
**Buried, high-impact poly(vinyl chloride)
(PVC-HI) piping systems for the supply of
gaseous fuels —**

Part 4:

**Code of practice for design, handling and
installation**

*Systèmes de canalisations enterrées en poly(chlorure de vinyle) à
résistance au choc améliorée (PVC-HI) pour réseaux de combustibles
gazeux —*

*Partie 4: Code de pratique pour la conception, la manutention et
l'installation*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

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 6993-4 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 4, *Plastics pipes and fittings for the supply of gaseous fuels*.

This first edition of ISO 6993-4, together with ISO 6993-1, ISO 6993-2 and ISO 6993-3, cancels and replaces ISO 6993:2001, of which it constitutes a technical revision.

ISO 6993 consists of the following parts, under the general title *Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels*:

- *Part 1: Pipes for a maximum operating pressure of 1 bar (100 kPa)*
- *Part 2: Fittings for a maximum operating pressure of 200 mbar (20 kPa)*
- *Part 3: Fittings and saddles for a maximum operating pressure of 1 bar (100 kPa)*
- *Part 4: Code of practice for design, handling and installation*

Introduction

This part of ISO 6993 addresses the common basic principles for gas supply systems. Its users need to be aware that more detailed national standards and/or codes of practice might exist in the ISO member countries and that these will take precedence over this part of ISO 6993, which is intended to be applied in association with those national standards and/or codes of practice related to the above-mentioned basic principles.

Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels —

Part 4: Code of practice for design, handling and installation

1 Scope

This part of ISO 6993 specifies a code of practice for the design, handling and installation of high-impact poly(vinyl chloride) (PVC-HI) pipes and fittings intended to be used for the supply of gaseous fuels through buried pipelines having an operating temperature range of 0 °C up to and including +30 °C and a maximum operating pressure of 1 bar (100 kPa) ¹⁾.

The code of practice covers mains and service lines, and gives provisions for the design, installation, storage, handling, transportation and quality control of PVC-HI pipes and fittings up to and including an outside diameter of 400 mm, as well as backfilling, pipe system testing and commissioning.

The pipes and fittings are suitable for those gases which do not contain potentially damaging components in such concentrations as to impair the properties of the pipe/fitting material.

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 4437:1997, *Buried polyethylene (PE) pipes for the supply of gaseous fuels — Metric series — Specifications*

ISO 6993-1, *Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels — Part 1: Pipes for a maximum operating pressure of 1 bar (100 kPa)*

ISO 6993-3, *Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels — Part 3: Fittings and saddles for a maximum operating pressure of 1 bar (100 kPa)*

ISO 7005 (all parts), *Metallic flanges*

ISO 7387-1:1983, *Adhesives with solvents for assembly of PVC-U pipe elements — Characterization — Part 1: Basic test methods*

ISO 8085 (all parts), *Polyethylene fittings for use with polyethylene pipes for the supply of gaseous fuels — Metric series — Specifications*

EN 682:2002, *Elastomeric seals — Material requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

EN 12327:2000, *Gas supply systems — Pressure testing, commissioning and decommissioning procedures — Functional requirements*

1) 1 bar = 0,1 MPa = 10⁵ Pa; 1 MPa = 1 N/mm²

3 Terms and definitions

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

3.1

clearance

shortest distance between the outer limits of two objects

3.2

design pressure

pressure on which design calculations are based

3.3

gas supply system

pipeline systems, including pipe work and their associated stations or plants, for the transmission and distribution of gas

3.4

nominal outside diameter

d_n
numerical designation of size which is common to all components in a thermoplastics piping system other than flanges and components designated by thread size

NOTE It is a convenient round number for reference purposes.

NOTE For metric pipes conforming to ISO 161-1, the nominal outside diameter, expressed in millimetres, is the minimum mean outside diameter $d_{em,min}$.

3.5

nominal wall thickness

e_n
numerical designation of the wall thickness of a component, approximately equal to the manufacturing dimension

NOTE 1 It is a convenient round number for reference purposes.

NOTE 2 It is expressed in millimetres (mm).

3.6

main

pipework in a gas supply system to which a number of gas consumers are connected via service lines

3.7

out-of-roundness

difference between the measured maximum outside diameter and the measured minimum outside diameter in the same cross-sectional plane of the pipe

3.8

maximum operating pressure

MOP

maximum effective pressure of the gas in a piping system, expressed in bars, which is allowed in continuous use

NOTE 1 It takes into account the physical and the mechanical characteristics of the components of the piping system.

NOTE 2 The MOP is given by the equation:

$$MOP = \frac{20 \times MRS}{C \times (SDR - 1)}$$