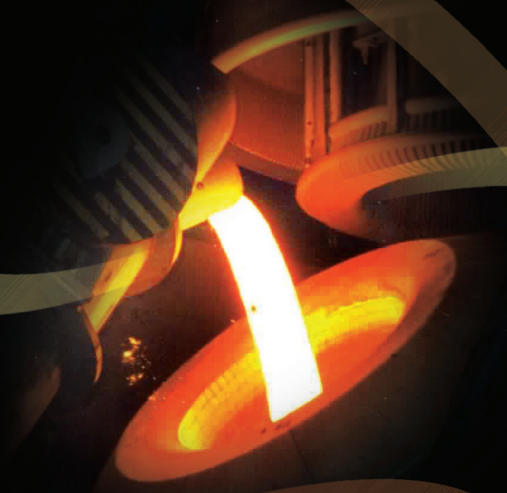
vivacious steel maker



आर.आइ.एन.एल RINL

VIZAG STEEL

Pride of Steel

A Navratna Company

Shri Beni Prasad Verma
Hon'ble Minister of Steel
Government of India

मैं गाँवों में स्टील की खपत पर अधिक ध्यान दूँगा जिससे स्टील और अन्य उद्योगों को बढ़ावा मिले।

I will increase focus on

Rural Steel Marketing

for multiplier effect with more investment to give an impetus to infrastructure growth in the country

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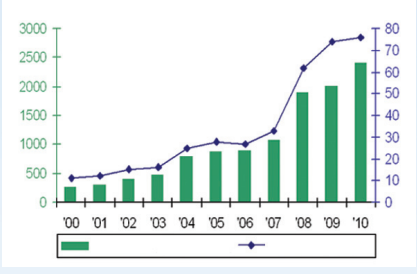
VIZAG STEEL
Pride of Steel
A Navratna Company

Rashtriya Ispat Nigam Limited - Visakhapatnam Steel Plant (RINL-VSP) popularly known as 'Vizag Steel' the 'Pride of Steel', a leading Central PSU under the Ministry of Steel is the first shore based Integrated Steel Plant in the country.

Vizag Steel known for its 'Quality' & 'Customer Service' is a market leader in longs with a share of about 10%. It has been supplying various grades of steel for construction of projects of National importance which include Metros, Power Sector, Bridges, Nuclear complexes and several others. RINL-VSP has exported finished products to countries like USA, UAE, Thailand, Bangladesh, Nepal, Sri Lanka etc. Its products are made from 100% virgin steel, maintaining stringent tolerances both in chemistry & physical properties. RINL-VSP has a wide marketing network spread across the country and is the "preferred steel maker" for the customers.

RINL-VSP is a 'Nav Ratna' Company with a yearly turnover of over 10,000 crores, having the distinction of 'Several Firsts' in the country to its credit, viz.,

- Coke Dry Quenching
- Large size Blast furnaces
- 100% Continuous Casting
- Rolling Mills with 'Tempcore' Processes
- Rolling Mills with 'Stelmor' Processes
- Triple Standards Certificates, viz. ISO 9001, ISO 14001 and OHSAS 18001 for Quality, Environment, Occupational Health and Safety
- Capability Maturity Model Integrated' (CMMI) level-3 certificate from Software Engineering Institute, USA



The Plant with a capacity of 3.0 Mtpa of liquid steel has been operating much above 100% rated capacity (120% and higher) over the last decade.Though the plant was basically designed to produce mild steel grades, innovative in-house improvements have helped to continuously develop 'value added' products to serve discerning customers. The quantum of Value added production has been on the rise continuously over the years and is now touching 80%.

RINL has already commenced the commissioning activities for its brown field expansion costing about Rs.12, 500 crores to almost double its capacity to 6.3 Mtpa of liquid steel and would be completed in phases by 2011-12.

UNIT	NEW TECHNOLOGY
Sinter Plant	Circular cooler
	Multi slit burners
	Profilometer
Blast Funace (3800 cum)	Copper staves high heat zones
	Hearth bottom cooling with water
	PCI
Steel Melt Shop	Combined blowing
	RH Degasser
	Auto mould level control
	Electro magnetic stirrer
Special Bar Mill	20-45 mm size straight coil form
Wire Rod Mill	High speed WRM (105 - 110 m/s)

Along with addition to capacity, RINL is adopting cutting edge newer technologies to help improve environmental protection, energy efficiency, yield etc.

Capital investment of additional Rs.7,000 crore is also being made towards modernization and rejuvenation of the existing units and addition of a Converter & Caster, to increase the capacity further to 7.3 Mtpa to be completed by 2013.

RINL has commenced planning for next phase expansion to 11 to 12 Mtpa where, RINL expects to add flat products including higher end products such as

- CRGO & CRNO electrical steel
- Seamless Tubes
- Heavy structurals

RINL has a land bank of 20,000 acres and excellent infrastructure & logistics and skilled workforce with top class work culture to go up to 20 MT steel production with total invested capital of about Rs.100, 000 crores by, say 2020.

WIRE RODS

5.5, 6, 6.5, 7, *7.5, 8, *9, 10, *11, 12, 12.7, *13, 14 mm

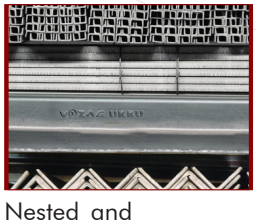
ROUNDS

16, *16.5, *17.5, 18, 20, **20.64, 22, 25, 28, 32, 33.5, 34, 36, 38, 40, 42, 45, 46.5, 48, 50, 53, 56, 60, 63, 65, 71, 75, 77, 80 mm

REINFORCEMENT BARS

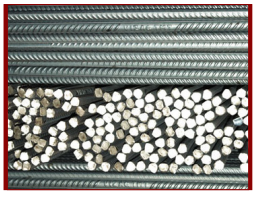
8, 10, 12 mm	in straightended or coil form
16, *18, 20, *22, 25, 28, 32, 36,40* mm	in straight lengths

Bundle Weights
4.5 tonnes to
10 tonnes (max)



Nested and
Interlocked

Bundle Weights
4.5 tonnes to
10 tonnes (max)



Compacted,
Coil weight
1.2 MT approx

* Not regulary rolled

** Only 55 Si7 grade spring steel rounds for "ERC" application

ANGLES

*50	x	50	X	5/6	mm
*60	X	60	X	5/6	mm
*65	X	65	X	6	mm
75	X	75	X	6/8	mm
90	X	90	X	6/8	mm
100	X	100	X	8/10	mm
110	X	110	X	8/10	mm

CHANNELS

MC	*40	X	32	X	5.0	mm
MC	*75	X	40	X	4.8	mm
MC	100	X	50	X	5.0	mm
MC	125	X	65	X	5.3	mm
MC	150	X	75	X	5.7	mm
MC	200	X	75	X	6.2	mm

BEAMS

IPE- BEAMS	*180	X	91	X	5.3	mm
HE-BEAMS	*120	X	114	X	5.0	mm
ISMB BEAMS	125	X	70	X	5.0	mm
	150	X	75	X	5.0	mm
	175	X	85	X	5.8	mm

BLOOMS

245	x	245 mm	---	5.5	to	6.08	mts
315	x	245 mm	---	6.0	to	6.40	mts

PRODUCT MIX

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BILLETS

125	x	125 mm	---	8.0	to	10.4	mts
90	x	90 mm	---	6.0	to	12.0	mts
75	x	75 mm	---	6.0	to	12.0	mts
65	x	65 mm	---	6.0	to	12.0	mts

GRADES

BLOOMS	: Mild Steel/Low, Medium & High Carbon Steel, Forging Quality
BILLETS	: Mild Steel, Low, Medium & High Carbon, Spring Steel, High Mn & Forging Quality Steels.
ROUNDS	: Mild Steel, Low, Medium Carbon, Bright Bar & Forging Quality
REBARS	: Thermo Mechanically Treated (TMT) bars of different yield strengths.
STRUCTURALS	: Structural Steel and High Tensile Steel.
WIRE RODS	: Low Carbon, Wire drawing, Bright Bar, Electrode Quality, Cold Heading Quality, Tyre-bead and other High Carbon Grades.

O All the above materials can be supplied conforming to various international specifications also.

Rolled from fully killed steel.

Size (mm) & Nominal Weight :

ANGLES	Nominal Wt. (Kg/m)	CHANNELS	Nominal Wt. (Kg/m)	BEAMS	Nominal Wt. (Kg/m)
*50 x 50 x 5/6	3.8/4.5	*MC 40 x 32 x 5	4.82	*IPE 180 x 91 x 5.3	18.80
*60 x 60 x 5/6	4.5/5.4				
*65 x 65 x 6	5.8	*MC 75 x 40 x 4.8	7.14	*HE 120 x ll4 x 5	19.90
75 X 75 X 6/8	6.8/8.9	MC 100 x 50 x 5	9.56	ISMB	
90 X 90 X 6	8.2			125 x70 x5	13.30
90 X 90 X 8	10.8	MC 125 x 65 x 5.3	13.10	150 x75 x5	15.00
100 X 100 X 8	12.1			175 x85 x5.8	19.60
100 X 100 X 10	14.9	MC 150 x 75 x 5.7	16.80		
110 X 110 X 8	13.4				
110 X 110 X 10	16.6	MC 200 x 75 x 6.2	22.3		

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STRUCTURALS

Sectional properties as per :

For Angles : IS : 808 -1989
For Channels : IS : 808 - 1989 / IS : 3954 -1991
For Beams : DIN : 1025 - 1994 / IS : 12778 - 1989 / IS : 808 - 1989

Tolerance as per :

For Angles : IS : 1852 - 1985
For Channels : IS : 1852 - 1985 / IS : 3954 - 1991
For Beams : DIN : 1025 - 1994 / IS : 12779 - 1989 / IS : 1852 - 1985

Grades as per

For Angles : IS : 2062 : E250 A - 2006
For Channels : IS : 2062 : E250 A - 2006
For Beams : IS : 2062 : E250 A - 2006

Length

6/12 meters

* Not regularly rolled

Upcoming Products
Equal Angles 55 - 100 mm
Unequal Angles
80 x 50, 90 x 60, 125 x 75

Upcoming Products
ISMC 75 to 175 mm
ISJC 100 to 175
ISLC 100 to 150 mm

Upcoming Products
IPE 100 to 200 mm
HE 100 t0 140 mm
IPN 100 to 200 mm
ISMB 100 to 150 mm
ISJB 150 to 175 mm
ISLB 100 to 150 mm

Special Features:

- Piling and automatic tying of the structurals ensure minimum damage during handling and transport.
- Tension free rolling ensures uniform dimensional tolerances.
- Universal beam rolled in Medium Merchant & Structural Mill is the most economical section which has got better sectional properties, has a simple symmetrical cross section providing more flexibility to designer, fabricator and erector. This section can result in saving of 15% Steel.

Packing	:	Bare / in strapped bundles / piles weighing 8.3 metric tonnes approximately.
Invoicing	:	As per actual weight.
Quantity & Shipment	:	On mutually agreed terms.

Produced from fully killed steel:

Size(mm)	Nominal Wl.Kg/m)	Size(mm)	Nominal Wl.(Kg/m)
16	1.58	40	09.85
* 16.5	1.68	42	10.88
* 17.5	1.89	45	12.50
18	2.00	46.5	13.33
20	2.47	48	14.21
20.64	2.63	50	15.40
22	2.98	53	17.32
25	3.85	56	19.30
28	4.83	60	22.20
32	6.31	63	24.50
33.5	6.92	65	26.00
34	7.13	71	31.09
36	7.99	75	34.70
38	8.91	77	36.57
		80	39.47

Specifications :

Grade		Conforming to
Structural	:	IS 2062 E250A - 2006
Forging / Bright Bar Medium Carbon, High Mn Steel		20C 15, 27C 15, SAE 1524S, SAE 1524CR CK-45, EN8, EN8A, EN8D, EN9,SAE 1049, 35C8 SAE 1524, EN15B, 37C15, A 105, 40Cr4 etc
Spring Steel	:	55Si7, 60Si7, 65Si7, SUP9, SUPl1 A, SUP10
Case Hardening Steels	:	20MnCr5, 16MnCr5

Upcoming Products

Additional sizes : 85, 90, 95 mm
Up to 45 mm in Coils & Straight form
45 to 95 mm - Straight form

PLAIN ROUNDS

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Special Features:

- Bundling and automatic tying / strapping of the rounds ensure minimum damage during handling and transport.
- Tension free rolling in the Light and Medium Merchant Mill ensures close dimensional tolerances.
- 38 mm and below are rolled in Light and Medium Merchant Mill and other rounds are rolled in Medium Marchant and Structrual Mill.

Packing	:	Bare, in strapped bundles weighing 4 to 5 T upto 36 & 8 to 9 T for above 36 approximately.
Invoicing	:	As per actual weight.
Quantity & Shipment	:	On mutually agreed terms

Produced by STELMOR controlled-cooling process from fully killed steel.

Diameter Range (mm) :

5.5	6	6.5	7	*7.5	8	*9	10	*11	12	12.7	*13	14

WIRE ROD COILS

Specifications :

Grade		Conforming to
Wire drawing	:	IS : 7887 GR.3 & GR.5 - 1992 ASTM A 510 M (SAE 1008/1010/1012/1015/1018)
Construction / Structural	:	IS 2062 E250A - 2006

Wire rods are manufactured in special steel grades also for various applications like Coldheading. Tyre-bead, Cable armouring, Electrodes, Pre-stressed Concrete wire etc.,

Tolerance as per

IS : 7887 - 1992

IS : 1852 - 1985

'Not regularly rolled

Upcoming Products
5.5 to 20 mm &
20.64 mm in Coils

Special Features:

- Stelmor cooling process ensures uniform grain size, and desired metallurgical and mechanical properties.
- Tungsten carbide rings in pre-finishing and finishing Morgan blocks ensure excellent surface finish and rigid dimensional tolerance.
- High pressure compactors with automatic tying retain tight and proper coil shape

Packing	:	Bare, tied coils of approx. 1.2 metric tonnes weight, Coil OD 1250 mm max., ID 725 mm max., height 1400 mm max.
Invoicing	:	As per actual weight.
Quantity & Shipment	:	On mutually agreed terms.

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	Tolerance as per
Uniform 12 meters, can also be supplied in 9/12 meters on mutual agreement	IS : 1786 - 2008

Specifications :

Grade	Conforming to
Constructional	: IS : 1786 - 2008

Standard	Grade	Remarks	Yield Strength (N/mm2) min	UTS (N/mm2)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

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Special Features:

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

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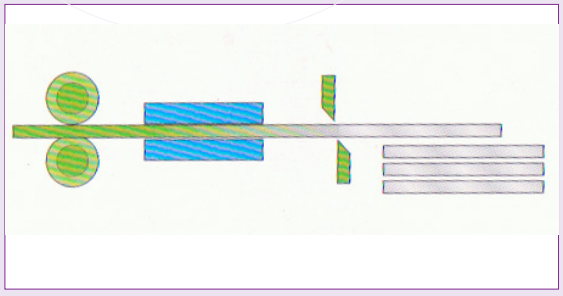
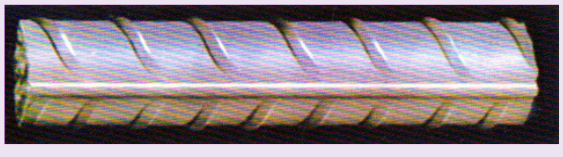
RE-BARS
Fe500 & Fe500D





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.

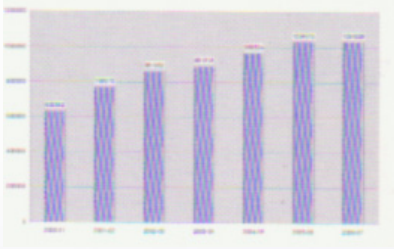
In the reverse bend test, these bars also show good results. In the construction site, situation arises where bars bent are left for a period in the bent condition and then reverse bent. During period between the first bend and the reverse bend the bars may strain age. The loss of ductility due to strain 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

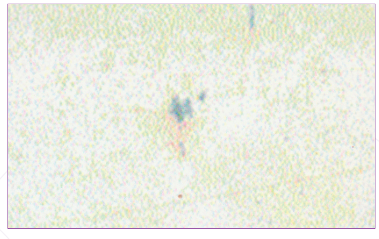
The added Advantages ...

of Vizag TMT over others in the market.

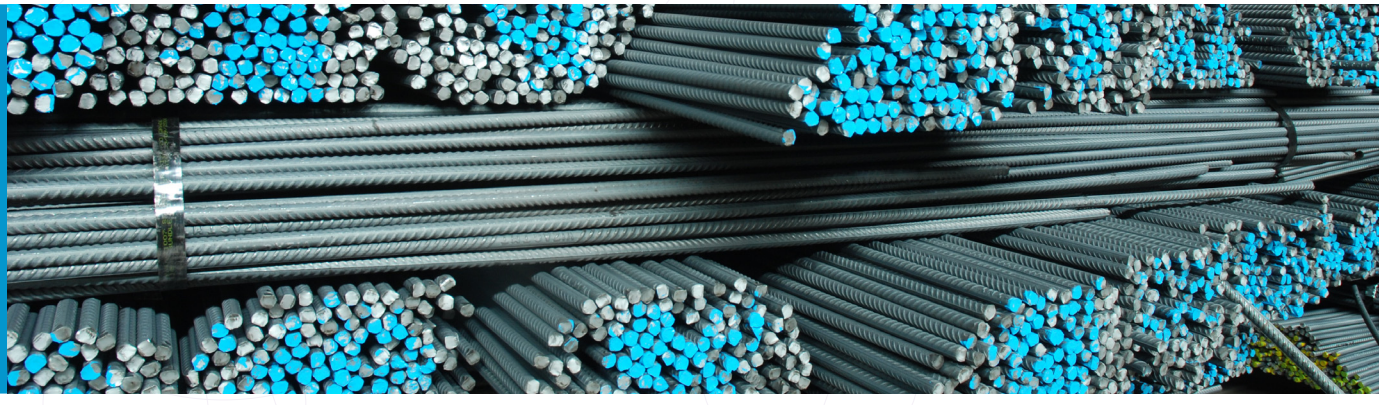
The only plant to adapt this technology (QST) for production of rebars from the design stage. Hence, the total extent of the superior technology could be harnessed. 120 metres length of the cooling bed available for self tempering which no other mill in India can match is the testimony for this.

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.

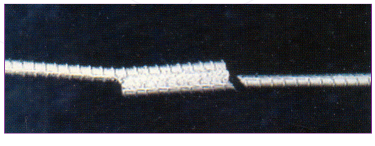
Very clean steel with distinctly low tramp element contents. Typical Inclusion rating as per IS:4163-1982



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 the 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
fy = 415 N/mm^2 and fck = 20 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	
For welding	6.3 dia = 126mm	0.31 Kg of bar @ Rs.28,0001' Per Tonne	Rs.8.68	51.2 %
		2.5 Electrodes of 4mm dia and 450mm long and other expenses	Rs.25.00 Rs.33.68	

Recommeded 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

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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
		15	Normal 415	115	
		15	VIZAG TMT 500	99	14
		15	VIZAG TMT 550	93	19.13
Doubly	300mm X 500mm				
Reinforced	M lim=234.5 KNM				
Beam	SF lim=187.5 KN	20	Normal 415	104	-
(5m long)	d'/d = 0.1	20	VIZAG TMT 500	89	14.5
		20	VIZAG TMT 550	83	20.2
		15	Normal 415	260	
Doubly	300mm X 600mm	15	VIZAG TMT 500	218	16
Reinforced	M lim=507 KNM	15	VIZAG TMT 550	204	21.5
Beam	SF lim=337.5 KN				
(6m long)	d'/d = 0.075	20	Normal 415	245	
		20	VIZAG TMT 500	207	15.5
		20	VIZAG TMT 550	198	20

	Yield Strength (N/mm2)	UTS (N/mm2)	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/mm2	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

FORGED ROUNDS

RINL VIZAG STEEL
Pride of Steel
A Navratna Company

Forged Rounds

Size : 180 mm - 240 mm
Grade : EN8D

Chemical Composition

C	:	040 -- 0.45 PCT
MN	:	0.70 -- 0.90 PCT
P & S	:	0.04 PCT MAX
Si	:	0.05 – 0.35 PCT
Al	:	0.02 PCT MIN

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SPECIAL STEELS

PRODUCT: WIRE ROD COILS

Grade	Desgn.	Chemical Composition					Mechanical Properties		
		C%	MN %	P%(MAX)	S%(MAX)	Si %	UTS %	ELONG %	%RA
VSP	HC50	0.46-0.50	0.50-0.80	0.035	0.035	0.15-0.35	80-90	16	40
VSP	HC55	0.51-0.55	0.50-0.80	0.035	0.035	0.15-0.35	85-95	15	35
VSP	HC60	0.56-0.6	0.50-0.80	0.035	0.035	0.15-0.35	90-100	15	35
VSP	HC65	0.61-0.65	0.50-0.80	0.035	0.035	0.15-0.35	95-105	13	30
VSP	HC70	0.66-0.70	0.50-0.80	0.035	0.035	0.15-0.35	100-110	13	30
VSP	HC75	0.71-0.75	0.50-0.80	0.035	0.035	0.15-0.35	105-115	12	25
VSP	HC80	0.76-0.80	0.50-0.80	0.035	0.035	0.15-0.35	110-120	12	25
VSP	HC85	0.81-0.85	0.50-0.80	0.035	0.035	0.15-0.35	115-125	12	25
VSP	PC 115	0.76-0.80	0.50-0.80	0.035	0.035	0.15-0.35	112 MIN	12	25*
VSP	VIZAGTBQ	0.68-0.72	0.50-0.80	0.035	0.035	0.15-0.35	100-110	13	30

* % Cr.O.15-0.20

Sizes : 5.5/6.0/6.5/7.0/8.0/10.0/12.0/12.7 /14.0 mm
Coil Weight : 1.2 mt approx
Remarks : For 7 - 9mm UTS is 5 Kgf/mm2 lower and for 10 - 12 mm UTS is 10 Kgf/mm2 lower

PRODUCT: MMSM ROUNDS & BILLETS

Grade	Desgn.	Chemical Composition							
		C%	MN %	P%(MAX)	S%(MAX)	Si %	Al %(min)	Cr %	B %
VSP	SAE 1541	0.36-0.44	1.35-1.65	0.04	0.035	0.15-0.35	0.02	-	
VSP	SAE 1008	0.10 MAX	0.30-0.50	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1020	0.18-0.23	0.30-0.60	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1022	0.18-0.23	0.70-1.00	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1023S	0.20-0.25	0.80-1.00	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1029S	0.26-0.30	0.70-0.90	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1030	0.28-0.34	0.60-0.90	0.04	0.05	0.15-0.35	0.02	-	
VSP	SAE 1049	0.46-0.50	0.60-0.90	0.04	0.04	0.15-0.35	0.02	-	
BS 970	EN8	0.35-0.45	0.60-1.00	0.04	0.04	0.05-0.35	0.02	-	
BS 970	EN8 D	0.40-0.45	0.70-0.90	0.04	0.04	0.05-0.35	0.02	-	
BS 970	EN9	0.50-0.60	0.60-0.80	0.04	0.04	0.05-0.35	0.02	-	
VSP	SAE 1524S	0.16-0.21	1.35-1.65	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1524Cr	0.23-0.28	1.35-1.65	0.04	0.04	0.15-0.35	0.02	0.20-0.30	
VSP	55Si7	0.50-0.60	0.80-1.00	0.04	0.04	1.50-2.00	-	-	
VSP	60Si7	0.55-0.65	0.80-1.00	0.04	0.04	1.50-2.00	-	-	
VSP	65Si7	0.60-0.70	0.80-1.00	0.04	0.04	1.50-2.00	-	-	
ASTM	A 105	0.20-0.25	0.90-1.15	0.035	0.035	0.15-0.35	0.02		
JIS G 4801	SUP9	0.52-0.60	0.65-0.95	0.035	0.035	0.15-0.35	-	0.65-0.95	
DIN	40CR4	0.35-0.40	0.60-0.90	0.035	0.030	0.15-0.35	0.02	0.90-1.20	
DIN	41CR4	0.36-0.44	0.60-0.90	0.035	0.030	0.15-0.35	0.02	0.90-1.20	
BS 970	EN15B	0.35-0.40	1.10-1.30	0.04	0.035	0.05-0.35	0.02	-	
VSP	SAE 1018	0.15-0.20	0.60-0.90	0.04	0.04	0.15-0.35	0.02	-	
VSP	27C15	0.22-0.32	1.3-1.7	0.035	0.035	0.15-0.35	0.02		
BS 970	EN32B	0.10-0.18	0.60-1.00	0.05	0.05	0.15-0.35	0.02		
DIN-17210	20MNCR5	0.17-0.22	1.10-1.40	0.035	0.035	0.15-0.40	0.02	1.0-1.30	
DIN-17210	16MNCR5	0.14-0.19	1.00-1.30	0.035	0.035	0.15-0.40	0.02	0.80-1.1	
JIS G 4801	SUP 11A	0.56-0.64	0.70-1.00	0.035	0.035	0.15-0.35	-	0.70-1.00	0.0005-0.003
VSP	35C8	0.35-0.40	0.60-0.90	0.04	0.035	0.15-0.35	0.02	-	
VSP	CK-45	0.42-0.50	0.50-0.80	0.035	0.035	0.15-0.35	0.02	-	
VSP	VIZAG TLT	0.17-0.22	1.20-1.60	0.04	0.04	0.15-0.35	0.015	-	0.03 (Min)*
VSP	37C15	0.32-0.42	1.30-1.70	0.035	0.035	0.15-0.35	-	-	

* Vanadium

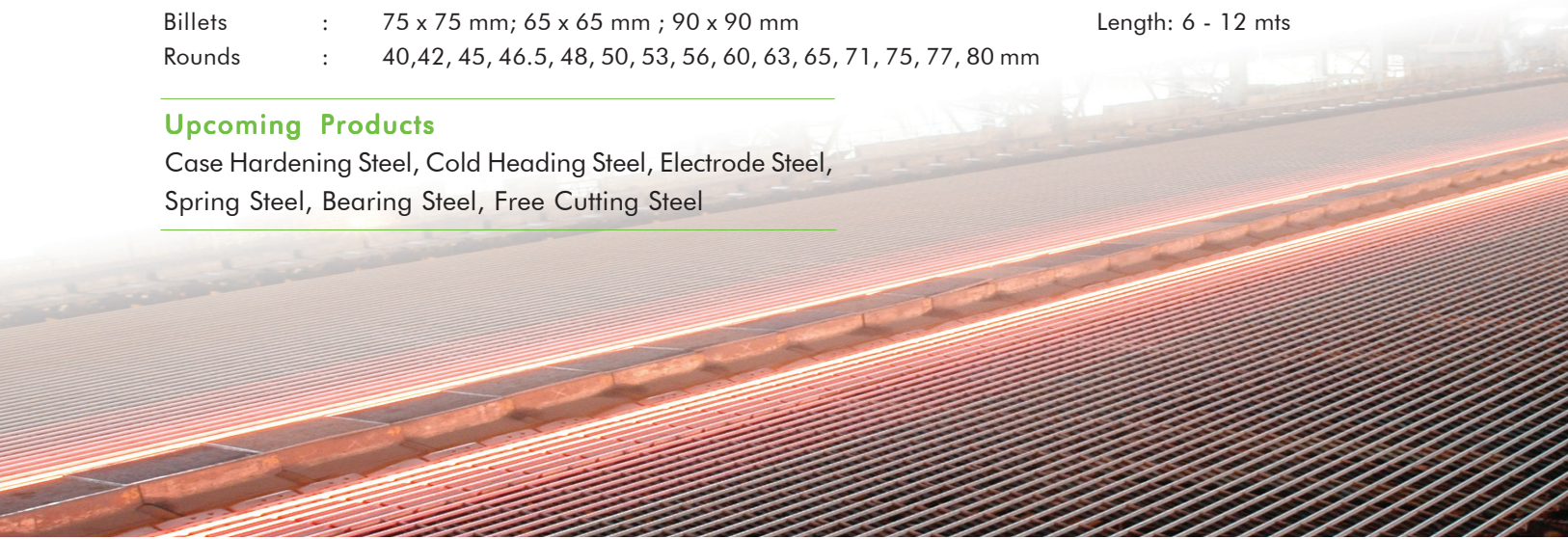
Size

Billets : 75 x 75 mm; 65 x 65 mm ; 90 x 90 mm Length: 6 - 12 mts

Rounds : 40,42, 45, 46.5, 48, 50, 53, 56, 60, 63, 65, 71, 75, 77, 80 mm

Upcoming Products

Case Hardening Steel, Cold Heading Steel, Electrode Steel, Spring Steel, Bearing Steel, Free Cutting Steel



PRODUCT: WIRE ROD COILS

Grade	Desgn.	Chemical Composition							
		C%	MN %	P%(MAX)	S%(MAX)	Si %	Al %(min)	Cr %	B %
ASTM A510	SAE 1008	0.10MAX	0.30-0.50	0.04	0.04	0.15-0.35	0.02	-	
ASTM A510	SAE 1010	0.08-0.13	0.30-0.60	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1010W	0.08-0.12	0.75-0.90	0.04	0.04	0.30 MAX	0.02		
ASTM A510	SAE 1012	0.10-0.15	0.30-0.60	0.04	0.04	0.15-0.35	0.02	-	
ASTM A510	SAE 1015	0.13-0.18	0.30-0.60	0.04	0.04	0.15-0.35	0.02	-	
ASTM A510	SAE 1018	0.15-0.20	0.60-0.90	0.04	0.04	0.15-0.30	0.02	-	
IS 2879	EW-NR	0.10 MAX	0.38-0.62	0.025	0.025	0.03 MAX	0.012 MAX		
VSP	EQ-NR	0.10 MAX	0.38-0.62	0.03	0.03	0.03 MAX	-	-	
VSP	CAQ	0.07 MAX	0.5 MAX	0.035	0.035	0.05 MAX	-		
BS 970	EN8D	0.40-0.45	0.70-0.90	0.04	0.04	0.05-0.35	-		
BS 970	EN8	0.35-0.45	0.60-1.0	0.04	0.04	0.05-0.35	-	-	-
BS 970	EN32B	0.10-0.18	0.60-1.00	0.05	0.05	0.15-0.35	0.02	-	-

PRODUCT: LMMM ROUNDS & BILLETS

Grade	Desgn.	Chemical Composition							
		C%	MN %	P%(MAX)	S%(MAX)	Si %	Al %(MIN)	Cr%	B %
VSP	SAE 1010	0.08-0.13	0.30-0.60	0.04	0.04	0.15-0.35	0.02		
VSP	SAE 1012S	0.10-0.15	0.50-0.80	0.035	0.035	0.20 max	0.02		
VSP	SAE 1020	0.18-0.23	0.30-0.60	0.04	0.04	0.15-0.35	0.02		
VSP	SAE 1023S	0.20-0.25	0.80-1.00	0.04	0.04	0.15-0.35	0.02		
VSP	SAE 1029S	0.26-0.30	0.70-0.90	0.04	0.04	0.15-0.35	0.02		
VSP	SAE 1030	0.28-0.34	0.60-0.90	0.04	0.04	0.15-0.35	0.02	-	
BS 970	EN8	0.35-0.45	0.60-1.00	0.04	0.04	0.05-0.35	0.02	-	
BS 970	EN8D	0.40-0.45	0.70-0.90	0.04	0.04	0.05-0.35	0.02	-	
BS 970	EN9	0.50-0.60	0.50-0.80	0.04	0.04	0.05-0.35	0.02	-	
VSP	SAE 1049	0.46-0.50	0.60-0.90	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1541	0.36-0.44	1.35-1.65	0.04	0.035	0.15-0.35	0.02	-	
VSP	SAE 1524S	0.16-0.21	1.35-1.65	0.04	0.04	0.15-0.35	0.02	-	
VSP	SAE 1524Cr	0.23-0.28	1.35-1.65	0.04	0.04	0.15-0.35	0.02	0.20-0.30	
VSP	37C15	0.32-0.42	1.30-1.70	0.035	0.035	0.15-0.35	0.02		

SPECIAL STEELS

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PRODUCT: LMMM ROUNDS & BILLETS

Grade	Desgn.	Chemical Composition							
		C%	MN %	P%(MAX)	S%(MAX)	Si %	Al %(MIN)	Cr%	B %
BS970	EN32B	0.10-0.18	0.60-1.00	0.05	0.05	0.15-0.35	0.02	-	
VSP	27C15	0.22-0.32	1.30-1.70	0.035	0.035	0.15-0.35	0.02		
VSP	SAE1018	0.15-0.20	0.60-0.90	0.04	0.04	0.15-0.35	0.02	-	
ASTM	A105	0.20-0.25	0.85-1.15	0.035	0.035	0.15-0.35	0.02	-	
DIN-17210	20MnCr5	0.17-0.22	1.1 0-1.40	0.035	0.035	0.15-0.35	0.02	1.00-1.30	
DIN	40CR4	0.35-0.40	0.60-0.90	0.035	0.03	0.15-0.35	0.02	0.90-1.20	
DIN	41CR4	0.36-0.44	0.60-0.90	0.035	0.03	0.15-0.35	0.02	1.00-1.20	
VSP	55Si7	0.50-0.60	0.80-1.00	0.04	0.04	1.50-2.00	-		
VSP	60Si7	0.55-0.65	0.80-1.00	0.04	0.04	1.50-2.00	-		
VSP	65Si7	0.60-0.70	0.80-1.00	0.04	0.04	1.50-2.00	-		
BS 970	EN43D	0.60-0.65	0.40-0.60	0.04	0.015-0.035	0.15-0.35	-		
VSP	35C8	0.35-0.40	0.60-0.90	0.04	0.04	0.15-0.35	0.02		
VSP	CK-45	0.42-0.50	0.50-0.80	0.035	0.035	0.15-0.35	0.02		

Sizes

Billets : 125 x 125 mm length : 8 - 10.4 mts

Rounds : 16, 18, 20, 22, 25, 28, 32, 33.5, 34, 36, 38 mm length: 6 - 12 mts

COKE FRACTIONS:

BF Coke (25-80 mm), Nut Coke (10 - 25 mm), Coke Breeze, Coke Dust.

MEDIUM HARD PITCH

	Softening Point (R & B) °C	Coking Value (Conradson) %	Toluene insoluble %	Quinolene insoluble %	Ash Content %
Grade - I	95 - 115	48 min	25 min	12 max	0.3 max
Grade - II	106-115	51 min	28 min	12 max	0.5 max

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BY PRODUCTS

AMMONIUM SULPHATE

Nitrogen by weight	% min	:	20.6
Moisture by weight	% max	:	1.00
Free acidity	% max	:	0.04

CRUDE COAL TAR

Specific gravity at 20°C	:	1.16 - 1.20
Moisture % max	:	6.00
* Viscosity (E deg) at 93°C	:	1.70 - 5.00
* Residue on distillation (above 360°C) % min	:	53
* Toluene insoluble % max	:	14
* Quinolene insoluble % max	:	8

COAL TAR FUEL / PITCH CREOSOTE MIXTURE (PCM)

* Moisture % max	:	4.00
Viscosity (E deg) at 93°C	:	2 - 5

HOT PRESSED NAPHTHALENE

Colour	:	White or Light Brown
Crystallisation point	:	78.50°C (Mininum)
* Ash (by weight) max	:	0.20
* Tolune insoluble % max	:	0.20
* Moisture % max	:	0.50

DRAINED NAPHTHALENE OIL

Moisture %	:	5 max
Naphthalene %	:	30-35

PHENOL FRACTIONS

Specific gravity at 20°C		:	0.99 - 1.02
Phenol %		:	20 - 35
Naphthalene % max		:	25
Moisture % max		:	5.0

LIGHT SOLVENT OIL (LSO)

Specific gravity at 15 °C		:	0.850 min
* Distillation range	upto 125°C ml	:	5 max
	upto 170°C ml	:	90 min
* Residue on evaporation	mg/100ml	:	10 max
* H2 S & mercaptans		:	Negative

(* These parameters will be included in the Test Certificate on agreement with the customers)
* For Drained Naphthalene Oil, Phenol Fractions & Light Solvent Oil the modifications are to be incorporated after approval of the committee recommendation by competent authority.

BENZENE

		Gr. A	Gr. B
*a. Relative density 15.6/15.6°C	:	0.879-0.886	0.879-0.886
*b. Total Sulphur, ppm max.	:	5	As agreed to between the purchaser and the supplier
*c. Crystallization point °C min	:	5.3	-
*d. Non-aromatics, ppm max	:	500	-
e. Purity (GLC method), min(%)	:	99.93	99.0% min.
*f. Thiophene Content	:	10.0 ppm max.	-

TOLUENE

		Nitration	Industrial
*a. Specific Gravity at 15/15 ^{0}C	:	0.870 - 0.874	0.86 - 0.875
*b. Distilliation range (1-96% ^{0}C incl. 110.6^{0}C)	:	0.6	-
Upto 105^{0}C ml.	:	-	5.0
Upto 120^{0}C ml.	:	-	90.0
*c. Residue on evaporation	:	5	10
d. H_2 S & mercaptans	:	-ve	-ve
e. Purity (by GLC method), kin (%)	:	99.2	92.0

Note : *-- These parameters will be included in test certificate on agreement with the customer.

COAL TAR WASH OIL

Specific gravity at 38°C		:	1.04 - 1.08
Moisture %		:	4.00 max
* Distillation	upto 230°C %	:	10.00 max
	230. - 300°C %	:	85.00 max
	above 300°C %	:	5.00 max
Naphthalene %		:	15.00 max

ANTHRACENE OIL

Specific gravity at 20°C	:	1.12 max
Moisture %	:	3.00 max
* Distillation upto 300°C%	:	20.00 max

SOL-110 (NON AROMATICS)

Specific gravity at 15°C	:	0.84 min
* Distillation range 1-95%	:	55-110°C

(*These parameters will be included in the Test Certificate on agreement with the customers)

HEAVY CRUDE BENZOL

Moisture	:	5% max
Naphthalene	:	20-25

B.F. SLAG

Specification : CaO : 30 - 38%, Size : 30 - 40%, $Al_2 0_3$: 15 - 22 %
MgO : 8 - 11 %, FeO : 5 % Max, Mn : 2% Max

GASES

Liquid Oxygen, Liquid Nitrogen, Argon Gas and Liquid Argon

BY PRODUCTS

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MISCELLANEOUS PRODUCTS

Still Bottom, TPP Mill Rejects, Calcined Lime Fines, Calcium Carbide Sludge

HOT ROLLED REBARS

Specification	Grade	Size (mm)	Remarks
JISG3112	SD 35	16,20,25 &	"*" In straight lengths 12 + 0.1m allowable short length 2%
JISG3112	SD 35	8, 10, 12	In coils of dimensions as for Wire Rod Coils

Note: "*" Sizes (mm) 18, 28 & 32 can also be supplied subject to economic quantity of orders.
Rib pattern on rebars will be as per VSP's design.

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EXPORT PRODUCTS

WIRE RODS

MEDIUM / LOW CARBON

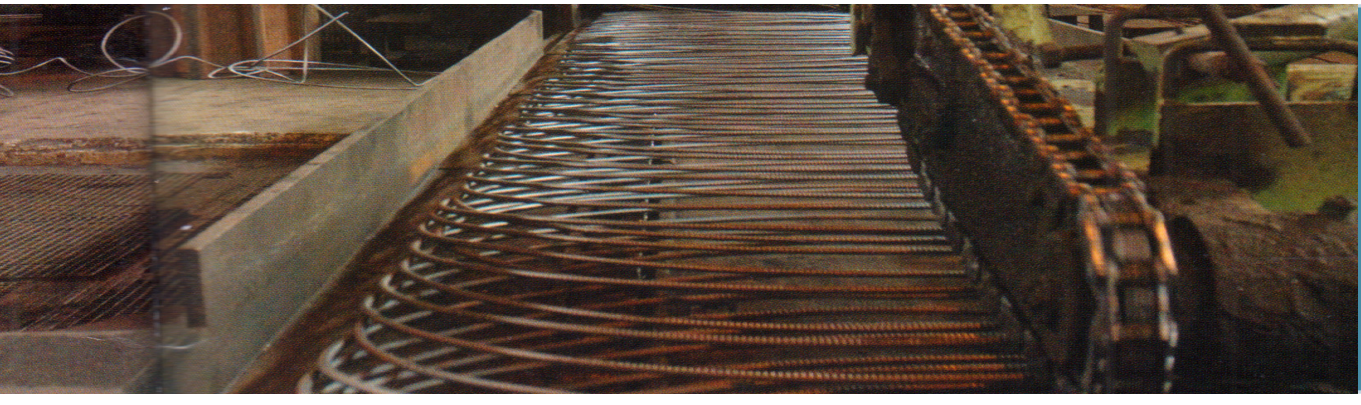
Specifications	Grade / Chemistry	Remarks
ASTM A510-00	SAE 1008 (Si-0.30% Max)	UTS: 430 N/ mm2 Max
ASTM A510-00	SAE 1010 (Si-0.30% Max)	UTS: 450 N/ mm2 Max.
ASTM A510-00	SAE 1012 (Si-0.30% Max)	UTS: 470 N/ mm2 Max.
ASTM A510-00	SAE 1015 (Si-0.30% Max)	UTS: 510 N/ mm2 Max.

Electrode Quality C- 0.10% Max; S,P & 5i-0.03% each Max; Mn-0.35-0.62% & Al-0.02-0.05%

HIGH CARBON

MECHANICAL PROPERTIES

Grade	C%	Mn%	S& P%	Si%	UTS (Kgf/mm^2)			%EL	%RA
					5.5, 6 & 6.5 mm	7,8 & 9 mm	10,11 & 12 mm	Min	Min
HC 50	0.46 - 0.50	0.50 - 0.80	0.035 Max	0.15-0.35	80 – 90	75 – 85	70 – 80	16	40
HC 55	0.51 - 0.55	0.50 - 0.80	0.035 Max	0.15-0.35	85 – 95	80 – 90	75 – 85	15	35
HC 60	0.56 - 0.60	0.50 - 0.80	0.035 Max	0.15-0.35	90 – 100	85 – 95	80 – 90	15	35
HC 65	0.61 - 0.65	0.50 - 0.80	0.035 Max	0.15-0.35	95 – 105	90 – 100	85 – 95	13	30
HC 70	0.66 - 0.70	0.50 - 0.80	0.035 Max	0.15-0.35	100 – 110	95 – 105	90 – 100	13	30
HC 75	0.71 - 0.75	0.50 - 0.80	0.035 Max	0.15-0.35	105 – 115	100 – 110	95 – 105	12	25
HC 80	0.76 - 0.80	0.50 - 0.80	0.035 Max	0.15-0.35	110 – 120	105 – 115	100 – 110	12	25
HC 85	0.81 - 0.85	0.50 - 0.80	0.035 Max	0.15-0.35	115 – 125	110 – 120	105 – 115	11	25



Note : Coil Dimensions (mm) : ID - 725 (Min), OD - 1250 (Max); Height - 1400 (Max);

Weight : 1.2 MT (approx);
Sizes (mm) - 5.5, 6.0, 6.5, 7.0, 8.0, 10.0 & 12.0; Order Qty per size: 1000 MT (Min)
Order / Quotes for lower percentage of 5.5 mm size will be preferred;

Offers with lower Si content also can be considered depending on Al content permissible.

OTHER SECTIONS

EQUAL ANGLES

Size (mm)	Sec. Wt. (Kg/M)	
100x100x8/10	12.10/14.90,	+ 5% - 3%
90 x 90 x 6 / 8	8.20 / 10.80,	+ 5% - 3%
75 x 75 x 6 / 8	6.80/8.90,	+ 5% - 3%
65 x 65 x 6	5.80	+ 5% - 3%

BEAMS

Size (mm)	Thickness of Web (mm)	Sec. Wt (Kg / M)
180 x 91	5.3 ± 0.7	18.80 ± 4%
120 x 114	5.0 ± 0.7	19.90 ± 4%

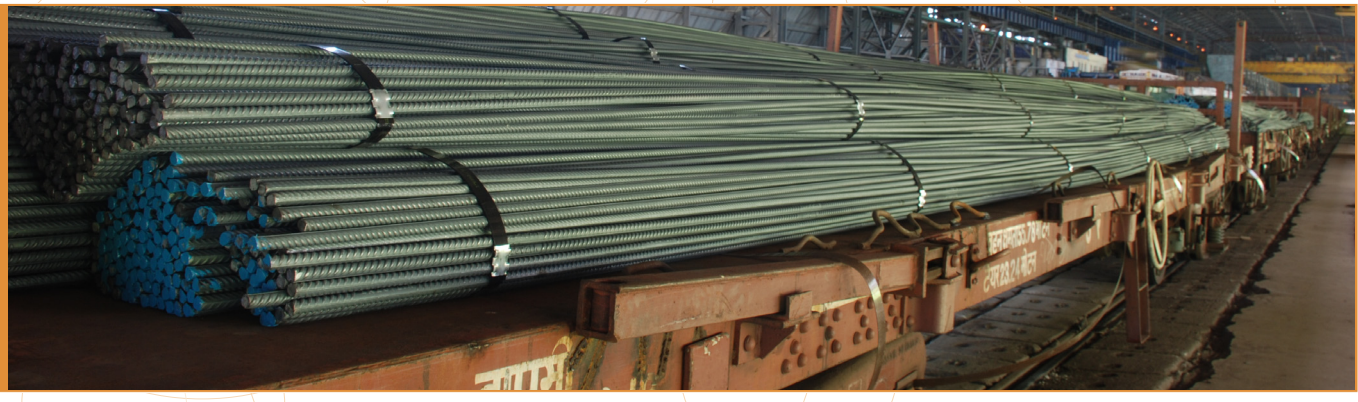
Flange Thickness: 8.0 mm ± 1.0 mm for both

EQUAL ANGLES

Size (mm)	Sec. Wt. (Kg/M)
150 x 75 x 5.7	16.8± 2.5%
125 x 65 x 5.3	13.1 ± 2.5%
100 x 50 x 5.0	9.56± 2.5%
75 x 40 x 4.8	7.14± 2.5%

BEAMS

Size (mm)	Length	Chemistry
125 x 125	10m ± 0.4	See note below
75 x 75	6 m ± 0.1	
65 x 65	6 m ± 0.1	IS : 2830 (C . 0.12-0.23% Si : 0.40% Max: Mn: 0.3-1.5% S & P :0.05 % Max)



PIG IRON

C	Mn	Si	P	S
* 3.5 - 4.8%	1 % Max	1.25% Max	0.12% Max	0.05 Max

(* average value of the lot)

Basic grade steel making pig iron, pigs are of two notches upto 45 kg in weight. Chips/Broken Pieces below 25 mm not exceeding 5%; dust, dirt and moisture exceeding 0.5% deductable from draft survey weight.

SLAG

Specification:	CaO : 30 - 40 %,	Si02 : 30 - 40%,	Al203 : 14 - 22 %
	MgO : 7 - 11 %,	FeO : 5 % Max,	MnO : 2% Max

Note: Chemistry for Billets: C : 0.14 - 0.20% ; Mn : 0.5-0.9% ; S/P : 0.05% Max; Si : 0.35%Max or SAE 1015 ; or other chemistry to be agreed.

EXPORT PRODUCTS

RINL VIZAG STEEL
Pride of Steel
A Navratna Company

ROUNDS

Size (mm)	16, 20, 25, 28, 32, 33.5, 34, 36, 40, 42, 45, 46.5, 50, 53, 56, 60, 65, 71 & 80
Specifications	EN8, EN8D, EN9, SAE 1045, SAE 1020 & IS : 2062 - 2006

Note: Chemistry (other than Billets) JIS G 3101 SS 400 or IS : 2062-2006;
Bundle wt.: 5MT (Max); Length: 12± 0.lm (for 6± 0.1 m ends would be gas cut);
Allowable short length upto 2%

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REGIONAL OFFICES

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EAST	
WEST	
ANDHRA	

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SOUTH	
EAST	
WEST	
ANDHRA	

CONSIGNMENT SALES AGENCIES

CSA	

PLANT

PLANT	

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Sharing dreams of Nation Building

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VIZAG STEEL
Pride of Steel
A Navratna Company

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