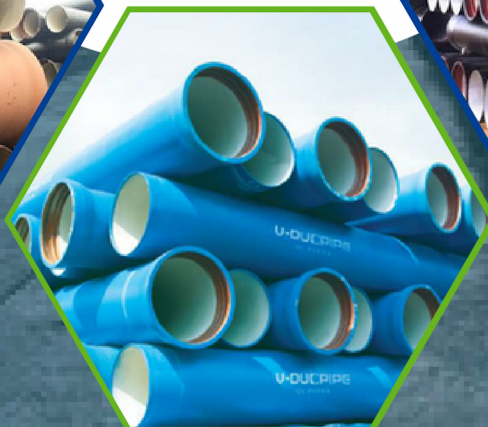


Building the Nation Strong Drop by Drop

V-DUCPIPE
DI PIPES



THE BEGINNING OF A NEW LEGACY

Vedanta Group is 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.

With the acquisition of integrated steel manufacturing unit of Electrosteel Steels Limited (ESL). Vedanta group is now looking to set new benchmarks in the steel industry. At the Greenfield Integrated Steel Plant in Bokaro (Jharkhand), ESL has a current capacity and produces approximately 1.5 Million Ton per annum of high-quality Steel intermediaries and Products Pig Irons, Billets, TMT Bars, Wire Rods, and Ductile Iron Pipes.

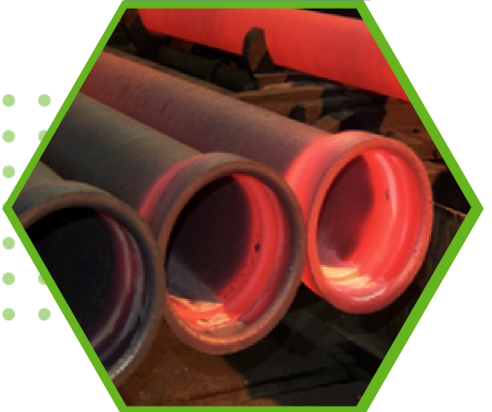
With process like benchmarking, operational and commercial excellence at every stage of value chain of steel Business, backed by state of the art technology and partnership with internationally reputed suppliers, the entity is poised for delivering refreshed and enhanced quality products. Along with technological interventions, entity is equally "in sync" with latest ecological standards for production of "GREEN" steel, contributing to responsible nation building and serving the communities in a more sustainable way.





BUILDING STRONGER VALUES

With a business model focused on growth, expansion and value creation, Vedanta and ESL Steel together promise excellence at every stage of production. A pioneer of latest technology, they source international expertise from reputed manufacturers while maintaining a high ecological standard. The desire to contribute to the collective future of the community drives them further, to go beyond.



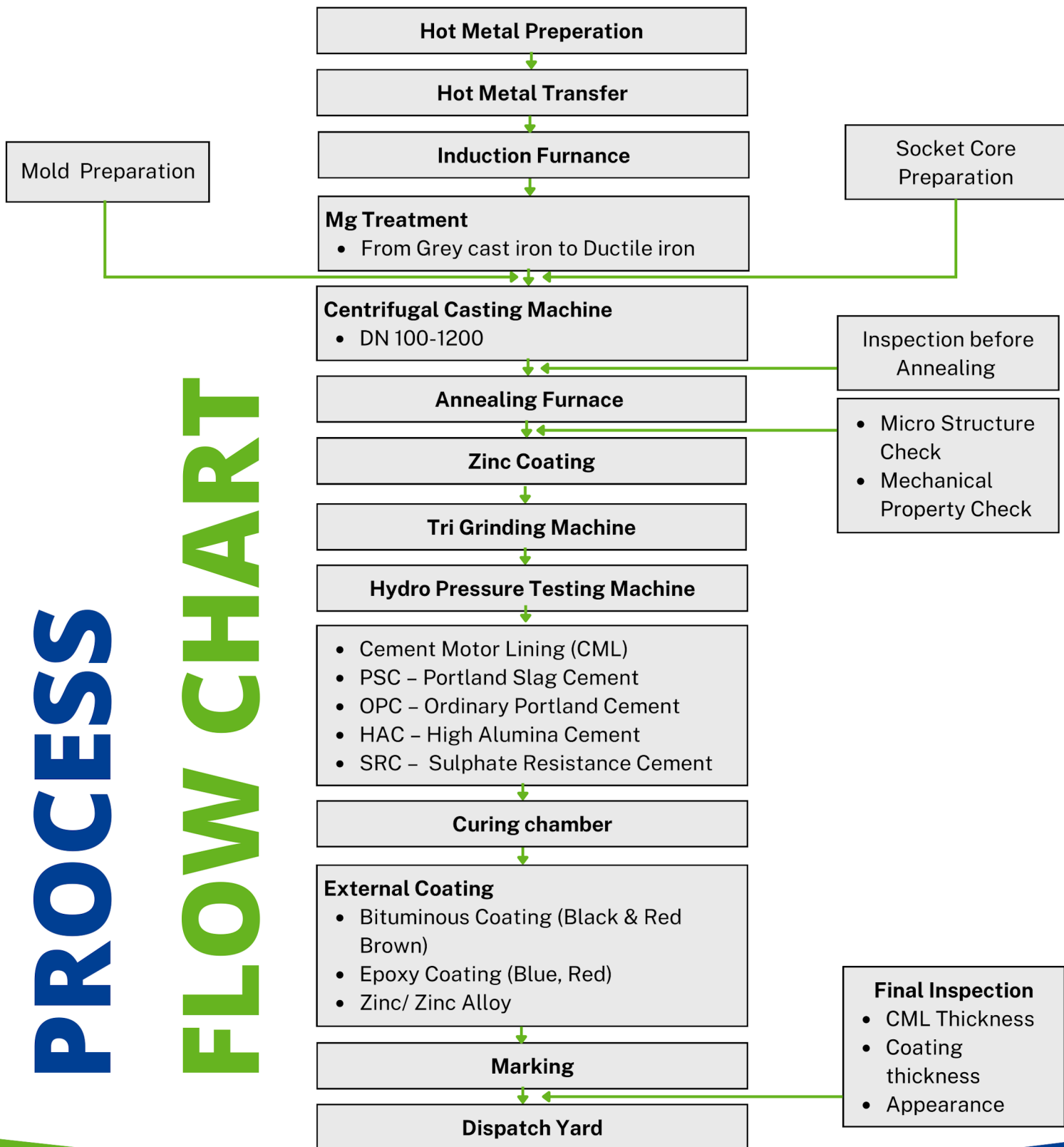
V-DUCPIPE- A CUT ABOVE THE REST

- Very strong with high tensile strength and impact resistance
- Minimizes handling/transportation damage
- Can withstand very high-pressure including surge
- The simple push-on type jointing system is easy to lay, even by unskilled workers
- Flexible joint offers considerable joint deflection
- Back-filling with special material is not required
- Higher Hazen William's Coefficient of 140 ensure lesser frictional resistance leading to lower pumping cost
- Reliable internal and external corrosion protection systems.
- Cathodic protection not required





PROCESS FLOW CHART





TECHNICAL SPECIFICATIONS

Mechanical Properties	Values
Tensile Strength	Min. 4,200 Kg/cm ² or 420 MPa
Yield Strength	3,000 Kg/cm ² or 300 MPa
Minimum Elongation	10% Up to DN 1000 7% for diameter > DN 1000
Modulus of Elasticity	1.62 x 10 ⁹ -1.70 x 10 ⁶ Kg/cm ² or 162,000 170,000 MPa
Hardness	Max. 230 BHN
Density	7,050 Kg per cubic meter
Coefficient of Thermal Expansion	11.5 x 10 per degree Celsius (C) (for temperature range 20°C -100°C)
Impact Strength	More than 80-150 joules

Standard Product	Ductile Iron Pipe suitable for Push-on-Jointing
Class of Pipe	C20, C25, C30, C40, C50, C64, Class K7,K9
Size Range	DN 100mm to DN 1200m
Standard Length (in meters)	5.5 or 6.0
Internal Linings	Cement Mortar Lining "Cement Type: Ordinary Portland Cement/Sulphate Resistant Cement/ Blast Furnace Slag Cement/High aluminium cement"
Outside Coatings	Zinc Coating (130 gm/m ² or 200 gm/m ² or 400 gm/m ³) with finishing layer of Bitumen/ Blue Epoxy/Red Epoxy Alloy of Zinc and Aluminium with or without other metals having a minimum mass of 400 gm/m ² with finishing layer of Bitumen/Blue Epoxy/Red Epoxy
Outside Onsite Protection	Polyethylene Sleeving
Coating of Joint Area	Bitumen/Epoxy or as per customer requirement
Conforming Specifications	ISO 2531; BSEN 545; IS 8329

NOMINAL THICKNESS CHART

SIZE (DN)	Thickness (mm)			
	K7		K9	
	Min.	Nom.	Min.	Nom.
100	3.7	5.0	4.7	6.0
150	3.7	5.0	4.7	6.0
200	3.7	5.0	4.8	6.3
250	4.0	5.3	5.3	6.8
300	4.3	5.6	5.6	7.2
350	4.7	6.0	6.1	7.7
400	4.8	6.3	6.4	8.1
450	4.9	6.6	6.9	8.6
500	5.2	7.0	7.2	9.0
600	5.8	7.7	8.0	9.9
700	7.0	9.0	8.8	10.8
800	8.3	10.4	9.6	11.7
900	9.0	11.2	10.4	12.6
1000	9.7	12.0	11.2	13.5
1100	12.0	14.4	12.0	14.4
1200	12.8	15.3	12.8	15.3



WHY DI PIPES ?

Attributes	HDPE Pipe	DI Pipe	GI Pipes	Mild Steel
Type of Pipe	Flexible	Rigid	Rigid	Rigid
Available Length	6m or 12m rolls upto 15m	5.5 m or 6m	6m	-
Tensile Strength	3,500 psi	60,000 psi	40,000 psi	58,000 psi
Pressure Rating	2.55 to 16.3	upto 100 bars	Class-B: 30 at test and 20 at working; Class-C: 50 at test and 30 at working	-
Hydraulic Efficiency (Hazen's Roughness Coefficient)	145	140	100	100
Jointing process	Slower	Fast	Fast	Slower
Flexibility of joints	High	Can take up to 5 degrees of deflection	Can take up to 2.5 degree of deflection	Joints are rigid
Corrosion Resistance	Corrosion resistant	Corrosion resistant	Susceptible to corrosion in long run	Susceptible to corrosion in long run
Life (Years)	50 yrs	Upto 100 yrs	30 yrs	25-30 yrs
Damage during laying	Moderate	Least	High	Low
Requirement of special equipment for laying and jointing	Requires sophisticated molding equipment for butt fusion	Not required	Not required	Welding machine or electrometrical sealing
Thermal Expansion	Yes	No	No	No



INTERNAL PROTECTION

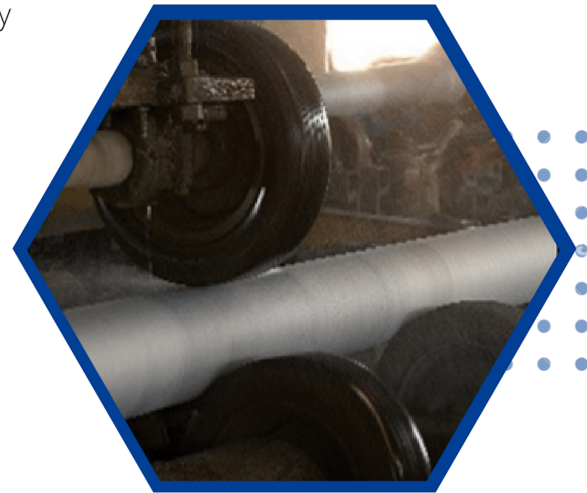
Internal coating of the Pipes helps to enhance the corrosion resistance ability of pipes, improves the flow, and helps to reduce deposit formation. Generally, all pipes are supplied with centrifugally applied cement motor lining(CML).

Types of CML offered are :

- PSC – Portland Slag Cement
- OPC – Ordinary Portland Cement
- HAC – High Alumina Cement
- SRC – Sulphate Resistance Cement

Advantages of Cement Motor Lining :

- Reduces frictional head loss and pumping cost
- CML passivates the pipe wall against corrosion by the alkaline reaction of cement
- CML prevents pitting and tuberculation of pipes and stops the production of red water
- CML helps to maintain same flow area and co-efficient of friction over a long period of time



EXTERNAL PROTECTION

Proper external coating is the key to preventing soil chemical attack, which can corrode a pipe in a few years, generating high maintenance costs and service interruptions. There are soils with different degrees of aggressiveness, both physical and chemical, and it is necessary to protect from them.

Types of Coating offered:

- Zinc Coating
- Bituminous Coating (Black & Red-brown)
- Epoxy Coating (Blue, Red)

Zinc Coating is done just after annealing in hot condition to have adherence in coating. Zinc has the ability to develop corrosion byproducts, which can considerably reduce ferrous metals' corrosion rate.





QUALITY POLICY

- Provide Products & Services that meet customer expectations and needs
- Achieve quality standards the First Time and every time
- Comply with the requirements and continually improve the effectiveness of our Quality Management System through teamwork, training and motivation
- Formulate and widely communicate our aims & objectives
- Ensure success through participation and involvement of all members of the ESL family.
- The Quality Policy and Objectives will be reviewed for continuing suitability and will be communicated and understood within the organization through training and interaction

Type of Testing	Equipment Used
Chemical Analysis	Spectrometer
Metallurgical Analysis	Metallurgical Microscope
	Image Analyser
Mechanical Testing Equipment	Universal Testing Machine
	Brinell Hardness Machine
Spectro sample preparation	Surface Grinding Machine
Micro sample preparation	Surface Grinding Machine
	Micro sample Polishing Machine
Tensile sample preparation	Lathe Machine
Cube Testing	Compression Testing M/c
	Compression Testing M/c
	Vibration Machine
	Mixer Machine
	Jolting Machine
Sand Testing	Dig. Electronic Balance
	Sieve Shaker
	Test Sieve
	Electric Oven
Bitumen Testing	Specific Gravity Hydrometer
	B4Cup with stand
Gasket Hardness testing	Dial Shore Hardness Tester



CERTIFICATE FOR EXCELLENCE



ISO - 9001 - Quality Management Systems (QMS)



ISO - 45001 - Occupational Health and Safety Management Systems (OHSMS)



ISO 14001 - Environmental Management Systems (EMS)



BS ISO 2531-2009 Kitemark



BS EN 545-2010 kitemark



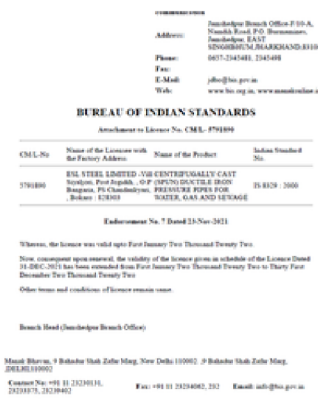
Type Test Certificate as per BS EN 545 :2010



WARS Certificate for slag Cemet & sulphate resistant portland cement



C Value test Certificate



BIS License NO. CML/L 5791890



ESL STEEL LIMITED
(Formerly known as Electrosteel Steels Limited)

DOMESTIC CUSTOMERS

- Development Authorities
- Public Health Engineering Departments
- Urban local bodies - Municipal Corporations
- Water resource department
- Major EPC companies

GOVERNMENT CLIENTS

- Ahmedabad Municipal Corporation
- Bihar Urban Infrastructure Development Corporation
- Delhi Development Authority
- Delhi Jal Board
- Drinking Water Supply & Sanitation (DWSS), Jharkhand
- Haryana Urban Development Authority
- Haryana Urban Infrastructure Development Corporation
- Hyderabad Municipal Corporation
- Jharkhand Urban Infrastructure development corporation
- Kerala Water Authority
- Madhya Pradesh Jal Nigam
- Military Engineering Service
- Public Health & Engineering Department (PHED), Haryana
- Public Health & Engineering Department (PHED), Manipur
- Public Health & Engineering Department (PHED), Rajasthan
- Public Health & Engineering Department (PHED), West Bengal
- Public Health & Engineering Department (PHED) Jammu & Kashmir
- Rural Water Supply & Sanitation (RWSS), Andhra Pradesh
- Rural Water Supply & Sanitation (RWSS), Odisha
- Uttar Pradesh Jal Nigam
- Water Corporation of Odisha (WATCO)
- Water Resource Department, Madhya Pradesh

Sales and Marketing office address :

Building Alpha, Bengal Intelligent Park (BIPL),
2nd Floor (South Wing),Block EP & GP,
Plot A2 and M2, Sector V, Bidhan Nagar
Kolkata – 700 091
West Bengal (India) Telephone (Landline) : 033-4408 6666

Plant Address:

ESL Steel Limited
(Formerly known as Electrosteel Steels Limited)
Vill. Siyaljori, Post - Jogidih, O.P. - Bangaria,
P.S. - Chandankyari,
Bokaro - 828303, Jharkhand