

<b>STN P</b>	<b>Potrubné systémy z plastov Validované návrhové parametre potrubných systémov z termoplastov uložených v zemi</b>	<b>STN P CEN/TS 15223</b>  64 3034
------------------	---	--

Plastics piping systems - Validated design parameters of buried thermoplastics piping systems

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/18

Táto predbežná norma je určená na overenie. Pripomienky zasielajte ÚNMS SR najneskôr do novembra 2019.

Obsahuje: CEN/TS 15223:2017

Oznámením tejto normy sa ruší  
STN P CEN/TS 15223 (64 3034) z februára 2009

**126490**

TECHNICAL SPECIFICATION

CEN/TS 15223

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

November 2017

ICS 23.040.01

Supersedes CEN/TS 15223:2008

English Version

## Plastics piping systems - Validated design parameters of buried thermoplastics piping systems

Systèmes de canalisations en matières plastiques -  
Paramètres de calcul validés pour les systèmes  
enterrés de canalisations en matières  
thermoplastiques

Kunststoff-Rohrleitungssysteme - Bestätigte  
Berechnungsparameter von erdverlegten  
thermoplastischen Rohrleitungssystemen

This Technical Specification (CEN/TS) was approved by CEN on 4 September 2017 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

**CEN/TS 15223:2017 (E)**

<b>Contents</b>	<b>Page</b>
European foreword.....	4
Introduction .....	5
<b>1 Scope.....</b>	<b>6</b>
<b>2 Normative references.....</b>	<b>6</b>
<b>3 Terms, definitions, symbols and abbreviations.....</b>	<b>7</b>
<b>3.1 Terms and definitions .....</b>	<b>7</b>
<b>3.2 Symbols.....</b>	<b>8</b>
<b>3.3 Abbreviations .....</b>	<b>9</b>
<b>4 Route for structural design.....</b>	<b>9</b>
<b>4.1 General.....</b>	<b>9</b>
<b>4.2 Structural design based on practical experience .....</b>	<b>12</b>
<b>4.3 Structural design based on design calculations.....</b>	<b>13</b>
<b>5 Functional design non-pressure .....</b>	<b>13</b>
<b>5.1 General.....</b>	<b>13</b>
<b>5.2 Material.....</b>	<b>13</b>
<b>5.3 Strain .....</b>	<b>14</b>
<b>5.4 Flow capacity .....</b>	<b>14</b>
<b>5.5 Temperature.....</b>	<b>15</b>
<b>5.6 Ring buckling.....</b>	<b>15</b>
<b>5.7 Longitudinal effects.....</b>	<b>16</b>
<b>5.7.1 General.....</b>	<b>16</b>
<b>5.7.2 Axial bending.....</b>	<b>17</b>
<b>5.7.3 Allowable cold bending.....</b>	<b>17</b>
<b>6 Functional design pressure .....</b>	<b>17</b>
<b>6.1 General.....</b>	<b>17</b>
<b>6.2 Material.....</b>	<b>17</b>
<b>6.3 Design coefficient.....</b>	<b>18</b>
<b>6.4 Pressure rating PN .....</b>	<b>18</b>
<b>6.5 Flow capacity .....</b>	<b>18</b>
<b>6.6 Temperature.....</b>	<b>19</b>
<b>6.6.1 Temperature dependence of the nominal working pressure of PE piping systems.....</b>	<b>19</b>
<b>6.6.2 Temperature dependence of the nominal working pressure of PVC piping systems.....</b>	<b>19</b>
<b>6.7 Working pressure .....</b>	<b>20</b>
<b>6.7.1 Buckling resistance for negative pressure applications.....</b>	<b>20</b>
<b>6.7.2 PFA, PMA and PEA.....</b>	<b>20</b>
<b>6.8 Water hammer .....</b>	<b>20</b>
<b>6.9 Ring buckling.....</b>	<b>21</b>
<b>6.10 Longitudinal effects.....</b>	<b>22</b>
<b>6.10.1 Axial bending.....</b>	<b>22</b>
<b>6.10.2 Cold bending limits.....</b>	<b>22</b>
<b>6.11 Joints .....</b>	<b>23</b>
<b>7 Structural design.....</b>	<b>23</b>
<b>7.1 General.....</b>	<b>23</b>
<b>7.2 Behaviour of installed plastic pipes in soil.....</b>	<b>24</b>

<b>7.3</b>	<b>Structural design based on practical experience</b> .....	<b>25</b>
<b>7.3.1</b>	<b>General</b> .....	<b>25</b>
<b>7.3.2</b>	<b>Values for installation phase</b> .....	<b>26</b>
<b>7.3.3</b>	<b>Values for final deflection</b> .....	<b>27</b>
<b>7.4</b>	<b>Structural design based on a design calculations</b> .....	<b>28</b>
<b>8</b>	<b>Guidance for verification of installation</b> .....	<b>28</b>
<b>9</b>	<b>Commissioning</b> .....	<b>29</b>
<b>9.1</b>	<b>General</b> .....	<b>29</b>
<b>9.2</b>	<b>Non pressure pipe</b> .....	<b>29</b>
<b>9.3</b>	<b>Pressure pipe</b> .....	<b>29</b>
<b>Annex A (informative) Time dependency of stress and strain in buried flexible piping systems</b> .....		<b>30</b>
<b>Annex B (informative) Soil / pipe behaviour</b> .....		<b>31</b>
<b>Annex C (informative) Verification against limit states for non-pressure pipes</b> .....		<b>33</b>
<b>Annex D (informative) Flow capacity charts (non-pressure)</b> .....		<b>34</b>
<b>Bibliography</b> .....		<b>36</b>

**CEN/TS 15223:2017 (E)****European foreword**

This document (CEN/TS 15223:2017) has been prepared by Technical Committee CEN/TC 155 “Plastics piping systems and ducting systems”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 15223:2008.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## **Introduction**

In Europe, several design methods exist and some are still under development. The plastics pipes industry has carried out a lot of research with full-scale trials. From these researches, graphs have been made that show the deflection in the pipes immediately after installation. In addition, the so-called settlement period is measured. This settlement will always take place. In case that heavy traffic is present, the final deflection will be reached faster.

It is strongly advised to check any calculated deflection with the values in the two design graphs.

The information compiled is meant to be used by designers. The values given are meant for general guidance.

For the purpose of design using simple methods, two compactible soil groups are used, granular and cohesive.

If applicable, reference is made to EN 1295-1, EN 1610, CEN/TR 1046 and national practices.

**CEN/TS 15223:2017 (E)****1 Scope**

This Technical Specification covers validated design parameters of buried thermoplastics piping systems for functional and structural design for the following applications:

- pressure (excluding piping systems for gaseous fluids and industrial applications);
- non-pressure.

The functional design is based on relevant standards and commonly used practices.

Depending on the project parameters, the route for structural design can be

- either established by long term experience (within certain limitations),
- or calculated according to CEN/TR 1295-2 [8] by using thermoplastic pipe material related properties and design criteria.

NOTE 1 The route for the structural design is shown in the flowchart given in Figure 1 in 4.1.

NOTE 2 Industrial applications also includes district heating

Since in practice precise details of types of soil and installation conditions are not always available at the design stage, the choice of design assumptions is left to the judgement of the designer/specifier. In this connection, this guide can only provide general indications and advice.

**2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 476, *General requirements for components used in drains and sewers*

EN 805, *Water supply - Requirements for systems and components outside buildings*

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

EN 1610:2015, *Construction and testing of drains and sewers*

CEN/TR 1046:2013, *Thermoplastics piping and ducting systems - Systems outside building structures for the conveyance of water or sewage - Practices for underground installation*

EN ISO 9969, *Thermoplastics pipes - Determination of ring stiffness (ISO 9969)*

EN ISO 12162, *Thermoplastics materials for pipes and fittings for pressure applications - Classification, designation and design coefficient (ISO 12162)*

EN ISO 13968, *Plastics piping and ducting systems - Thermoplastics pipes - Determination of ring flexibility (ISO 13968)*

**koniec náhľadu – text ďalej pokračuje v platenej verzii STN**