
Cevni sistemi iz polimernih materialov za odvodnjavanje in kanalizacijo, položeni v zemljo – Polipropilen (PP) - 3. del: Smernice za polaganje

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

Kunststoff-Rohrleitungssysteme für erdverlegte Abwasserkanäle und -leitungen - Polypropylen (PP) - Teil 3: Empfehlungen für die Verlegung

Systemes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Polypropylene (PP) - Partie 3 : Guide pour la pose

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93.030	Zunanji sistemi za odpadno vodo	External sewage systems

SIST-TS CEN/TS 1852-3:2003**en**

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**Plastics piping systems for non-pressure underground drainage
and sewerage - Polypropylene (PP) - Part 3: Guidance for
installation**

This Technical Specification (CEN/TS) was approved by CEN on 23 November 2002 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. 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (CEN/TS 1852-3:2003) has been prepared by Technical Committee CEN/TC 155, "Plastics piping systems and ducting systems", the secretariat of which is held by NEN.

This Technical Specification is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There are a number of such System Standards.

System Standards are based on the results of the work undertaken in ISO/TC 138 "Plastics pipes, fittings and valves for the transport of fluids", which is a Technical Committee of the International Organization for Standardization (ISO).

They are supported by separate standards on test methods to which references are made throughout the System Standard.

The System Standards are consistent with general standards on functional requirements and on recommended practice for installation.

EN 1852 consists of the following Parts, under the general title *Plastics piping systems for non-pressure underground drainage and sewerage — Polypropylene*

- *Part 1: Specifications for pipes, fittings and the system*
- *Part 2: Guidance for assessment of conformity (ENV)*
- *Part 3: Guidance for installation (this Technical Specification)*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This Technical Specification, together with ENV 1046 and EN 1610, provides a material-specific set of guidelines for the installation of piping systems made of polypropylene (PP) in the field of non-pressure underground drainage and sewerage.

- - outside the building structure (application area code "U");
- - both buried in ground within the building structure (application area code "D") and outside the building.

This is reflected in the marking of products by "U" and "UD".

2 Normative references

This Technical Specification incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Technical Specification only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

EN 1610:1997, *Construction and testing of drains and sewers*

EN ISO 178, *Plastics — Determination of flexural properties (ISO 178:2001)*

EN ISO 9967, *Plastics pipes — Determination of creep ratio (ISO 9967:1994)*

3 Choice of stiffness (SN) series

3.1 General

PP pipe is a flexible pipe.

When loaded a flexible pipe deflects and presses into the surrounding material. This generates a reaction in the surrounding materials which controls deflection of the pipe. The amount of deflection, which occurs is limited by the care exercised in the selection and laying of the bedding and side fill materials.

3.2 Pipes

3.2.1 Standard procedure

The choice of the stiffness (SN) series may be made:

- when the same class of pipe has previously proved to be satisfactory in the same condition;
- or based on local practice (place of installation, usual installation procedure and experience);
- or based on local regulation;
- or based on Tables 1 and 2 of ENV 1046:2001
- or based on structural design.

3.2.2 Structural design

If a static calculation is required, information on methods is given in EN 1295-1 and the following parameters apply:

- Flexural modulus: $E_{(1min)} \geq 1250$ MPa determined in accordance with EN ISO 178;
- Creep ratio: $\gamma < 4$ determined in accordance with EN ISO 9967;
- Deflection limits for calculation given in Table 1.

Table 1 — Deflection limits

Pipe series ^a	Initial deflection	Long term deflection
SN 2	0,08 d_n	0,10 d_n
SN 4 and SN 8	0,09 d_n	0,12 d_n
^a See EN 1852-1:1997		

NOTE Deflection up to 15 % e.g. caused by soil movement, will not affect the proper functioning of the piping system.

3.3 Fittings

Fittings according to EN 1852-1:1997^[1], because of their geometry, have a stiffness greater than the stiffness of the corresponding pipe. Therefore the following applies:

- fittings marked with S 16 may be used with pipes up to SN 8;
- fittings of DN ≥ 400 marked with S 20 may be used with pipes up to SN 4.

NOTE When fittings conforming to one of the product standards listed in Annex C of EN 1852-1:1997^[1] are used in combination with pipes and fittings conforming to EN 1852-1:1997^[1], the appropriate recommended practice for installation applies.

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3.4 Application area code D

Only pipes and fittings marked "UD" should be installed in situations covered by application area D: buried in ground either within the building structure or not more than 1 m from the building structure.

4 Storage in sunlight

Storage in direct sunlight for long periods and/or high temperatures could cause deformations affecting the jointing.

To avoid this risk the following precautions are recommended:

- a) to limit the height of the stacks of pipes;
- b) to shield the stacks of pipes from continuous and direct sunlight and arrange to allow the free passage of air around the pipes;
- c) to store the fittings in boxes or sacks manufactured so as to permit the free passage of air.

The fading of the colour caused by outside storage does not affect the mechanical properties of pipes and fittings made of PP.

5 Handling and installation at low temperature

Although the impact strength of PP pipes is reduced at low temperatures, experience has shown that even at substantially sub-zero temperatures, these products can be satisfactorily handled and laid, when adequate care is taken.

A special marking on PP pipes "❄" (ice crystal) shows that the pipe conforms to an additional impact test requirement for pipes intended to be installed at temperatures below -10 °C.

6 Push-fit joints (elastomeric sealings)

Jointing should be carried out according to the manufacturer's instructions. However, in the absence of such instructions, it is recommended that the following instructions are used:

- a) spigot end shall be chamfered;
- b) only sealing rings and lubricants supplied by the manufacturer of the pipe and/or fitting shall be used;
- c) for pipes cut on site, the end to be jointed shall be cut square and chamfered to produce a finish equivalent to that of the pipes and fittings supplied by the manufacturer;
- d) the pipe end, the socket and the ring groove shall be clean and the sealing ring shall be seated correctly into its location;
- e) the lubricant shall be applied over the whole chamfered end. It shall not be aggressive to the PP or to the elastomeric seal;
- f) the pipe shall be carefully aligned with the adjoining pipe socket and pushed to the required insertion depth;
- g) when a lever is used on the pipe to push the joint, a block of wood should be inserted between the lever and the end of the pipe to prevent damage to the pipe.

7 Butt fusion joints

7.1 General

The butt fusion technique provides rigidly jointed pipework. The pipe or fitting ends to be fused are heated by means of a heating element, then pressed together with a given pressure.

NOTE The fused joints have physical and mechanical properties similar to those of the pipe material, since an interlacing of the material molecule chains occurs.

Only joint together by butt fusion those components, which are made of materials with melt mass-flow rate (MFR) within the same class or within adjacent classes, and which are MFR class marked on the component itself (for example: MFR B).

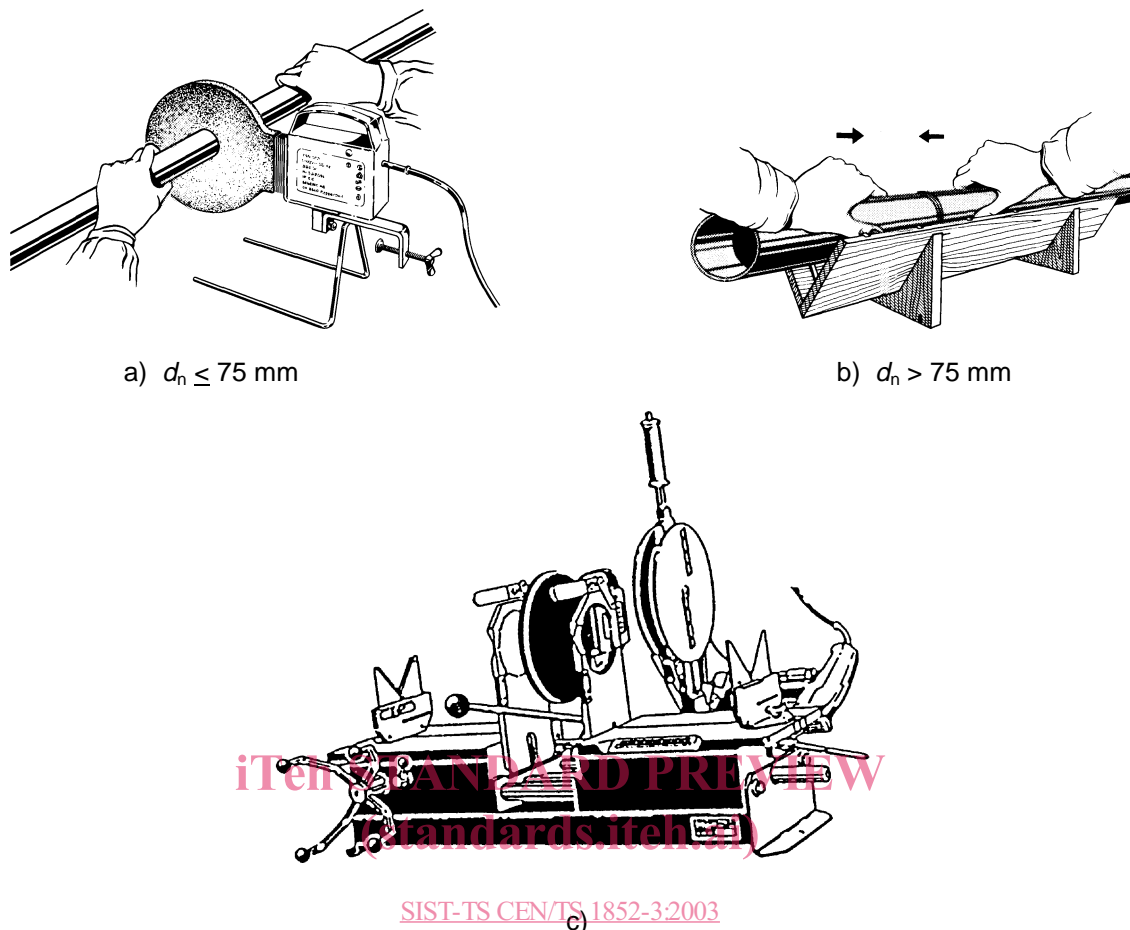
NOTE: Classes of MFR for PP materials (230/2,16) are as follows:

- Class A: $0 < [\text{MFR}] \leq 0,3 \text{ g/10 min}$;
- Class B: $0,3 < [\text{MFR}] \leq 0,6 \text{ g/10 min}$;
- Class C: $0,6 < [\text{MFR}] \leq 0,9 \text{ g/10 min}$;
- Class D: $0,9 < [\text{MFR}] \leq 1,5 \text{ g/10 min}$;

In all cases, follow the manufacturer's instructions.

7.2 Jointing recommendations

Carry out the fusion operation in a clean place, protected from frost and high humidity. Use fusion equipment, which in principle is as shown in Figure 1.



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Figure 1 — Typical butt fusion techniques

The method of butt fusion comprises three stages as follows.

a) Surface preparation

Check that the matching surfaces for assembly are cut square, without chamfer, and are free from defects.

b) Heating of surfaces

Before starting the fusion process, check the operation of the fusion machine. Raise the temperature of the heater according to the manufacturer's instructions, normally between 190 °C and 220 °C. Align the joint surfaces of the joining components to be fused and insert the hot heating plate between them. Press the two parts together with the heating plate at a pressure in the fusion surface between 0,10 MPa and 0,20 MPa. Maintain the heating-up pressure until a bead of melt material is formed around the whole circumference of the parts to be fused. Manufacturer's instructions may include recommendation for parameters of the fusion operation as shown in Figure 2 including time intervals and related pressures together with the preferred ranges of temperature.