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ESL STEEL LIMITED

for

VICTORY
VISHWAS
VEDANTA

V-XEGA

550D TMT BAR

क्वालिटी की नई पहचान

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The journey of excellence

ESL STEEL LIMITED

Vedanta Group

A globally diversified Natural Resources Company specializing in Zinc, Lead, Silver, Iron Ore, Steel, Copper, Aluminum, Power, Oil and Gas. It is the Largest Mining and Non-ferrous Metals Company in India and has Mining, Petroleum and Gas Operations in various countries across the Globe. The group's journey consists of regular geological exploration and discoveries, technological advancements, sustainable developments, turning around businesses and setting new industry benchmarks.


Aluminium


Zinc, Lead & Silver


Oil & Gas


Iron Ore


Steel


Copper


Power


Ferro Chrome

ESL Steel Limited (ESL)

Vedanta group is now looking to set new benchmarks in the steel industry. ESL is having state of art Integrated primary steel plant having main products such as Wire Rods, TMT Rebars, Ductile Iron Pipes, Pig Iron, and Billets.

Currently commissioned at a capacity of 2.5 MTPA, the company has a vision of expanding up to 10 MTPA in the coming years.

WHY CHOOSE ESL

Fully integrated steel plant with 100% production at a single site which ensures high-quality assurance. The company is having its own iron ore mines and coke oven ensuring good quality raw materials used for its manufacturing operations.

Acknowledged by the Ministry of Steel as a primary steel maker, the Company is equipped with cutting-edge modern machinery for all steel-making processes.

High diversified range of products suiting as per different international standards.

Drive for customer delight and transparency with the e-commerce Vedanta Metal bazaar portal.

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WHO **WE ARE**

ESL Steel Limited (ESL), an Integrated Steel Producer, was incorporated in 2006 as a Public Limited Company with operations in Bokaro, Jharkhand, India. In June 2018, Vedanta Limited acquired the management control of ESL. The company has set up a green field integrated manufacturing facility, which is currently commissioned at a capacity of 2.5 MT per annum. The Company's product range includes Pig Iron, Billets, TMT Bars, Wire Rods and Ductile Iron Pipes.

WHAT **WE DO**

The Company has introduced its rebranded product range in the market under three new brands, V-XEGA for TMT Bars, V-DUCPIPE for Ductile Iron Pipes, and V-WIRRO for Wire Rods. It plans to launch V-XEGA in the domestic market in the retail space so as to give the home builders, architects, engineers as well as the builders and contractors a very lucrative brand option in the construction business.

ESL has established excellence in every stage of production by bringing international expertise and solutions from reputed manufacturers. The Company registered its business turnaround in less than a year since its acquisition, becoming a profitable business in 2019. ESL aims to scale up its steel operations in Bokaro through brown field expansion and be amongst the top steel producers in the country. It looks forward to expanding horizons and pushing boundaries, both in its existing and future endeavours, and to providing continuous growth, profit and prosperity to all its stakeholders.

- **TRUST**
- **ENTERPRENEURSHIP**
- **INNOVATION**
- **EXCELLENCE**
- **INTEGRITY**
- **CARE AND RESPECT**

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QUALITIES THAT RAISE THE BAR

- Made from fully killed steel.
- Very clean steel with low tramp element content.
- Higher tensile strength to yield strength ratio.
- Higher percentage elongation compared to BIS specifications.
- Easy bendability, Weldability and excellent ductility ensures economy and safety of use.

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- Requires less energy for bending and re-bending Can be butt welded or lap welded.
- Use of Fe-550 D grade results in saving more than 15% in steel consumption when compared to Fe-415 grade.
- Superior corrosion resistance and seismic resistance properties.
- Ideally suited for any type of concrete structure.

PACKING
Bare, in strapped bundles / piles weighting 2 to 3 metric tonnes **approximately per bundle.**

TOLERANCE
As per **IS:1786:2008**

LENGTH
Uniform 12 metres, can also be supplied in any length on mutual agreement.

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V-XEGA 550D: A GRADE ABOVE

Superior Strength and High Ductility

V-XEGA TMT bars show rare combination of high strength and excellent ductility. The tensile to yield strength ratios are always greater than 1.15

Resistance to Ageing

The mechanical properties of V-XEGA TMT Bars such as strength and elongation do not change with time.

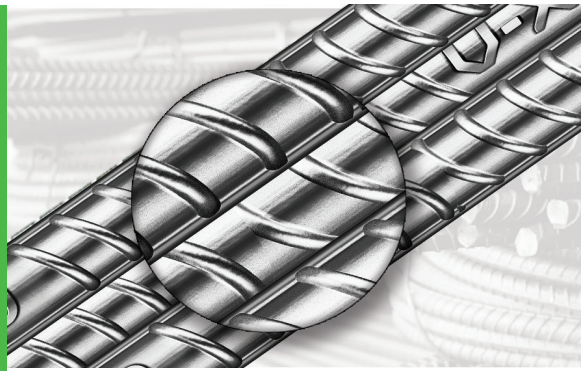
THE STRENGTHS OF V-XEGA TMT BARS

Superior Corrosion Resistance

Lower carbon content and the absence of torsional residual stress allow better corrosion resistance. This unique property of V-XEGA TMT Bars is further enhanced through a martensitic layer on the outside surface, uniform microstructure and an adherent scale film formed by water quenching during rolling.

Superior Rib Patternt

V-XEGA TMT bars have unique rib patterns resulting in formation of a stronger bond with concrete. The mean projected area of V-XEGA TMT is more than the specified values of the IS:1786 standard. The uniformity of the rib pattern ensures uniform strong bonding with concrete for the entire structure.



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Excellent Bendability and Workability

The tough outer layer of martensite and the ductile core of the V-XEGA TMT bars result in excellent bendability. This Ferrite Pearlite structure makes the bars flexible and strong.

Fire Resistance Property

V-XEGA TMT bars when exposed to a temperature of 400°C for one hour lose only 5% of its tensile strength, which it regaines as soon as the temperature comes down.

Seismic Property

With superior seismic properties, V-XEGA TMT bars ensure better protection and minimum damage to the structure in case of earthquake. Additional area under the curve shows the extra energy that can be dissipated before breaking. High UTS/YS indicates high strain hardening rate beyond yield point - a requirement for EQR steel. It confirms to international standards by maintaining minimum uniform elongation at maximum stress.

Higher Fatigue Strength

The fatigue strength of these bars meets the requirements of international Standards.

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STEEL STRONG
TECHNOLOGY

ESL Steel Limited has introduced Thermo-mechanically Treated (TMT) reinforcement bars in India, using the latest technology available worldwide. V-XEGA TMT bars are produced at our ESL Steel Limited Bokaro plant under the close supervision of our frontline metallurgists and engineers. Our TMT Bars are made from virgin steel through the Blast Furnace-Basic Steel Making-Secondary Refining-Billet Casting route with the lowest amount of impurities and processed through fully automated rolling mills.

Rolling

The concast billets are subsequently converted into TMT bars, as per requirement. First, hot billets [around 600001 are charged into an online reheating furnace for uniform heating and prop soaking. The furnace is provided sixty-eight burners arranged in three different zones, namely; heating, soaking and bottom heating zones. The blast furnace gas, obtained as a by-product, is used as a fuel in the furnace which has regenerative burners for controlled heating. The heated billets are then rolled in the Bar Mill, equipped with alternate horizontal and vertical housing-less stands, for twist-free operation and accurate size control. In the finishing stands, computer-controlled vertical loopers have been provided for push-pull control during rolling in the continuous mill.

Quenching and Self-Tempering Technology (GIST)

The finished bar then enters the programmable logic-controlled cooling quenching operation, where the bar is subjected to heat treatment in three successive stages. The first stage of quenching begins when the hot rolled bar leaves the final mill stand and is rapidly quenched by a water spray system This converts the surface layer of the bar into a hardened structure called (Martensite' while the core remains austenitic.

Self-Tempering

The second stage of self-tempering begins when the bar leaves the quenching box with a temperature gradient through its cross section, the temperature of core being higher than that of the surface. This allows heat to flow from the core to the surface, resulting in the tempering of the surface, giving it a structure called 'Tempered Martensite' which is strong and tough. The core is still austenitic at this stage.

Atmospheric Cooling

The third stage of atmospheric cooling' takes place on the cooling bed, where the austenitic core adjacent to the martensitic ring is transformed into a tough banitic structure ring, and the core of the bar into ductile pearlite. Thus, the final structure consists of a combination of a strong outer layer of tempered martensite followed by a bainite ring and a ductile core of pearlite. This is what gives V-XEGA TMT bars their unique combination of strength and ductility.

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TMT BARS COMPARISON

SECTIONAL WEIGHT

Sectional Weight	
DIA [mm]	Nominal Weight (Kg/metre)
8	0.395
10	0.617
12	0.888
16	1. 580
20	2. 470
25	3. 850
32	6. 313
36	7. 990
40	9. 860

% Sectional Weight Variation

	IS 1786-2008 Specifications		V-Xega TMT Rebars	
Sizes	Positive Tolerances	Negative Tolerances	Positive Tolerances	Negative Tolerances
8,10 mm	+ 7 %	- 7 %	0 %	- 6 %
12, 16 mm	+ 5 %	- 5 %	0 %	- 4 %
20 to 40 mm	+ 3 %	- 3 %	0 %	- 3 %

CHEMICAL PROPERTIES

ELEMENT	IS 1786-2008 Fe 500	IS 1786-2008 Fe 500 D	IS 1786-2008 Fe 550 D	UK BS 4449/2005 500 B	UK BS 4449/2005 500 C	Aus/ NZ 500 E	Aus/ NZ 500 N	ESL FE 500 D	ESL FE 550 D	ESL FE 500 D CRS	ESL FE 550 D CRS
% C max	0. 30	0. 25	0. 25	0.22	0.22	0.22	0. 22	0. 25	0. 25	0. 15	0. 15
% S max	0. 055	0. 040	0. 040	0. 050	0. 050	0. 05	0. 05	0. 040	0. 040	0. 04	0. 04
% P max	0. 055	0. 040	0. 040	0. 050	0. 050	0. 05	0. 05	0. 040	0. 040	0. 080	0. 080
% (S+P) max	0. 105	0. 075	0. 075	N.S	N.S	N.S	N.S	0. 075	0. 075	0. 12	0. 12
CE max	Not Defined	0. 50	0. 61	0. 50	0. 50	0.44	0. 49	0.42	0.42	0. 42	0. 42
% (Cr+Cu+P)	-	-	-	-	-	-	-	-	-	0. 50 min	0. 50 min

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CHEMICAL COMPOSITION

ELEMENTS V-Xega 550 D		IS 1786-2008 Specifications
Carbon (%) :	0 . 23 Max	0 . 25 Max
Sulphur (%) :	0 . 035 Max	0 . 040 Max
Phosphorous (%) :	0 . 035 Max	0 . 040 Max
Carbon Equivalent (%) :	0 . 38 Max	0 . 61 Max
Sulphur + Phosphorous :	0 . 7 Max	0 . 075 Max

PHYSICAL PROPERTIES

ELEMENT	IS 1786-2008 Fe 500	IS 1786-2008 Fe 500 D	IS 1786-2008 Fe 550 D	UK BS 4449/2005 500 B	UK BS 4449/2005 500 C	Aus/ NZ 500 E	Aus/ NZ 500 N	ESL FE 500 D	ESL FE 550 D	ESL FE 500 D CRS	ESL FE 550 D CRS
YS [N/mm2]	500 min	500 min	500 min	500-650	500-650	500-600	500-650	530 min	580 min	530 min	580 min
TS [N/mm2]	545 min	565 min	600 min	N.S	N.S	N.S	N.S	600 min	640 min	600 min	640 min
TS/YS min	1.08	1. 10	1.08	1.15-1.35	1.15-1.40	1.08	1. 10	1. 10	1. 10	1. 10	1. 10
% Elongation min	12	16	14.5	N.S	N.S	N.S	16	16	16	16	16
% Uniform elongation at max stress, min	N.S	5	5	5	7.5	10	5	5	5	5	5
Application	General	Seismic	Seismic	General	Seismic	Seismic	General	Seismic	Seismic	Seismic	Seismic

PHYSICAL PROPERTIES

MECHANICAL PROPERTIES V-XEGA 550 D	
Yield Strength (N/mm2)	580 Min
Tensile Strength (N/mm2)	640 Min
Elongation (%)	16% Min
Ratio of Tensile Strength to Yield Strength	1.10 Min

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