TECHNICAL REPORT

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Thermoplastics piping systems — Guidance for definitions of wall constructions for pipes

Systèmes de canalisations thermoplastiques — Lignes directrices pour les définitions relatives à la construction des parois de tubes

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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.

ISO/TR 27165 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids,* Subcommittee SC 2, *Plastics pipes and fittings for water supplies,* in collaboration with Technical Committee CEN/TC 155*, Plastics piping systems and ducting systems*.

Introduction

For thermoplastics piping systems used in pressure and non-pressure applications, there are different wall constructions on the market.

Existing definitions in product standards can vary from those as given in this document.

Regarding new developments in this sector, CEN/TC 155 and ISO/TC 138/SC 2 felt it necessary to establish common definitions for wall constructions of pipes to be referenced in a uniform way in product standards.

Thermoplastics piping systems — Guidance for definitions of wall constructions for pipes

1 Scope

This Technical Report provides definitions for wall constructions of thermoplastics pipes intended to be used in pressure and non-pressure pipe applications. It takes into account as far as possible already existing definitions in published product standards and gives guidance for a common text when drafting new deliverables or revising existing ones.

2 Normative references

The following referenced documents are indispensable for the application 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 472:1999, *Plastics — Vocabulary*

ISO 1043-1:2011, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 472:1999 and ISO 1043-1:2011and the following apply.

NOTE For specific definitions related to wall constructions of thermoplastics pipes, guidance is given in 3.3, 3.4 and 3.5 as applicable. The definitions refer to the body of the pipe not to the spigots and sockets.

3.1 Materials

3.1.1
material
generic term for compositions (compounds/formulations) grouped by families, expressed by generic names, e.g. polypropylene, stainless steel, brass or EPDM

3.1.2
compound
formulation
clearly defined homogenous mixture of base polymer with additives, e.g. anti-oxidants, pigments, stabilisers and others, at a dosage level necessary for the processing and the intended use of the final product

NOTE In water and food contact regulations, the term “composition” is often used instead of compound or formulation.

3.2 Coated pipes

3.2.1
coated pipes
pipe with a peelable, contiguous thermoplastics additional layer on the outside of the pipe

NOTE A peelable layer is intended to protect the pipe and shall be removed prior to jointing.

3.3 Solid wall pipes

3.3.1
solid wall pipe
pipe made out of one compound/formulation, respectively out of different compounds/formulations with the same MRS for pressure applications or with the same base polymer for non-pressure applications

3 3.2
solid wall single layered pipe
pipe with smooth internal and external surface, extruded from the same compound/formulation throughout the wall

3.3.3
solid wall multilayered pipe
pipe with smooth internal and external surface, having co-extruded layers on either or both the outside and/or inside of the pipe, where all layers have the same MRS rating for pressure applications or with the same base polymer for non-pressure applications

3.4 Multilayer pipes

3.4.1
multilayer pipes
pipe comprised of two or more stress designed or functional layers with smooth internal and external surfaces and with adjacent polymeric or metallic layers not from the same compound/formulation and not the same MRS for pressure applications, respectively, and not with the same base polymer for non-pressure applications

3.4.2
inner layer
layer in contact with the conveyed fluid

3.4.3
outer layer
layer exposed to the outer environment

3.4.4
intermediate layer(s)
embedded layer(s)
layer(s) between the internal and external layer

3.4.5
stress/strain designed layer(s)
layer required for the mechanical strength of the pipe

3.4.6
specific function layer
application layer(s)
layer(s) in addition to the stress designed layer(s) which provide(s) a specific function linked to the conditions of use and/or performance of the pipe or the conveyed fluid

NOTE 1 A specific function can relate to permeability (e.g. oxygen barrier), indication of conveyed fluid (colour), ageing (U.V.-resistance), etc.

NOTE 2 A stress design layer may also perform as a specific function layer or vice-versa.

3.4.7
multilayer M type wall
multilayer wall comprised of layers of polymeric materials with a thickness of at least 60 % of the total wall thickness, and one or more metallic layers

NOTE 1 All layers of a multilayer M pipe are stress-loaded and, therefore, also stress-designed.

NOTE 2 Pipes with layers of polymeric materials, together with a thickness less than 60 % of the wall thickness are not considered plastics pipes and are out of the scope of this technical report.

3.4.8
multilayer P type wall
multilayer wall comprised of more than one stress designed polymeric layer, without any metallic layer, and not of the same compound, nor of the same compound with the same MRS rating for pressure applications, respectively, and not with the same base polymer for non-pressure applications

3.4.9
metal layer standard dimension ratio
S_{DRm}
nominal outside diameter, d_n, divided by the nominal wall thickness of the metal layer(s)

3.4.10
polymeric layer standard dimension ratio
S_{DRp}
nominal outside diameter, d_n, divided by the nominal wall thickness of the polymeric layer(s)

3.5 Structured wall pipes

3.5.1
structured wall pipes
pipes having a profiled outer layer or foamed or hollow intermediate layer

3.5.2
structured-wall construction with hollow sections
wall construction comprised of an outer wall with a smooth external surface and an inner wall with a smooth internal surface, which are connected by internal ribs

3.5.3
structured-wall construction with a foamed intermediate layer
wall construction comprised of an outer layer with a smooth external surface and an inner layer with a smooth internal surface, which are connected by an intermediate layer of foamed material

3.5.4
structured-wall construction with smooth inside and profiled outside surface
wall construction with a smooth internal surface and with an external profiled geometry, ribbed, corrugated or spirally formed

NOTE The wall can be a single layer or be composed of an inner layer and a profiled outer layer, both layers not necessarily of the same compound/formulation.

3.5.5
structured-wall construction single layer foamed
wall construction comprising of a single throughout foamed layer with a smooth internal and external surface

3.5.6
construction height
radial distance between the top of ribs, corrugation or smooth outside surface of the wall and the inside surface of the wall

3.6 Double wall piping system

3.6.1
double wall piping system
pipe system comprising an inner primary pipe and an external secondary pipe containment separated by an interstitial space

NOTE The system is designed to prevent a leakage from a primary system entering the environment and shall enable detection of leakage.