Cement mortar linings for cast iron pipes, steel pipes, and steel fittings

DIN 2880

ICS 23.040.99; 91.100.10

Anwendung von Zementmörtel-Auskleidung für Gussrohre, Stahlrohre und Formstücke

This standard, together with DIN EN 545, January 1995 edition, and DIN EN 598, November 1994 edition, partially supersedes DIN 2614, February 1990 edition.

In keeping with current practice in standards published by the International Organization for Standardization (ISO), a comma has been used throughout as the decimal marker.

Foreword

This standard has been prepared by Technical Committee *Zementmörtelauskleidungen* of the *Normenausschuss Rohrleitungen und Dampfkesselanlagen* (Pipelines and Boilers Standards Committee).

Amendments

This standard differs from the February 1990 edition of DIN 2614 in that it has been harmonized with DIN EN 545 and DIN EN 598.

Previous edition

DIN 2614: 1990-02.

Contents

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Translation by DIN-Sprachendienst.

In case of doubt, the German-language original should be consulted as the authoritative text.

All dimensions are in millimetres.

1 Scope

This standard covers cement mortar linings for pipes and pipelines as in DIN EN 545, DIN EN 598 and ISO 4179, for onshore and offshore pipelines as in DIN EN 10298, as well as for buried pipes as in *DVGW-Arbeitsblatt* (DVGW Code of practice) W 343.

Pipes and fittings with cement mortar linings are used to convey different types of water, such as drinking water, untreated water, sea and salt water, and brine. Such linings may be deemed to be protective coatings as defined in DIN 50902, and serve to

- improve the hydraulic properties of the pipes,
- prevent corrosion damage (cf. ISO 8044) such as
  - damage to the pipe material due to pitting,
  - impairment of the hydraulic properties of the pipeline due to incrustation by corrosion products,
  - impairment of the water quality due to the presence of corrosion products.

To ensure the linings fulfil their purpose, they shall be sufficiently resistant to various media. This is achieved by selecting linings which meet the requirements of this standard as specified for the application under consideration. This standard also gives guidance on the commissioning and operation of water pipes with cement mortar linings (see also *DVGW-Arbeitsblatt* W 346).

2 Normative references

This standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the titles of the publications are listed below. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

DIN 1045-1	Plain, reinforced and prestressed concrete structures – Design and construction
DIN 1045-2	Plain, reinforced and prestressed concrete structures – Specification, performance, production and conformity of concrete (Application document for use with DIN EN 206)
DIN 1045-3	Plain, reinforced and prestressed concrete structures – Workmanship
DIN 1045-4	Plain, reinforced and prestressed concrete structures – Supplementary specifications governing the production and conformity of precast concrete elements
DIN 1048-1	Testing concrete – Testing of fresh concrete
DIN 1164	Special cement – Composition, requirements and conformity evaluation
DIN 1986-3	Site drainage systems – Operation and maintenance
DIN 2614	Cement mortar linings for steel and ductile iron pipes and fittings – Application, requirements and testing
DIN 50902	Protective coatings on metals – Concepts, application methods and surface preparation
DIN EN 545	Ductile iron pipes, fittings, accessories and their joints for water pipelines – Requirements and test methods
DIN EN 598	Ductile iron pipes, fitting, accessories and their joints in sewerage applications – Requirements and test methods
DIN EN 10298	Steel tubes and fittings for onshore and offshore pipelines – Internal lining with cement mortar*)
DIN EN 14647	Calcium aluminate cement – Composition, specifications and conformity criteria*)
DIN ISO 3310-1	Test sieves – Technical requirements and testing – Part 1: Test sieves of metal wire cloth (ISO 3310-1 : 2000)
ISO 4179 : 1985	Ductile iron pipes for pressure and non-pressure pipelines – Centrifugal cement mortar lining – General requirements
ISO 8044 : 1999	Corrosion of metals and alloys – Basic terms and definitions

*) Currently at draft stage.

ATV-Arbeitsblatt A 110 *Richtlinien für die hydraulische Dimensionierung und den Leistungsnachweis von Abwasserkanälen und -leitungen* (Guidelines for the hydraulic design and performance testing of drains and sewers)

ATV-Arbeitsblatt A 115 *Hinweise für das Einleiten von Abwasser in eine öffentliche Abwasseranlage* (Instructions on the discharge of waste water into public sewerage systems)

DVGW-Arbeitsblatt W 302 *Hydraulische Berechnung von Rohrleitungen und Rohrnetzen – Druckverlust-Tafeln für Rohrdurchmesser von 40 bis 2 000 mm* (Hydraulic design of pipelines and pipework systems – Head loss tables for pipe diameters of 40 mm to 2 000 mm)

DVGW-Arbeitsblatt W 343 *Zementmörtelauskleidung von erdverlegten Guss- und Stahlrohrleitungen – Einsatzbereiche, Anforderungen und Prüfungen* (Cement mortar lining of buried ductile iron and steel pipes – Areas of application, requirements and testing)

DVGW-Arbeitsblatt W 346 *Guss- und Stahlrohrleitungsteile mit ZM-Auskleidung – Handhabung* (Handling of cast iron and steel pipe fittings with cement mortar linings)

DVGW-Arbeitsblatt W 347 *Hygienische Anforderungen an zementgebundene Werkstoffe im Trinkwasserbereich – Prüfung und Bewertung* (Health requirements for cement-bound materials used in water supply systems – Testing and evaluation)

Verordnung zur Novellierung der Trinkwasserverordnung (German Regulation amending the German Drinking Water Regulation), as of 21 May 2001, *BGBl*. (German Federal Law Gazette) I, 2001, No. 24, pp. 959–980

BS 915-2 : 1972 Specification for high alumina cement – Metric units

NF P 15-315 *Liants hydrauliques – Ciment alumineux fondu*

3 Concepts

For the purposes of this standard, the concepts specified in the DIN 1045 series of standards apply, in addition to the following.

3.1 Plasticizer

Organic admixture that increases the workability of cement with a particularly low water content, i.e. that with a solids content lower than about 1 %.

3.2 Polymer modifier

Organic addition that improves the corrosion resistance and other physical properties of cement. The polymer/cement ratio, k, is lower than about 10 %.

3.3 Mix ratio

The ratio by mass of sand to cement, whereby the latter may contain up to 10 % pozzolana.

NOTE: When determining the influence of the water/cement ratio on the lining properties, it should be taken into account that as the mix ratio increases, the density remains the same if the water/cement ratio also increases (e.g. cement mortar with a mix ratio of 1,0 and a w/c ratio of 0,3 has a similar density to that with a mix ratio of 2,5 and a w/c ratio of 0,4).

The mix ratio and w/c ratio of fresh mortar can be determined using the methods described in Annex A. These methods may also be used for mortar with a polymer/cement ratio of 0,1, for which the methods specified in product standards might not be suitable.

4 Types of cement mortar and cement mortar lining

4.1 Composition and designation

Tables 1 and 2 specify symbols for cement mortar and cement mortar linings according to composition and the lining process used, respectively. The effects of the lining process and mortar composition on the lining itself are described below.