NORMAS DE APLICACIÓN

EUROPEAN STANDARD **EN ISO 24817**

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English Version

Petroleum, petrochemical and natural gas industries - Composite repairs for pipework - Qualification and design, installation, testing and inspection (ISO 24817:2015)

Industries du pétrole, de la pétrochimie et du gaz naturel - Réparations en matériau composite pour canalisations: Conformité aux exigences de performance et conception, installation, essai et inspection (ISO 24817:2015)

Erdöl-, petrochemische und Erdgasindustrie - Reparatur von Rohrleitungen mit Verbundwerkstoffen - Bewertung und Ausführung, Montage, Test und Inspektion (ISO 24817:2015)

This European Standard was approved by CEN on 6 June 2015.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Class 1 repairs cover design pressures up to 2 MPa (20 bar), design temperatures up to 40 °C and are appropriate for the majority of the utility service systems. This class is intended for those systems that do not relate directly to personnel safety or safety-critical systems.

Class 2 repairs cover design pressures up to 2 MPa (20 bar) and design temperatures up to 100 °C but exclude hydrocarbons. This class is appropriate for those systems that have specific safety-related functions.

Class 3 repairs cover all fluid types and pressures up to the qualified upper pressure limit. This class is appropriate for systems transporting produced fluids.

Applications in which the service conditions are more onerous or not included in the above shall be designated as Class 3.

Table 2 — Repair class

Repair class	Typical service	Design pressure	Design temperature
Class 1	Low specification duties, e.g. static head, drains, cooling medium, sea (service) water.	<2 MPa	<40 °C
Class 2	Fire water/deluge systems	<2 MPa	<100 °C
Class 3	Produced water and hydrocarbons, flammable fluids, gas systems. Class 3 also covers operating conditions more onerous than described above.	Limited to repairs designed in compliance with this International Standard and of a thickness equivalent to < D/12	Defined in 7.5.3

The qualified upper pressure limit is a function of defect type (internal, external or through-wall), defect dimensions (depth and extent), pipe diameter, design temperature, and repair design lifetime. Therefore, a unique number cannot be quoted but rather the limit is derived for a given set of conditions by calculations in accordance with this International Standard using the qualification test data from either Annex C for Type A defects and Annex D for Type B defects.

7.3 Repair design lifetime

The repair design lifetime (in years) of the repair system shall be defined by the owner in the repair data sheet (Annex A). It may be limited by the defect type and service conditions, e.g. internal corrosion.

The minimum design lifetime of the repair shall be 2 years.

Short design lifetimes (2 years) may be appropriate to those situations where the repair is required to survive until the next shutdown.

Long design lifetimes (up to 20 years) may be appropriate to those situations where the repair is required to reinstate the substrate to its original design lifetime or to extend its design life for a specified period.

The repair design lifetime is the maximum application lifetime of the repair. The actual application or service lifetime, often termed the defined lifetime, maybe less than the repair design lifetime.

Once the repair design lifetime has expired, the owner shall either remove or revalidate the repair system as described in 9.5.

Post-curing using elevated temperature heating should not be undertaken on live pipes unless it can be demonstrated the required post cure temperature can be achieved within the repair laminate.

8.7 Repair of clamps, piping components, tanks, or vessels

Guidance for the surface preparation of clamps, piping components, tanks, and vessels is the same as for repairs on straight pipe (see Annex I).

The axial profile of the repair laminate in the transition from the main pipe body to the component causing the protuberance should be at least tapered with taper dimension of 3 (axial direction) to 1 (radial direction). The precise details of the repair, e.g. repair laminate lay-up and orientation relative to clamps, piping components, tanks, or vessels, shall be provided by the repair system supplier. The arrangements at the edges of the repair, e.g. tapering, profiling onto raised faces, shall also be provided by the repair system supplier.

8.8 Environmental considerations

Only repair materials that allow for satisfactory disposal according to prevailing environmental regulations shall be used as described in the method statement, 8.2.

Information and procedures for disposing of unused chemicals, resins, and waste shall be provided by the repair system supplier. Incineration in the open air shall not be performed.

9 Testing and inspection

9.1 General

This subclause provides guidance on the post-installation operational issues of repair systems. The installation of a repair system should not influence or prevent any internal inspections (e.g. from pigging inspection tools) that are performed on the substrate.

The main issues for the non-destructive examination of a repair system are the following:

— inspection of the repair laminate;

— inspection of the bond between the repair laminate and the substrate;

— inspection of the substrate underneath the repair laminate.

The basic structure of a repair system in this context is considered in Figure 4.