

Produced from fully killed steel:

Size (mm)	Sectional Wt. (Range) Kg/m	Size (mm)	Sectional Wt. (Range) Kg/m
8	0.363 to 0.426	22	2.891 to 3.069
10	0.567 to 0.666	25	3.735 to 3.966
12	0.835 to 0.941	28	4.685 to 4.975
16	1.501 to 1.659	32	6.121 to 6.499
18	1.940 to 2.060	36	7.750 to 8.230
20	2.396 to 2.544	40	9.564 to 10.156

Length

Uniform 12 meters, can also be supplied in 9/12 meters on mutual agreement

Tolerance as per

IS : 1786 - 2008



Specifications :

Grade

Conforming to

Constructional

: IS : 1786 - 2008

Standard	Grade	Remarks	Yield Strength (N/mm ²) min	UTS (N/mm ²)min	% Elongation min
IS : 1786- 2008	Fe 415	-	415	485	14.5
IS : 1786-2008	Fe 500	-	500	545	12
IS : 1786-2008	Fe 550	-	550	585	8
IS : 1786-2008	Fe 500D	-	500	565	16
Re-bars with corrosion resistant elements	CRM	Cu+Cr+P = 0.75% min	415	485	14.5
	HSCRM	Cu+Cr+P = 0.75% min	500	545	12

Note: Sizes 8,10 and 12 mm are not regularly rolled in Fe 550 Grades



RE-BARS



Special Features:

- o Low carbon content and made from fully killed steel.
- o Higher yield strength, Ultimate tensile strength and higher percentage elongation when compared to cold twisted bars of same grade.
- o Easy bendability, weldability and excellent ductility ensures economy and safety of use.
- o In-built ability to resist loss of strength at higher temperature.
- o Require less energy for bending and re-bending along with superior reverse bending properties.
- o Can be butt welded or lap-welded.
- o Use of Fe-500 grade results in saving more than 15% in steel consumption when compared to cold twisted bars.
- o Higher corrosion resistance and seismic resistance compared to CTD.
- o Ideally suited for any type of concrete structure.

- Packing** : Bare, in strapped bundles / piles weighing 7 to 8 metric tonnes approximately.
- Invoicing** : As per actual weight.
- Quantity & Shipment** : On mutually agreed terms.

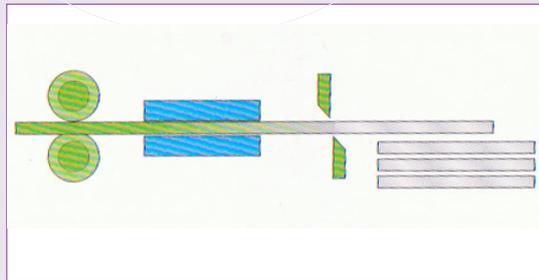


Quenching and Self Tempering (QST) imparts a composite micro structure ranging from a strong, tough, tempered martensite in the surface layer to a refined, tough, ductile ferrite-pearlite in the core with a intermediate structure in between.

Superior rib design for excellent bonding with cement. Mean Projected Area much more than the specified values of the IS1786 standard.



RE-BARS Fe500 & Fe500D



Worried about construction at most adverse conditions?

VIZAG TMT - CRM and VIZAG TMT - HSCRM are the right choice.



Advantages ..of TMT (QST) Rebars of VSP

Combination of high strength and high ductility

VIZAG TMT bars have rare combination of high strength with excellent ductility. The tensile to yield strength ratios are always greater than 1.12. In normal bars, the increase in the yield strength of the bars is accompanied by the loss of percent elongation. But in the case of VIZAG TMT bars this loss is negligible and the percent elongation values are much higher than normally specified in various International Standards. In Fe 500D grade rebars the UTS/YS ratio values are maintained always at more than 1.15.

Resistance to ageing

The tests carried out on the VIZAG TMT bars, indicate that no significant change of strength as a function of time occurs which could affect the usefulness of these bars.

Superior corrosion resistance



Heat weight of 140 T ensure uniform properties throughout a huge quantity.

The absence of Eutectoid Carbides and pearlite colonies in VIZAG TMT, absence of stresses because of tempering, presence of martensitic layer at the outside surface and formation of adherent scale

film due to water quenching during rolling are the reasons for better corrosion resistance properties of these reinforcement bars.

Excellent bendability and workability

The tough outer skin and the ductile core of the VIZAG TMT bars result in excellent bendability. This coupled with a high resistance to low temperature brittle fracture, allows these bars to be bent, without fear of failure around small diameter mandrels.



In the reverse bend test, these bars also show good results. In the construction site, situation arises where bars bent are left for a period in the bent condition and then reverse bent. During period between the first bend and the reverse bend the bars may strain age. The loss of ductility due to strain ageing and due to strain imposed from the first bend may cause failure during rebending operations, if the bars are not sufficiently ductile. Test results have shown that VIZAG TMT bars have withstood successfully the bending, straightening and rebending tests after ageing. The bend tests carried out at VSP have shown that these bars could be bent even around smallest dia mandrel without causing any cracking.

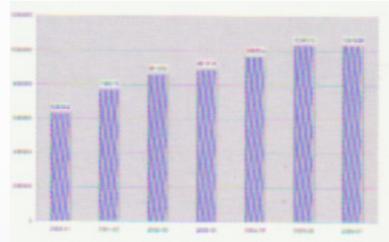


Very high reduction ratio is the added advantage.
Good internal soundness & allied properties.

Bloom size: 320X250

Amazing Reduction Ratios.

1:1534 for 8mm dia rebar	1:202 for 22 mm dia rebar
1:982 for 10 mm dia rebar	1:157 for 25 mm dia rebar
1:383 for 12 mm dia rebar	1:125 for 28 mm dia rebar
1:303 for 16 mm dia rebar	1:95 for 32 mm dia rebar
1:245 for 18 mm dia rebar	1:75 for 36 mm dia rebar



Structures can be designed taking the full advantage of intermediate sizes like 18 & 22 to save steel.

Largest manufacturer of Rebars in India,
Production more than 1 million ton per year.

Wide Size Range:

8,10,12,16,18,20,22,25,28,32, 36 & 40



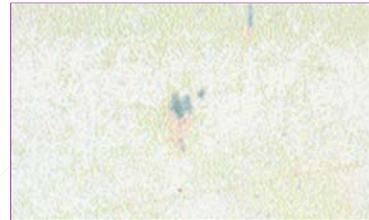
The added Advantages ... of Vizag TMT over others in the market.

The only plant to adapt this technology (QST) for production of rebars from the design stage. Hence, the total extent of the superior technology could be harnessed. 120 metres length of the cooling bed available for self tempering which no other mill in India can match is the testimony for this.

These bars are made from virgin steel in Blast Furnace - Basic Oxygen Furnace - Continuous Casting route. Steel is fully killed, made from best Quality Raw Materials. Rolling is done in the state of the art Rolling Mills with latest technologies. Not even a single ton of Rebar is produced by conversion.

Very clean steel with distinctly low tramp element contents. Typical Inclusion rating as per IS:4163-1982

A	B	C	D (Thin Series)
1.5	1.0	0.5	1.0



Can be butt welded or lap welded



The low carbon content and low carbon equivalent of VIZAG TMT reinforcement bars ensure excellent weldability even while using any of the welding processes such as arc welding, flash butt welding, gas shielded semi automatic welding, gas pressure welding and resistance welding etc.

Welding of these bars does not require pre-heating or post heating. VIZAG TMT bars indicate good welding properties in case of butt welds, cross welds and lap welds. Tensile tests carried out on these reinforcing bars after butt welds, cross welds and lap welds have shown no failure at the weld joints. Normal electrodes with matching strength can be used for welding.

In the welding of steel, the tendency to produce hard and brittle heat affected zones is maximum when the cooling rates of the weld and the carbon content are high. In addition, In those welding processes, where molten metal filler is used, such as in manual metal arc welding, hydrogen pick up may occur leading to hydrogen induced cracking in the heat affected zone. In case of welding reinforcement bars, hard brittle welds of low ductility and heat affected zone can occur in susceptible steels due to fast cooling rates. VIZAG TMT bars have got very low susceptibility to both heat affected zone brittleness and hydrogen induced cracking due to their low carbon content. These bars when welded show no loss of strength at the load carrying joints.

Higher fatigue strength

Fatigue test carried out on VIZAG TMT bars (by subjecting to alternate tensile stressing) has shown that the fatigue strength of the bars is equal to the reinforcement bars produced by other methods. The fatigue test was also carried out on bent and angled bars encased in concrete. The results were obtained by using constant amplitude loading of 200 MPa with a maximum stress equal to 0.7 X Yield Strength. The fatigue strength of these bars meets the requirements given in various International Standards.



ADDITIONAL COST SAVING BY USING TMT BARS WITH WELDED LAP JOINTS

For a dia = 20 mm
 $f_y = 415 \text{ N/mm}^2$ and $f_{ck} = 20 \text{ N/mm}^2$ grade of concrete

Type of lap	Lap length reqd.	Material requirement	Cost	% cost saving per joint of a single bar
Conventional Joint	50 X dia (average) = 1000 mm	2.47 Kg of bar @ Rs. 28,000/!per Tonne	Rs.69-00	51.2 %
For welding	6.3 dia = 126mm	0.31 Kg of bar @ Rs.28,000! Per Tonne 2.5 Electrodes of 4mm dia and 450mm long and other expenses	Rs.8.68 Rs.25.00 Rs.33.68	

Recommended welding length For VIZAG TMT 415 = 6.3 X dia
 VIZAG TMT 500 = 7.0 X dia
 VIZAG TMT 550 = 7.5 X dia

IS 2751 - 1979 - Welding Code

*Indicative market price, which will change from time to time

FE500 & FE500D



A Navratna Company

Economy and Savings in Steel

The use of High strength Fe 500 VIZAG-TMT rebars has numerous advantages over normal Fe 415 rebars. It leads to savings in steel in terms of weight and there by cost.

Section	Example	Grade of Concrete	Grade of Steel	Qty in Kgs	% Saving in Wt, over normal 415
Doubly Reinforced Beam (5m long)	300mm X 500mm M lim=234.5 KNM SF lim=187.5 KN d'/d = 0.1	15	Normal 415	115	-
		15	VIZAG TMT 500	99	14
		15	VIZAG TMT 550	93	19.13
		20	Normal 415	104	-
		20	VIZAG TMT 500	89	14.5
		20	VIZAG TMT 550	83	20.2
Doubly Reinforced Beam (6m long)	300mm X 600mm M lim=507 KNM SF lim=337.5 KN d'/d = 0.075	15	VIZAG TMT 500	218	16
		15	VIZAG TMT 550	204	21.5
		20	Normal 415	245	-
		20	VIZAG TMT 500	207	15.5
		20	VIZAG TMT 550	198	20

	Yield Strength (N/mm ²)	UTS (N/mm ²)	UTS/YS(%)	% Elongation
IS: 1786-2008 Fe 415	415	485	1.17	14.5
VI ZAG TMT (Typical)	478	572	1.20	24.0
IS : 1786-2008 Fe500	500	545	1.09	12.0
VI ZAG TMT (Typical)	550	648	1.18	22.0
IS:1786-2008 Fe500D	500	565	1.10	16
VI ZAG TMT (Typical)	540	638	1.18	22
IS : 1786-2008 Fe550	550	585	1.06	8.0
VI ZAG TMT (Typical)	611	707	1.16	20.0

Comparison of Fe 500 with International Standards

	Grade	UTS N/mm ²	YS	% Elongation
ASTMA 615	75	690	520	6-7
JISG 3112	SD 490	620	490-625	12-13
BS4449	500	525-675	500	12
DIN-488	BST-500	550	-----	8
New Zealand	500N	650	-----	5
Australia	500N	-----	500	-----
IS 1786-1985	Fe 500	545	500	12
VIZAG TMT (Typical)	Fe 500	648	550	22