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Pipes and fittings made of glass-reinforced thermosetting plastics (GRP) — Definitions of terms relating to pressure, including relationships between them, and terms for installation and jointing

Tubes et raccords en plastique thermodurcissable renforcé au verre textile (PRV) — Définitions des termes relatifs à la pression, y compris les relations entre eux, l'installation et l'assemblage

Reference number
ISO 8572:1991(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 8572 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids.*

Annex A forms an integral part of this International Standard.

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Introduction

Usage of terms in the design and installation of glass-reinforced thermosetting plastics (GRP) pipes and fittings has gone away from those used in the fields of pipes and fittings manufactured from other materials.

This International Standard has been prepared to provide some definitions for a wider understanding of terms used for GRP pipes and fittings.

Pipes and fittings made of glass-reinforced thermosetting plastics (GRP) — Definitions of terms relating to pressure, including relationships between them, and terms for installation and jointing

1 Scope

This International Standard gives definitions of nominal pressure (PN), maximum allowable pressure and maximum service pressure when applied to components of a glass-reinforced thermosetting plastics (GRP) pipe and fitting system, and states the range of PN ratings for use with these same components.

It also defines terms relating to the installation and jointing of GRP and fittings.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

3 Definitions relating to pressure

3.1 PN (nominal pressure): An alphanumeric designation loosely related to the resistance of a component of a piping system to internal pressure.

NOTES

1 The designation, which is a nominal one for reference or marking purposes, consists of the letters PN plus a number selected from a series of preferred numbers (see annex A).

2 The number used for a particular component will be specified by the relevant component or piping system specification, e.g. PN 16.

3 It should not be assumed that the number represents a measurable value or that it is suitable for use in calculations unless otherwise specified in the relevant component or piping system standard.

4 The value assigned to PN does not necessarily equate to any limiting pressure applicable to the component as manufactured or in service (see 3.2 and 3.3).

3.2 maximum allowable pressure: For GRP pipes or fittings, the calculated maximum internal water pressure in bars[1)] which the pipe or fitting, as manufactured, will withstand, without failure, for 50 years at 23 °C. This pressure is determined by extrapolation of results of long-term pressure tests, taking into account a factor of safety for those nominal service conditions.

NOTE 5 For GRP pipes and fittings, the value assigned to PN is derived from the maximum allowable pressure (see annex A).

3.3 maximum service pressure: Maximum sustained internal pressure allowable in use for the pipe and fitting under the proposed service conditions.

It may be higher or lower than the maximum allowable pressure (3.2) depending on whether the service conditions are more or less severe than the reference conditions for the maximum allowable pressure.

1) 1 bar = 10^5 Pa = 0,1 Mpa

Factors to be considered when setting the working pressure include the following:

a) temperature;

b) planned working life;

c) water hammer;

d) pressure variation;

e) longitudinal bending;

f) deformation due to external loads;

g) corrosive effects of chemicals on the inside or outside of the pipe or fitting;

h) longitudinal tensile forces developed by internal pressure (if not allowed for in determining the maximum allowable pressure);

i) extra safety precautions.

3.4 pressure pipes and fittings: Pipes and fittings to be used with internal pressure equal to one of the values given in table A.1.

3.5 non-pressure pipes and fittings: Pipes and fittings subject to an internal pressure not greater than 0,5 bar measured at the top of the pipeline.

4 Types of pipeline

4.1 buried pipeline: Pipeline which is subjected to the external pressure transmitted from soil loading, including traffic and superimposed loads and, possibly, the pressure of a head of water.

4.2 non-buried pipeline: Pipeline which is not subjected to external pressures, except for the possibility of wind pressures, but only subject to forces resulting from its supports.

4.3 sub-aqueous pipeline: Pipeline which is subjected to an external pressure arising from a head of water.

5 Types of joint

5.1 rigid joint: Joint which does not allow angular deflection and which incorporates resistance to longitudinal loading by the full hydrostatic pressure.

Examples of this type of joint are:

a) flanged joints, including integral and loose flanges;

b) butt joints;

c) rigid locked socket and spigot joints, with an elastomeric sealing element (including double socket designs);

d) cemented socket and spigot joints (including double socket designs);

e) threaded joints.

5.2 flexible joint: Joint capable of allowing relative movement between the component parts.

NOTE 6 Flexible joints may have resistance to longitudinal loading built into their design.

Examples of this type of joint are:

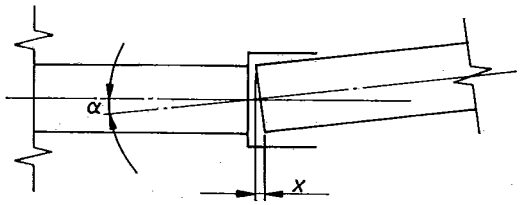
a) socket and spigot joints with an elastomeric sealing element (including double socket designs);

b) flexible locked socket and spigot joints with an elastomeric sealing element (including double socket designs);

c) clamped joints, for example bolted couplings including joints made from materials other than GRP.

6 Movements within flexible joints

6.1 angular deflection, α: The angle formed by the axes of two pipework components assembled by a joint, where either component may be part of either a pipe or a fitting, including one half of a double socket joint. See figure 1.



NOTE — Angular deflection α causes a longitudinal movement x.

Figure 1 — Angular deflection, α

6.2 draw: Longitudinal movement within a joint. See figure 2.

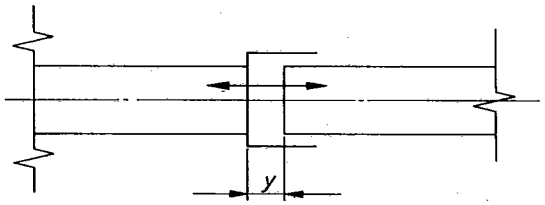
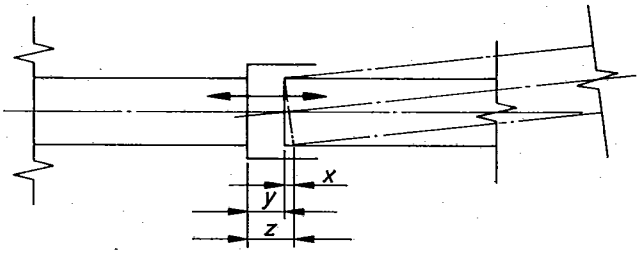


Figure 2 — Draw

6.3 total draw: Sum of the draw plus the longitudinal movement of the components due to the presence of angular deflection. See figure 3.



NOTE — Total draw z is the sum of x and y.

Figure 3 — Total draw

6.4 misalignment: The amount by which the centrelines of joint components do not coincide. See figure 4.

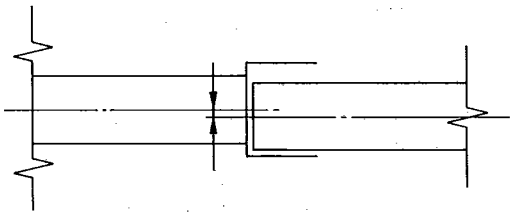


Figure 4 — Misalignment

Annex A
(normative)

Selection of PN values

For GRP pipes and fittings, PN values up to PN 400 shall be selected from table A.1 as the closest value that is less than the maximum allowable pressure (see 3.2), in bars, for the component in question.

If values higher than those given in table A.1 are required, they shall be chosen from the R 10 series of numbers in ISO 3.

Table A.1 — PN values

2,5	20	160
4	25	200
6	32	250
10	40	315
12,5	64	400
16	100	

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Descriptors: glass reinforced plastics, plastics products, plastic tubes, pipe fittings, vocabulary.

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