This standard applies to the external anti-corrosion engineering of the following buried

Definition and Applications

DIN30671

- ALLLAND Production Standards Overview

1. Definition

The standard defines the core terms as follows:

Thermoset plastic coating: A rigid anti-corrosion layer formed by heating and curing epoxy resin or polyurethane-tar as the base material, featuring excellent adhesion and corrosion resistance.

Fusion-bonded epoxy (FBE): A solvent-free solid powder coating that is applied to the surface of preheated steel pipes via electrostatic spraying or fluidized bed coating, and forms a uniform layer after melting and curing.

Polyurethane-tar (PUR-T): A coating made by mixing polyurethane resin with tar, applied by airless spraying and cured at room or low temperature.

External anti-corrosion coating for buried steel pipes: A protective layer applied to the outer wall of steel pipes to isolate corrosive media such as soil and groundwater and protect the steel pipe substrate.

2. Material & Process

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Coating Material Requirements

ALLLAND STEEL PIPE

Coating Type	Raw Material Composition	Storage and Shelf Life Requirements
FBE	Epoxy resin powder, curing agent, leveling agent, pigments and fillers	Sealed and stored in a dry environment at a temperature ≤ 30℃ with a shelf life of 6 months; must be used up within 7 days after opening
PUR-T	Polyurethane prepolymer, tar, diluent, curing agent	Two components stored separately, protected from direct sunlight with a shelf life of 3 months; must be applied within 4 hours after mixing

Core Process Flow

A .Steel Pipe Surface Preparation

- Rust removal grade: Must meet the **Sa 2½ (near-white metal)** or **Sa 3 (white metal)** blast cleaning standard, with no scale, rust or oil stains on the surface.
- Surface cleanliness: Water-soluble salt content ≤ 50mg/m² (calculated as NaCl).
- Surface roughness: Rz 40–80μm (for FBE coatings) to ensure the mechanical anchoring effect of the coating.

B .Coating Application Process

Process Parameter	FBE Coating	PUR-T Coating
Preheating Temperature	230–260℃	60–80℃
Application Method	Electrostatic spraying / Fluidized bed coating	Airless spraying
Spraying Pressure	0.4–0.6MPa	0.2–0.3MPa

C. Curing Process

- FBE coating: Maintain a temperature above 200℃ for 30–60 seconds to ensure a curing degree ≥ 95%.
- PUR-T coating: Cure at room temperature for 24 hours or accelerate curing at 80℃ for 2 hours, with a curing degree ≥ 90%.

Coating Thickness

- Standard-grade FBE: 300–400μm
- Reinforced-grade FBE: 400–500μm
- PUR-T coating: 500–1000μm

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奥蓝德钢管 ALLLAND STEEL PIPE

3. Performance Requirements (The Core)

Basic Performance of Coating Materials

Performance Index	FBE Coating Requirement	PUR-T Coating Requirement	Test Basis
Gel Time (200℃)	≤ 120 seconds	Not applicable	DIN 55635
Curing Degree	≥ 95%	≥ 90%	Differential Scanning Calorimetry (DSC)
Adhesion	≥ 5 MPa (Cross-cut Method)	≥ 4 MPa (Pull-off Method)	DIN 53151 / DIN 53289
Chemical Resistance	No blistering/peeling after 7-day immersion in 10% H_2SO_4	No visible change after 30-day immersion in 10% NaCl	DIN 50021
Glass Transition Temperature	≥ 90℃	≥ 60℃	DSC Method

Key Performance of Coating Systems (Core Indicators)

Performance Item	Qualification Standard	Applicable Coating
Cathodic Disbondment Performance	Disbondment radius ≤ 8 mm after 48 hours (Conditions: 65℃, 3% NaCl solution, -1.5V vs SCE)	FBE / PUR-T
Impact Resistance	No cracking/peeling after impact by 1kg weight dropped from 500mm height (5J energy)	FBE / PUR-T

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Bending Performance	No coating cracking when bending radius = 3 × pipe diameter	FBE
Pinhole Resistance	No breakdown detected by high-voltage spark test (FBE: 5kV/mm; PUR-T: 3kV/mm)	FBE / PUR-T
Soil Stress Resistance	No coating damage/disbondment after 1-year buried simulation test	FBE / PUR-T

Testing & Acceptance

Inspections are categorized into Factory Inspection and Type Inspection, with specific requirements on items, acceptance criteria and inspection frequency as follows:

1. Factory Inspection (100% Inspection)

- ✧ Carried out for each steel pipe:
- ✧ Visual Inspection: No pinholes, bubbles, sagging or missed coating.
- ✧ Thickness Measurement: ≥ 5 measuring points per pipe; local minimum thickness ≥ 80% of the designed value.
- ✧ Pinhole Detection: No breakdown detected by spark detector.

2. Type Inspection

- ✧ Conducted periodically to verify batch performance stability:
- ✧ Adhesion Test: Meet the requirements specified in Section 3.1; once per batch.
- ✧ Cathodic Disbondment Test: Disbondment radius ≤ 8 mm; once per quarter.
- ✧ Impact Resistance Test: No cracking or peeling of the coating; once per batch.
- ✧ Bending Test: No coating cracking (applicable to FBE only); once every six months.

Identification & Documentation

Certification and marking are required. The producer must supply a **test report or certificate of compliance** stating that the product conforms to DIN 30671. This document must include key information such as:

- Product identification (grade, dimensions, coil/sheet number)
- Coating class designation (e.g., Z275)
- Coating type (Z or ZF)
- Results of coating mass and adhesion tests
- Reference to the specific part of DIN 30671

- The material itself is often marked with the standard number, coating class, and producer identification.

Certification and marking are mandatory requirements. The producer must supply a test report or certificate of compliance stating that the anti-corrosion coated steel pipes conform to DIN 30671. This document must include key information such as:

- ·Product identification (pipe grade, specification/diameter, batch number)
- ·Coating type and class (e.g., FBE standard-grade/reinforced-grade, PUR-T)
- ·Coating thickness designation (e.g., FBE 400μm)
- ·Results of key tests (thickness, adhesion, pinhole detection, etc.)
- ·Reference to the specific provisions of DIN 30671:1992
- ·The coated steel pipes themselves must be clearly marked with the standard number (DIN 30671:1992), coating type/class, production date, and producer identification.

DIN 30671 specifies a full quality control framework for thermoset plastic external anti-corrosion coatings on buried steel pipes, defining applicable scopes, clear

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