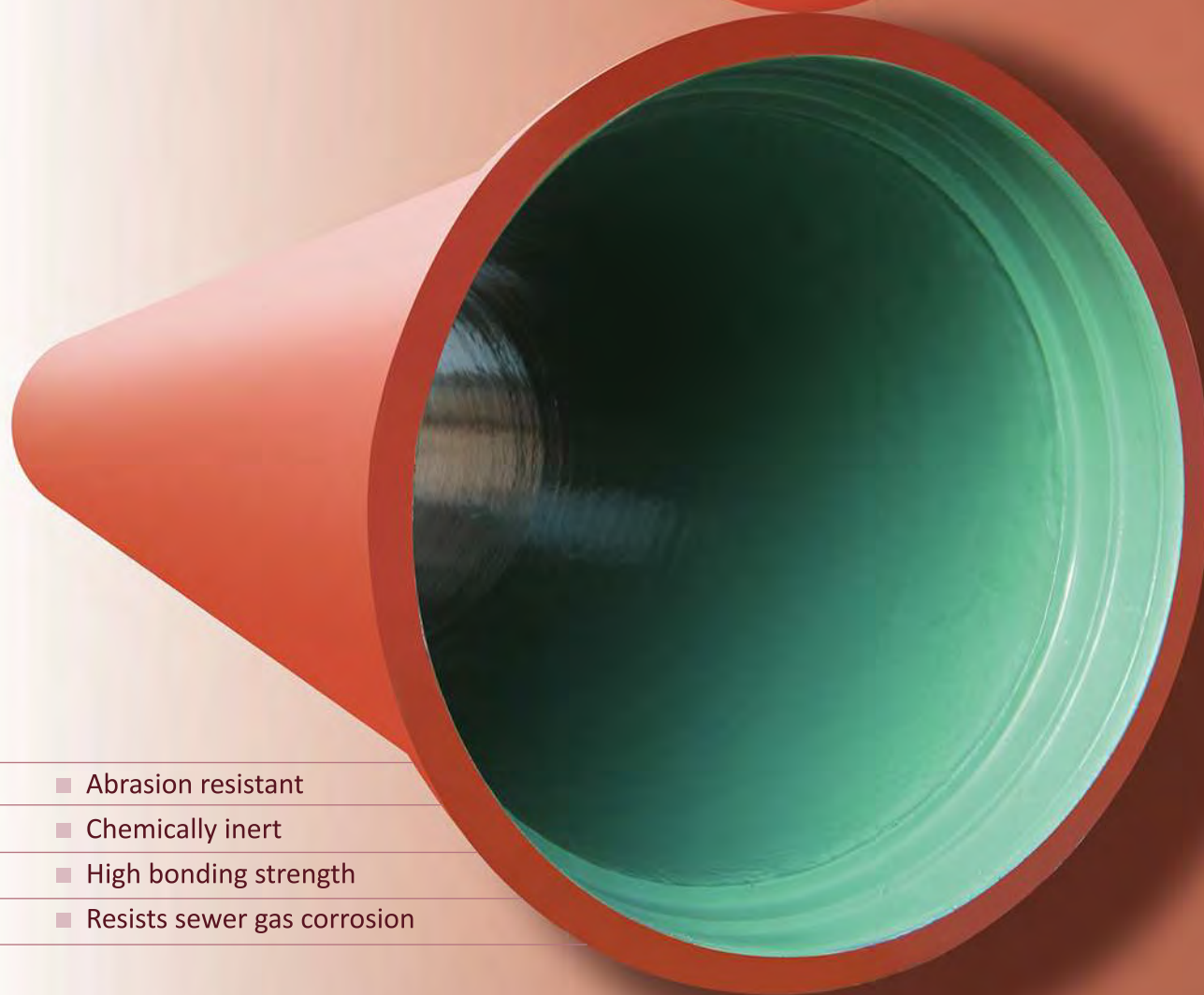


# ELECTROSTEEL

## THE TOUGHEST LINING TO HANDLE WASTE WATER

DUCTILE IRON PIPES AND FITTINGS  
WITH CERAMIC EPOXY LINING



- Abrasion resistant
- Chemically inert
- High bonding strength
- Resists sewer gas corrosion



# ELECTROTUFF

## ULTRATOUGH LINING FROM ELECTROSTEEL

Electrosteel Castings Ltd manufactures Ductile Cast Iron Pipes and Fittings for use in the transportation of fresh water and disposal of wastewater. Over 5 decades of experience and global presence in more than 50 countries worldwide, provide a solid foundation for the introduction of ELECTROTUFF; a new solution for sewage pipelines.

Electrosteel offers pipes for sewerage and wastewater application with a tough lining which has excellent chemical and abrasion resistance as well as superior mechanical strength and imperviousness. For pipelines which are expected to convey waste water, process water or various types of sewage, domestic as well as industrial, ELECTROTUFF is the right choice.

- It is a result of continual research and development.
- Superior to pipes & fittings with conventional lining/coating.
- Paint used is an epoxy based paint induced with ceramic filler material.
- This material, in right texture and quantity, makes the coating impervious.
- Chemically inert impervious coating offers high resistance to chemical corrosion.
- It also enhances the resistance against abrasion and mechanical damage.
- ELECTROTUFF has been used in USA, Europe, Middle East and Indian Markets.



### PRODUCT PROFILE

**NAME :** ELECTROTUFF

**DESCRIPTION :** Electrosteel brand Ductile Iron Pipes and Fittings are internally lined with high build impervious ceramic enhanced system containing a minimum of 20% ceramic quartz pigment dispersed in a phenol derived epoxy resin.

**SPECIFICATION:** BS EN 598, ISO 7186, IS 8329

#### COMMON USAGE:

- Domestic and municipal wastewater
- Industrial wastewater and effluents
- Water with solid particles leading to inner wall abrasion
- Foul water with high chance of biologically induced corrosion

**COLORS & FINISH:** Light Green with Semi-gloss finish

**DRY FILM THICKNESS (DFT):** 40 mils (1000 microns) (minimum).

**TEMPERATURE RESISTANCE :** (Dry) Continuous 275°F (135°C) Intermittent 300°F (149°C)



INDIA



UK



UK



GERMANY



EU



USA

"For scope of different certificates, please refer to the manufacturer."



## KEY BENEFITS OF ELECTROTUFF

- Exhibits superior mechanical bonding strength with the metal substrate
- Can resist prolonged exposure to corrosive environment
- Excellent resistance against abrasion and mechanical damage
- Impervious coating resists chemical attack
- Protects effectively against sewer gas corrosion



## OUTLINE OF MANUFACTURING :

Electrosteel applies the Ceramic epoxy lining in the factory itself. This gives complete control over the quality of the Pipe/Fitting along with Quality of Coating which includes surface preparation, application of lining/coating and monitoring through performance as well as routine tests. Our factory operation is in compliance with ISO 9001 and ISO 14001.

### SURFACE PREPARATION

Surface preparation involves not only cleaning the surface to make it free from loose dust, oil etc. but also involves development of proper surface profile, equivalent to Swedish Standard SA2-1/2 and also an anchor profile of minimum 3.0 mils (76.2) micron. The surface is blasted in an in-built facility, using standardized abrasive material (as per ASTM D 4417, Method C).

### APPLICATION OF LINING

Immediately after surface preparation, the pipes/fittings are transferred for coating. Coating is applied by Plural airless system with computerized control software which ensures a consistent quality with required thickness. Coating in a low temperature controlled environment ensures minimum residual stress on the coating.



USA



SINGAPORE



MALAYSIA



BRASIL



PERU



BULGARIA



INDIA

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## PERFORMANCE EVALUATION : EXPERIMENTS AND TEST RESULTS

ELECTROTUFF pipes are extensively tested for abrasion, adhesion, permeability, cathodic disbondment and chemical resistance. In all the testing it has shown performance superior to currently used interior protection of pipe and fittings for such application.

	Tests Conducted	Relevant standard	Test method	Performance
1.	Abrasion test	ASTM D 4060-07	(CS-17 Wheel, 1,000 cycles, 1,000 gram load)	No more than 76 mg loss, average of three tests
2.	Abrasion type test A	BS EN 598: 2007+A1: 2009	Rocking Abrasion of 50000 cycles	No more than 0.01 mm (0.6 mils) thickness of coating loss
3.	Abrasion type test B	BS EN 598: 2007+A1: 2009	Rocking Abrasion of 100000 cycles	No more than 0.14 mm (5.5 mils) thickness of coating loss
4.	Adhesion test	ASTM D 4541-09	Method E, Type V Tester, Scored	No less than 1,450 psi (10 MPa) pull, average of three tests
5.	Cathodic disbondment	ASTM G 8-96 (2003)	Applied at 37 mils average DFT and cured 14 days at 75°F (24°C)	No more than 0.00 inch (0.00 mm) disbonded equivalent circle diameter, average of two tests
6.	Chemical immersion	NACE TM 0174-2002.	NACE Solution Exposed to White Metal Blast Cleaned and cured 30 days at 75°F (24°C)	No blistering, cracking, checking, erosion or delamination of film after one year continuous immersion at 72°F (22°C)
7.	Immersion Test 20% H <sub>2</sub> SO <sub>4</sub>	ASTM D714-87	Sample immersed in 20% H <sub>2</sub> SO <sub>4</sub> Solution	No effects after 2 years
8.	Chemical resistance Type test	BS EN 598: 2007+A1: 2009	Reagents applied to ductile iron pipe and cured 14 days at 75°F (24°C)	No blistering, disbonding, softening, discoloration or loss of gloss after six months immersion, recirculated at 1.0 lit/min and maintained at 64°F (18°C)
9.	Coating Hardness	ASTM D 2240-05.	cured 30 days at 75°F (24°C)	No less than a Shore Type D hardness of 78, average of five tests
10.	Immersion in water	ASTM D 870-09.	Continuous immersion for 4000 hours in 140°F de-ionized water after curing for 14 days at 75°F (24°C)	No rusting, cracking, checking, or delamination of film
11.	Salt spray test (Fog)	ASTM B 117-09.	Exposure for 5,000 hours after curing for 14 days at 75°F (24°C)	No blistering, cracking or delamination of film
12.	Water absorption test	ASTM C 413-01 (2006).	immersion in water after curing for 14 days at 75°F (24°C)	No absorption of water
13.	Water vapour transmission	ASTM D 1653-03 (2008)	(Method B Wet Cup, Condition C)	No more than 1.25 g/m <sup>2</sup> per 24h water vapor transmission (WVT), and no more than 0.09 perms (0.06 metric perms) water vapor permeance (WVP), average of three tests
14.	Impact Resistance	ASTM 2794	Resistance of Organic Coatings to the effects of Rapid Deformation (Impact); Modified for thick metal substrate.	160 lb-in
15.	Spark Holiday Test	EN 14901	Using Standard Holiday detection device	Safe test Voltage - 2.5 KV

### OUR CONTACT DETAILS

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