited for high load applications, the resulting bond is stronger than the base material itself and as the system is based on adhesion principle, no additional load stress is imparted to the base material as with expansion type anchors and are therefore ideal for close to edge fixing, reduced center and group anchoring and use in concrete of unknown quality or low compressive strength.

Approvals:
- EOTA assessment acc. to - ETA 14/0203, ETA 14/0207 by DIBT
- EOTA technical report TR 029
- Tested and Certified by CIVIL AID, Bureau Veritas India.
- Fire Resistance F240 as per REPORT No 26051287 by CSTB for Post Installed Reinforcement bars Ø 8 mm to Ø 32 mm
- VOC Limits for Multipurpose construction adhesive as per LEED
- Cured R Fix Mortar is water - impermeable in accordance with DIN EN 12390-8
- **ETA with Post Installed rebar upto 40 mm diameter.**

Installation temperature from **+5°C** and a **service temperature** up to **72°C**. It has high chemical resistance for applications in extreme ambiences e.g. in swimming pools (chlorine) or closeness to the sea (salt).

Handling and Storage:
- Storage: Store in cold and dark place
- Storage Temperature: from **+5°C** upto **+25°C**
- **Shelf life: 24** months from the date of manufacturing, when stored under 25°C
- Avoid direct sunlight

Properties of R Fix

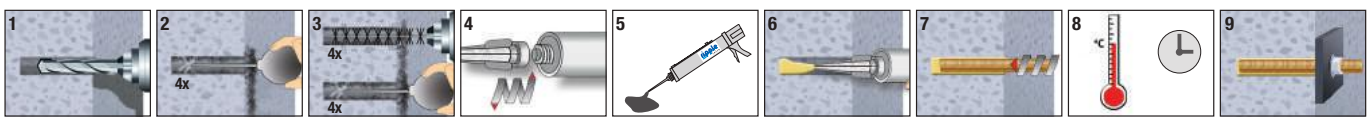
Properties	Test Method	Result
UV Resistance		Pass
Water tightness	DIN EN 12390 - 8	Pass
Temperature Stability		72°C
pH Value		> 12
Density		1.41 gm/cm^3
Compressive Strength	EN 196 Teil1	120 N/mm^2
Bending Strength	EN 196 Teil1	42 N/mm^2
Dynamic Modulus of Elasticity	EN 196 Teil1	10800 N/mm^2
Shrinkage		< 0.02 %
Hardness Shore D		85
Electrical Resistance	IEC 93	1.2 X 10^{12} Ω m
Thermal Conductivity	IEC 60093	0.47W/m.K

Reaction Behaviour

Base Material	Gelling & Working Time	Minimum Curing Time	Minimum Curing Time
Temperature	Insert before	Dry Base Material	Wet Base Material
°C(Celsius)	Minutes	(Hours)	(Hours)
≥ + 5°C	120 Min	50 hours	100 hours
≥ + 10°C	90 Min	30 hours	60 hours
≥ + 20°C	30 Min	10 hours	20 hours
≥ + 30°C	20 Min	6 hours	12 hours
≥ + 40°C	12 Min	4 hours	8 hours

Cartridge Temperature must be maintained between min + 15°C and max + 25°C

Installation Procedure



** 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.

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

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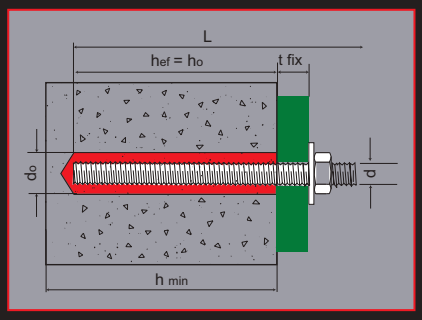
R Fix™
Pure Epoxy Chemical Anchoring System

FEATURES
- Heavy Duty Chemical Anchor
- Seismic C1 Certification
- F 240 Fire Resistance Certification
- Pure Epoxy
- Suitability- Base Materials
- Styrene free Chemical
- Slow Curing

ADVANTAGES
- High loads & safe Chemical anchoring
- Seismic Zones, Cracked & Un Cracked Concrete.
- Fire Resistant upto 240 minutes
- Excellent Bonding & low shrinkage
- Wide range of construction Base Materials
- Low odour, High chemical resistance
- Can be used for Deep embedment depths



Base Materials
- Concrete
- Cracked Concrete
- Solid Brick
- Light Weight Honeycomb Brick
- Wood
- Aerated concrete
- Solid Stone

d = threaded bar diameter | h_{nom} = nominal embedment depth | t_{fix} = fixture thickness | h_o = minimum hole depth
d_o = hole diameter | L_b = threaded bar length | T_{max} = torque | h_{min} = minimum support thickness

Installation Parameters - Anchor Rods (Threaded bars)

Design Method acc. to EOTA Technical Report TR 029, characteristic values for Tension & Shear Loading

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Edge distance	$C_{cr,N}$	[mm]	113	135	165	188	255	304	342	379	400	436	472
Min. edge distance	C_{min}	[mm]	40	50	60	80	100	120	135	150	165	180	195
Axial distance	$S_{cr,N}$	[mm]	226	270	330	375	510	607	683	759	799	872	945
Min. axial distance	S_{min}	[mm]	40	50	60	80	100	120	135	150	165	180	195
Embedment Depth	h_{ef}	[mm]	80	90	110	125	170	210	250	280	320	350	380
Min. part thickness	h_{min}	[mm]	h_{ef} + 30 mm ≥ 100 mm			h_{ef} + $2d_o$							
Anchor diameter	d	[Nm]	8	10	12	16	20	24	27	30	33	36	39
Drill diameter	d_o	[Nm]	10	12	14	18	24	28	32	35	37	42	46
Installation torque	$T_{inst.}$	[Nm]	10	20	40	60	120	150	200	250	350	500	700

The recommended loads are only valid for single anchor for a roughly design, if the following conditions are valid: $c \geq c_{cr,N}$ $s \geq s_{cr,N}$ $h \geq 2 \times h_{ef}$. If the conditions are not fulfilled the loads must be calculated acc. to EOTA Technical Report TR 029. The safety factors are already included in the recommended loads.

Anchor Rods (Threaded Bars) — Recommended Loads - Threaded Bars in Concrete (C20/25)

Design Method acc. to EOTA Technical Report TR 029, characteristic values for Tension & Shear Loading

Anchor size					M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Tension Load	24°C/40°C	Un-cracked Concrete	$N_{Rec,stat}$		8.6	13.8	20.0	28.0	38.1	52.3	67.9	80.5	98.3	113	127
		Cracked Concrete	$N_{Rec,stat}$	[KN]	6.0	8.4	12.3	16.2	21.8	29.6	39.7	49.4	62.1	74.1	87.1
			$N_{Rec,seis}$		4.1	5.7	8.4	11.0	14.8	20.4	27.4	34.1	42.8	51.1	60.1
Shear Load		Un-cracked Concrete	$V_{Rec,stat}$		5.1	8.6	12.0	22.3	34.9	50.3	65.7	80.0	88.6	102	117
		Cracked Concrete	$V_{Rec,stat}$	[KN]	4.8	7.1	9.6	13.7	19.2	24.2	29.1	34.6	40.6	47.0	53.8
			$V_{Rec,seis}$		1.8	3.0	4.2	6.9	9.6	12.1	14.5	17.3	20.3	23.5	26.9
Embedment Depth			h_{ef}	[mm]	80	90	110	125	170	210	250	280	320	350	380
Edge Distance			$C_{cr,N}$	[mm]	113	135	165	188	255	304	342	379	400	436	472
Axial Distance			$S_{cr,N}$	[mm]						$2XC_{cr,N}$					

1) Sizes M8 and M10 (cracked concrete only), as well as M33 up to M39 are not covered by ETA's.
2) Shear load with lever arm acc. TR 029.
$N_{Rec,stat}$, $V_{Rec,stat}$ = Recommended Load under static and quasi-static action,
$N_{Rec,seis}$, $V_{Rec,seis}$ = Recommended Load under seismic action

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Installation Parameters - Reinforcement Bars (Rebars) (Bonded Anchors)

Reinforcement bars (Rebars)			Setting Parameters - Rebars								
Rebar size			**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	$h_{ef,\,min}$	mm =	60	60	70	75	80	90	100	112	128
	$h_{ef,\,max}$	mm =	96	120	144	168	192	240	300	336	384
Development Length	l_{min}	mm	400	500	600	-	800	1000	1200	1350	1500
Diameter of nylon brush	d_b	mm ≥	14	16	18	20	22	26	34	37	41.5
Minimum thickness of member	h_{min}	mm	h_{ef} + 30 mm ≥100mm					h_{ef} + $2d_0$			
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

*The values of development length are rounded off to 50D.

Performance Data - Reinforcement Bars (Bonded Anchors)

PERFORMANCE DATA - Reinforcement Bars Fe500

Rebar Diameter	Hole Diameter	Design load for good bond condition, f_{ck}, cube = 25 N/mm² [$N_{b,d}$]																	
(mm)	(mm)	kN																	
Ø 8	Ø 12	19.6	20.6	21.9															
Ø 10	Ø 14	24.5	25.8	27.0	29.4	34.2													
Ø 12	Ø 16				32.8	36.9	38.3	43.7	49.2										
Ø 14	Ø 18						44.6	51.0	55.8	63.8	67.0								
Ø 16	Ø 22							53.8	58.9	67.3	70.6	74.0	87.5						
Ø20	Ø 28									72.1	75.7	79.3	90.1	93.7	100.9	108.1	115.3	126.1	136.7
Depth (mm)		100	105	110	120	135	140	160	175	200	210	220	250	260	280	300	320	350	365

PERFORMANCE DATA - Reinforcement Bars Fe500

Rebar Diameter	Hole Diameter	Design load for good bond condition, f_{ck}, cube = 25 N/mm² [$N_{b,d}$]																	
(mm)	(mm)	kN																	
Ø25	Ø 32	103.2	107.4	115.6	123.9	132.2	144.5	150.7	165.2	185.8	213.6								
Ø28	Ø 35			129.5	138.8	148.0	161.9	168.8	185.0	208.1	231.3	254.4	268.0						
Ø32	Ø 40					169.2	185.0	192.9	211.4	237.9	264.3	290.7	296.0	317.2	350.0				
Ø40	Ø 50								264.3	297.3	330.4	363.4	370.0	396.5	422.9	462.5	495.6	546.9	
Depth (mm)		250	260	280	300	320	350	365	400	450	500	550	560	600	640	700	750	800	

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Reinforcement bars (REBARS) **Performance Data - Rebars in Concrete**

Design Method acc. to EOTA Technical Report TR 029, characteristic values for Tension & Shear Loading

Rebar size				Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32	Ø 36	Ø 40
Steel Failure														
Characteristic Tension reistance		$N_{RK,s}$	[KN]	28	43	62	85	111	173	270	339	442	560	691
Partial Safety Factor		$\gamma_{Ms,N}$		1.40										
Pullout and Concrete cone failure														
Characteristic bond resistance in concrete (C20/25) f_{ck}, cube = 25 N/mm²														
24°C/40°C	Un-cracked Concrete	$N_{Rk,p}$= $N^0_{Rk,C}$	[KN]	22	31	42	56	60	96	148	187	225	308	362
	Cracked Concrete			15	21	30	34	42	68	106	147	194	265	308
43°C/60°C	Un-cracked Concrete			13	18	27	33	38	59	91	110	127	173	204
	Cracked Concrete			9	13	18	21	26	42	64	89	118	161	187
43°C/72°C	Un-cracked Concrete			12	17	23	28	35	59	83	99	113	154	181
	Cracked Concrete			8	11	17	19	23	37	58	81	106	145	168
Partial Safety Factor		$\gamma_{Mp}=\gamma_{Mc}$		1.8							2.1			
Embedment Depth		h_{ef}	[mm]	80	90	110	115	125	170	210	250	280	340	360
Edge Distance		$C_{cr,N}$	[mm]	97	121	139	170	180	219	274	298	330	372	413
Axial Distance		$S_{cr,N}$	[mm]	$2XC_{cr,N}$										
Increasing factors for non-concrete Ψ_c				$(f_{ck}^{0.11})$ /1.42										
Splitting Failure														
Edge Distance		$C_{cr,sp}$	[mm]	$C_{cr,N} <= 2\ h_{ef}(2.5\text{-}h / h_{ef}) <= 2.4\ h_{ef}$										
Axial Distance		$S_{cr,sp}$	[mm]	$2XC_{cr,sp}$										
Partial Safety Factor (dry & wet)		γ_{Msp}		1.8							2.1			
Steel Failure without lever arm														
Characteristic Shear resistance		$V_{RK,s}$	[KN]	14	22	31	42	55	86	135	169	221	280	346
Partial Safety Factor		$\gamma_{Ms,v}$		1.5										
Steel Failure with lever arm														
Characteristic Bending moment		$M^\circ_{RK,s}$	[Nm]	33	65	112	178	265	518	1012	1422	2123	3023	4147
Partial Safety Factor		$\gamma_{Ms,v}$		1.5										
Concrete Pry out failure														
Factor k				2.0										
Partial Safety Factor		γ_{Mcp}		1.5										
Concrete Edge Failure														
Effective length of anchor in Shear loading		l_f	[mm]	80	90	110	115	125	170	210	250	280	340	360
Outside Diameter of anchor		d_{nom}	[mm]	12	14	16	18	20	24	32	35	40	46	50
Partial Safety Factor		γ_{Mc}		1.5										

The data in this table is intended to be used together with the design provisions of EOTA Technical Report TR 029.

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Consumption Guide Threaded Bars (RTR Anchor Rods)

**R Fix CONSUMPTION CHART For Threaded Bars (Anchor Rods)

Anchor Ø (mm)	Hole Ø (mm)	Volume of Mortar per Hole (ml)																			
M8	10	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.7												
M10	12	2.3	2.7	3.0	3.4	3.8	4.2	4.6	5.7	6.8	7.6										
M12	14	2.7	3.1	3.6	4.0	4.5	4.9	5.4	6.7	8.1	9.0	10.8									
M16	18	3.5	4.1	4.7	5.3	5.9	6.5	7.1	8.8	10.6	11.8	14.1	14.7	16.2	17.6	19.1					
M20	24	9.1	10.6	12.2	13.7	15.2	16.7	18.3	22.8	27.4	30.4	36.5	38.0	41.8	45.6	49.4	53.2	54.8	60.8		
M24	28	10.8	12.6	14.4	16.2	18.0	19.8	21.6	27.0	32.4	36.0	43.1	44.9	49.4	53.9	58.4	62.9	64.7	71.9	80.9	
M27	32	15.3	17.8	20.4	22.9	25.5	28.0	30.6	38.2	45.9	51.0	61.2	63.7	70.1	76.5	82.9	89.2	91.8	102.0	114.7	127.5
M30	35	16.9	19.7	22.5	25.3	28.1	30.9	33.7	42.1	50.6	56.2	67.4	70.2	77.2	84.3	91.3	98.3	101.1	112.4	126.4	140.4
Depth (mm)		**60**	**70**	**80**	**90**	**100**	**110**	**120**	**150**	**180**	**200**	**240**	**250**	**275**	**300**	**325**	**350**	**360**	**400**	**450**	**500**

Consumption Guide Reinforcement Bars (Rebars)

**R Fix CONSUMPTION CHART For Reinforcement Bars (Rebars) upto 20 mm Ø

Rebar Ø (mm)	Hole Ø (mm)	Volume of Mortar per Hole (ml)															
Ø 8	10	3.1	3.7	4.5	5.0	5.6	6.2	7.2	7.8	8.7	9.3						
Ø10	14	8.3	10.0	12.0	13.3	14.9	16.6	19.1	20.7	23.2	24.9	26.6	27.4				
Ø12	16	9.7	11.6	14.0	15.5	17.4	19.4	22.3	24.2	27.1	29.0	31.0	31.9	38.7			
Ø16	22	19.7	23.6	28.6	31.5	35.5	39.4	45.3	49.3	55.2	59.1	63.1	65.0	78.8	91.6	98.5	
Ø20	28	33.2	39.8	48.1	53.1	59.7	66.4	76.3	83.0	92.9	99.6	106.2	109.5	132.8	154.3	165.9	199.1
Depth (mm)		**100**	**120**	**145**	**160**	**180**	**200**	**230**	**250**	**280**	**300**	**320**	**330**	**400**	**465**	**500**	**600**

**R Fix CONSUMPTION CHART For Reinforcement Bars (Rebars) from 25 mm Ø to 40 mm Ø upto a depth of 620 mm

Rebar Ø (mm)	Hole Ø (mm)	Volume of Mortar per Hole (ml)																
Ø25	32	34.5	41.4	50.0	55.2	62.1	69.0	79.3	86.2	96.6	103.5	110.4	113.8	137.9	160.4	172.4	206.9	213.8
Ø28	35	38.1	45.7	55.3	61.0	68.6	76.2	87.7	95.3	106.7	114.3	122.0	125.8	152.5	177.2	190.6	228.7	236.3
Ø32	40	49.8	59.7	72.2	79.7	89.6	99.6	114.5	124.5	139.4	149.3	159.3	164.3	199.1	231.5	248.9	298.7	308.7
Ø40	50	77.8	93.3	112.8	124.5	140.0	155.6	178.9	194.5	217.8	233.4	248.9	256.7	311.1	361.7	388.9	466.7	482.3
Depth (mm)		**100**	**120**	**145**	**160**	**180**	**200**	**230**	**250**	**280**	**300**	**320**	**330**	**400**	**465**	**500**	**600**	**620**

Note: 1) Theoretical Calculations for Chemical Consumption is done by using the formula $(\Pi(d_0^2-d^2)*h)/4)$. The actual chemical consumption can be obtained by multiplying the Wastage percentage to this chemical consumption.

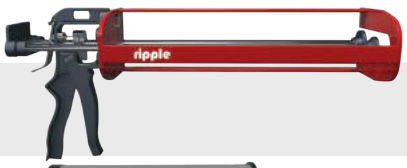
2) 1ml = 1000mm³.

* The above consumption data is calculated theoretically and for estimation purpose only.

* Actual Consumption may vary upto 10-15% depending on site conditions and type of application.

** Please refer to page no. 2 of this brochure under installation procedure

Accessories

Dispenser Gun for R Fix (Suitable for R Fix 585 & 385 ml Cartridges)	30306	
Blow out Pump - Manual (Medium)	16007	
Cleaning Nylon Brush (Various Diameters available)	-	
Threaded bars (RTR) available in various diameters & lengths in 5.8, 8.8 grades & also in A2 (304) & A4 (316)	-	

RC1-v3.0 @ Nov 2017

New Delhi | Mumbai | Pune | Kolkata | Bangalore | Chennai
Lucknow | Ahmedabad | Nagpur | Patna | Bhubaneswar | Kochi

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