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Technical specification for anticorrosion of steel pipe and fitting lining with fluoroplastics

钢制管道及管件内衬氟塑料耐蚀作业技术规范

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Technical specification for anticorrosion of steel pipe and fitting lining with fluoroplastics

1 Scope

This Standard specifies general requirements for anticorrosion of steel pipe and fitting lining with fluoroplastics, lining operations, product inspection, environmental protection, safety requirements.

This Standard is applicable to pipe and pipe fitting drawing, roto-molding, molding, spraying, plate lining, isostatic pressing, injection molding, transfer of fluoroplastic lining.

NOTE: Fluoroplastics include the following: polytetrafluoroethylene (PTFE), modified polytetrafluoroethylene (M-PTFE), soluble polytetrafluoroethylene (PFA), polyvinylidene fluoride (PVDF), perfluoroethylene propylene copolymer (FEP), ethylene-tetrafluoroethylene copolymer (ETFE).

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 1033.1, *Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method liquid pycnometer method and titration method*

GB/T 8163, *Seamless steel pipes for liquid service*

GB/T 8923.1, *Preparation of steel substrates before application of paints and related products - Visual assessment of surface cleanliness - Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

GB 9448, *Safety in welding and cutting*

GB 12348-2008, *Emission Standard for Industrial Enterprises Noise at Boundary*

GB/T 12459, *Steel butt-welding seamless pipe fittings*

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ASTM D3159, *Standard specification for modified ETFE fluoropolymer molding and extrusion materials*

ASTM D3222, *Standard specification for unmodified poly (vinylidene fluoride) (PVDF) molding extrusion and coating materials*

ASTM D3307, *Standard specification for perfluoroalkoxy (PFA)-fluorocarbon resin molding and extrusion materials*

ASTM D4894, *Standard specification for polytetrafluoroethylene (PTFE) granular molding and ram extrusion materials*

ASTM D5575, *Standard classification system for copolymers of vinylidene fluoride (VDF) with other fluorinated monomers*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 matrix

Steel pipe and fitting before lining.

3.2 lining thickness

Lining layer thickness of steel-plastic composite pipe.

3.3 drawing molding

Lining process that allows a seamless gap between the lining layer and the matrix through a certain mechanical method.

3.4 wrapping

Lining process that uses thermal expansion to make the fluoroplastic film tightly merged.

3.5 roto-lining

Composite tight lining process that the plastic powder is the main raw material, and the multi-directional rotary hot-melt technology has a certain peel strength after multiple feedings and one-time molding.

3.6 transfer molding

Process that melts and extrudes plastic pellets into molds and then cools and demolds.

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serious break in the matrix, and the specifications meet the requirements of the production record table.

5.2.1.2 Fix specific fixture to fluoroplastic tube. Slowly pull the fluoroplastic tube into the matrix through the stretching equipment, so that the fluoroplastic tube and the matrix are tightly combined.

5.2.1.3 After completion, check whether the inner wall of the liner is flat and smooth. The scratch depth of the reserved outer end of the drawn tube shall not exceed 10% of the tube wall thickness. Then reserve enough flanging amount for the edges of the fluoroplastic tube. For nonconforming products, pull the liner tube out of the steel base again and restart the tube drawing operation.

5.2.1.4 Conduct annealing and stress-relieving for the matrix with conforming lining. The temperature is 150°C~250°C.

5.2.1.5 Heat the composite straight tube after stress relief to 150°C~300°C (according to different materials) after flanging. Cool and mold.

5.2.1.6 The minimum thickness of the lining after molding shall meet the requirements of 5.4. The minimum outer diameter of the sealing surface shall meet the requirements of 5.5. The scratches and depressions of the flanging surface shall not exceed 20% of the wall thickness.

5.2.2 Iso-static lining of fittings

5.2.2.1 Assemble conforming matrix and elastic mold.

5.2.2.2 Inject plastic powder into the module gap. Plastic powder shall be clean and free of impurities. Then blindly put it into the pressure tank and slowly pressurize it to 15MPa~35MPa. Slowly relieve the pressure after holding pressure for 10min~30min.

5.2.2.3 Check the inner wall for cracks, impurities and other bad phenomena. If there are, it shall return to work.

5.2.2.4 Sinter the conforming matrix after molding according to the parameters in Table 5 or the sintering parameters provided by the raw material manufacturer.

5.2.2.5 Check the inner wall after sinter cooling. There shall be no cracks on the surface of the fluoroplastic, and the thickness shall meet the technical specifications or contract requirements.

5.2.3 Sheet lining of pipes and fittings

5.2.3.1 Apply conforming adhesive to the inner surface of the conforming matrix. The thickness of the adhesive shall be tested after ventilating and drying. Continue working only after it meets the requirements of the enterprise standard.

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There must be no bad phenomena such as impurities and cracks.

5.2.5.5 The minimum thickness of the lining after molding shall meet the requirements of 5.4. The minimum outer diameter of the sealing surface shall meet the requirements of 5.5. The scratches and depressions of the flanging surface shall not exceed 20% of the wall thickness.

5.2.6 Roto-lining of pipes and fittings

5.2.6.1 Install conforming matrix on roto-molding machine. After heating to the sintering temperature, it rotates and revolves simultaneously.

5.2.6.2 Put the screened powder into the matrix. At the same time continue to use the sintering temperature to rotate and revolute.

5.2.6.3 When the raw material is naturally and evenly attached to the matrix lining surface, then remove the heat source. Slowly cool down while rotating.

5.2.6.4 After cooling, inspect the rotomolded lining surface for cracks and impurities, and the wall thickness is uniform.

5.2.6.5 If the inspection is conforming, the sealing surface shall be conducted for plane processing to ensure the tightness.

5.2.6.6 The minimum thickness of the lining after molding shall meet the requirements of 5.4. The minimum outer diameter of the sealing surface shall meet the requirements of 5.5. The scratches and depressions of the flanging surface shall not exceed 20% of the wall thickness.

5.2.7 Coating lining of pipes and fittings

5.2.7.1 The matrix shall be preheated to evaporate water before powder coating. Preheating temperature is 150°C~300°C.

5.2.7.2 Before liquid spraying, mix the prepared compound fluoroplastic coating 30min~60min in advance evenly.

5.2.7.3 Spray to the surface of conforming matrix to reach the thickness of single mode and sinter. The thickness of powder single mode is generally 50μm~150μm. The thickness of liquid single mode is 15μm~40μm. The sintering temperature is set according to the parameters in Table 5 or according to the sintering parameters provided by the raw material manufacturer.

5.2.7.4 After the single film is sintered, check the surface for cracks and sand holes and then continue working.

5.2.7.5 Repeat 5.2.7.3 and 5.2.7.4. In the meantime, use the thickness gauge to test the thickness in multiple areas and points until the required thickness is

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