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Restrained Joint Systems for Ductile Iron Pipelines - Design Rules and Type Testing

(ISO 10804:2010, MOD)

球墨铸铁管线用自锚接口系统 设计规定和型式试验

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Restrained Joint Systems for Ductile Iron Pipelines - Design Rules and Type Testing

1 Scope

This Standard specifies the terms and definitions, design rules and type testing of restrained joints systems for ductile iron pipelines.

This Standard is applicable to the ductile iron pipelines conforming to the provisions of GB/T 13295 and GB/T 26081.

NOTE: Self-anchored joint is sometimes referred to as restrained joint or stop-off joint.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 13295 Ductile Iron Pipes, Fittings and Accessories for Water or Gas Applications (GB/T 13295-2013, ISO 2531:2009, MOD)

GB/T 26081 Ductile Iron Pipes Fittings and Accessories for Sewage Applications (GB/T 26081-2010, ISO 7186:1996, MOD)

3 Terms and Definitions

For the purposes of this document, the following term and definitions and those ones stipulated in GB/T 13295 apply.

3.1 Allowable angular deflection

The deflection angle that can be endured safely by the joint between two ductile iron pipelines under the action of the allowable working pressure.

3.2 Allowable operating pressure; PFA

The maximum internal pressure that can be endured safely by the components for a

5 Type Test

5.1 General

5.1.1 The design of restrained joint shall take type test. The type test shall be performed under the most unfavorable conditions such as casting tolerance and joint movement; so that verify the mechanical strength and sealing properties of the joint.

5.1.2 The type test shall be carried out under the condition that the connecting part forms the maximum design radial clearance (minimum socket connects with maximum bell-mouth); for the restrained joint with steel teeth set on the seal rubber ring, the positive internal pressure type test shall be carried out under the condition of minimum design radial clearance (maximum socket connects with minimum bell-mouth).

5.1.3 The wall thickness of socket including the one within the range of weld ring and attachment shall be the minimum wall thickness of design; its tolerance is $^{+10}_{0}$%. The inner diameter of the machining socket is allowed to reach the required wall thickness.

5.1.4 In the type test, the tolerance of the radial clearance shall meet the following requirements; the dimension requirements can be met by machining the bell-mouth or making special bell-mouth:

--- When adopting the maximum design radial clearance, the upper limit of the radial clearance is 0mm; the lower limit of the tolerance is 5% of the maximum design radial clearance or 0.5mm (whichever is smaller);

--- When adopting the minimum design radial clearance, the upper limit of the radial clearance is 5% of the minimum design radial clearance or 0.5mm (whichever is smaller); the lower limit of the tolerance is 0mm.

5.2 Test conditions

5.2.1 Table 1 gives the specification group of the type test; at least one specification in each group shall be carried out type test; generally, the recommended specification shall be selected for test. If the product design and/or manufacture is different in a certain group, then such group can be divided further. For the manufacturer, if a group has only one nominal diameter (DN) or nominal pressure (PN), then this nominal diameter (DN) or nominal pressure (PN) can be considered one part of the neighboring group of the same design and manufacture process.

NOTE: When the joint performance of the same specification group is based on the same design parameter, the type test result of one specification can represent the whole group.

not exceed 0.1MPa/s.

5.3.1.5 The test pressure shall be maintained within a constant value ± 0.05MPa for at least 2h; during this period, completely inspect the joint every 15min; and measure the axial movement of the joint.

5.3.2 Negative internal pressure type test

5.3.2.1 The requirements for test device and equipment shall be the same as 5.3.1; the pipeline section shall be axially constrained to prevent the adverse movement.

5.3.2.2 Discharge water completely from the test assembly; pump the air to an absolute pressure of 0.01MPa; then close the vacuum pump, and close the test assembly. Place the test assembly under the vacuum state for at least 2h; the pressure change shall not exceed 0.009MPa during this period. The test temperature is 5°C~40°C; the temperature change of the test assembly during the test period shall not exceed 10°C.

5.3.3 Cyclic internal pressure type test

5.3.3.1 The requirements for test device and equipment shall be the same as 5.3.1; the test device is filled with water; discharge the gas.

5.3.3.2 The pressure continues to rise to the maximum allowable operating pressure (PMA); then perform the automatic monitoring as per the pressure cycle described below:

a) The pressure continues to drop to (PMA-0.5) MPa;

b) Maintain the pressure of (PMA-0.5) MPa for at least 5s;

c) The pressure continues to rise to the PMA;

d) Maintain the PMA pressure for at least 5s.

5.3.3.3 Record the number of cycles; if the joint leaks water, the test shall be stopped automatically. After the completion of the test, the axial movement on the socket end shall be measured.

5.4 Type test report

The type test report shall contain the following contents:

a) Joint type;

b) Dimension range covered by the test;

c) Nominal diameter;

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