SLOVENSKI STANDARD
oSIST prEN ISO 12736-3:2022

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Industrija za predelavo nafte in zemeljskega plina - Mokre toplotne izolacijske prevleke za naftovode, dovodne cevi, opremo in podvodne konstrukcije - 3. del: Vmesniki med sistemi, sistem spojev na terenu, popravila na terenu in montažne izolacije (ISO/DIS 12736-3:2021)

Petroleum and natural gas industries - Wet thermal insulation systems for pipelines and subsea equipment - Part 3: Interfaces between systems, field joint system, field repairs and prefabricated insulation (ISO/DIS 12736-3:2021)

Erdöl- und Erdgasindustrie - Wärmedämmschicht für Rohrleitungen und Unterwasseranlagen - Teil 3: Schnittstellen zwischen Systemen, Feldfugensystem, Feldreparaturen und vorgefertigte Isolierungen (ISO/DIS 12736-3:2021)

Industries du pétrole et du gaz naturel - Revêtements pour isolation thermique humide de canalisations, lignes d'écoulement et structures sous-marines - Partie 3: Interfaces entre les systèmes, système de joint soudé sur site, réparations sur site et isolation préfabriquée (ISO/DIS 12736-3:2021)

Ta slovenski standard je istoveten z: **prEN ISO 12736-3**

ICS:

25.220.20	Površinska obdelava	Surface treatment
75.180.10	Oprema za raziskovanje, vrtanje in odkopavanje	Exploratory, drilling and extraction equipment

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Petroleum and natural gas industries — Wet thermal insulation systems for pipelines and subsea equipment —

Part 3:
Interfaces between systems, field joint system, field repairs and prefabricated insulation

ICS: 75.180.10; 25.220.20

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*, Subcommittee SC 2, *Pipeline transportation systems*.

This second edition partly cancels and replaces the first edition (ISO 12736:2014), which has been technically revised and split into three parts.

The main changes compared to the previous edition are as follows:

— clearer delineation between commercial projects and validation;

— introduction of material classes;

— introduction of interface types;

— elimination of system specific qualification testing tables;

— introduction of project specific functional tests;

— addition of items related to pre-fabricated insulation;

— addition of informative annexes with guidelines for using this document, design of systems, and pre-fabricated insulation.

A list of all parts in the ISO 12736 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Users of this document are advised that further or differing requirements can be required for individual applications. This document is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is the responsibility of the vendor to identify any variations from this document and provide details. Annex A further clarifies the intended use of this document.

Petroleum and natural gas industries — Wet thermal insulation systems for pipelines and subsea equipment —

Part 3: Interfaces between systems, field joint system, field repairs and prefabricated insulation

1 Scope

This document defines the minimum requirements for project specific product and process qualification of field applied wet thermal insulation system applied at interfaces (e.g. field joints) and pre-fabricated insulation in the petroleum and natural gas industries.

This document is applicable to wet thermal insulation systems submerged in seawater.

This document is not applicable to:

— the project qualification of anticorrosion coatings or the requirements for application thereof;

— thermal insulation in the annulus of a steel pipe-in-pipe system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 1133 (all parts), *Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics*

ISO 1183 (all parts), *Plastics — Methods for determining the density of non-cellular plastics*

ISO 2781, *Rubber, vulcanized or thermoplastic — Determination of density*

ISO 3104, *Petroleum products — Transparent and opaque liquids — Determination of kinematic viscosity and calculation of dynamic viscosity*

ISO 6502, *Rubber — Guide to the use of cure meters*

ISO 7619-1, *Rubber, vulcanized or thermoplastic — Determination of indentation hardness — Part 1: Durometer method (Shore hardness)*

ISO 8502-3, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 3: Assessment of dust on steel surfaces prepared for painting (pressure-sensitive tape method)*

ISO 8502-4, *Preparation of steel substrates before application of paints and related products — Tests for the assessment of surface cleanliness — Part 4: Guidance on the estimation of the probability of condensation prior to paint application*

ISO 12736-1:202X, *Petroleum and natural gas industries — Wet thermal insulation systems for pipelines, flow lines, equipment and subsea structures — Part 1*

ISO 12736-2:202X, *Petroleum and natural gas industries — Wet thermal insulation systems for pipelines, flow lines, equipment and subsea structures — Part 2*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
agreed
specified in the purchase order

Note 1 to entry: To be discussed by the *system provider* (3.41) and *system purchaser* (3.42) with input from *end user* (3.7) as required.

3.2
application procedure specification
quality specification document, or group of specifications, describing procedures, method, equipment, tools, etc. used for *system* (3.40) application

3.3
batch
quantity of *material* (3.21) produced in a continuous manufacturing operation using raw materials of the same source or grade

3.4
blown foam
insulation *material* (3.21) formed by incorporating a gas phase into a polymer matrix

3.5
certificate of analysis
document provided by the manufacturer which indicates results of specific tests or analysis, including test methodology, performed on a defined lot of the manufacturer's product and corresponding conformity ranges

3.6
cutback
length of item left uncoated at each end for joining purposes

Note 1 to entry: Joining purposes are welding for example.

3.7
end user
company that owns and/or operates the *pipeline* (3.25) or *subsea equipment* (3.38)

3.8
factory applied
applied in a permanent facility

3.9
field joint
uncoated area that results when two pipe sections, or a pipe section and a *fitting* (3.10), with *cutbacks* (3.6) are assembled by welding or other methods

3.10
fitting
receptacle on a piece of *subsea equipment* (3.38), which interfaces to a *pipeline* (3.25)

3.11
high molecular weight precursor thermoset
material (3.21), which is a polymeric compound that remains malleable until application of sufficient heat to cause network formation and then does not flow upon reheating

EXAMPLE Butyl rubber.

3.12
inorganic syntactic foam
insulation *material* (3.21) formed by dispersing inorganic hollow particles within a polymer matrix

3.13
inspection and test plan
document providing an overview of the sequence of inspections and tests, including appropriate resources and procedures

3.14
inspection document
document issued by the *system provider* (3.41) and attesting that the supplied *system* (3.40) is in conformity with the requirement given in purchase order

Note 1 to entry: See also ISO 10474.

3.15
interface
location where two *systems* (3.40) meet and affect each other.

Note 1 to entry: A field joint system has two interfaces.

Note 2 to entry: In the case of multilayer systems, interfaces can be made up of multiple sub-interfaces.

3.16
J-lay
method of *pipeline* (3.25) installation in which pipelines are assembled by welding together pre-insulated pipes, with subsequent application of a *field joint* (3.9) system, in vertical position, onboard an installation vessel with a tower

Note 1 to entry: The pipeline is lowered into the water vertically and creates a characteristic J-shape when touching the seabed.

Note 2 to entry: This method is used mainly for deep water.

3.17
jumper
short section of *pipeline* (3.25) that transfers fluid between two pieces of *subsea equipment* (3.38)

3.18
liquid precursor elastomeric thermoset
material (3.21), which is a polymeric compound with its glass transition below ambient temperature, that is produced via combination of one or more components that can be pumped and flow as liquids and which reacts to create a crosslinked polymer that does not flow upon reheating

EXAMPLE Liquid precursor silicone rubber.

3.19
liquid precursor non-elastomeric thermoset
material (3.21), which is a polymeric compound with its glass transition above ambient temperature, that is produced via combination of one or more components that can be pumped and flow as liquids and which reacts to create a crosslinked polymer that does not flow upon reheating

EXAMPLE Liquid epoxy.

3.20
mainline
portion of a *pipeline* (3.25) which is not a *field joint* (3.9)

3.21
material
polymeric compound applied to the surface to be protected/insulated in units of discrete thickness (layers) to build up a *system* (3.40)

3.22
material data sheet
form containing typical data regarding the physical and mechanical properties of a particular *material* (3.21) used in the coating process including guidelines and recommendations for its processing and use

3.23
material manufacturer
legal entity responsible for the manufacture of one or more *materials* (3.21) utilized in a *system* (3.40)

3.24
maximum rated pressure
maximum hydrostatic pressure to which the *system* (3.40) can be exposed, according to the *system provider* (3.41)

3.25
pipeline
flowline
tubular piping used to convey fluids

Note 1 to entry: Pipeline includes *jumpers* (3.17), *risers* (3.32) and *field joints* (3.9).

3.26
pi tape
precision vernier periphery tape that allows the direct and accurate measurement of the diameter of tubular objects without the need for calipers or micrometres

3.27
pre-fabricated insulation
section of stand-alone insulative *material* (3.21), which is factory manufactured into its final form and then installed in the field by mechanically fastening or bonding to a corrosion protected structure

3.28
pre-production trial
series of tests performed immediately before the start of production, designed to demonstrate that the requirements of the validated *system* (3.40) and/or *procedure qualification trial* (329) are achieved, as outlined in this document and as agreed

3.29
procedure qualification trial
series of tests designed to demonstrate that the *materials* (3.21), *system provider* (3.41), equipment and procedures can produce the *system* (3.40) in accordance with the *validation dossier* (3.49) and meet the specific project requirements as outlined in this document and as agreed

3.30
project
scope of work agreed upon contractually between *system purchaser* (3.42) and *system provider* (3.41)

3.31
reel-lay
R-lay
method of *pipeline* (3.25) installation in which long *stalks* (3.37) of pre-insulated pipes are pre-assembled by welding and application of *field joint* (3.9) system onshore before being spooled onto large reels onboard the installation vessel, which then lays the pipes by unspooling the reel offshore

3.32
riser
vertical portion of a *pipeline* (3.25), including the bottom bend, arriving on or departing from an offshore surface installation

3.33
safety data sheet
DEPRACATED: material safety data sheet
form intended to provide workers and emergency personnel with procedures for handling and working with a *material* (3.21) utilized in the manufacture of the *system* (3.40) in a safe manner including physical data

Note 1 to entry: Physical data can include flash point, toxicity and first aid.

3.34
service life
specified period of use for a *system* (3.40) in service

4.35
S-lay
method of *pipeline* (3.25) installation in which pipelines are assembled by welding together pre-insulated pipes, with subsequent application of a *field joint* (3.9) system onboard an installation vessel in a horizontal orientation

Note 1 to entry: The pipeline curvature created from the vessel down to the seabed is a characteristic S-shape.

Note 2 to entry: This method is used mainly for low to medium water depths.

3.36
solid/solid filled
insulation *material* (3.21) which systematically does not contain voids, bubbles, or hollow particles

3.37
stalk
continuous string of welded and *field joint* (3.9) coated pipe, which is prepared in readiness for pipe spooling onto a *reel-lay* (3.31) barge

Note 1 to entry: Note1 to entry: A number of stalks will normally be required to make up a *pipeline* (3.29).

3.38
subsea equipment
components from a subsea production system, including subsea processing items and structures, meant to control hydrocarbons, not including *pipelines* (3.25)

EXAMPLE Valve, connector, manifold, christmas tree, flowline end termination.

3.39
substrate
surface to which a *material* (3.21) is applied or is to be applied

3.40
system
all of the various *materials* (3.21) and the combination thereof, which can include layers of anti-corrosion, insulation, adhesive, and protective materials, as defined by cross-section to the underlying *substrate* (3.39) at a single point, which function together to act as a *wet thermal insulation* (3.50)

3.41
system provider
legal entity which is selling/marketing the applied *system* (3.40)

3.42
system purchaser
legal entity which is purchasing the applied *system* (3.40)

3.43
thermal conductivity
k-value
conductivity
heat flow through a unit length of *material* (3.21) under the influence of a thermal gradient

Note 1 to entry: Thermal conductivity is expressed in $W \cdot m^{-1} \cdot K^{-1}$.

3.44
thermoplastic
material (3.21), which is a polymeric compound that solidifies upon cooling and can flow and be reformed upon reheating

EXAMPLE Polypropylene.

3.45
tie-in field joint
connection of a *pipeline* (3.25) to a facility or *subsea equipment* (3.38), to other pipeline *systems* (3.40), or the connecting together of different sections of a single pipeline

3.46
unit of production
quantity of product, given as either a percentage of total output, produced over a short period of time or produced from a specific combination of raw *material* (3.21) *batch* (3.3) numbers, as *agreed* (3.1)

Note 1 to entry: A short period of time can be for example up to 24 hours, or across shift changes, which is based on manufacturing capacity, job length and product line.

3.47
U-value
overall heat transfer coefficient
rate of heat transfer from a reference surface under the influence of a thermal gradient

Note 1 to entry: Note1 to entry: U-value is expressed in $W \cdot m^{-2} \cdot K^{-1}$.

3.48
validation
demonstration of *material* (3.21) and *system* (3.40) performance during storage, handling and operation, within a defined envelope of use, as determined by the *system provider* (3.41)

3.49
validation dossier
collection of documentation and test reports, which provides detailed information on the proposed *system* (3.40), method of application, the *materials* (3.21) which form said system, and demonstration of system performance, prepared in accordance with ISO 12736-1

3.50
wet thermal insulation
system (3.40) that provides external corrosion protection and thermal insulation, and that is in direct contact with surrounding fluid

4 Abbreviated terms

APS	application procedure specification
ACC	anti-corrosion coating
CP	cathodic protection
HSE	health, safety and the environment
ITP	inspection and test plan
MFR	melt flow rate
OD	outer diameter
PPT	pre-production trial
PQT	procedure qualification trial
QC	quality control
SDS	safety data sheet
ROV	remotely operated vehicle
UV	ultraviolet

5 Conformance

5.1 Rounding

Unless otherwise stated in this document, to determine conformance with the specified requirements, observed or calculated values shall be rounded to the nearest unit in the last right-hand place of figures used in expressing the limiting value, in accordance with ISO 80000-1 .

NOTE For the purpose of this provision, the rounding method of ASTM E29 is equivalent to ISO 80000-1:2009, Annex B, Rule A.

5.2 Conformity to requirement

Systems for quality and environmental management, and the competence of testing and calibration laboratories, should be applied to demonstrate conformance with the requirements of this document.

NOTE The following documents can be used:

— ISO 29001 gives sector-specific requirements with guidance for the use of quality management systems;

— ISO 14001 gives requirements with guidance for the use of environmental management systems;

— ISO/IEC 17025 gives general requirements for the competence of testing and calibration laboratories.

The system provider shall be responsible for conforming with all the applicable requirements for the application of this document. The system purchaser shall be allowed to make any investigation