

**Plastics piping systems for hot and cold water
installations - Polyethylene of raised temperature
resistance (PE-RT) - Part 2: Pipes**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN ISO 22391-2:2010 sisaldab Euroopa standardi EN ISO 22391-2:2009 ingliskeelset teksti.

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ICS 23.040.20, 91.140.60, 93.025

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English Version

**Plastics piping systems for hot and cold water installations -
Polyethylene of raised temperature resistance (PE-RT) - Part 2:
Pipes (ISO 22391-2:2009)**

Systèmes de canalisations en plastique pour les
installations d'eau chaude et froide - Polyéthylène de
meilleure résistance à la température (PE-RT) - Partie 2:
Tubes (ISO 22391-2:2009)

Kunststoff-Rohrleitungssysteme für die Warm- und
Kaltwasserinstallation - Polyethylen erhöhter
Temperaturbeständigkeit (PE-RT) - Teil 2: Rohre (ISO
22391-2:2009)

This European Standard was approved by CEN on 4 November 2009.

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Foreword

This document (EN ISO 22391-2:2009) has been prepared by Technical Committee ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids" in collaboration with Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems" the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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Endorsement notice

The text of ISO 22391-2:2009 has been approved by CEN as a EN ISO 22391-2:2009 without any modification.

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Introduction

The System Standard, of which this is Part 2, specifies the requirements for a piping system and its components when made from polyethylene of raised temperature resistance (PE-RT). The piping system is intended to be used for hot and cold water installations.

In respect of potential adverse effects on the quality of water intended for human consumption caused by the products covered by ISO 22391, the following are relevant.

- a) This part of ISO 22391 provides no information as to whether the products can be used without restriction.
- b) Existing national regulations concerning the use and/or characteristics of the products remain in force.

This part of ISO 22391 specifies the characteristics of pipes. At the date of publication of this part of ISO 22391, System Standards Series for piping systems of other plastics materials used for the same application are the following:

ISO 15874 (all parts), *Plastics piping systems for hot and cold water installations — Polypropylene (PP)*

ISO 15875 (all parts), *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X)*

ISO 15876 (all parts), *Plastics piping systems for hot and cold water installations — Polybutylene (PB)*

ISO 15877 (all parts), *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C)*

Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) —

Part 2: Pipes

1 Scope

This part of ISO 22391 specifies the characteristics of pipe made of

- polyethylene of raised temperature resistance (PE-RT), Type I, and
- polyethylene of raised temperature resistance (PE-RT), Type II,

intended to be used for hot and cold water installations within buildings for the conveyance of water, whether or not the water is intended for human consumption (domestic systems) and for heating systems, under the design pressures and temperatures appropriate to the class of application according to ISO 22391-1.

This part of ISO 22391 covers a range of service conditions (classes of application), design pressures and pipe dimension classes, and also specifies test parameters and test methods. In conjunction with the other parts of ISO 22391, it is applicable to PE-RT pipes, fittings, their joints, and to joints having components of PE-RT, as well as of other plastics and non-plastics materials, respectively, used for hot and cold water installations.

It is applicable to pipes with or without a barrier layer or layers.

It is not applicable to values of design temperature, maximum design temperature or malfunction temperature in excess of those specified in ISO 22391-1.

NOTE It is the responsibility of the purchaser or specifier to make the appropriate selections from these aspects, taking into account their particular requirements and any relevant national regulations and installation practices or codes.

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 1133-1, *Plastics — Determination of the melt volume-flow rate (MVR) and the melt mass-flow rate (MFR) of thermoplastics — Part 1: Standard method*

ISO 1167-1, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 1: General method*

ISO 1167-2, *Thermoplastics pipes, fittings and assemblies for the conveyance of fluids — Determination of the resistance to internal pressure — Part 2: Preparation of pipe test pieces*

ISO 2505, *Thermoplastics pipes — Longitudinal reversion — Test method and parameters*

ISO 3126, *Plastics piping systems — Plastics components — Determination of dimensions*

ISO 7686, *Plastics pipes and fittings — Determination of opacity*

ISO 9080, *Plastics piping and ducting systems — Determination of long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation*

ISO 13760, *Plastics pipes for the conveyance of fluids under pressure — Miner's rule — Calculation method for cumulative damage*

ISO 22391-1:2009, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 1: General*

ISO 22391-3, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 3: Fittings*

ISO 22391-5, *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT) — Part 5: Fitness for purpose of the system*

3 Terms, definitions, symbols and abbreviated terms

For the purposes of this document, the terms, definitions, symbols and abbreviated terms given in ISO 22391-1 apply.

4 Material

4.1 Pipe material

The material from which the pipe is made shall be polyethylene of raised temperature resistance (PE-RT).

4.2 Evaluation of σ_{LPL} values

The pipe material shall be evaluated in accordance with ISO 9080 or equivalent, with internal pressure tests being carried out in accordance with ISO 1167-1 and ISO 1167-2, in order to determine the σ_{LPL} values. The σ_{LPL} value thus determined shall be at least as high as the corresponding values of the reference curves given in Figure 1 or Figure 2 (taken from ISO 24033:2009) over the complete range of times.

NOTE 1 One equivalent way of evaluation is to calculate the σ_{LPL} value for each temperature (for example 20 °C, 60 °C and 95 °C), individually.

NOTE 2 The reference curves for PE-RT Type I in Figure 1 in the temperature range of 10 °C to 95 °C are derived from Equations (1) and (2).

First branch (i.e. the left-hand portion of the lines shown in Figure 1):

$$\lg t = -190,481 - \frac{58\,219,035 \lg \sigma}{T} + \frac{78\,763,07}{T} + 119,877 \lg \sigma \quad (1)$$

Second branch (i.e. the right-hand portion of the lines shown in Figure 1):

$$\lg t = -23,7954 - \frac{1723,318 \lg \sigma}{T} + \frac{11\,150,56}{T} \quad (2)$$

The 110 °C values have been determined separately using water inside and air outside the test specimen and have not been derived from Equations (1) and (2).