



SLOVENSKI STANDARD

SIST EN 14125:2005

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Cevovodi iz kovinskih gibljivih cevi in cevi iz plastomerov za podzemne napeljave za bencinske servise

Thermoplastic and flexible metal pipework for underground installation at petrol filling stations

Thermoplastische und flexible metallene Rohrleitungen für erdverlegte Installationen für Tankstelle

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Tuyauteries enterrées thermoplastiques et tuyauteries métalliques flexibles pour stations -service

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23.040.10	Železne in jeklene cevi	Iron and steel pipes
75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment
83.140.30	Cevi, fitingi in ventili iz polimernih materialov	Plastics pipes, fittings and valves

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EUROPEAN STANDARD

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Thermoplastic and flexible metal pipework for underground installation at petrol filling stations

Tuyauteries enterrées thermoplastiques et en métaux flexibles pour stations-service

Thermoplastische und flexible metallene Rohrleitungen für erdverlegte Installationen für Tankstelle

This European Standard was approved by CEN on 15 November 2004.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

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Foreword

This document (EN 14125:2004) has been prepared by Technical Committee CEN/TC 221 “Shop fabricated metallic tanks and equipment for storage tanks and for service stations”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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Introduction

The purpose of this document is to ensure the suitability of underground pipework for conveying liquid fuels and their vapours at petrol filling stations.

NOTE Pipework should have a designated means of connector specified by the manufacturer or supplier.

Pipework for underground installation at petrol filling stations generally has a diameter less than 100 mm and is therefore outside the scope of the Pressure Equipment Directive (PED) 97/23/EC. Pipework with an internal diameter greater than or equal 100 mm could be within the scope of the PED.

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1 Scope

This document specifies requirements for underground pipework systems used to transfer liquid fuels and their vapours at petrol filling stations. Minimum performance requirements covering fitness for purpose, safety and environmental protection are given.

This document applies to pipework made from thermoplastics, which may include some degree of reinforcement, and to flexible metal pipework. It does not apply to fibre reinforced thermosets, commonly referred to as glass fibre reinforced plastic (GRP), nor to rigid metals.

This document applies to:

- delivery pipes from tanks to dispensers, including positive pressure, vacuum suction and siphon modes;
- fill pipes from road tankers to tanks;
- vapour recovery and vent pipework;
- pipework for secondary containment;
- connectors.

It does not apply to pipework for use with liquefied petroleum gas.

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2 Normative references

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

EN 2243-2, *Aerospace series – Structural adhesives – Test methods – Part 2: Peel metal-metal*

EN 13463-1:2001, *Non-electrical equipment for potentially explosive atmospheres – Part 1: Basic method and requirements*

EN 60243-2, *Electric strength of insulating materials – Test methods - Part 2: Additional requirements for tests using direct voltage (IEC 60243-2:2001)*

EN ISO 4892-2, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc sources (ISO 4892-2:1994)*

EN ISO 11306, *Corrosion of metals and alloys – Guidelines for exposing and evaluating metals and alloys in surface seawater (ISO 11306:1998)*

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

CLC/TR 50404, *Electrostatics – Code of practice for the avoidance of hazards due to static electricity*

IEC 60093, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*

ISO 3458, *Assembled joints between fittings and polyethylene (PE) pressure pipes – Test of leakproofness under internal pressure*

ISO 6259-3, *Thermoplastics pipes – Determination of tensile properties – Part 3: Polyolefin pipes*

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ISO 11922-1, *Thermoplastics pipes for the conveyance of fluids – Dimensions and tolerances – Part 1: Metric series*

3 Terms and definitions

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

3.1**pipework system**

pipes and connectors used to convey or retain liquid fuels and their vapours

3.2**connector**

coupler, elbow, reducer, tee or cap, or flange or other component supplied to connect one pipe to another or pipework to equipment

3.3**flexible pipe**

pipe that can be bent by hand to any radius above a set minimum without any change in performance

3.4**primary delivery pipework**

pipework designed to convey liquid fuels by positive pressure or vacuum suction

3.5**fill pipework**

pipework designed to convey liquid fuels from a delivery tanker to an underground storage tank by gravity discharge

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3.6**vent pipework**

pipework designed to convey vapour from a storage tank to the atmosphere

3.7**vapour recovery pipework**

pipework designed to convey vapour (or condensate) to or from a storage tank

3.8**liquid fuel**

commercially available petrol and diesel fuel comprising a complex mixture of volatile hydrocarbon compounds in the C₄ to C₁₂ range

3.9**secondary containment**

system in which the outer secondary is separated continuously from the primary by an interstitial space consisting of an annulus between the primary and the secondary pipes and fittings over the whole length of the system, designed so as to prevent leakage of fuel from the primary system entering the environment

3.10**design pressure (P_d)**

maximum effective pressure of the fluid in the piping system, expressed in bar, which is allowed in continuous use

4 Classes and dimensions

4.1 Classes of pipework

Pipes for underground fuel distribution shall conform to one of the following two classes:

Class 1 – Double wall pipework capable of containing and facilitating the detection of leakage from a primary delivery pipe.

Class 2 – Single wall pipework.

The primary pipe of Class 1, and pipes of Class 2, shall conform to one of Types A or B. The secondary pipe of Class 1 shall conform to one of Types C1 or C2.

Type A. Plastic systems

Pipes shall be principally made of thermoplastic polymers, with some metal or fibre reinforcement optional.

Type B. Flexible metal systems

Pipes shall comprise a fluid tight primary pipe made of a metal.

Type C. Secondary containment

Type C1: A pipe system designed to contain any leakage from the primary pipe. The system is at atmospheric pressure.

Type C2: A pipe system designed to contain any leakage from the primary pipe. The system is designed to meet the performance criteria of Class I leak detection systems according to EN 13160-1, EN 13160-2 and EN 13160-7.

4.2 Connectors

All pipework shall include connectors to provide leak-tight attachment to other systems, terminations, branches and changes of direction.

4.3 Dimensional tolerances

The external diameter and wall thickness shall be stated by the manufacturer. For plastic pipework the tolerance on the external diameter shall be according to ISO 11922-1, Grade B, and the tolerance on the out-of-roundness shall be according to ISO 11922-1, Grade N.

5 Physical properties

5.1 Pressure

5.1.1 General

Operating and test pressures shall be in accordance with Table 1 according to the application.

All pressures in Table 1 are gauge pressures.

Table 1 — Operating and test pressures for pipework

Application	Operating pressure bar	Test vacuum bar	Lower test pressure bar	Higher test pressure bar
Primary delivery pipework: positive pressure	+3,5	–	+5,0 ± 0,1	+30,0 ± 1,0
Primary delivery pipework: vacuum suction including siphons	-0,6	-0,9 ± 0,05	+5,0 ± 0,1	
Vents and vapour recovery pipework	1,0	-0,9 ± 0,05	+5,0 ± 0,1	
Fill pipework	1,0	–	+5,0 ± 0,1	
Secondary containment Type C1	+0,5	–	+1,0 ± 0,02	
Secondary containment Type C2	-0,5 to +4,5	-0,6 ± 0,05	+5,0 ± 0,1	+10 ± 0,2

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5.1.2 Hydrostatic pressure

This requirement applies to all pipes and connectors.

When tested in accordance with 7.2.1.1, all pipes and connectors, sampled according to 7.1.2 and connected together as one or more assemblies, shall:

- withstand the lower test pressure in Table 1 for no less than 5 min with no signs of leakage;

When tested in accordance with 7.2.1.2, all pipes and connectors, sampled according to 7.1.2 and connected together as one or more assemblies, shall:

- withstand the lower test pressure in Table 1 for no less than 5 min with no signs of leakage;
- withstand the higher test pressure in Table 1 for no less than 1 min with no signs of leakage.

5.1.3 Vacuum

This requirement applies to all pipes and connectors intended for vacuum suction, including siphons, vent and vapour recovery and secondary containment, Type C2.

When tested in accordance with 7.2.2, all pipes and connectors, sampled according to 7.1.2, shall:

- withstand the vacuum specified in Table 1 for no less than 30 min. The loss of vacuum shall not exceed 0,05 bar and there shall be no signs of collapse.

5.1.4 Cyclic pressure

This requirement applies to pipes and connectors for all applications except secondary containment.

When tested in accordance with 7.2.3, a sample of pipes and connectors selected according to 7.1.1 and 7.1.2 shall withstand the test conditions without leakage.

5.2 Estimated working life

Design plans shall be available for all pipework which demonstrate that the pipework is designed to have an estimated working life of at least 30 years.

NOTE The pressure design of multilayer, polymeric pipes can be calculated from stress base design, of each layer which contributes to the pressure rating. In this case a regression curve may be generated for each polymeric material according to EN ISO 9080. Alternative methods may be applied, where the pressure design of the pipes is linked to the construction itself.

When tested in accordance with ISO 3458, pipes, fittings and assemblies shall not leak under the following test conditions:

a) a 1 h hydrostatic pressure test, at (20 ± 2) °C, at 1,5 times the design pressure P_d , or at 9 bar for primary pipe and 3 bar for secondary containment piping, whichever is the greater.

b) a 1 000 h hydrostatic pressure test, at (80 ± 2) °C, at 1,3 times the design pressure P_d , or at 8 bar for primary piping and 2,6 bar for secondary containment piping, whichever is the greater.

5.3 Temperature

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There shall be two temperature classes: [d5ce281ab750/sist-en-14125-2005](https://standards.iteh.ai/catalog/standards/sist/12390ca7-e1a8-4350-8727-d5ce281ab750/sist-en-14125-2005)

Class T1: Underground pipework shall be fully operational between -40 °C and $+50$ °C.

Class T2: Underground pipework shall be fully operational between -20 °C and $+50$ °C, but suitable for transport and storage at -40 °C and $+50$ °C.

Pipework that passes the tests in 7.2.1.1, 7.2.5.3, 7.2.6 and 7.2.7.3 at the appropriate temperature shall be deemed to satisfy this requirement.

5.4 Mechanical tests

5.4.1 Crush test

This requirement applies to all pipes and connectors.

When tested in accordance with 7.2.4, a sample of pipes and connectors selected according to 7.1.1 and 7.1.2 shall:

- recover to not less than 90 % of their original diameter within 5 min of the load being removed;
- show no visible sign of leakage or cracking;
- when tested according to 7.1.3 show no signs of leakage and, where vacuum testing is specified, show no signs of collapse.

EN 14125:2004 (E)**5.4.2 Bend radius test**

This requirement applies to all pipes and straight connectors.

When tested in accordance with 7.2.5, a sample of pipes and straight connectors selected according to 7.1.1 and 7.1.2 shall:

- show no visible sign of leakage or cracking;
- when tested according to 7.1.3 show no signs of leakage and, where vacuum testing is specified, show no signs of collapse.

The sample of pipes chosen according to 7.1.1 shall include that pipe diameter for which the bending strain is greatest. The bending strain is equal to $d/2R$, where d is the outer diameter of the pipe and R the bending radius specified by the manufacturer.

5.4.3 Impact test

This requirement applies to all pipes and connectors.

When tested in accordance with 7.2.6, a sample of pipes and connectors selected according to 7.1.1 and 7.1.2 shall:

- show no visible sign of leakage or cracking; in Type B pipes there shall be no through-thickness damage to any protective coating;
- when tested according to 7.1.3 show no signs of leakage and, where vacuum testing is specified, show no signs of collapse.

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5.4.4 Puncture test

This requirement applies to all pipes.

When tested in accordance with 7.2.7, a sample of pipes selected according to 7.1.1 and 7.1.2 shall:

- show no visible sign of leakage or cracking;
- when tested according to 7.1.3 show no signs of leakage and, where vacuum testing is specified, show no signs of collapse.

5.4.5 Pull test

This requirement applies to all pipes and straight connectors intended for positive pressure and vacuum suction applications.

When tested in accordance with 7.2.11, a sample of pipes and straight connectors selected according to 7.1.1 and 7.1.2 and connected to pipes to form assemblies, shall:

- show no visible sign of slippage;
- when tested according to 7.1.3 show no signs of leakage and, where vacuum testing is specified, show no signs of collapse.

The samples of pipes and connectors chosen according to 7.1.1 shall include those with the lowest diameter and those with the lowest diameter >63 mm.