



LABORATÓRIO NACIONAL  
DE ENGENHARIA CIVIL

DEPARTAMENTO DE MATERIAIS  
Núcleo de Materiais Orgânicos

Proc. 0203/11/17694

## **COMPORTAMENTO E APLICAÇÃO DE MATERIAIS PLÁSTICOS**

**Normalização internacional e europeia aplicável  
a tubagem de materiais plásticos**

**Actualização de Setembro de 2011**

Comportamento e aplicação de materiais plásticos

Lisboa • Novembro de 2011

OAC&T MATERIAIS

RELATÓRIO 351/2011 – NMO



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## RESUMO

Este relatório contém o conjunto de todas as normas EN e ISO referentes a sistemas de tubagem em material plástico, organizadas por aplicação, em vigor à data de Setembro de 2011.

## ABSTRACT

This report contains all EN and ISO standards related to plastic pipe systems, organized by field of application, on the date September 2011.

## RÉSUMÉ

Ce rapport contient l'ensemble de toutes les normes EN et ISO relatives aux systèmes de canalisations en plastique, organisés par champ d'application, à la date Septembre 2011.



## 1. INTRODUÇÃO

Actualmente, é extremamente importante que os agentes económicos sigam de perto os trabalhos de normalização internacional e procurem que os seus produtos, serviços e sistemas de gestão atendam aos requisitos das normas internacionais. Por outro lado, a avaliação da conformidade dos produtos que, naturalmente, tanto preocupa os fabricantes, só pode efectuar-se com referenciais normativos. A normalização permite também uma melhor organização e coordenação do processo produtivo e de controlo da qualidade, uma vez que as normas permitem garantir o rigor e a exatidão das medições realizadas, assegurando a sua comparabilidade e rastreabilidade.

As principais organizações normativas são a ISO (International Organization for Standardization) e o CEN (Comité Européen de Normalisation). A ISO é uma das principais organizações não-governamentais a nível mundial, que em regime voluntário se dedica à produção de normas técnicas, designadas por “ISO”. O CEN é um organismo composto por 30 organismos nacionais de normalização, o qual promove a harmonização voluntária de normas técnicas na Europa, designadas por “EN”.

A actualização do processo de desenvolvimento de normas, com a adopção de novos métodos de gestão e de novas ferramentas de tecnologia da informação, é dinâmica e permanente, contribuindo para que o processo de normalização acompanhe a evolução tecnológica.

Actualmente, os documentos desenvolvidos por um dos organismos são notificados para aprovação simultânea do outro. Assim, algumas normas de especificação de produto e de ensaio EN têm vindo a ser substituídas pelas suas congéneres ISO, originando normas EN ISO, o que tem conduzido a alterações importantes no acervo normativo. Os benefícios resultantes deste processo consistem na não duplicação de trabalhos e de estruturas de normalização, permitindo que se trabalhe de forma mais eficiente, aumentando a rapidez de elaboração das normas e a sua revisão. Contudo, não se pode afirmar que este processo se encontre finalizado, verificando-se ainda apenas para alguns sistemas de tubagem em material plástico para distribuição de água quente e fria no interior de edifícios e em algumas normas de ensaio.

Também se tem desenvolvido um trabalho importante na revisão das normas já publicadas, o que conduz à necessidade de actualização permanente das versões existentes

nos laboratórios de ensaio e controle de qualidade, nas empresas fabricantes e nos organismos de certificação.

O NMO do DM-LNEC sentiu necessidade de proceder a um levantamento exaustivo das normas de especificação de produto e de ensaio aplicáveis a tubagem em materiais plásticos, em virtude da caracterização e da avaliação da qualidade destes produtos se inserirem no âmbito da actividade do Núcleo, tendo desse esforço resultado o conteúdo deste relatório. As normas encontram-se classificadas por tipo de aplicação e, dentro de cada classe, por ordem numérica crescente. É importante referir que algumas destas normas, assinaladas a itálico, encontram-se actualmente em processo de revisão, pelo que serão substituídas a curto prazo pelas versões actualizadas correspondentes. As normas ISO que foram adoptadas pelo CEN, classificadas como EN ISO, são apenas referidas uma vez. Optou-se por referir também as normas ISO que ainda estão em fase de projecto, mas cuja publicação se prevê ocorra a curto prazo, designadamente referidas como ISO/NP, ISO/CD, ISO/DIS e ISO/FDIS. Referem-se ainda as especificações técnicas, indicadas como CEN\TS ou ISO\TS. As normas EN e ISO, ou EN ISO, para as quais exista já a respectiva versão em língua portuguesa NP são assinaladas

## **2. SISTEMAS DE TUBAGEM EM MATERIAL PLÁSTICO PARA O INTERIOR DE EDIFÍCIOS**

### **2.1. DISTRIBUIÇÃO DE ÁGUA QUENTE E FRIA**

#### **2.1.1. PROJETO**

EN 806-2:2005 Specification for installations inside buildings conveying water for human consumption - Part 2: Design

EN 806-3:2006 Specifications for installations inside buildings conveying water for human consumption - Part 3: Pipe sizing - Simplified method

ISO 10508:2006 Plastics piping systems for hot and cold water installations - Guidance for classification and design



### **2.1.2. INSTALAÇÃO**

EN 806-4:2010 Specifications for installations inside buildings conveying water for human consumption - Part 4: Installation

ENV 12108:2001<sup>1</sup> Plastics piping systems - Guidance for the installation inside buildings of pressure piping systems for hot and cold water intended for human consumption

### **2.1.3. ESPECIFICAÇÕES**

EN 806-1:2000/A1:2001 Specifications for installations inside buildings conveying water for human consumption - Part 1: General

EN ISO 15874-1:2001<sup>2</sup> Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 1: General (ISO 15874-1:2003)

EN ISO 15874-1:2003/A1:2007 Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 1: General - Amendment 1 (ISO 15874-1:2003/Amd 1:2007)

EN ISO 15874-2:2003<sup>2</sup> Plastics piping systems for hot and cold water installations - Polypropylene (PP) -Part 2: Pipes (ISO 15874-2:2003)

EN ISO 15874-2:2003/A1:2007 Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 2: Pipes - Amendment 1 (ISO 15874-2:2003/Amd 1:2007)

EN ISO 15874-3:2003 Plastics piping systems for hot and cold water installations - Polypropylene (PP) -Part 3: Fittings (ISO 15874-3:2003)

EN ISO 15874-5:2003<sup>2</sup> Plastics piping systems for hot and cold water installations - Polypropylene (PP) -Part 5: Fitness for purpose of the system (ISO 15874-5:2003)

CEN ISO/TS 15874-7:2003 Plastics piping systems for hot and cold water installations - Polypropylene (PP) - Part 7: Guidance for the assessment of conformity (ISO/TS 15874-7:2003)

EN ISO 15875-1:2003<sup>3</sup> Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 1: General (ISO 15875-1:2003)

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<sup>1</sup>: Existe versão portuguesa NP, datada de 2006

<sup>2</sup>: Existe versão portuguesa NP, datada de 2005

<sup>3</sup>: Existe versão portuguesa NP, datada de 2005

EN ISO 15875-1:2003/A1:2007 Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 1: General - Amendment 1 (ISO 15875-1:2003/Amd 1:2007)

EN ISO 15875-2:2003<sup>3</sup> Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 2: Pipes (ISO 15875-2:2003)

EN ISO 15875-2:2003/A1:2007 Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 2: Pipes - Amendment 1 (ISO 15875-2:2003/Amd 1:2007)

EN ISO 15875-3:2003 Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 3: Fittings (ISO 15875-3:2003)

EN ISO 15875-5:2003<sup>3</sup> Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 5: Fitness for purpose of the system (ISO 15875-5:2003)

CEN ISO/TS 15875-7:2003 Plastics piping systems for hot and cold water installations – Crosslinked polyethylene (PE-X) - Part 7: Guidance for the assessment of conformity (ISO/TS 15875-7:2003)

EN ISO 15876-1:2003 Plastics piping systems for hot and cold water installations - Polybutylene (PB) -Part 1: General (ISO 15876-1:2003)

EN ISO 15876-1:2003/A1:2007 Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 1: General - Amendment 1 (ISO15876-1:2003/Amd 1:2007)

EN ISO 15876-2:2003 Plastics piping systems for hot and cold water installations - Polybutylene (PB) -Part 2: Pipes (ISO 15876-2:2003)

EN ISO 15876-2:2003/A1:2007 Plastics piping systems for hot and cold water installations - Polybutylene (PB) - Part 2: Pipes - Amendment 1 (ISO 15876-2:2003/Amd 1:2007)

EN ISO 15876-3:2003 Plastics piping systems for hot and cold water installations - Polybutylene (PB) -Part 3: Fittings (ISO 15876-3:2003)

EN ISO 15876-5:2003 Plastics piping systems for hot and cold water installations - Polybutylene (PB) -Part 5: Fitness for purpose of the system (ISO 15876-5:2003)

CEN ISO/TS 15876-7:2003 Plastics piping systems for hot and cold water installations - Polybutylene (PB) Part 7: Guidance for the assessment of conformity (ISO/TS 15876-7:2003)

EN ISO 15877-1:2009 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 1: General (ISO 15877-1:2009)

EN ISO 15877-1:2009/A1:2010 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 1: General - Amendment 1 (ISO 15877-1:2009/AMD 1:2010)

EN ISO 15877-2:2009 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 2: Pipes (ISO 15877-2:2009)

EN ISO 15877-2:2009/A1:2010 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 2: Pipes - Amendment 1 (ISO 15877-2:2009/AMD 1:2010)

EN ISO 15877-3:2009 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 3: Fittings (ISO 15877-3:2009)

EN ISO 15877-3:2009/A1:2010 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 3: Fittings - Amendment 1 (ISO 15877-3:2009/AMD 1:2010)

EN ISO 15877-5:2009 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 5: Fitness for purpose of the system (ISO 15877-5:2009)

EN ISO 15877-5:2009/A1:2010 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 5: Fitness for purpose of the system - Amendment 1 (ISO 15877-5:2009/AMD 1:2010)

CEN ISO/TS 15877-7:2009 Plastics piping systems for hot and cold water installations – Chlorinated poly(vinyl chloride) (PVC-C) - Part 7: Guidance for the assessment of conformity (ISO/TS 15877-7:2009)

EN ISO 21003-1:2008<sup>4</sup> Multilayer piping systems for hot and cold water installations inside buildings – Part 1: General (ISO 21003-1:2008)

EN ISO 21003-2:2008<sup>5</sup> Multilayer piping systems for hot and cold water installations inside buildings – Part 2: Pipes (ISO 21003-2:2008)

EN ISO 21003-2:2008/A1:2011 Multilayer piping systems for hot and cold water installations inside buildings – Part 2: Pipes - Amendment 1 (ISO 21003-2:2008/Amd 1:2011)

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<sup>4</sup>: Existe versão portuguesa NP, datada de 2009

<sup>5</sup>: Existe versão portuguesa NP, datada de 2010

EN ISO 21003-3:2008 Multilayer piping systems for hot and cold water installations inside buildings – Part 3: Fittings (ISO 21003-3:2008)

EN ISO 21003-5:2008<sup>5</sup> Multilayer piping systems for hot and cold water installations inside buildings – Part 5: Fitness for purpose of the system (ISO 21003-5:2008)

CEN ISO/TS 21003-7:2008 Multilayer piping systems for hot and cold water installations inside buildings – Part 7: Guidance for the assessment of conformity (ISO/TS 21003-7:2008)

CEN ISO/TS 21003-7:2008/A1:2010 Multilayer piping systems for hot and cold water installations inside buildings – Part 7: Guidance for the assessment of conformity - Amendment 1 (ISO/TS 21003-7:2008/Amd 1:2010)

EN ISO 22391-1:2009<sup>5</sup> Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) - Part 1: General (ISO 22391-1:2009)

EN ISO 22391-2:2009<sup>6</sup> Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) - Part 2: Pipes (ISO 22391-2:2009)

EN ISO 22391-3:2009 Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) - Part 3: Fittings (ISO 22391-3:2009)

ISO 22391-5:2009 Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) - Part 5: Fitness for purpose of the system

ISO/PRF TS 22391-7 Plastics piping systems for hot and cold water installations - Polyethylene of raised temperature resistance (PE-RT) - Part 7: Guidance for the assessment of conformity

## **2.2. CANALIZAÇÕES DE ESGOTO**

### **2.2.1. PROJETO**

EN 12056-2:2000 Gravity drainage systems inside buildings. Part 2: Sanitary pipework, layout and calculation.

EN 12056-3:2000 Gravity drainage systems inside buildings. Part 3: Roof drainage, layout and calculation.

EN 12056-4:2000 Gravity drainage systems inside buildings. Part 4: Wastewater lifting plants. Layout and calculation.

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<sup>6</sup>: Existe versão portuguesa NP, datada de 2011

### **2.2.2. INSTALAÇÃO**

ISO/TS 7024:2005 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Thermoplastics - Recommended practice for installation

EN 12056-5:2000 Gravity drainage systems inside buildings. Part 5: Installation and testing, instructions for operation, maintenance and use.

ENV 13801:2000<sup>7</sup> Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Thermoplastics - Recommended practice for installation

### **2.2.3. ESPECIFICAÇÕES**

EN 1329-1:1999<sup>8</sup> Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes, fittings and the system

ENV 1329-2:2001 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Guidance for the assessment of conformity

EN 1451-1:1998<sup>9</sup> Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polypropylene (PP) - Part 1: Specifications for pipes, fittings and the system

ENV 1451-2:2001 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polypropylene (PP) - Part 2: Guidance for the assessment of conformity

EN 1453-1:2000<sup>10</sup> Plastics piping systems with structured wall-pipes for soil and waste discharge (low and high temperature) inside buildings - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes and the system

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<sup>7</sup>: Existe versão portuguesa NP ENV, datada de 2005

<sup>8</sup>: Existe versão portuguesa NP, datada de 2002

<sup>9</sup>: Existe versão portuguesa NP, datada de 2000

<sup>10</sup>: Existe versão portuguesa NP, datada de 2004

ENV 1453-2:2000 Plastics piping systems with structured wall pipes for soil and waste discharge (low and high temperature) inside buildings - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Guidance for the assessment of conformity

EN 1455-1:1999 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Acrylonitrile-butadiene-styrene (ABS) - Part 1: Requirements for pipes, fittings and the system

ENV 1455-2:2001 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Acrylonitrile-butadiene-styrene (ABS) - Part 2: Guidance for the assessment of conformity

EN 1519-1:1999 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polyethylene (PE) - Part 1: Specifications for pipes, fittings and the system

ENV 1519-2:2001 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Polyethylene (PE) - Part 2: Guidance for the assessment of conformity

EN 1565-1:1998 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure – Styrene copolymer blends (SAN+PVC) - Part 1: Specifications for pipes, fittings and the system

ENV 1565-2:2001 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure – Styrene copolymer blends (SAN+PVC) - Part 2: Guidance for the assessment of conformity

EN 1566-1:1998<sup>11</sup> Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Chlorinated poly(vinyl chloride) (PVC-C) - Part 1: Specifications for pipes, fittings and the system

ENV 1566-2:2001 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure - Chlorinated poly(vinyl chloride) (PVC-C) - Part 2: Guidance for the assessment of conformity

ISO 3633:2002 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Unplasticized poly(vinyl chloride) (PVC-U)

ISO 7671:2003 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Polypropylene (PP)

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<sup>11</sup>: Existe versão portuguesa NP, datada de 2000

ISO 7675:2003 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Chlorinated poly(vinyl chloride) (PVC-C)

ISO 7682:2003 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Acrylonitrile-butadiene-styrene (ABS)

ISO 8283-1:1991 Plastics pipes and fittings - Dimensions of sockets and spigots for discharge systems inside buildings - Part 1: Unplasticized poly(vinyl chloride) (PVC-U) and chlorinated poly (vinyl chloride) (PVC-C)

ISO 8283-2:1992 Plastics pipes and fittings - Dimensions of sockets and spigots for discharge systems inside buildings - Part 2: Polyethylene (PE)

ISO 8283-3:1992 Plastics pipes and fittings - Dimensions of sockets and spigots for discharge systems inside buildings - Part 3: Polypropylene (PP)

ISO 8283-4:1992 Plastics pipes and fittings - Dimensions of sockets and spigots for discharge systems inside buildings - Part 4: Acrylonitrile/butadiene/styrene (ABS)

ISO 8770:2003 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Polyethylene (PE)

ISO 9896:1996 Plastics traps for discharge pipework systems inside buildings

EN 12056-1:2000 Gravity drainage systems inside buildings. Part 1:General and performance requirements

EN 15012:2007<sup>12</sup> Plastics piping systems - Soil and waste discharge systems within the building structure - Performance characteristics for pipes, fittings and their joints

ISO 19220:2004 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Styrene copolymer blends (SAN + PVC)

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<sup>12</sup>: Existe versão portuguesa NP, datada de 2009

### **3. SISTEMAS DE TUBAGEM EM MATERIAL PLÁSTICO PARA O EXTERIOR DE EDIFÍCIOS**

#### **3.1. DISTRIBUIÇÃO DE ÁGUA FRIA COM PRESSÃO, INCLUINDO IRRIGAÇÃO**

##### **3.1.1. PROJETO**

ISO/TR 10501:1993 Thermoplastics pipes for the transport of liquids under pressure - Calculation of head losses

##### **3.1.2. INSTALAÇÃO**

ISO/TR 4191:1989 Unplasticized polyvinyl chloride (PVC-U) pipes for water supply – Recommended practice for laying

##### **3.1.3. ESPECIFICAÇÕES**

ISO 727-1:2002 Fittings made from unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C) or acrylonitrile/butadiene/styrene (ABS) with plain sockets for pipes under pressure - Part 1: Metric series

ISO 727-2:2005 Fittings made from unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly(vinyl chloride) (PVC-C) or acrylonitrile/butadiene/styrene (ABS) with plain sockets for pipes under pressure - Part 2: Inch-based series

ISO 4132:1979 Unplasticized polyvinyl chloride (PVC) and metal adaptor fittings for pipes under pressure - Laying lengths and size of threads - Metric series

ISO 4427-1:2007 Plastics piping systems - Polyethylene (PE) pipes and fittings for water supply - Part 1: General

ISO 4427-1:2007/Cor 1:2008

ISO 4427-2:2007 Plastics piping systems - Polyethylene (PE) pipes and fittings for water supply - Part 2: Pipes

ISO 4427-3:2007 Plastics piping systems - Polyethylene (PE) pipes and fittings for water supply - Part 3: Fittings

ISO 4427-5:2007 Plastics piping systems - Polyethylene (PE) pipes and fittings for water supply - Part 5: Fitness for purpose of the system



ISO 8779:2010 Plastics piping systems - Polyethylene (PE) pipes for irrigation – Specifications

ISO 9623:1997 PE/metal and PP/metal adaptor fittings for pipes for fluids under pressure – Design lengths and size of threads - Metric series

ISO 9624:1997 Thermoplastics pipes for fluids under pressure - Mating dimensions of flange adapters and loose backing flanges

EN 12201-1:2003<sup>13</sup> Plastics piping systems for water supply - Polyethylene (PE) - Part 1: General

EN 12201-2:2003<sup>13</sup> Plastics piping systems for water supply - Polyethylene (PE) - Part 2: Pipes

EN 12201-3:2003 Plastics piping systems for water supply - Polyethylene (PE) - Part 3: Fittings

EN 12201-4:2001 Plastics piping systems for water supply - Polyethylene (PE) - Part 4: Valves

EN 12201-5:2003<sup>13</sup> Plastics piping systems for water supply - Polyethylene (PE) - Part 5: Fitness for purpose of the system

CEN/TS 12201-7:2003 Plastics piping systems for water supply - Polyethylene (PE) - Part 7: Guidance for the assessment of conformity

EN 15014:2007 Plastics piping systems - Buried and above ground systems for water and other fluids under pressure - Performance characteristics for pipes, fittings and their joints

ISO 14236:2000 Plastics pipes and fittings - Mechanical-joint compression fittings for use with polyethylene pressure pipes in water supply systems

ISO 16422:2006 Pipes and joints made of oriented unplasticized poly(vinyl chloride) (PVC-O) for the conveyance of water under pressure – Specifications

ISO 21004:2006 Plastics piping systems - Multilayer pipes and their joints, based on thermoplastics, for water supply

ISO/NP TS 29561-1 Plastics piping systems - Glass fibre reinforced polyethylene (PE-GF) piping systems for water supply - Part 1: General

ISO/NP TS 29561-2 Plastics piping systems - Glass fibre reinforced polyethylene (PE-GF) piping systems for water supply - Part 2: Pipes

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<sup>13</sup>: Existe versão portuguesa NP, datada de 2004

## **3.2. DISTRIBUIÇÃO DE ÁGUA FRIA COM OU SEM PRESSÃO, INCLUINDO IRRIGAÇÃO**

### **3.2.1. ESPECIFICAÇÕES**

EN 805:2000 Water supply.. Requirements for systems and components outside buildings.

EN 1796:2006+A1:2008 Plastics piping systems for water supply with or without pressure – glass reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP)

ISO 10639:2004 Plastics piping systems for pressure and non-pressure water supply – Glass reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

ISO 10639:2004/Amd 1:2011

ISO 25780:2011 Plastics piping systems for pressure and non-pressure water supply, irrigation, drainage or sewerage - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin - Pipes with flexible joints intended to be installed using jacking techniques

## **3.3. PARA DRENAGEM E PARA ESGOTO, ENTERRADOS, SEM PRESSÃO**

### **3.3.1. INSTALAÇÃO**

ENV 1401-3:2001<sup>14</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U) - Part 3: Guidance for installation

CEN/TS 1852-3:2003 Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene (PP) - Part 3: Guidance for installation

ISO/TR 7073:1988 Recommended techniques for the installation of unplasticized poly(vinyl chloride) (PVC-U) buried drains and sewers

CEN/TS 14758-3:2006 Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene with mineral modifier(s) (PP-MD) - Part 3: Guidance for installation

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<sup>14</sup>: Existe versão portuguesa NP, datada de 2002

### 3.3.2. ESPECIFICAÇÕES

ISO 265-1:1988 Pipes and fittings of plastics materials - Fittings for domestic and industrial waste pipes - Basic dimensions: Metric series - Part 1: Unplasticized poly(vinyl chloride) (PVC-U)

EN 1401-1:2009<sup>15,16</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes, fittings and the system

ENV 1401-2:2000 Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Guidance for assessment of conformity

EN 1852-1:2009<sup>17</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene (PP) - Part 1: Specifications for pipes, fittings and the system

CEN/TS 1852-2:2009 Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene (PP) - Part 2: Guidance for the assessment of conformity

ISO 4435:2003 Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U)

ISO/TR 7074:1986 Performance requirements for plastics pipes and fittings for use in underground drainage and sewage

ISO 8772:2006 Plastics piping systems for non-pressure underground drainage and sewerage - Polyethylene (PE)

ISO 8773:2006 Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene (PP)

EN 12666-1:2005<sup>18,19</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Polyethylene (PE) - Part 1: Specifications for pipes, fittings and the system

CEN/TS 12666-2:2005 Plastics piping systems for non-pressure underground drainage and sewerage - Polyethylene (PE) - Part 2: Guidance for the assessment of conformity

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<sup>15</sup>: Existe versão portuguesa NP, datada de 2010

<sup>16</sup>: A norma EN 1401-1 também permite que a tubagem se destine a ao uso no interior de edifícios, sendo os tubos marcados com os códigos D (só interior) e UD (interior e exterior)

<sup>17</sup>: Existe versão portuguesa NP, datada de 2002

<sup>18</sup>: Existe versão portuguesa NP, datada de 2007

<sup>19</sup>: A norma EN 12666-1 também permite que a tubagem se destine a ao uso no interior de edifícios, sendo os tubos marcados com os códigos D (só interior) e UD (interior e exterior)

ISO/FDIS 13272 Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP), polypropylene with mineral modifiers (PP-MD) and polyethylene (PE) - Specifications for manholes and inspection chambers in traffic areas and underground installations

EN 13476-1:2007<sup>20</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: General requirements and performance characteristics

EN 13476-2:2007<sup>21</sup> Plastics piping systems for non-pressure underground drainage and sewerage -Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for pipes and fittings with smooth internal and external surface and the system, Type A

EN 13476-3:2007+A1:2009<sup>22</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 3: Specifications for pipes and fittings with smooth internal and profiled external surface and the system, Type B

CEN/TS 13476-4:2008 Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 4: Guidance for the assessment of conformity

EN 13598-1:2010<sup>23</sup> Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: Specifications for ancillary fittings including shallow inspection chambers

EN 13598-2:2009 Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations

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<sup>20</sup>: Existe versão portuguesa NP, datada de 2008

<sup>21</sup>: Existe versão portuguesa NP, datada de 2008

<sup>22</sup>: Existe versão portuguesa NP, datada de 2011

<sup>23</sup>: A norma EN 13598-1 também permite que a tubagem se destine a ao uso no interior de edifícios, sendo os tubos marcados com os códigos D (só interior) e UD (interior e exterior)

EN 13598-2:2009/AC:2009 Plastics piping systems for non-pressure underground drainage and sewerage Unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Specifications for manholes and inspection chambers in traffic areas and deep underground installations

EN 14636-1:2009 Plastics piping systems for non-pressure drainage and sewerage - Polyester resin concrete (PRC) - Part 1: Pipes and fittings with flexible joints

EN 14636-2:2009 Plastics piping systems for non-pressure drainage and sewerage - Polyester resin concrete (PRC) - Part 2: Manholes and inspection chambers

EN 14758-1:2005+A1:2009 Plastics piping systems for non-pressure underground drainage and sewerage - With mineral modifiers (PP-MD) - Part 1: Specifications for pipes, fittings and the system

CEN/TS 14758-2:2007 Plastics piping systems for non-pressure underground drainage and sewerage - Polypropylene with mineral modifier(s) (PP-MD) - Part 2: Guidance for the assessment of conformity

ISO/DIS 15398 Specifications for thermoplastics covers and frames for manholes and inspection chambers used in non-traffic areas

ISO/NP 16611 Plastics piping systems for drainage and sewerage without pressure - Non-circular pipes and joints made of glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resins (UP) - Dimensions, requirements and tests

ISO 18672-1:2009 Plastics piping systems for non-pressure drainage and sewerage - Polyester resin concrete (PRC) - Part 1: Pipes and fittings with flexible joints

ISO 21138-1:2007 Plastics piping systems for non-pressure underground drainage and sewerage -Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 1: Material specifications and performance criteria for pipes, fittings and system

ISO 21138-2:2007 Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 2: Pipes and fittings with smooth external surface, Type A

ISO 21138-3:2007 Plastics piping systems for non-pressure underground drainage and sewerage - Structured-wall piping systems of unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) - Part 3: Pipes and fittings with non smooth external surface, Type B

### **3.4. PARA DRENAGEM E PARA ESGOTO, ENTERRADOS, COM OU SEM PRESSÃO**

#### **3.4.1. ESPECIFICAÇÕES**

ISO 10467:2004 Plastics piping systems for pressure and non-pressure drainage and sewerage - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

ISO 10467:2004/FDAmd 1

EN 14364:2006+A1:2008 Plastics piping systems for drainage and sewerage with or without pressure - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Specifications for pipes, fittings and joints

### **3.5. PARA CANALIZAÇÃO DE ÁGUA, PARA DRENAGEM E PARA ESGOTO COM PRESSÃO, ENTERRADOS OU ACIMA DO SOLO**

#### **3.5.1. PROJECTO**

CEN/TR 1295-2:2005 Structural design of buried pipelines under various conditions of loading - Part 2: Summary of nationally established methods of design

CEN/TR 1295-3:2007 Structural design of buried pipelines under various conditions of loading - Part 3: Common method

CEN/TS 15223:2008 Plastics piping systems - Validated design parameters of buried thermoplastics piping systems

#### **3.5.2. INSTALAÇÃO**

ENV 1046:2001 Plastics piping and ducting systems - Systems outside building structures for the conveyance of water or sewage - Practices for installation above and below ground

EN 1295-1:1997 Structural design of buried pipelines under various conditions of loading - Part 1: General requirements

ENV 1452-6:2006<sup>24</sup> Sistemas de tubagens de plástico para abastecimento de água. Policloreto de vinilo não plastificado (PVC-U). Parte 6: Guia para a instalação.

EN 1610:1997 Construction and testing of drains and sewers

ISO/TS 10465-1:2007 Underground installation of flexible glass-reinforced pipes based on unsaturated polyester resin (GRP-UP) - Part 1: Installation procedures

ISO/TR 10465-2:2007 Underground installation of flexible glass-reinforced pipes based on unsaturated polyester resin (GRP-UP) - Part 2: Comparison of static calculation methods

ISO/TR 10465-3:2007 Underground installation of flexible glass-reinforced pipes based on unsaturated polyester resin (GRP-UP) - Part 3: Installation parameters and application limits

CEN/TS 14578:2003 Plastics piping systems for water supply or drainage and sewerage – Glass reinforced thermosetting plastics (GPR) based on unsaturated polyester resin (UP) - Recommended practice for installation

### **3.5.3. ESPECIFICAÇÕES**

EN ISO 1452-1:2009<sup>24,25</sup> Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: General (ISO 1452-1:2009)

EN ISO 1452-2:2009<sup>24,25</sup> Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Pipes (ISO 1452-2:2009)

EN ISO 1452-3:2010<sup>24</sup> Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 3: Fittings (ISO 1452-3:2009, corrected version 2010-03-01)

EN ISO 1452-4:2009<sup>26</sup> Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 4: Valves (ISO 1452-4:2009)

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<sup>24</sup>: A norma EN 1452 também permite que a tubagem se destine a distribuição de água no interior de edifícios (até 45°C), sendo os tubos marcados com os códigos B (só interior) e BD (interior e exterior)

<sup>25</sup>: Existe versão portuguesa NP datada de 2010

<sup>26</sup>: A norma EN 1452 também permite que a tubagem se destine a distribuição de água no interior de edifícios (até 45°C), sendo os tubos marcados com os códigos B (só interior) e BD (interior e exterior)

EN ISO 1452-5:2010<sup>26,27</sup> Plastics piping systems for water supply and for buried and above-ground drainage and sewerage under pressure - Unplasticized poly(vinyl chloride) (PVC-U) - Part 5: Fitness for purpose of the system (ISO 1452-5:2009, corrected version 2010-03-01)

ENV 1452-7:2000<sup>26</sup> Plastics piping systems for water supply - Unplasticized poly(vinyl chloride) (PVC-U) - Part 7: Guidance for the assessment of conformity

EN 13244-1:2002<sup>28</sup> Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 1: General

EN 13244-2:2002<sup>28</sup> Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 2: Pipes

EN 13244-3:2002 Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 3: Fittings

EN 13244-4:2002 Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 4: Valves

EN 13244-5:2002<sup>28</sup> Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 5: Fitness for purpose of the system

CEN/TS 13244-7:2003 Plastics piping systems for buried and above-ground pressure systems for water for general purposes, drainage and sewerage - Polyethylene (PE) - Part 7: Guidance for the assessment of conformity

### **3.6. PARA CANALIZAÇÃO DE ÁGUA, PARA DRENAGEM E PARA ESGOTO COM OU SEM PRESSÃO, ENTERRADOS OU ACIMA DO SOLO**

#### **3.6.1. INSTALAÇÃO**

ENV 1046:2001 Plastics piping and ducting systems - Systems outside building structures for the conveyance of water or sewage - Practices for installation above and below ground

EN 1610:1997<sup>29</sup> Construction and testing of drains and sewers

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<sup>27</sup>: Existe versão portuguesa NP datada de 2010

<sup>28</sup>: Existe versão portuguesa NP, datada de 2004

<sup>29</sup>: Existe versão portuguesa NP, datada de 2008



CEN/TS 14578:2003 Plastics piping systems for water supply or drainage and sewerage – Glass reinforced thermosetting plastics (GPR) based on unsaturated polyester resin (UP) - Recommended practice for installation

### **3.6.2. ESPECIFICAÇÕES**

CEN/TS 14632:2006 Plastics piping systems for drainage, sewerage and water supply, pressure and non-pressure - Glass-reinforced thermosetting plastics (GRP) based on polyester resin (UP) - Guidance for the assessment of conformity

## **3.7. PARA CANALIZAÇÃO DE ÁGUAS PLUVIAIS, ACIMA DO SOLO**

### **3.7.1. ESPECIFICAÇÕES**

EN 12200-1:2000<sup>30</sup> Plastics rainwater piping systems for above ground external use - Unplasticized poly(vinyl chloride) (PVC-U) - Part 1: Specifications for pipes, fittings and the system

CEN/TS 12200-2:2003 Plastics rainwater piping systems for above ground external use - Unplasticized poly(vinyl chloride) (PVC-U) - Part 2: Guidance for the assessment of conformity

## **4. SISTEMAS DE TUBAGEM EM MATERIAL PLÁSTICO PARA CANALIZAÇÃO DE ÁGUA NÃO DESTINADA A CONSUMO HUMANO**

### **4.1. ESPECIFICAÇÕES**

EN 15015:2007 Plastics piping systems - Systems for hot and cold water not intended for human consumption – Performance characteristics for pipes, fittings and their joints

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<sup>30</sup>: Existe versão portuguesa NP, datada de 2006

## **5. SISTEMAS DE TUBAGEM EM MATERIAL PLÁSTICO PARA RENOVAÇÃO DE CONDUTAS**

### **5.1. PROJETO**

EN ISO 11295:2010 Classification and information on design of plastics piping systems used for renovation (ISO 11295:2010)

### **5.2. INSTALAÇÃO**

EN ISO 11296-4:2011 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 4: Lining with cured-in-place pipes (ISO 11296-4:2009, corrected version 2010-06-01)

EN ISO 11298-3:2011 Plastics piping systems for renovation of underground water supply networks - Part 3: Lining with close-fit pipes (ISO 11298-3:2010)

EN 13566-2:2005 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 2: Lining with continuous pipes

EN 13566-7:2007 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 7: Lining with spirally-wound pipes

EN 14408-3:2004 Plastics piping systems for renovation of underground gas supply networks – Part 3: Lining with close-fit pipes

### **5.3. ESPECIFICAÇÕES**

EN ISO 11296-1:2011 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 1: General (ISO 11296-1:2009)

EN ISO 11296-3:2011 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks - Part 3: Lining with close-fit pipes (ISO 11296-3:2009+Cor 1:2011)

EN ISO 11298-1:2011 Plastics piping systems for renovation of underground water supply networks - Part 1: General (ISO 11298-1:2010)

EN 12007-4:2000 Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 4: Specific functional recommendations for renovation

EN 14408-1:2004 Plastics piping systems for renovation of underground gas supply networks  
– Part 1: General

## **6. SISTEMAS DE TUBAGEM EM MATERIAL PLÁSTICO PARA CANALIZAÇÃO E DISTRIBUIÇÃO DE COMBUSTÍVEIS GASOSOS**

### **6.1. PROJETO E INSTALAÇÃO**

ISO 6993-4:2006 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

ISO/TS 10839:2000 Polyethylene pipes and fittings for the supply of gaseous fuels - Code of practice for design, handling and installation

EN 12007-1:2000 Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 1: General functional recommendations

EN 12007-2:2000 Gas supply systems - Gas pipelines for maximum operating pressure up to and including 16 bar - Part 2: Specific functional recommendations for polyethylene (MOP up to and including 10 bar)

EN 12007-4:2000 Gas supply systems - Pipelines for maximum operating pressure up to and including 16 bar - Part 4: Specific functional recommendations for renovation

ISO 14531-4:2006 Plastics pipes and fittings - Crosslinked polyethylene (PE-X) pipe systems for the conveyance of gaseous fuels - Metric series - Specifications - Part 4: System design and installation guidelines

ISO/DIS 16486-6 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 6: Code of practice for design, handling and installation

ISO/NP 17135-6 Plastics piping systems for the supply of gaseous fuels - Plasticized Polyamide (PA-P) piping systems for the supply of gaseous fuels - Piping systems with fusion jointing and mechanical jointing - Part 6: Code of practice for design, handling and installation

ISO 17484-2:2009 Plastics piping systems - Multilayer pipe systems for indoor gas installations – Part 2: Code of practice

ISO 22621-6:2010 Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) - Polyamide (PA) - Part 6: Code of practice for design, handling and installation

## **6.2. ESPECIFICAÇÕES**

EN 1555-1:2010 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 1: General

EN 1555-2:2010 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 2: Pipes

EN 1555-3:2010 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 3: Fittings

EN 1555-4:2011 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 4: Valves

EN 1555-5:2010 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 5: Fitness for purpose of the system

CEN/TS 1555-7:2003 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 7: Guidance for the assessment of conformity

ISO 4437:2007 Buried polyethylene (PE) pipes for the supply of gaseous fuels - Metric series - Specifications

ISO/NP 4437-1 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 1: General

ISO/NP 4437-2 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 2: Pipes

ISO/NP 4437-3 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 3: Fittings

ISO/NP 4437-5 Plastics piping systems for the supply of gaseous fuels - Polyethylene (PE) – Part 5: Fitness for purpose

ISO 6993-1:2006 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 6993-2:2006 Buried, high-impact poly(vinyl chloride) (PVC-HI) piping systems for the supply of gaseous fuels - Part 2: Fittings for a maximum operating pressure of 200 mbar (20 kPa)

ISO 6993-3:2006 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 8085-1:2001 Polyethylene fittings for use with polyethylene pipes for the supply of gaseous fuels - Metric series - Specifications - Part 1: Fittings for socket fusion using heated tools

ISO 8085-1:2001/Cor 1:2008

ISO 8085-2:2001 Polyethylene fittings for use with polyethylene pipes for the supply of gaseous fuels - Metric series - Specifications - Part 2: Spigot fittings for butt fusion, for socket fusion using heated tools and for use with electrofusion fittings

ISO 8085-2:2001/Cor 1:2001

ISO 8085-2:2001/Cor 2:2008

ISO 8085-3:2001 Polyethylene fittings for use with polyethylene pipes for the supply of gaseous fuels- Metric series - Specifications - Part 3: Electrofusion fittings

ISO 8085-3:2001/Cor 1:2007

ISO 8085-3:2001/Cor 2:2008

ISO 10838-1:2000 Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels - Part 1: Metal fittings for pipes of nominal outside diameter less than or equal to 63 mm

ISO 10838-2:2000 Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels - Part 2: Metal fittings for pipes of nominal outside diameter greater than 63 mm

ISO 10838-3:2001 Mechanical fittings for polyethylene piping systems for the supply of gaseous fuels - Part 3: Thermoplastics fittings for pipes of nominal outside diameter less than or equal to 63 mm

ISO 10933:1997 Polyethylene (PE) valves for gas distribution systems

ISO 12176-1:2006 Plastics pipes and fittings - Equipment for fusion jointing polyethylene systems - Part 1: Butt fusion

ISO 12176-2:2008 Plastics pipes and fittings - Equipment for fusion jointing polyethylene systems - Part 2: Electrofusion

ISO 12176-3:2011 Plastics pipes and fittings - Equipment for fusion jointing polyethylene systems - Part 3: Operator's badge

ISO 12176-4:2003 Plastics pipes and fittings - Equipment for fusion jointing polyethylene systems - Part 4: Traceability coding

ISO 13950:2007 Plastics pipes and fittings - Automatic recognition systems for electrofusion joints

ISO 13950:2007/Cor 1:2008

ISO 14531-1:2002 Plastics pipes and fittings - Crosslinked polyethylene (PE-X) pipe systems for the conveyance of gaseous fuels - Metric series - Specifications - Part 1: Pipes

ISO 14531-2:2004 Plastics pipes and fittings - Crosslinked polyethylene (PE-X) pipe systems for the conveyance of gaseous fuels - Metric series - Specifications - Part 2: Fittings for heat-fusion jointing

ISO 14531-3:2010 Plastics pipes and fittings - Crosslinked polyethylene (PE-X) pipe systems for the conveyance of gaseous fuels - Metric series - Specifications - Part 3: Fittings for mechanical jointing (including PE-X/metal transitions)

ISO 15439-1:2007 Plastics piping systems for the supply of gaseous fuels for maximum operating pressure up to and including 0,4 MPa (4 bar) - Polyamide (PA) - Part 1: General

ISO 15439-2:2007 Plastics piping systems for the supply of gaseous fuels for maximum operating pressure up to and including 0,4 MPa (4 bar) - Polyamide (PA) - Part 2: Pipes

ISO 15439-3:2007 Plastics piping systems for the supply of gaseous fuels for maximum operating pressure up to and including 0,4 MPa (4 bar) - Polyamide (PA) - Part 3: Fittings

ISO/DIS 16486-1 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 1: General

ISO/DIS 16486-2 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 2: Pipes

ISO/DIS 16486-3 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 3: Fittings

ISO/DIS 16486-5 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems with fusion jointing and mechanical jointing - Part 5: Fitness for purpose of the system

ISO/NP 17135-1 Plastics piping systems for the supply of gaseous fuels - Plasticized Polyamide (PA-P) piping systems for the supply of gaseous fuels - Piping systems with fusion jointing and mechanical jointing - Part 1: General

ISO/NP 17135-2 Plastics piping systems for the supply of gaseous fuels - Plasticized Polyamide (PA-P) piping systems for the supply of gaseous fuels - Piping systems with fusion jointing and mechanical jointing - Part 2: Pipes

ISO/NP 17135-3 Plastics piping systems for the supply of gaseous fuels - Plasticized Polyamide (PA-P) piping systems for the supply of gaseous fuels - Piping systems with fusion jointing and mechanical jointing - Part 3: Fittings

ISO/NP 17135-5 Plastics piping systems for the supply of gaseous fuels - Plasticized Polyamide (PA-P) piping systems for the supply of gaseous fuels - Piping systems with fusion jointing and mechanical jointing - Part 5: Fitness for purpose of the system

ISO/CD 17467-1 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems jointed by solvent cement - Part 1: General

ISO/CD 17467-2 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems jointed by solvent cement - Part 2: Pipes

ISO/CD 17467-3 Plastics piping systems for the supply of gaseous fuels - Unplasticized polyamide (PA-U) piping systems jointed by solvent cement - Part 3: Fittings

ISO 17484-1:2006 Plastics piping systems - Multilayer pipe systems for indoor gas installations with a maximum operating pressure up to and including 5 bar (500 kPa) - Part 1: Specifications for systems

ISO/AWI 17484-1 Plastics piping systems - Multilayer pipe systems for indoor gas installations with a maximum operating pressure up to and including 5 bar (500 kPa) - Part 1: Specifications for systems

ISO 17484-1:2006/Cor 1:2008

ISO 18225:2007 Plastics piping systems - Multilayer piping systems for outdoor gas installations - Specifications for systems

ISO/TS 18226:2006 Plastics pipes and fittings - Reinforced thermoplastics pipe systems for the supply of gaseous fuels for pressures up to 4 MPa (40 bar)

ISO/TR 19480:2005 Polyethylene pipes and fittings for the supply of gaseous fuels or water – Training and assessment of fusion operators

ISO 21307:2011 Plastics pipes and fittings - Butt fusion jointing procedures for polyethylene (PE) pipes and fittings used in the construction of gas and water distribution systems

ISO 22621-1:2007 Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) - Polyamide (PA) - Part 1: General

ISO 22621-2:2007 Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) - Polyamide (PA) - Part 2: Pipes

ISO 22621-3:2007 Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) - Polyamide (PA) - Part 3: Fittings

ISO 22621-5:2010 Plastics piping systems for the supply of gaseous fuels for maximum operating pressures up to and including 2 MPa (20 bar) - Polyamide (PA) - Part 5: Fitness for purpose of the system

## **7. SISTEMAS DE TUBAGEM EM MATERIAL PLÁSTICO PARA APLICAÇÕES INDUSTRIAIS**

### **7.1. ESPECIFICAÇÕES**

ISO 4433-1:1997 Thermoplastics pipes - Resistance to liquid chemicals - Classification - Part 1: Immersion test method

ISO 4433-2:1997 Thermoplastics pipes - Resistance to liquid chemicals - Classification - Part 2: Polyolefin pipes

ISO 4433-3:1997 Thermoplastics pipes - Resistance to liquid chemicals - Classification - Part 3: Unplasticized poly(vinyl chloride) (PVC-U), high-impact poly (vinyl chloride) (PVCHI) and chlorinated poly (vinyl chloride) (PVC-C) pipes

ISO 4433-4:1997 Thermoplastics pipes - Resistance to liquid chemicals - Classification - Part 4: Poly(vinylidene fluoride) (PVDF) pipes

ISO/TR 10358:1993 Plastics pipes and fittings - Combined chemical-resistance classification table

EN ISO 10931:2005 Plastics piping systems for industrial applications - Poly(vinylidene fluoride) (PVDF) - Specifications for components and the system (ISO 10931:2005)

EN ISO 15493:2003<sup>31</sup> Plastics piping systems for industrial applications - Acrylonitrile-butadienestyrene (ABS), unplasticized poly(vinyl chloride) (PVC-U) and chlorinated poly(vinyl chloride) (PVC-C) - Specifications for components and the system - Metric series (ISO 15493:2003)

ISO 15493:2003/Cor 1:2004

EN ISO 15494:2003 Plastics piping systems for industrial applications - Polybutene (PB), polyethylene (PE) and polypropylene (PP) - Specifications for components and the system - Metric series (ISO 15494:2003)

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<sup>31</sup>: Existe versão portuguesa NP, datada de 2007



## **8. NORMAS DE ÂMBITO GERAL APLICÁVEIS A SISTEMAS DE TUBAGEM DE MATERIAL PLÁSTICO**

EN 705:1994<sup>32</sup> Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Methods for regression analysis and their use

EN 705:1994/AC:1995 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Methods for regression analysis and their use

CEN/TR 852:2010 Plastics piping systems for the transport of water intended for human consumption - Migration assessment - Guidance on the interpretation of laboratory derived migration values

ISO 7245:1984 Pipes and fittings of acrylonitrile/butadiene/styrene (ABS) -- General specification for moulding and extrusion materials

ISO 7246:1984 Pipes and fittings of acrylonitrile/styrene/acrylester (ASA) -- General specification for moulding and extrusion materials

ISO 10928:2009 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Methods for regression analysis and their use

ISO/DTR 10986 Plastics piping systems for pressure and non-pressure applications - Installation of pipes above ground - Glass-reinforced thermosetting plastics (GRP) systems based on unsaturated polyester (UP) resin

EN ISO 12162:2009<sup>33</sup> Thermoplastics materials for pipes and fittings for pressure applications - classification, designation and design coefficient (ISO 12162:2009)

CEN/TS 14541:2007 Plastics pipes and fittings for non-pressure applications - Utilisation of non-virgin PVC-U, PP and PE materials

CEN/TS 14807:2004 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) - Guidance for the structural analysis of buried GRP-UP pipelines

CEN/TS 15223:2008 Plastics piping systems - Validated design parameters of buried thermoplastics piping systems (enterrados)

CEN/TR 15438:2007 Plastics piping systems - Guidance for coding of products and their intended uses

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<sup>32</sup>: Existe versão portuguesa NP, datada de 1998

<sup>33</sup>: Existe versão portuguesa NP, datada de 2010

CEN/TR 15729:2010 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) based on unsaturated polyester resin (UP) – Report on the determination of mean abrasion after a defined number of test cycles

ISO 16135:2006 Industrial valves - Ball valves of thermoplastics materials

ISO 16136:2006 Industrial valves - Butterfly valves of thermoplastics materials

ISO 16137:2006 Industrial valves - Check valves of thermoplastics materials

ISO 16138:2006 Industrial valves - Diaphragm valves of thermoplastics materials

ISO 16139:2006 Industrial valves - Gate valves of thermoplastics materials

ISO 21787:2006 Industrial valves - Globe valves of thermoplastics materials

ISO/WD TR 27165 Plastics piping systems - Wall constructions (including pressure and non-pressure systems)

## **9. NORMAS DE ENSAIO APLICÁVEIS A SISTEMAS DE TUBAGEM DE MATERIAL PLÁSTICO**

EN 579:1993<sup>34</sup> Plastics piping systems – Crosslinked polyethylene (PE-X) pipes - Determination of degree of crosslinking by solvent extraction

EN 580:2003<sup>35</sup> Plastics piping systems – Unplasticized poly(vinyl chloride) (PVC-U) pipes – Test method for the resistance to dichloromethane at a specified temperature (DCMT)

EN ISO 580:2005<sup>36</sup> Plastics piping and ducting systems - Injection-moulded thermoplastics fittings - Methods for visually assessing the effects of heating (ISO 580:2005)

EN 637:1994<sup>37</sup> Plastics piping systems - Glass-reinforced plastics components - Determination of the amounts of constituents using the gravimetric method

EN 637:1994/AC:1995 Plastics piping systems - Glass-reinforced plastics components - Determination of the amounts of constituents using the gravimetric method

EN 712:1993<sup>34</sup> Thermoplastics piping systems - End-load bearing mechanical joints between pressure pipes and fittings - Test method for resistance to pull-out under constant longitudinal force

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<sup>34</sup>: Existe versão portuguesa NP, datada de 1996

<sup>35</sup>: Existe versão portuguesa NP, datada de 2007

<sup>36</sup>: Existe versão portuguesa NP, datada de 2008

<sup>37</sup>: Existe versão portuguesa NP, datada de 1997

EN 713:1993<sup>34</sup> Plastics piping systems – Mechanical joints between fittings and polyolefin pressure pipes - Test method for leaktightness under internal pressure of assemblies subjected to bending

EN 714:1994<sup>38</sup> Thermoplastics piping systems - Non-end-load-bearing elastomeric sealing ring type joints between pressure pipes and moulded fittings -Test method for leaktightness under internal hydrostatic pressure without end thrust

EN 715:1994<sup>39</sup> Thermoplastics piping systems - End-load bearing joints between small diameter pressure pipes and fittings - Test method for leaktightness under internal water pressure, including end thrust

EN 727:1994<sup>40</sup> Plastics piping and ducting systems - Thermoplastics pipes and fittings - Determination of Vicat softening temperature (VST)

EN 728:1997<sup>40</sup> Plastics piping and ducting systems -Polyolefin pipes and fittings - Determination of oxidation induction time

EN 744:1995<sup>41</sup> Plastics piping and ducting systems - Thermoplastics pipes - Test method for resistance to external blows by the round-the-clock method

EN 761:1994<sup>38</sup> Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the creep factor under dry conditions

EN 761:1994/AC:1995 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the creep factor under dry conditions

EN 802:1994<sup>39</sup> Plastics piping and ducting systems - Injection-moulded thermoplastics fittings for pressure piping systems – Test method for maximum deformation by crushing

EN 803:1994<sup>39</sup> Plastics piping systems – Injection moulded thermoplastics fittings for elastic sealing ring type joints for pressure piping - Test method for resistance to a short-term internal pressure without end thrust

EN 804:1994<sup>38</sup> Plastics piping systems – Injection moulded socket fittings for solvent cemented joints for pressure piping – Test method for resistance to a short-term internal hydrostatic pressure

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<sup>38</sup>: Existe versão portuguesa NP, datada de 1997

<sup>39</sup>: Existe versão portuguesa NP, datada de 1996

<sup>40</sup>: Existe versão portuguesa NP, datada de 2000

<sup>41</sup>: Existe versão portuguesa NP, datada de 1998

EN 911:1995<sup>42</sup> Plastics piping systems – Elastomeric sealing ring type joints and mechanical joints for thermoplastics pressure piping - Test method for leaktightness under external hydrostatic pressure

EN 917:1997<sup>43</sup> Plastics piping systems – Thermoplastics valves - Test methods for resistance to internal pressure and leaktightness

EN 922:1994 Plastics piping and ducting systems - Pipes and fittings of unplasticized poly(vinyl chloride) (PVC-U) – Specimen preparation for determination of the viscosity number and calculation of the K-value

EN 1053:1995<sup>44</sup> Plastics piping systems – Thermoplastics piping systems for non-pressure applications - Test method for watertightness

EN 1054:1995<sup>44</sup> Plastics piping systems – Thermoplastics piping systems for soil and waste discharge - Test method for airtightness of joints

EN 1055:1996<sup>44</sup> Plastics piping systems – Thermoplastics piping systems for soil and waste discharge inside buildings - Test method for resistance to elevated temperature cycling

EN 1119:2009 Plastics piping systems - Joints for glass reinforced thermosetting plastics (GRP) pipes and fittings - Test methods for leaktightness and resistance to damage of non-thrust resistant flexible joints with elastomeric sealing elements

EN 1120:1996 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Determination of the resistance to chemical attack from the inside of a section in a deflected condition

EN ISO 1133:2005<sup>45</sup> Plastics -- Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics

EN ISO 1167-1:2006<sup>45</sup> Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 1: General method (ISO 1167-1:2006)

EN ISO 1167-2:2006<sup>46</sup> 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 1167-2:2006)

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<sup>42</sup>: Existe versão portuguesa NP, datada de 1998

<sup>43</sup>: Existe versão portuguesa NP, datada de 2000

<sup>44</sup>: Existe versão portuguesa NP, datada de 1997

<sup>45</sup>: Existe versão portuguesa NP, datada de 2007

<sup>46</sup>: Existe versão portuguesa NP, datada de 2007

EN ISO 1167-3:2007 Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 3: Preparation of components (ISO 1167-3:2007)

EN ISO 1167-4:2007 Thermoplastics pipes, fittings and assemblies for the conveyance of fluids - Determination of the resistance to internal pressure - Part 4: Preparation of assemblies (ISO 1167-4:2007)

EN ISO 1183-1:2004 Plastics -- Methods for determining the density of non-cellular plastics -- Part 1: Immersion method, liquid pycnometer method and titration method

EN ISO 1183-2:2004<sup>47</sup> Plastics -- Methods for determining the density of non-cellular plastics -- Part 2: Density gradient column method

EN 1226:1996 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes – Test method to prove the resistance to initial ring deflection

EN 1228:1996 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial specific ring stiffness

EN 1229:1996<sup>48</sup> Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the leaktightness of the wall under short-term internal pressure

EN 1277:2003 Plastics piping systems – Thermoplastics piping systems for buried non-pressure applications - Test methods for leaktightness of elastomeric sealing ring type joints

EN 1393:1996<sup>49</sup> Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of initial longitudinal tensile properties

EN 1393:1996/AC:1997 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes -Determination of initial longitudinal tensile properties

EN 1394:1996 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the apparent initial circumferential tensile strength

EN 1394:1996<sup>50</sup>/AC:1997 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the apparent initial circumferential tensile strength

EN 1411:1996 Plastics piping and ducting systems - Thermoplastics pipes - Determination of resistance to external blows by the staircase method

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<sup>47</sup>: Existe versão portuguesa NP, datada de 2011

<sup>48</sup>: Existe versão portuguesa NP, datada de 2001

<sup>49</sup>: Existe versão portuguesa NP, datada de 2000

<sup>50</sup>: Existe versão portuguesa NP, datada de 2000

EN 1437:2002 Plastics piping systems - Piping systems for underground drainage and sewerage - Test method for resistance to combined temperature cycling and external loading

EN 1447:2009+A1:2010<sup>51</sup> Plastics piping systems. Glass-reinforced thermosetting plastics (GRP) pipes. Determination of long-term resistance to internal pressure

EN 1448:1997<sup>50</sup> Plastics piping systems. Glass-reinforced thermosetting plastics (GRP) components. Test methods to prove the design of rigid locked socket-and-spigot joints with elastomeric seals

EN 1449:1997<sup>50</sup> Plastics piping systems. Glass reinforced thermosetting plastics (GRP) components. Test methods to prove the design of cemented socket-and-spigot joints

EN 1450:1997<sup>50</sup> Plastics piping systems. Glass-reinforced thermosetting plastics (GRP) components. Test methods to prove the design of bolted flange joints

EN 1638:1997 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes – Test method for the effects of cyclic internal pressure

EN 1680:1997 Plastics piping systems - Valves for polyethylene (PE) piping systems – Test method for leaktightness under and after bending applied to the operating mechanisms

EN 1704:1997<sup>52</sup> Plastics piping systems – Thermoplastics valves - Test method for the integrity of a valve after temperature cycling under bending

EN 1705:1996 Plastics piping systems – Thermoplastics valves - Test method for the integrity of a valve after an external blow

EN 1716:1997<sup>53</sup> Plastics piping systems – Polyethylene (PE) tapping tees - Test method for impact resistance of an assembled tapping tee

EN 1862:1997<sup>54</sup> Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes -Determination of the relative flexural creep factor following exposure to a chemical environment

EN 1905:1998 Plastics piping systems – Unplasticized poly(vinyl chloride) (PVC-U) pipes, fittings and material - Method for assessment of the PVC content based on total chlorine content

EN 1979:1999 Plastics piping and ducting systems - Thermoplastics spirally-formed structured-wall pipes - Determination of the tensile strength of a seam

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<sup>51</sup>: Existe versão portuguesa NP, datada de 2011

<sup>52</sup>: Existe versão portuguesa NP, datada de 1999

<sup>53</sup>: Existe versão portuguesa NP, datada de 2000

<sup>54</sup>: Existe versão portuguesa NP, datada de 2002

EN ISO 2505:2005<sup>55</sup> Thermoplastics pipes – Longitudinal reversion - Test method and parameters (ISO 2505:2005)

ISO 2507-1:1995 Thermoplastics pipes and fittings - Vicat softening temperature - Part 1: General test method

ISO 2507-2:1995 Thermoplastics pipes and fittings - Vicat softening temperature - Part 2: Test conditions for unplasticized poly(vinyl chloride) (PVC-U) or chlorinated poly(vinyl chloride) (PVC-C) pipes and fittings and for high impact resistance poly (vinyl chloride) (PVC-HI) pipes

ISO 2507-3:1995 Thermoplastics pipes and fittings - Vicat softening temperature - Part 3: Test conditions for acrylonitrile/butadiene/styrene (ABS) and acrylonitrile/styrene/acrylic ester (ASA) pipes and fittings

ISO 3114:1977 Unplasticized polyvinyl chloride (PVC) pipes for potable water supply - Extractability of lead and tin - Test method

EN ISO 3126:2005 Plastics piping systems – Plastics components - Determination of dimensions (ISO 3126:2005)

ISO 3127:1994 Thermoplastics pipes - Determination of resistance to external blows - Round-the clock method

ISO 3213:2009 Polypropylene (PP) pipes - Effect of time and temperature on the expected strength

ISO 3458:1976 Assembled joints between fittings and polyethylene (PE) pressure pipes - Test of leakproofness under internal pressure

ISO 3459:1976 Polyethylene (PE) pressure pipes - Joints assembled with mechanical fittings - Internal under-pressure test method and requirement

ISO 3501:1976 Assembled joints between fittings and polyethylene (PE) pressure pipes - Test of resistance to pull out

ISO 3503:1976 Assembled joints between fittings and polyethylene (PE) pressure pipes - Test of leakproofness under internal pressure when subjected to bending

ISO 3514:1976 Chlorinated polyvinyl chloride (CPVC) pipes and fittings - Specification and determination of density

ISO 3603:1977 Fittings for unplasticized polyvinyl chloride (PVC) pressure pipes with elastic sealing ring type joints - Pressure test for leakproofness

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<sup>55</sup>: Existe versão portuguesa NP, datada de 2006

ISO 4059:1978 Polyethylene (PE) pipes - Pressure drop in mechanical pipe-jointing systems - Method of test and requirements

ISO 4439:1979 Unplasticized polyvinyl chloride (PVC) pipes and fittings - Determination and specification of density

EN ISO 6259-1:2001 Thermoplastics pipes - Determination of tensile properties - Part 1: General testmethod (ISO 6259-1:1997)

ISO 6259-2:1997 Thermoplastics pipes - Determination of tensile properties - Part 2: Pipes made of unplasticized poly(vinyl chloride) (PVC-U), chlorinated poly (vinyl chloride) (PVC-C) and high-impact poly (vinyl chloride) (PVC-HI)

ISO 6259-3:1997 Thermoplastics pipes - Determination of tensile properties - Part 3: Polyolefin pipes

ISO 6964:1986 Polyolefin pipes and fittings - Determination of carbon black content by calcinations and pyrolysis - Test method and basic specification

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

ISO 7432:2002 Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the design of locked socket-and-spigot joints, including double-socket joints, with elastomeric seals

ISO 7509:2000 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of time to failure under sustained internal pressure

ISO 7510:1997 Plastics piping systems - Glass-reinforced plastics (GRP) components - Determination of the amounts of constituents using the gravimetric method

ISO 7511:1999 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the leaktightness of the wall under short-term internal pressure

ISO 7684:1997 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the creep factor under dry conditions

ISO 7685:1998 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes -Determination of initial specific ring stiffness

EN ISO 7686:2005<sup>56</sup> Plastics pipes and fittings – Determination of opacity (ISO 7686:2005)

ISO 8233:1988 Thermoplastics valves - Torque - Test method

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<sup>56</sup>: Existe versão portuguesa NP, datada de 2007



ISO 8361-1:1991 Thermoplastics pipes and fittings - Water absorption - Part 1: General test method

ISO 8361-2:1991 Thermoplastics pipes and fittings - Water absorption - Part 2: Test conditions for unplasticized poly(vinyl chloride) (PVC-U) pipes and fittings

ISO 8361-3:1991 Thermoplastics pipes and fittings - Water absorption - Part 3: Test conditions for acrylonitrile/butadiene/styrene (ABS) pipes and fittings

ISO 8483:2003 Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the design of bolted flange joints

ISO 8483:2003/DAmD 1

ISO 8513:2000 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Determination of longitudinal tensile properties

ISO/DIS 8513 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Test methods for the determination of the apparent initial longitudinal tensile strength

ISO 8521:2009 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Test methods for the determination of the apparent initial circumferential tensile strength

ISO 8533:2003 Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Test methods to prove the design of cemented or wrapped joints

ISO 8533:2003/DAmD 1

ISO 8639:2000 Glass-reinforced thermosetting plastics (GRP) pipes and fittings -- Test methods for leaktightness of flexible joints

ISO 8659:1989 Thermoplastics valves - Fatigue strength - Test method

EN ISO 8795:2001 Plastics piping systems for the transport of water intended for human consumption - Migration assessment - Determination of migration values of plastics pipes and fittings and their joints (ISO 8795:2001)

ISO 8796:2004 Polyethylene PE 32 and PE 40 pipes for irrigation laterals - Susceptibility to environmental stress cracking induced by insert-type fittings - Test method and requirements

EN ISO 9080:2003 Plastics piping and ducting systems - Determination of the long-term hydrostatic strength of thermoplastics materials in pipe form by extrapolation (ISO 9080:2003)

ISO 9311-1:2005 Adhesives for thermoplastic piping systems - Part 1: Determination of film properties

ISO 9311-2:2002 Adhesives for thermoplastic piping systems - Part 2: Determination of shear strength

ISO 9311-3:2005 Adhesives for thermoplastic piping systems - Part 3: Test method for the determination of resistance to internal pressure

ISO 9393-1:2004 Thermoplastics valves for industrial applications - Pressure test methods and requirements - Part 1: General

ISO 9393-2:2005 Thermoplastics valves for industrial applications - Pressure test methods and requirements - Part 2: Test conditions and basic requirements

ISO 9852:2007 Unplasticized poly(vinyl chloride) (PVC-U) pipes - Dichloromethane resistance at specified temperature (DCMT) - Test method

ISO 9853:1991 Injection-moulded unplasticized poly(vinyl chloride) (PVC-U) fittings for pressure pipe systems - Crushing test

ISO 9854-1:1994 Thermoplastics pipes for the transport of fluids - Determination of pendulum impact strength by the Charpy method - Part 1: General test method

ISO 9854-2:1994 Thermoplastics pipes for the transport of fluids - Determination of pendulum impact strength by the Charpy method - Part 2: Test conditions for pipes of various materials

EN ISO 9967:2007 Thermoplastics pipes - Determination of creep ratio (ISO 9967:2007)

EN ISO 9969:2007<sup>57</sup> Thermoplastics pipes - Determination of ring stiffness (ISO 9969:2007)

ISO 10146:1997 Crosslinked polyethylene (PE-X) pipes - Effect of time and temperature on the expected strength

ISO 10147:2004 Pipes and fittings made of crosslinked polyethylene (PE-X) - Estimation of the degree of crosslinking by determination of the gel content

ISO/PRF 10147 Pipes and fittings made of crosslinked polyethylene (PE-X) - Estimation of the degree of crosslinking by determination of the gel content

ISO 10147:2004/Amd 1:2008

ISO 10466:1997 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes - Test method to prove the resistance to initial ring deflection

ISO 10468:2003 Glass-reinforced thermosetting plastics (GRP) pipes -- Determination of the long term specific ring creep stiffness under wet conditions and calculation of the wet creep factor

ISO 10468:2003/Amd 1:2010

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<sup>57</sup>: Existe versão portuguesa NP, datada de 2009

ISO 10471:2003 Glass-reinforced thermosetting plastics (GRP) pipes - Determination of the long term ultimate bending strain and the long-term ultimate relative ring deflection under wet conditions

ISO 10471:2003/Amd 1:2010

ISO 10952:2008 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes and fittings - Determination of the resistance to chemical attack for the inside of a section in a deflected condition

ISO 11173:1994 Thermoplastics pipes - Determination of resistance to external blows – Staircase method

ISO 11413:2008 Plastics pipes and fittings - Preparation of test piece assemblies between a polyethylene (PE) pipe and an electrofusion fitting

ISO 11414:2009 Plastics pipes and fittings - Preparation of polyethylene (PE) pipe/pipe or pipe/fitting test piece assemblies by butt fusion

ISO 11673:2005 Unplasticized poly(vinyl chloride) (PVC-U) pressure pipes - Determination of the fracture toughness properties

EN 12061:1999 Plastics piping systems – Thermoplastics fittings - Test method for impact resistance

ISO 12091:1995 Structured-wall thermoplastics pipes - Oven test

EN 12095:1997<sup>58</sup> Plastics piping systems - Brackets for rainwater piping systems - Test method for bracket strength

EN 12099:1997<sup>59</sup> Plastics piping systems – Polyethylene piping materials and components - Determination of volatile content

EN 12100:1997<sup>60</sup> Plastics piping systems – Polyethylene (PE) valves - Test method for resistance to bending between supports

EN 12106:1997<sup>59</sup> Plastics piping systems – Polyethylene (PE) pipes - Test method for the resistance to internal pressure after application of squeeze-off

EN 12117:1997<sup>61</sup> Plastics piping systems - Fittings, valves and ancillaries - Determination of gaseous flow rate/pressure drop relationships

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<sup>58</sup>: Existe versão portuguesa NP, datada de 1998

<sup>59</sup>: Existe versão portuguesa NP, datada de 2000

<sup>60</sup>: Existe versão portuguesa NP, datada de 2001

<sup>61</sup>: Existe versão portuguesa NP, datada de 2002

EN 12118:1997<sup>61</sup> Plastics piping systems – Determination of moisture content in thermoplastics by coulometry

EN 12119:1997<sup>61</sup> Plastics piping systems – Polyethylene (PE) valves - Test method for resistance to thermal cycling

ISO 12162:2009 Thermoplastics materials for pipes and fittings for pressure applications - Classification, designation and design coefficient

ISO 12230:1996 Polybutene (PB) pipes - Effect of time and temperature on the expected strength

ISO/DIS 13056 Plastics piping systems - Pressure systems for hot and cold water - Test method for leaktightness under vacuum

EN 12256:1998<sup>59</sup> Plastics piping systems – Thermoplastics fittings - Test method for mechanical strength or flexibility of fabricated fittings

EN 12293:1999 Plastics piping systems – Thermoplastics pipes and fittings for hot and cold water - Test method for the resistance of mounted assemblies to temperature cycling

EN 12294:1999<sup>61</sup> Plastics piping systems - Systems for hot and cold water - Test method for leaktightness under vacuum

EN 12295:1999<sup>62</sup> Plastics piping systems – Thermoplastics pipes and associated fittings for hot and cold water - Test method for resistance of joints to pressure cycling

ISO/DIS 12512 Plastics piping systems - Glass-reinforced thermosetting plastics (GRP) pipes –Determination of initial specific ring stiffness and resistance to initial ring deflection using segment test pieces cut from a pipe

ISO 13229:2010 Thermoplastics piping systems for non-pressure applications - Unplasticized poly (vinyl chloride) (PVC-U) pipes and fittings - Determination of the viscosity number and K-value

ISO 13254:2010 Thermoplastics piping systems for non-pressure applications - Test method for watertightness

ISO 13255:2010 Thermoplastics piping systems for soil and waste discharge inside buildings – Test method for airtightness of joints

ISO 13257:2010 Thermoplastics piping systems for non-pressure applications - Test method for resistance to elevated temperature cycling

ISO 13259:2010 Thermoplastics piping systems for underground non-pressure applications – Test method for leaktightness of elastomeric sealing ring type joints

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<sup>62</sup>: Existe versão portuguesa NP, datada de 2002

ISO 13260:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Test method for resistance to combined temperature cycling and external loading

ISO 13262:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics spirally-formed structured-wall pipes – Determination of the tensile strength of a seam

ISO 13263:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics fittings - Test method for impact strength

ISO 13264:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics fittings - Test method for mechanical strength or flexibility of fabricated fittings

ISO 13265:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Joints for buried non-pressure applications - Test method for the long term sealing performance of joints with elastomeric seals by estimating the sealing pressure

ISO 13266:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics shafts or risers for inspection chambers and manholes - Determination of resistance against surface and traffic loading

ISO 13267:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics inspection chamber and manhole bases – Test methods for buckling resistance

ISO 13268:2010 Thermoplastics piping systems for non-pressure underground drainage and sewerage - Thermoplastics shafts or risers for inspection chambers and manholes - Determination of ring stiffness

EN ISO 13477:2008 Thermoplastics pipes for the conveyance of fluids - Determination of resistance to rapid crack propagation (RCP) - Small-scale steady-state test (S4 test) (ISO 13477:2008)

EN ISO 13478:2007 Thermoplastics pipes for the conveyance of fluids - Determination of resistance to rapid crack propagation (RCP) Full-scale test (FST) (ISO 13478:2007)

EN ISO 13479:2009 Polyolefin pipes for the conveyance of fluids - Determination of resistance to crack propagation - Test method for slow crack growth on notched pipes (ISO 13479:2009)

ISO 13480:1997 Polyethylene pipes - Resistance to slow crack growth - Cone test method

EN ISO 13760:1998 Plastics pipes for the conveyance of fluids under pressure - Miner's rule - Calculation method for cumulative damage (ISO 13760:1998)

ISO 13761:1996 Plastics pipes and fittings - Pressure reduction factors for polyethylene pipeline systems for use at temperatures above 20 degrees C

EN ISO 13783:1997<sup>63</sup> Plastics piping systems – Unplasticized poly(vinyl chloride) (PVC-U) end-load bearing double socket joints – Test method for leaktightness and strength while subjected to bending and internal pressure (ISO 13783:1997)

EN ISO 13844:2000<sup>63</sup> Plastics piping systems – Elastomeric sealing-ring-type socket joints of unplasticized poly(vinyl chloride) (PVC-U) for use with PVC-U pipes - Test method for leaktightness under negative pressure (ISO 13844:2000)

EN ISO 13845:2000<sup>63</sup> Plastics piping systems – Elastomeric sealing- ring-type socket for use with unplasticized poly(vinyl chloride) (PVC-U) pipes - Test method for leaktightness under internal pressure and with angular deflection (ISO 13845:2000)

EN ISO 13846:2000<sup>63</sup> Plastics piping systems - End-load bearing and non-end-load-bearing assemblies and joints for thermoplastics pressure piping - Test method for long-term leaktightness under internal water pressure (ISO 13846:2000)

ISO 13924:2000 Plastics pipes and fittings - Bending-tensile cycle test for PE/metal transition fittings, PE tapping tees and PE branch saddles

ISO 13951:2001 Plastics piping systems - Test method for the resistance of polyolefin pipe/pipe or pipe/fitting assemblies to tensile loading

ISO 13953:2001 Polyethylene (PE) pipes and fittings - Determination of the tensile strength and failure mode of test pieces from a butt-fused joint

ISO 13954:1997 Plastics pipes and fittings - Peel decohesion test for polyethylene (PE) electrofusion assemblies of nominal outside diameter greater than or equal to 90 mm

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ISO 13957:1997 Plastics pipes and fittings - Polyethylene (PE) tapping tees - Test method for impact resistance

EN ISO 13967:2009 Thermoplastics fittings – Determination of ring stiffness (ISO 13967:2009)

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<sup>63</sup>: Existe versão portuguesa NP, datada de 2002

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EN 14741:2006<sup>65</sup> Thermoplastics piping and ducting systems. Joints for buried non-pressure applications. Test method for the long-term sealing performance of joints with elastomeric seals by estimating the sealing pressure

EN 14802:2005 Plastics piping systems – Thermoplastics shafts or risers for inspection chambers and manholes - Determination of resistance against surface and traffic loading

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ISO 14828:2003/Amd 1:2010

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EN 15014:2007 Plastics piping systems - Buried and above ground systems for water and other fluids under pressure - Performance characteristics for pipes, fittings and their joints

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ISO 15306:2003/D Amd 1

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ISO 16241:2005 Notch tensile test to measure the resistance to slow crack growth of polyethylene materials for pipe and fitting products (PENT)

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<sup>64</sup>: Existe versão portuguesa NP, datada de 2010

<sup>65</sup>: Existe versão portuguesa NP, datada de 2007

ISO/DTS 16479 Thermoplastics pipes for the conveyance of fluids - Determination of the slow cracking resistance of pipes and fittings using the Notched Ring Test (NRT)

EN ISO 16871:2003 Plastics piping and ducting systems - Plastics pipes and fittings - Method for exposure to direct (natural) weathering (ISO 16871:2003)

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ISO 18373-1:2007 Rigid PVC pipes - Differential scanning calorimetry (DSC) method - Part 1: Measurement of the processing temperature

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ISO 18553:2002 Method for the assessment of the degree of pigment or carbon black dispersion in polyolefin pipes, fittings and compounds

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Lisboa e Laboratório Nacional de Engenharia Civil, em Novembro de 2011

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