



## Definition and Applications

# DIN30670

## - ALLLAND Production Standards Overview

### 1. Definition

The standard clearly defines its scope and coating systems:

- Governed Objects: Applies to factory-applied polyethylene coatings for buried or submerged steel pipes and fittings.
- Main Processes: Covers two primary process systems: extruded polyethylene coatings and sintered (powder) polyethylene coatings.
- Coating Types: Classified into Normal Type (Type N) and Special Type (Type S) based on performance grade. Type S is designed for more demanding conditions (e.g., wider temperature range, higher mechanical stress).
- Thickness Classes: Under Type N or S, further classified into normal thickness (n) and reinforced thickness (v). The latter is typically used where higher mechanical damage risk is anticipated.

### 2. Material & Process

The standard specifies strict requirements for substrate preparation, raw materials, and application process:



**Surface Preparation (Pretreatment):** Prior to coating, the steel pipe surface must be blast-cleaned to achieve a cleanliness level of Sa 2½ with appropriate anchor profile (typically 50-90 µm) to ensure coating adhesion.

**Three-Layer Coating System (Mainstream Process):** For the most common extruded polyethylene three-layer system, the standard defines the function of each layer:

- ✧ Epoxy Primer (Fusion-Bonded Epoxy, FBE): Provides excellent wet adhesion and cathodic disbondment protection.
- ✧ Polymer Adhesive (Copolymer): Acts as a tie layer, ensuring chemical bonding between the polyethylene and the primer.
- ✧ Polyethylene Topcoat (PE): Provides the primary mechanical protection, electrical insulation, and barrier against permeation. The polyethylene material must meet requirements for density, melt flow rate, etc.

**Application Process:** Must be carried out in a controlled factory environment to ensure stable parameters such as preheating temperature, application speed, and cooling process, resulting in a uniform and continuous coating.

### 3. Performance Requirements & Important Note on Minimum Requirements

This is the technical core of the standard. The table below summarizes key performance indicators and their minimum requirements:



Requirement Category	Specific Indicator / Test	Standard / Notes (Based on DIN 30670 & Common Project Specifications)
Coating Thickness	Minimum Thickness	Ranges from 1.8 mm to 3.0 mm depending on pipe diameter. Reinforced type (v) requires additional thickness (e.g., +0.7mm). The average thickness during construction is typically required to be higher than this minimum.
Adhesion / Peel Strength	Ambient Temperature (23°C)	≥ 35 N/cm (Common project specifications often require 50-70 N/cm or higher).
	Elevated Temperature (Type S: 50°C / Type N: 50°C)	Type S requires ≥ 25 N/cm; Type N requires ≥ 15 N/cm.
Coating Continuity	Holiday Detection (Spark Test)	Test voltage approximately 25 kV per mm of coating thickness. Must be 100% free of holidays (defects).
Cathodic Disbondment Resistance	28-day or 48-hour Test	Disbondment radius ≤ 8 mm (typical value) under specified voltage and temperature. Test temperature is usually higher for Type S.
Indentation Hardness	At specified temperature (e.g., Type S: 70°C)	Indentation depth ≤ 0.2 mm. Reflects coating resistance to soil static stress.
Impact Resistance	Drop-Weight Impact Test (e.g., at -20°C or -30°C)	≥ 10 J per mm of coating thickness. Verifies coating ability to withstand mechanical impact during installation.
Bending Capacity	Bend Test	Coating must show no cracking or disbondment after bending of the steel pipe.
Visual Inspection	Visual	Coating surface shall be smooth, uniform, and free from bubbles, cracks, or inclusions.

**Important Note on Minimum Requirements:** The performance values listed in the standard (e.g., peel strength of 15 N/cm) are the minimum limits that a product must meet to conform to this standard. In real pipeline project tenders and construction (especially for high-pressure, large-diameter, or critical pipelines), the client's technical specifications will typically significantly elevate these requirements. For example, specifying ambient peel strength as  $\geq 70$  N/cm or cathodic disbondment radius as  $\leq 6$  mm. Understanding this point is crucial for correctly applying the standard and preparing or reviewing technical bids.

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## Testing & Acceptance

Testing is divided into production process testing and pipe delivery acceptance:

**1. Production Process Testing:** The applicator must test raw materials for each production batch (polyethylene, primer, etc.) and perform continuous online monitoring of the coating process (e.g., thickness, holiday detection).

**2. Pipe Delivery Acceptance:** The purchaser or a third-party inspection agency may conduct Witnessed Performance Tests (WPT) or sampling tests. Tests are typically performed on laboratory-coated test pipe sections or coupons taken from finished pipes, covering all the performance requirements mentioned above.

**3. Basis for Acceptance:** Upon successful acceptance, the applicator must provide an inspection certificate conforming to DIN 50049. Common certificate types include:

Certificate 3.1.B: Declaration of conformity by the manufacturer (based on its own testing).

Certificate 2.2: Issued by an independent third-party inspection body, carrying higher authority.

## Identification & Documentation

- **Product Identification:** Finished pipes conforming to the standard shall be clearly and permanently marked on the pipe body or on a label, including at least:
  - ✧ Standard Number: DIN 30670
  - ✧ Coating Type: N or S
  - ✧ Thickness Class: n or v
  - ✧ Manufacturer's name or trademark
  - ✧ Year of production
- **Accompanying Documentation:** Each pipe delivery batch must be accompanied by documents, including at least:
  - ✧ **A Declaration of Conformity** or the aforementioned **Inspection Certificate (DIN 50049)**.
  - ✧ **Material Data Sheets** describing the coating system used.
  - ✧ **Application/Installation Guidelines**, such as recommendations for field repair of weld joints, storage, and handling requirements.

## ALLLAND DIN30670 Product Images



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