

DIN 30678



ICS 23.040.10

Supersedes
DIN 30678:1992-10

**Polypropylene coatings on steel pipes and fittings –
Requirements and testing,
English translation of DIN 30678:2013-09**

Polypropylen-Umhüllungen von Rohren und Formstücken aus Stahl –
Anforderungen und Prüfungen,
Englische Übersetzung von DIN 30678:2013-09

Revêtements à base de polypropylène de tubes et raccords en acier –
Exigences et essais,
Traduction anglaise de DIN 30678:2013-09

Document comprises 35 pages

Translation by DIN-Sprachendienst.

In case of doubt, the German-language original shall be considered authoritative.

A comma is used as the decimal marker.

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Foreword

This standard has been revised by Working Committee NA 032-02-09 AA *Außenkorrosion* of the *Normenausschuss Gastechnik* (NAGas) (Gas Technology Standards Committee). The previous edition of DIN 30678 was published in 1992 and could not be revised for a long time because work was being carried out on the European standards project EN 10286. The present edition of DIN 30678 not only covers fields of application that are not dealt with in DIN EN ISO 21809-1, it also takes into consideration the current state of the art, not only as regards the tests and test frequencies specified here for the first time, but also as regards various product requirements.

A check of the effectiveness of stabilizing agents by controlling the MRF before and after extrusion has now been specified. The test of the degree of cure of the epoxy resin coating by means of DSC measurement is also new, as is the cathodic disbondment test, which is frequently required at international level.

Extensive investigations and practical experience have shown that, regardless of the manufacturing method, disbondment of damaged polypropylene coatings can occur depending on the salinity of the soil water and the extent of cathodic polarization. However this involves neither an increased risk of corrosion (underrusting) nor an increase in the protective current density requirement in cathodic corrosion protection. The cathodic disbondment test thus does not serve to evaluate the boundary phase reaction in the case of damaged coatings, which is unavoidable in practice, but is primarily a means of assessing the boundary areas between the epoxy resin layer and the steel substrate. For single-layer sintered polypropylene coatings, it is difficult to achieve the required peel strength without suitable surface preparation, and so the cathodic disbondment test is not required for single-layer sintered polypropylene coatings.

The peel strength requirements have been adapted to the production methods commonly used today. The differences between sintered and extruded (by sleeve extrusion or sheet extrusion) coatings have been taken into consideration. Experience gained in the storage, transport and laying of pipes and pipelines with polypropylene coatings has shown that a high bond strength is necessary to reduce possible mechanical damage to the pipes. Bond strength is not a significant factor with regard to the protection the coating provides against corrosion, as long as the thickness and quality of the coating meet the requirements of this standard.

In the Explanatory Notes to DIN 30678:1992-10, reference was made to the possibility of testing stress crack formation under the influence of wetting agents. Today, findings confirm that the testing of new materials exposed to wetting agents at high temperatures does not have any significance as regards ageing-related stress cracking behaviour. Relevant changes to the materials during operation, such as a reduction of elongation-at-break and tear strength values – and thus changes to the fracture properties of the polypropylene – are not well-described in short-term tests involving exposure to wetting agents even at higher test temperatures. The saponification of adhesive components, and thus stress crack formation due to the effects of wetting agents, are not possible when an epoxy resin primer and adhesive copolymers are used in a three-layer coating system. This also applies for single-layer sintered polypropylene coatings. For this reason, a wetting agent test is not specified in this standard.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. DIN [and/or DKE] shall not be held responsible for identifying any or all such patent rights.

Amendments

The standard differs from DIN 30678:1992-10 as follows:

- a) the scope has been restricted;
- b) requirements and testing of the epoxy resin primer of three-layer polypropylene coatings are specified;
- c) test frequencies are now specified;
- d) current standards have been taken into consideration;
- e) requirements for documentation are specified;
- f) separate requirements for the different coating methods (sintering or extrusion) are specified;
- g) the temperature has been modified;
- h) testing of cathodic disbondment is specified;
- i) the peel strength has been adjusted.

Previous editions

DIN 30678: 1992-10

1 Scope

This standard specifies requirements for factory-applied three-layer extruded polypropylene-based coatings, and one- or multi-layered sintered polypropylene-based coatings for the corrosion protection of steel pipes and fittings.

The present standard specifies requirements for coatings that are applied to longitudinally or spirally welded or seamless steel pipes and fittings used for the construction of pipelines for conveying liquids or gases.

Applying this standard ensures that the PP coating provides sufficient protection against the mechanical, thermal and chemical loads occurring during operation, transport, storage and installation.

DIN EN ISO 21809-1 specifies requirements at international level for three-layer extruded polypropylene- and polypropylene-based coatings for steel pipes for petroleum and natural gas pipeline transportation systems.

The following fields of application are not covered by DIN EN ISO 21809-1:

- all polypropylene-based coatings for steel pipes and fittings used for the conveyance and distribution of water and wastewater,
- all polypropylene-based coatings for steel pipes and fittings in distribution pipelines for gaseous and liquid media,
- single- and multi-layer sintered polypropylene-based coatings for steel pipes and fittings used for transport pipelines and distribution pipelines.

The present standard remains valid for the above fields of application.

The coatings are suitable for the protection of buried or submerged steel pipes at design temperatures of -20 °C up to $+110\text{ °C}$ (see DIN EN ISO 21809-1:2011-10, Table 1). Special precautions in transport, handling and installation need to be taken for temperatures below 0 °C . The purchaser shall specify temperature ranges below 0 °C and above 90 °C , as this could require adjustments to be made in the coating components.

2 Normative references

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

DIN EN 10204:2005-01, *Metallic products — Types of inspection documents*

DIN EN ISO 306, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST)*

DIN EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

DIN EN ISO 527-2:2012-06, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

DIN EN ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*

DIN EN ISO 1133-1:2012-03, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method*

DIN EN ISO 2808:2007-05, *Paints and varnishes — Determination of film thickness*

DIN EN ISO 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

DIN EN ISO 4577, *Plastics — Polypropylene and propylene-copolymers — Determination of thermal oxidative stability in air, oven method*