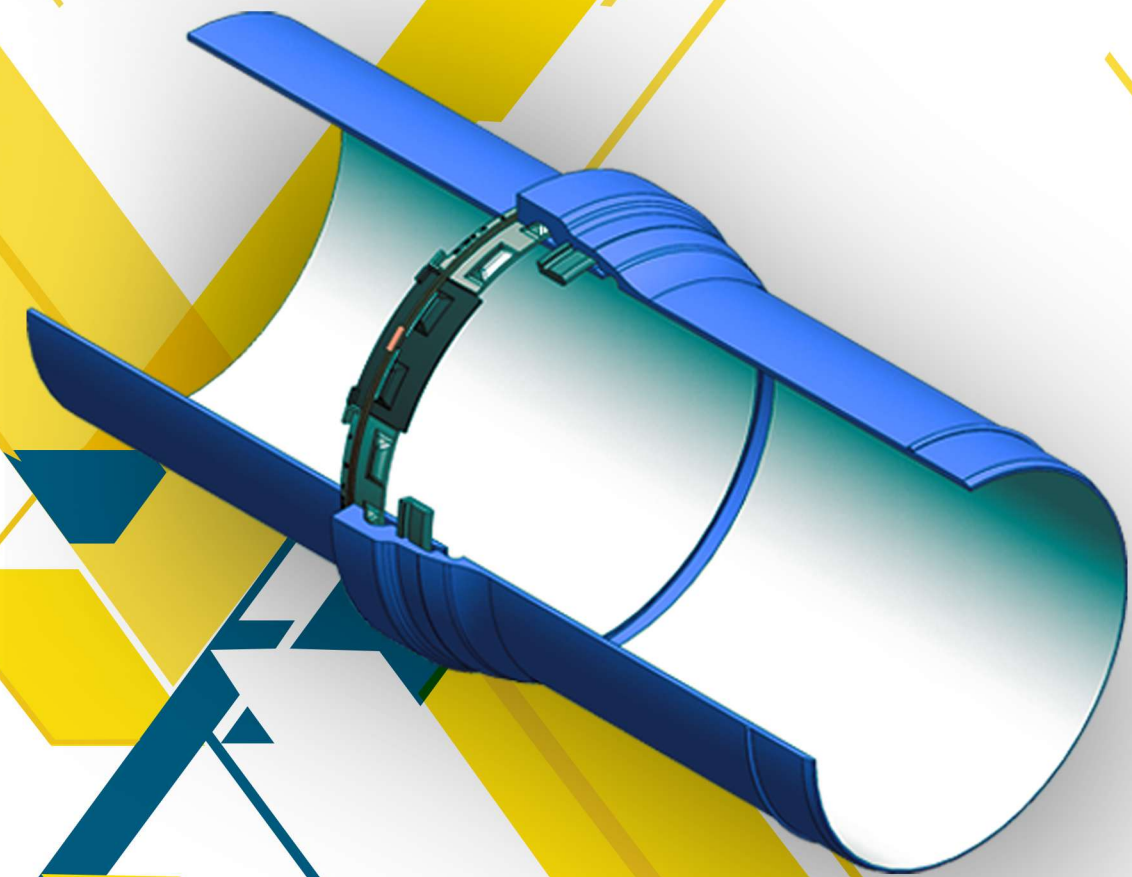
ELECTROLOCK

BOLTLESS DOUBLE CHAMBER THRUST RESTRAINING JOINT



ELECTROSTEEL CASTINGS LIMITED

INTRODUCTION

ELECTROSTEEL CASTINGS LIMITED (ECL) is a six-decade-old company engaged in the water infrastructure business and is one of the largest manufacturers of Ductile Iron Pipes in the Indian sub-continent. Electrosteel is the pioneer to set up a Ductile Iron Pipe Plant in India for the first time in 1994 using state of the art technology and is among the five largest producers of Ductile Iron Pipes in the world. It caters to a large customer base spread around the Indian subcontinent, Europe, North and South America, South East Asia, Middle East and Africa.

What is a restrained joint?

Hydraulic thrust forces are generated within a pipeline due to change of direction, reduction in diameter or at the end of pipelines, under pressure during operation. These forces may cause joint separation in a DI pipeline, if thrust blocks or restraining devices are not provided in the pipeline. Normal Push-on joints in DI Pipes and Fittings do not provide significant restraint against longitudinal separation.

One of the most common methods of providing resistance to thrust forces is the use of concrete thrust block or Restrained Joint system by transferring the thrust force to the soil. A restrained joint system is a technically more advanced system offering certain distinct advantages over thrust blocks. Electrosteel presents 'Electrolock' – a boltless self-restrained joint system, which eliminates the need for concrete thrust blocks.

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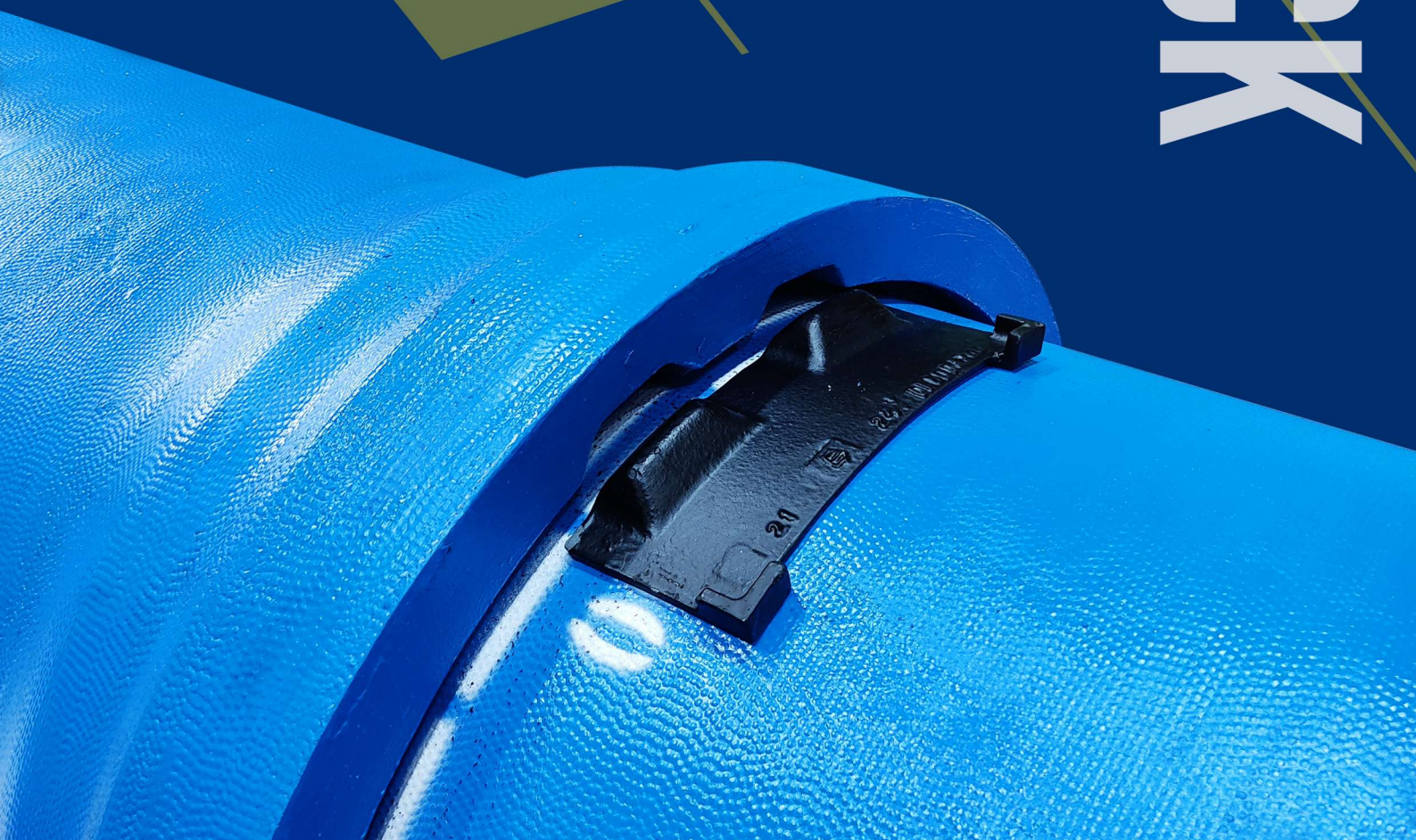

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Where bearing capacity of soil is poor and construction of thrust blo could be problematic as this might entail construction of mammoth thrust blocks/anchor blocks.

INSTALLATION GUIDELINE (From DN 600 to DN 1000)

The installation recommendations are valid for pipes and fittings made of ductile cast iron with ELECTROLOCK restrained joint system.

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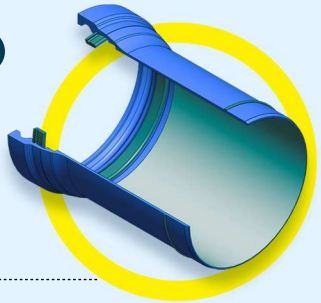
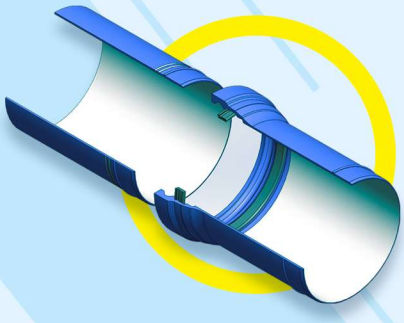
STEP 1 Cleaning and gasket insertion



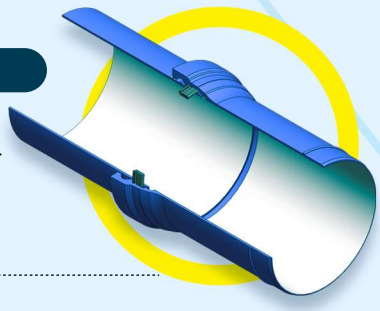
- Ensure that socket windows are accessible during laying.
- Clean all the parts, as well as the socket inside and the spigot end to avoid dust and dirt.
- Put the gasket inside the groove like normal push-on joint pipe.
- Lubricate the exposed portion of the gasket and the spigot end.



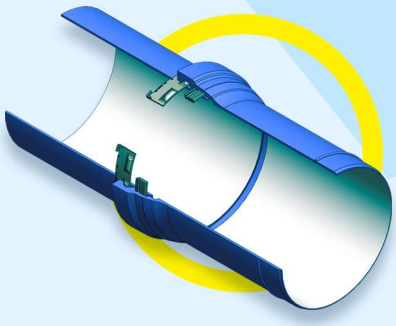
Ensure joint alignment STEP 2

- Align the jointing pipe properly.
- Push the spigot end by suitable means until it stops.
- No angular deflection to be given during assembly.

STEP 3 Sealing joint assembly



- Arrange to push the spigot into the socket so that a leak-tight sealing is created with the push-on type gasket fitted at the inner chamber.
- Ensure that one of the white band on the spigot side remains outside the socket to ensure correct insertion depth.

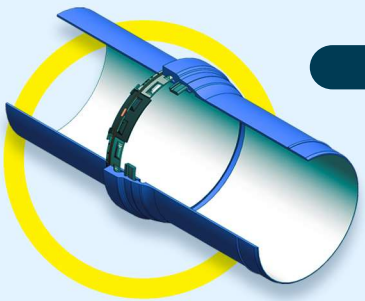


Inserting the locking plates STEP 4

- Insert the locking plate segments through the window and slide around the pipe.
- Repeat the same for all the locking segments to place all of them.

STEP 5 Placement of locking plates

- Hold the upper segment and place the rubber retainer in one of the windows.



Final Locking STEP 6

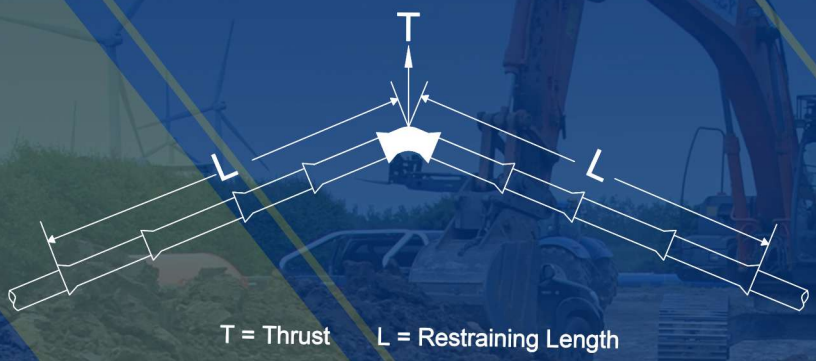
- Withdraw the pipe up to the stop locks to remove the slack in the locking segments. Now the assembly is locked.
- Clamp the locking segments on the pipe with the jubilee clamp provided with the pipes.
- The angular deflection is to be given only after final locking of the assembly.

Concept of restraining length

In a typical Restrained Jointed pipeline, the thrust is calculated and then a system of Restrained Jointed components, comprising a Restrained Jointed Ductile Iron fitting and a requisite number of Restrained Jointed pipes on the upstream and downstream side of the fitting are installed to combat the thrust force. The length of pipeline to be restrained is calculated based on the pipeline pressure, type of fittings, surrounding soil parameters and backfill compaction level, as per the provision of ISO:21052.

- All pipes in the pipeline need not be restrained
- All bends, reducers, end blocks and tees are to be with restrained joints.
- All Joints on both sides of the fittings within the restraining length are to be restrained.

Number of pipes to be restrained in a DI pipeline (for a Design Pressure of 1.2 MPa with a safety factor of 1.5)



Diameter (DN)	Number of Electrolock Joint Pipe(s) required on either side of the Ductile Iron Pipe Bend (in no.)			
	11.25°	22.5°	45°	90°
100	1	1	1	1
150	1	1	1	2
200	1	1	1	2
250	1	1	1	3
300	1	1	2	3
350	1	1	2	4
400	1	1	2	4
450	1	1	2	4
500	1	1	2	5
600	1	1	2	5
700	1	2	3	6
800	1	2	3	7
900	1	2	3	7
1000	1	2	4	8

Note: The above is a sample calculation with Cohesive Granular Soils with Coarse Particles > 50% is taken in design. Trench condition modifier (Reduction Constant, Kn) is taken for the condition where Pipe bedded in 4-inch minimum loose soil and Backfill lightly consolidated to top of the pipe.

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ELECTROLOCK FITTINGS

QUALITY CERTIFICATION

DVGW | BSI | BUREAU VERITAS | ÖVGW ÖSTERREICHISCHE VEREINIGUNG FÜR DAS GAS- UND WASSERFACH | SGS

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