

INTERNATIONAL
STANDARD

ISO
12162

First edition
1995-06-01

Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient
(standards.iteh.ai)

Matières thermoplastiques pour tubes et raccords pour applications avec pression — Classification et désignation — Coefficient global de service
<https://standards.iteh.ai/standards/sist/83dd0dba-7838-4330-9964-ea467dbddf31/iso-12162-1995>



Reference number
ISO 12162:1995(E)

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.

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.

International Standard ISO 12162 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 5, *General properties of pipes, fittings and valves of plastic materials and their accessories* — Test methods and basic specifications.

TECH STANDARD PREVIEW
(standards.iteh.ai)
ISO 12162:1995
http://standards.iteh.ai/catalog/standards/sis/83d19d8a-7838-4330-9964-ca467dbddf31/iso-12162-1995

© ISO 1995

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

ISO/TR 9080 states in 0.2.7 of its introduction that methods for using σ_{LTHS} and/or σ_{LCL} to arrive at the allowable design stresses still had to be considered. Service factors or safety factors have to be introduced.

This International Standard uses the lower confidence limit of the long-term strength, σ_{LCL} , as a basis for material classification and designation and defines the relation with the design stress. The service factors are expressed in the overall service (design) coefficient. The final overall service (design) coefficients are given in the product or system standards.

iTeh STANDARD PREVIEW (standards.iteh.ai)

ISO 12162:1995

<https://standards.iteh.ai/catalog/standards/sist/83dd0dba-7838-4330-9964-ea467dbddf31/iso-12162-1995>

iTeh STANDARD PREVIEW

This page intentionally left blank
(standards.iteh.ai)

ISO 12162:1995

<https://standards.iteh.ai/catalog/standards/sist/83dd0dba-7838-4330-9964-ea467dbddf31/iso-12162-1995>

Thermoplastics materials for pipes and fittings for pressure applications — Classification and designation — Overall service (design) coefficient

1 Scope

This International Standard establishes the classification of thermoplastics materials in pipe form and specifies the material designation. It also gives a method for calculating the design stress.

It applies to materials intended for pipes and/or fittings for pressure applications.

The classification, the material designation, and the calculation method are based on the resistance to internal pressure with water at 20 °C in water for 50 years, derived by extrapolation using the method given in ISO/TR 9080.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3:1973, *Preferred numbers — Series of preferred numbers*.

ISO 497:1973, *Guide to the choice of series of preferred numbers and of series containing more rounded values of preferred numbers*.

ISO 1043-1:1987, *Plastics — Symbols — Part 1: Basic polymers and their special characteristics*.

ISO/TR 9080:1992, *Thermoplastics pipes for the transport of fluids — Methods of extrapolation of hydrostatic stress rupture data to determine the long-term hydrostatic strength of thermoplastics pipe materials*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 long-term strength at 20 °C for 50 years, σ_{LTS} : Quantity with the dimensions of stress, in megapascals, which can be considered as a property of the material and represents the 50 % lower confidence limit for the long-term strength. It is equal to the mean strength or predicted mean strength at 20 °C for 50 years with internal pressure with water.

3.2 lower confidence limit at 20 °C for 50 years, σ_{LCL} : Quantity with the dimensions of stress, in megapascals, which can be considered as a property of the material and represents the 97,5 % lower confidence limit of the mean long-term strength at 20 °C for 50 years with internal pressure with water.

3.3 minimum required strength, MRS: Value of σ_{LCL} , rounded down to the next smaller value of the R10 series or of the R20 series conforming to ISO 3 and ISO 497, depending on the value of σ_{LCL} .

3.4 overall service (design) coefficient, C: Overall coefficient with a value greater than 1, which takes into consideration service conditions as well as properties of the components of a piping system other than those represented in the lower confidence limit.

NOTE 1 Minimum values of C for various materials are given in clause 5.

3.5 design stress, σ_s : Allowable stress for a given application. It is derived by dividing the MRS by the coefficient C , then rounding to the next lower value in the R20 series, i.e.

$$\sigma_s = \frac{[MRS]}{C}$$

4 Classification of materials in pipe form

A thermoplastics material shall be classified by the

values of its σ_{LCL} , rounded down to the next smaller value of the R10 series when σ_{LCL} is less than 10 MPa or to the next smaller value of the R20 series when σ_{LCL} is greater than or equal to 10 MPa. This value constitutes the MRS.

The classification number for a thermoplastics material shall be 10 times the MRS expressed in megapascals (see table 1).

Table 1 — Classification

Range of lower confidence limits σ_{LCL} MPa	Minimum required strength MRS MPa	Classification number ¹⁾
$1 \leq \sigma_{LCL} \leq 1,24$	1	10
$1,25 \leq \sigma_{LCL} \leq 1,59$	1,25	12,5
$1,6 \leq \sigma_{LCL} \leq 1,99$	1,6	16
$2 \leq \sigma_{LCL} \leq 2,49$	2	20
$2,5 \leq \sigma_{LCL} \leq 3,14$	2,5	25
$3,15 \leq \sigma_{LCL} \leq 3,99$	3,15	31,5
$4 \leq \sigma_{LCL} \leq 4,99$	4	40
$5 \leq \sigma_{LCL} \leq 6,29$	5	50
$6,3 \leq \sigma_{LCL} \leq 7,99$	6,3	63
$8 \leq \sigma_{LCL} \leq 9,99$	8	80
$10 \leq \sigma_{LCL} \leq 11,19$	10	100
$11,2 \leq \sigma_{LCL} \leq 12,49$	11,2	112
$12,5 \leq \sigma_{LCL} \leq 13,99$	12,5	125
$14 \leq \sigma_{LCL} \leq 15,99$	14	140
$16 \leq \sigma_{LCL} \leq 17,99$	16	160
$18 \leq \sigma_{LCL} \leq 19,99$	18	180
$20 \leq \sigma_{LCL} \leq 22,39$	20	200
$22,4 \leq \sigma_{LCL} \leq 24,99$	22,4	224
$25 \leq \sigma_{LCL} \leq 27,99$	25	250
$28 \leq \sigma_{LCL} \leq 31,49$	28	280
$31,5 \leq \sigma_{LCL} \leq 35,49$	31,5	315
$35,5 \leq \sigma_{LCL} \leq 39,99$	35,5	355
$40 \leq \sigma_{LCL} \leq 44,99$	40	400
$45 \leq \sigma_{LCL} \leq 49,99$	45	450
$50 \leq \sigma_{LCL} \leq 54,99$	50	500

1) If the classification number is not an integer, a full stop is used instead of a comma.

5 Setting of C values in the product (system) standards

The value(s) of C (see 3.4) is (are) specified in the applicable product (system) standard.

The value(s) of C at 20 °C shall be equal to or, if appropriate, greater than the minimum value given in table 2, which is established for static water pressure at 20 °C for 50 years, to take account of the following considerations:

- specific requirements for the products, such as additional stresses and other unquantifiable effects which are considered to arise in the application, for example dynamic loading;
- the influence of temperature, time and environment inside or outside the pipe if different from 20 °C, 50 years and water respectively;
- standards relating to the MRS, for temperatures other than 20 °C.

The minimum values of C (see 3.4) for various materials are given in table 2.

Table 2 — Minimum values of C

Material	C min.
ABS	1,6
PB	1,25
PE (all types)	1,25
PE-X	1,25
PP copolymer	1,25
PP homopolymer	1,6
PVC-C	1,6
PVC-HI	1,4
PVC-U	1,6
PVDF copolymer	1,4
PVDF homopolymer	1,6

6 Calculation of design stress

Unless otherwise specified in the product (system) standards, the design stress, σ_s , shall be calculated using the following equation and rounded to the next lowest value in the R20 series:

$$\sigma_s = \frac{[MRS]}{C}$$

where

[MRS] is the value of the minimum required strength (see 3.3);

C is the applicable value of C , in accordance with clause 5.

7 Designation of materials in pipe form

The designation shall be given by a combination of the following:

- the symbol of the material in accordance with ISO 1043-1;
- its classification number in accordance with clause 4.

EXAMPLE

A PVC-U with an MRS of 25 MPa is designated as follows:

PVC-U 250

8 Marking

Unless otherwise specified in the product (system) standards, the tubes and fittings shall be marked with the following information:

- the type and class of the material in accordance with the designation specified in clause 7;

and, for fittings,

- whether the material was tested in extruded or injection moulded pipe form.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 12162:1995

<https://standards.iteh.ai/catalog/standards/sist/83dd0dba-7838-4330-9964-ea467dbddf31/iso-12162-1995>

ICS 23.040.20; 23.040.45

Descriptors: plastics, plastic tubes, pressure pipes, pipe fittings, thermosetting materials, classification, designation, marking.

Price based on 3 pages
