



SAIL TMT EQR

THE HIDDEN STRENGTH OF MODERN INDIA





From highrises to flyovers, bridges, dams, railways stations, ports and airports, **SAIL TMT-EQR Rebars** are strengthening modern India from deep within.

Steel Authority of India Limited, India's largest and most trusted steel maker, produces Earthquake Resistant (EQR) TMT (thermo-mechanically treated) rebars for use in construction in seismic zones and other areas where the possibility of earthquakes exist.

SAIL TMT-EQR Rebars, produced from SAIL's modernised mills at IISCO Steel Plant, Durgapur Steel Plant and Bhilai Steel Plant, are superior, elastic energy absorbing bars that are supplied in both straight and coil form. All SAIL TMT-EQR bars fully conform to revised IS 1786-2008 grade D (ductile) specifications.

SAIL TMT-EQR rebars are characterised by higher UTS/YS ratio due to which they are capable of absorbing more energy if pressure-loaded beyond yield point due to sudden natural occurrences such as an earthquake, tsunami, etc. The desired UTS/YS ratio is 1.20 (minimum) for grade Fe 415 and 1.18 (minimum) for grade Fe 500.

Further, the percentage elongation of SAIL TMT-EQR rebars is enhanced to minimum 18% with a guaranteed UTS/YS ratio of minimum 1.18. These enhanced attributes enables the material to withstand and absorb sudden loads encountered during earthquakes, cyclones, tsunamis, etc., thus providing higher safety to structures.

Features of SAIL TMT-EQR Rebars/Coils

Bond Strength

The bond strength of all SAIL TMT-EQR bars has been tested at the **National Test House, Alipore, Kolkata** and meets IS 1786-2008 norms.

Weldability

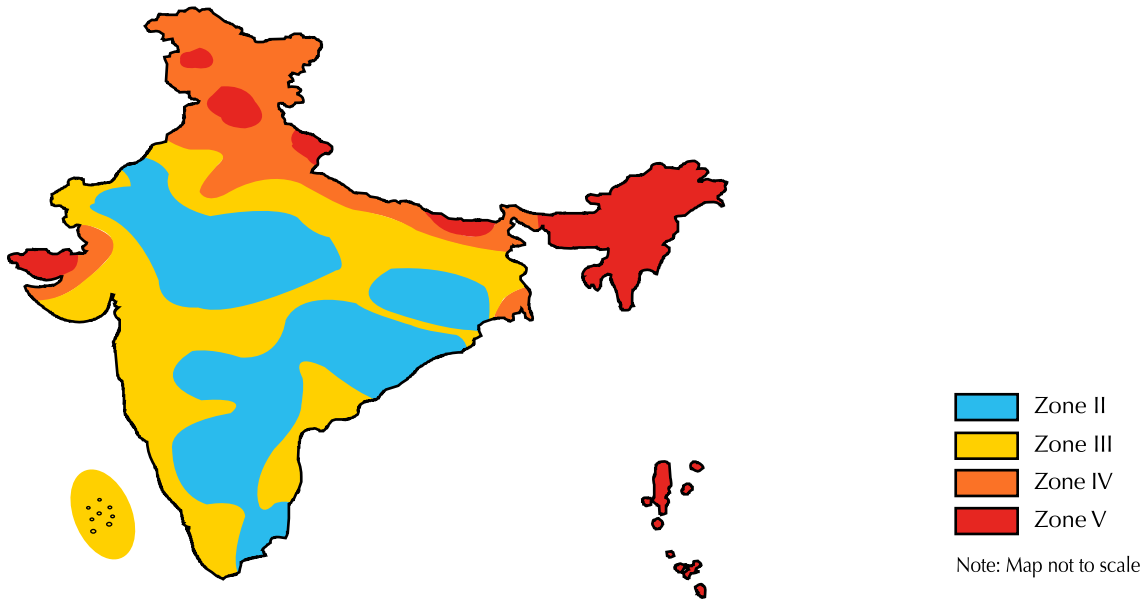
SAIL TMT-EQR bars are perfectly weldable by normal process of welding with suitable electrodes. They are also weldable without preheating, preferably with low hydrogen

electrode. The weldability of SAIL TMT-EQR bars has been tested and certified by the **Welding Research Institute, Trichy**.

Bendability

All SAIL TMT-EQR bars have lower bend diameter compared to specified bend diameters as per IS 1786-2008, Grade D specification. This allows easier bending with less effort and thus facilitates easier onsite works.

Seismic Zones of India...At-a-glance



All **SAIL TMT – EQR** rebars are manufactured to suit the seismic forces that cover the four zones across India.

Fire Resistance

All SAIL TMT-EQR bars are able to withstand fire hazards when enclosed in concrete up to 600°C, whereas ordinary TMT starts losing its mechanical properties from 250°C.

Corrosion Resistance

SAIL TMT-EQR is also available in corrosion-resistant variety (HCR) with modified chemical compositions to give enhanced resistance to seismic and corrosive atmospheric conditions.

Product Characteristics of SAIL TMT-EQR Rebars

Attributes	Advantages
High UTS/YS ratio	Provides good plastic energy absorption
High total elongation	Higher resistance to failure
High uniform elongation	<ul style="list-style-type: none">Enhances plastic energy absorption capacityDelays failure i.e. onset of necking
Low variation in YS	Avoids localised shear failure
Higher strength (YS & UTS)	<ul style="list-style-type: none">Lower dead loadHigher energy absorption capacity with elastic zone
Composite microstructure martensite rim & ferrite-pearlite core	Fire resistance due to tempered martensitic rim
Good weldability	<ul style="list-style-type: none">Enhances cold and hot cracking resistancePre-welded meshes can be used to eliminate manual binding at site

Chemistry of SAIL TMT-EQR Rebars/Coils (Ladle Analysis in %)

Element	IS: 1786-2008	IS: 1786-2008	SAIL-EQR TMT
	Fe-500	Fe-500D	Fe-500
Carbon (C) (maximum)	0.30	0.25	0.25
Sulphure (S) (maximum)	0.055	0.040	0.040
Phosphorus (P) (maximum)	0.055	0.040	0.040
S+P (maximum)	0.105	0.075	0.075

Mechanical Properties of SAIL TMT-EQR Rebars

Parameter	IS: 1786-2008	IS: 1786-2008	SAIL-EQR TMT
	Fe-500	Fe-500 D	Fe-500 D
Yeild strength (YS), MPa (minimum)	500	500	500
Yeild strength (YS), MPa (maximum)	-	-	625
Ultimate Tensile Strength (UTS), MPa (minimum)	545	565	590
UTS/YS ratio (minimum)	1.08	1.10	1.18
Total Elongation (minimum) (GL=5.65 Ao)	12.0	16.0	18 (up to 28 mm) 16 (abv 28 mm)
Uniform Elongation minimum (%) or Elongation at maximum force (%)	-	5	7



Rationalised Sizes of SAIL EQR TMT

Size (in mm)	Weight (in kg/m)	Length (in m)	Mill
6	0.22	Coil form	IWRM/BBRM
8	0.39	Coil form/Straight*	BWRM/IWRM/IBM/BBRM
10	0.62		
12	0.89		
16	1.58	5.5 to 13.5	DMM/IBM/BBRM
20	2.47		DMM/IBM/BMM/BBRM
25	3.85		
28	4.83		BMM/IBM/BBRM
32	6.31		
36	7.99		
40	9.85		
45	12.5		

Abbreviations used: IWRM: IISCO Wire Rod Mill; BWRM: Bhilai Wire Rod Mill; IBM: IISCO Bar Mill; DMM: Durgapur Merchant Mill; BMM: Bhilai Merchant Mill, BBRM: Bhilai Bar & Rod Mill

Dimensional Tolerance : As per IS: 1786-2008 specification

Applications of SAIL TMT-EQR

- Highrise Buildings • Bridges • Flyovers • Dams • Underground Metro Railway Platforms • Industrial Structures
 - Thermal and Hydel Power Plants • SAIL EQR is specially suited for non-corrosive earthquake-prone zones.
- For earthquake-prone corrosive zones, SAIL TMT-EQR HCR is more suitable

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STEEL AUTHORITY OF INDIA LIMITED

केन्द्रीय विपणन संगठन

CENTRAL MARKETING ORGANISATION

A Government of India Enterprise

There's a little bit of SAIL in everybody's life