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DIN 30670

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Together with
DIN EN 10288:2003-12,
supersedes
DIN 30670:1991-04

Polyethylene coatings on steel pipes and fittings – Requirements and testing, English translation of DIN 30670:2012-04

Polyethylen-Umhüllungen von Rohren und Formstücken aus Stahl – Anforderungen und Prüfungen,
Englische Übersetzung von DIN 30670:2012-04

Gainage du polyéthylène pour des tubes et des pièces ajustées d'acier – Exigences et essais,
Traduction anglaise de DIN 30670:2012-04

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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 30670 was published in 1991 and could not be revised for a long time because work was being carried out on the European standards project EN 10288. The present edition of DIN 30670 not only covers fields of application that are not dealt with in DIN EN ISO 21809-1 and DIN EN 10288, 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.

The option of agreeing on design temperatures for different types of coating, and of agreeing on a special, greater coating thickness have been maintained here. A 1 mm thickness is necessary for the polyethylene coating layer in terms of corrosion protection, while the remaining layer thicknesses serve to improve resistance to mechanical loading.

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 polyethylene 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. This test has therefore been specified here to evaluate surface preparation. For single-layer sintered polyethylene 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 polyethylene 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 taking into consideration. Experience gained in the transport and laying of pipes and pipelines with polyethylene 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 and as long as the coating is undamaged and is in good contact along the entire pipe length.

In the Explanatory Notes to DIN 30670:1991-04 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 polyethylene – 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 polyethylene 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 the DKE] shall not be held responsible for identifying any or all such patent rights.

Amendments

The standard differs from DIN 30670:1991-04 as follows:

a) the scope has been restricted;

b) requirements and testing of the epoxy resin primer of three-layer polyethylene 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) two-layer extruded polyethylene coatings are no longer included as they are covered by DIN EN 10288;

j) agreement on special coating thicknesses is now permitted.

Previous editions

DIN 30670: 1974-02, 1980-07, 1991-04