

JINDAL
D.P. JINDAL GROUP



MAHARASHTRA SEAMLESS LIMITED

MANUFACTURERS OF SEAMLESS STEEL PIPES & ERW PIPES

COATED PIPES

3L PE/PP, FBE, DFBE and Internal Coating



www.jindal.com

Introduction:

Maharashtra Seamless Limited (flagship company of D.P. Jindal Group) is the largest manufacturer of Seamless Pipes & Tubes In India. MSL has the production capacity of 7,00,000 metric tons per year for the Seamless and ERW pipes and tubes. Since its inception in 1988, in its continuous endeavour to excel MSL has upgraded itself by adding latest facilities & technologies and in the process set no. of milestone.

- ☆ MSL is the 1st & only manufacturer in India of Seamless Pipes upto 20" OD.
- ☆ MSL is the 1st manufacturer in India of ERW Pipes upto 20" OD.
- ☆ MSL has the only Seamless plant in India with a coating mill of 1"-48" OD.
- ☆ MSL has collaboration with Tenaris-Hydril of USA for production of Premium Connections.
- ☆ MSL has set up a 7 MW windpower project at Satara (Maharashtra)

MSL has been meeting the requirement of important sector like Oil & Gas, Hydrocarbon & Process Industry, Power, Automation etc. in both domestic & overseas market. Today, MSL is a well known brand in India & abroad.

COATED PIPES

Pipe coating is the most consistent and successful solution for protecting ERW/Seamless pipes from corrosion, from moisture, other harmful chemicals. Coated pipes are the most viable cost effective products used for transmission of oil, gas, water and other fluids. The coating provides pipelines with a constant protective layer that shield the pipes from any damaging effects of corrosion.

- ☆ 3 LPE (External 3 Layer Polyethylene)-link
- ☆ 3 LPP (External 3 Layer Polypropylene)-link
- ☆ FBE (External Fusion Bonded Epoxy (Single / Dual Layer))-link
- ☆ Internal Epoxy Coating-link



Coating Availability

3LPE / 3LPP COATING

Pipe Size Range	:	33.4 to 1219.0mm
Wall Thickness	:	25 mm (Max.)
Length	:	9 to 14 meters

Coating Thickness (Layerwise)

Epoxy Coating	:	150 - 300 microns
Adhesive Coating	:	200 - 400 microns
Polyethylene / Polypropylene	:	1.55 - 3.35mm
Total Thickness	:	1.80 - 3.70mm

Single Layer FBE Coating

Pipe Size Range	:	33.4 to 1219.0mm
Wall Thickness	:	25 mm (Max.)
Length	:	9 to 14 meters
Coating Thickness	:	400 - 750 microns

DUAL FBE COATING

Pipe Size Range:		
Outer Dia	:	88.90 - 1219.00mm
Wall Thickness	:	Upto 35mm
Length	:	9-14 meters

Dual FBE Thickness

FBE Thickness (Anti Corrosive Layer)	:	400-500 microns
ARO Thickness (Hard Coat Layer)	:	400-500 microns
Total Thickness	:	800 - 1000 microns

INTERNAL COATING

Pipe Size Range:

Outer Dia	:	168.30 - 559.00mm
Wall Thickness	:	upto 25mm
Length	:	6-14 meters

Coating Thickness

Internal Flow Coating for flow Improvement	:	60 - 100 microns
Internal Solvent Free Epoxy for Corrosion Protection	:	400 - 500 microns

Maharashtra Seamless (MSL) Coating Features

We at Maharashtra Seamless limited, offer excellent quality of external and internal coated pipes which are corrosion resistant and reliable. We are the leading manufacturer of ERW/Seamless pipes in India providing high quality coated steel pipes for the transportation of oil, water or gas.

We have an excellent testing facility providing the following facilities:

In-house facility for raw material as well as finished coating.

All testing facility for external and internal coating as per various specifications.

Surface profile detector with printing facility.

Peel testing facility as per din 30670 method -II.

Cathodic disbondment facility for 14 tests at a time.

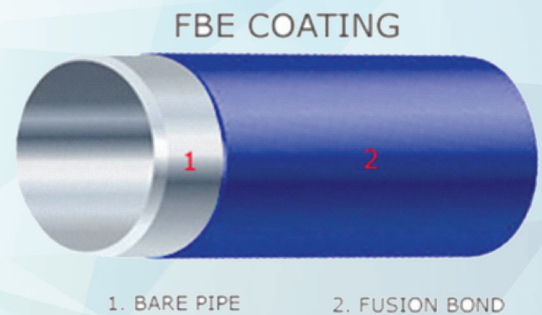
Differential scanning calorimetry from Mettler for virgin & cured epoxy.

Feature of coated pipes manufactured by us:

1. **Superb Corrosion Resistance** – Our products show excellent resistance to any corrosive chemicals and ensure longer life even in harshest conditions.
2. **With standing High Temperature differences** – Our coated pipes show high capacity to withstand any environment with temperatures ranging from +104 °C to -45 °C
3. **Electricity Resistant** – External Pipeline Coating offers excellent resistance to electricity.
4. **Pinhole free** – Made from hot extrusion process the pipes are homogeneous and free from any pinholes
5. **Impact resistant** – The external coating on pipelines also protects it from any physical damage as well while storing or transportation.
6. **Cathodic disbonding** – Our products show excellent protection from catodic disbondement.
7. **Bendability** – Our pipes show excellent bendability (up to 3°).
8. **Easy Repair options** – Any surface defects that may have occurred during laying or transportation can be repaired easily.

External Coating Pipes & Process:

Fusion bonded epoxy (FBE) coated pipes are used for prevent steel pipes from corrosion and harmful chemicals. These are thin coatings of epoxy-resin powder materials formed in a film and applied on pipes by specialised coating facilities by electrostatic spraying. These FBE coated pipes can be used in temperatures up to 85°C in dry conditions.



FBE Coating has been used as a standard in industries for protection against corrosion. FBE coatings have good handling characteristics; they are flexible and resistant to soil pressure. These are used in pipeline projects that have normal requirements and do not have harsh conditions.

Dual-layer of fusion bonded epoxy: can also be used for coating of pipelines for use in harsher conditions to make it more abrasion resistant. The second layer is also made of the similar fusion bonded epoxy with both the layers being sprayed successively. Depending on the application, the dual-layer FBE can also come with an Abrasion-Resistant Overcoat (ARO), to reduce damage to pipes.

3LPE Coated Pipes consist of 3 layers for pipeline coating.

- Layer 1** Consists of Fusion Bonded Epoxy. This later provides protection against corrosion and is fusion bonded with the blasted steel surface.
- Layer 2** Is a copolymer adhesive which has excellent chemical bonding to the inner layer and the top layer of polyethylene.
- Layer 3** Is the layer of polyethylene used for protection against any physical damage of the pipes.

The 3 layer polyethylene coated pipes are the preferred choice for transmission of oil and gas around the world. It can withstand varied temperatures and environments ranging from dessert dry lands to deep underwater regions. 3LPE coated steel pipes are used for transportation of drinking water, oil and gas and other fluids. The 3LPE coated pipes can be used in the high temperatures as high as 60° C to 80° C.



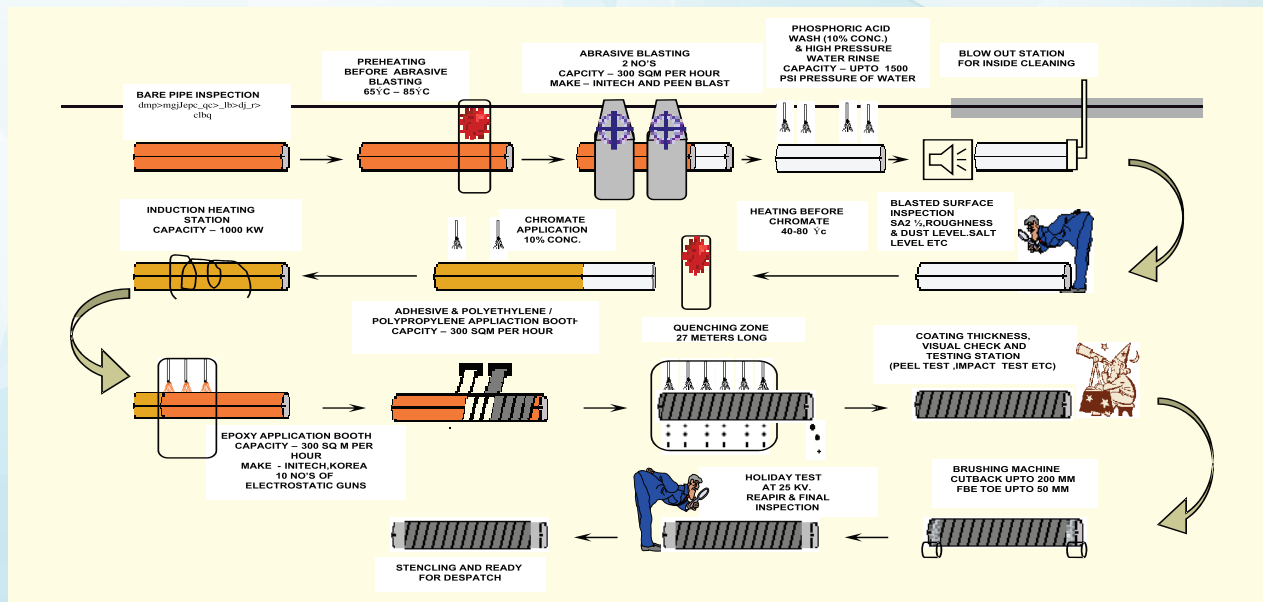
3LPP Coated Pipes

3LPP Coated Pipes consists of multilayer anti-corrosion coatings consisting of an inner layer of fusion bonded epoxy layer, the middle layer is an adhesive layer and an outer layer of polypropylene. The inner layer is used for protection against corrosion and chemical damage while the outer layer is used for protection against any physical damage in laying and transportation.

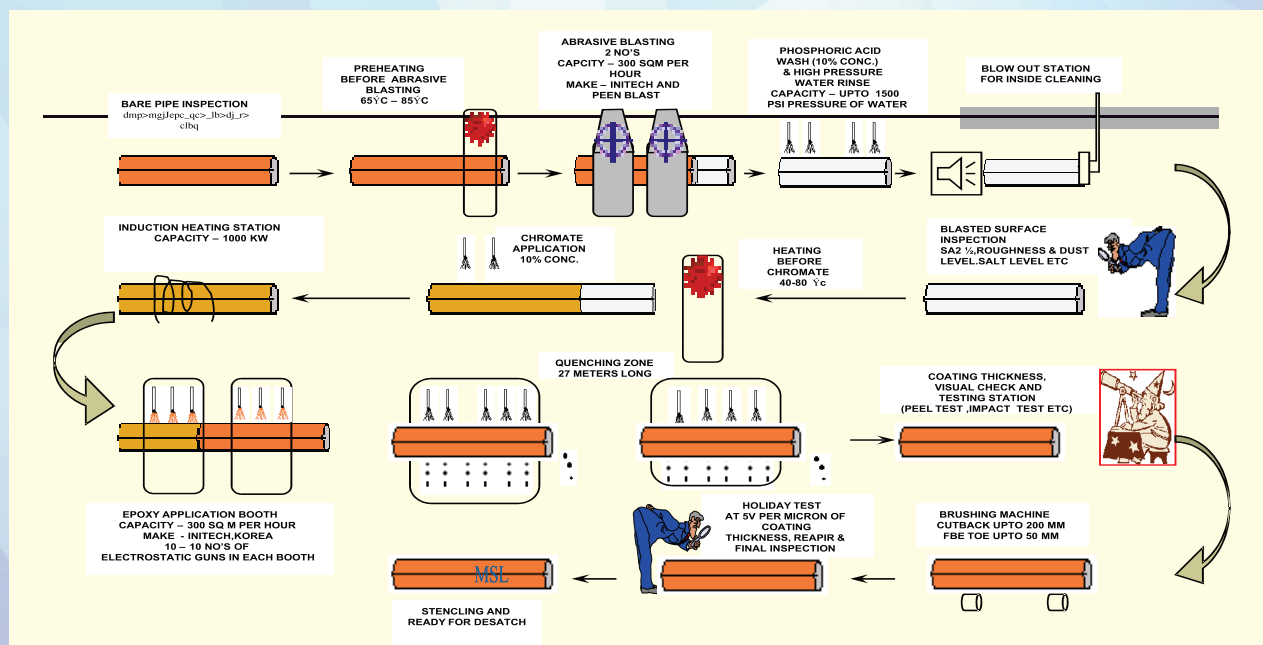
The 3 layer polypropylene coated pipes are used in oil fields where the resources are drawn from deep reservoirs and at high temperatures (100oC to 140oC). It is highly abrasion resistant and is generally used where the chances of damage are high such as Rocky Mountains or for drilling operations.

External Coating Flow Chart

3 LPE / 3 LPP COATING FLOW DIAGRAM

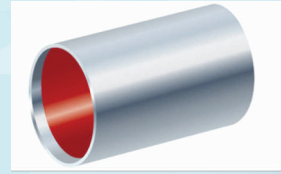


FBE/DFBE COATING FLOW DIAGRAM

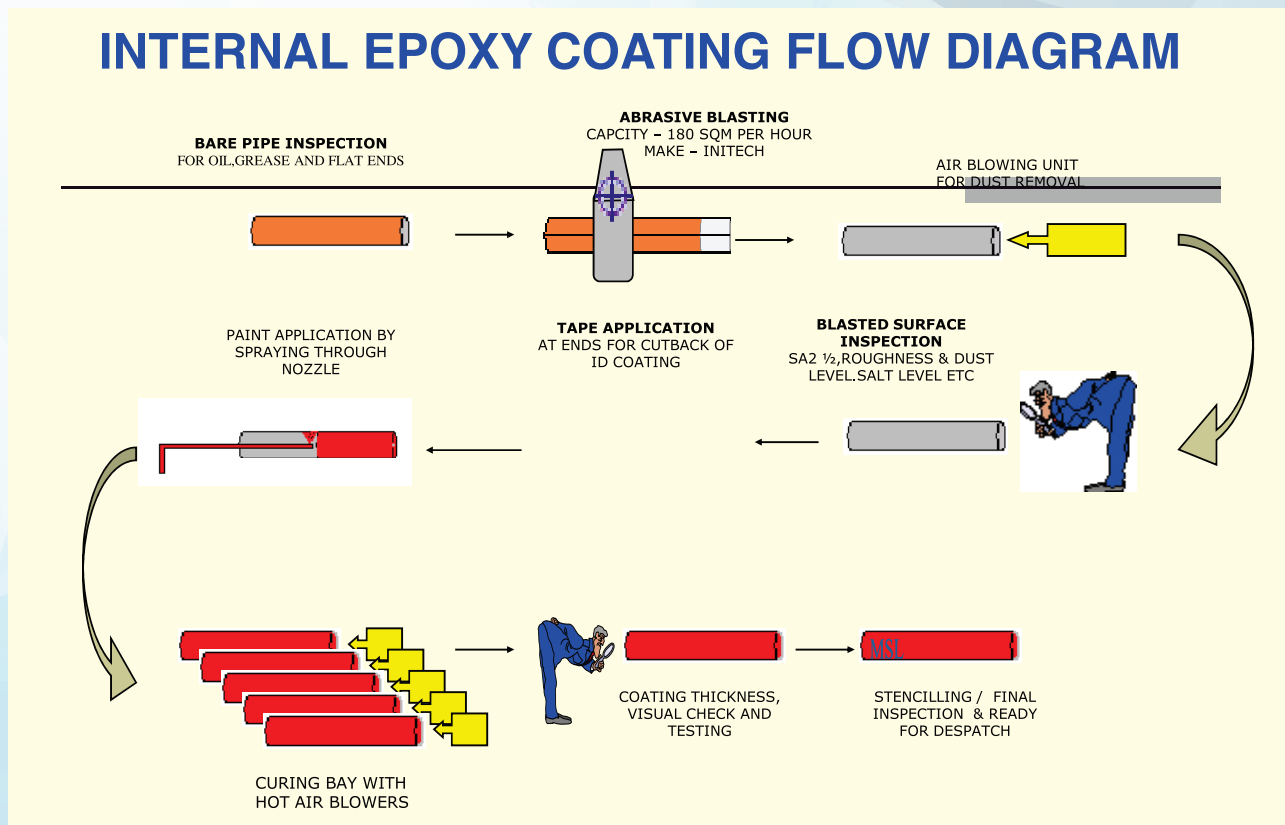


Internal Coating Pipes & Process:

Maharashtra Seamless Limited (MSL) manufacture and supply internal coated pipes (epoxy coated). A spraying nozzle has been used to spray the liquid epoxy inside the pipe as per the required thickness. Before applying the epoxy paint, internal surface of the pipe is cleaned. The typical coating thickness for gas pipelines varies between 60 to 100 μm and for water and other liquids it varies between 200 to 500 μm .



Internal Epoxy Coating Flow Chart



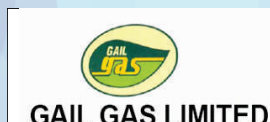
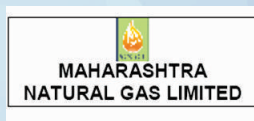
Manufacturing standard for external coating

DIN 30670, ISO 21809, DIN 30678, NF SPECIFICATIONS, CANADIAN SPECIFICATIONS, NACE RP 0394, AWWA SPECIFICATIONS etc.

Manufacturing Standard for internal coating

API RP 5L 2, ISO 15741, NF A 49 - 709, BS - 6920, AWWA C 210

Our Major Clients





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