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BSI Standards Publication

Plastics piping systems for pressure and non-pressure water supply — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

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National foreword

This British Standard is the UK implementation of ISO 10639:2017.

The UK participation in its preparation was entrusted to Technical Committee PRI/88/2, Plastics piping for pressure applications.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Plastics piping systems for pressure and non-pressure water supply — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

Systèmes de canalisation en matières plastiques pour l'alimentation en eau avec ou sans pression — Systèmes en plastiques thermodurcissables renforcés de verre (PRV) à base de résine de polyester non saturé (UP)



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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 on 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 the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 6, *Reinforced plastics pipes and fittings for all applications*.

This second edition cancels and replaces the first edition (ISO 10639:2004), which has been technically revised. It also incorporates the Amendment ISO 10639:2004/Amd. 1:2011.

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

- inclusion of a guidance for the harmonization of design practices which are based on a partial safety factor concept and risk management engineering, as well as inclusion of the probability of failure and possible consequences of failures;
- addition of references to the general principle for the reliability of structures detailed in ISO 2394 and EN 1990;
- addition of a new safety factor concept for the hydrostatic pressure design;
- addition of a clear reference for assessment of conformity;
- changes in [Clause 6](#), including pressure tests requirements for fittings;
- changes in [Clause 7](#);
- changes in [Annex A](#) for the establishment of the design requirements.

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Plastics piping systems for pressure and non-pressure water supply — Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

1 Scope

This document specifies the properties of piping system components made from glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP). It is suited for all types of water supply with or without pressure, including, but not limited to, raw water, irrigation, cooling water, potable water, salt water, sea water, penstocks in power plants, processing plants and other water-based applications. This document is applicable to GRP UP piping systems, with flexible or rigid joints with or without end thrust load-bearing capability, primarily intended for use in direct buried installations.

NOTE 1 For the purpose of this document, the term polyester resin (UP) also includes vinyl-ester resins (VE).

NOTE 2 Piping systems conforming to this document can also be used for non-buried applications, provided the influence of the environment and the supports are considered in the design of the pipes, fittings and joints.

NOTE 3 This document can also apply for other installations, such as slip-lining rehabilitation of existing pipes.

NOTE 4 This document is also referenced in ISO 25780, which specifies requirements for GRP-pipes used for jacking installation.

The requirements for the hydrostatic pressure design of pipes referring to this document meet the requirements of ISO/TS 20656-1 and the general principle for the reliability of structures detailed in ISO 2394 and in EN 1990. These International Standards provide procedures for the harmonization of design practices and address the probability of failure, as well as possible consequences of failures. The design practices are based on a partial safety factor concept, as well as on risk management engineering.

This document is applicable to pipes, fittings and their joints of nominal sizes from DN 50 to DN 4000 which are intended to be used for the conveyance of water at temperatures up to 50 °C, with or without pressure. In a pipework system, pipes and fittings of different nominal pressure and stiffness ratings may be used together. [Clause 4](#) specifies the general aspects of GRP UP piping systems intended to be used in the field of water supply with or without pressure.

[Clause 5](#) specifies the characteristics of pipes made from GRP UP with or without aggregates and/or fillers. The pipes may have a thermoplastics or thermosetting resin liner. [Clause 5](#) also specifies the test parameters for the test methods referred to in this document.

[Clause 6](#) specifies the characteristics of fittings made from GRP UP, with or without a thermoplastics or thermosetting resin liner, intended to be used for conveyance of water. [Clause 6](#) specifies the dimensional and performance requirements for bends, branches, reducers, saddles and flanged adaptors. [Clause 6](#) covers requirements to prove the structural design of fittings. It is applicable to fittings made using any of the following techniques:

- fabrication from straight pipes;
- moulding by
 - 1) filament winding,
 - 2) tape winding,
 - 3) contact moulding, and