SLOVENSKI STANDARD
SIST ENV 1401-3:2002

01-junij-2002

Cevni sistemi iz polimernih materialov za odpadno vodo in kanalizacijo, ki delujejo po teģnostnem principu in so poloģeni v zemljo - Nemehļ an polivinilklorid (PVC-U) - 3. del: Navodilo za vgradnjo

Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U) - Part 3: Guidance for installation

Kunststoff-Rohrleitungssysteme für erdverlegte drucklose Abwasserkanäle und -leitungen - Weichmacherfreies Polyvinylchlorid (PVC-U) - Teil 3: Empfehlungen für die Verlegung

Systemes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 3:Guide pour la pose

Ta slovenski standard je istoveten z: **ENV 1401-3:2001**

ICS:

23.040.01	Deli cevovodov in cevovodi na splošno	Pipeline components and pipelines in general
93.030	Zunanji sistemi za odpadno vodo	External sewage systems

SIST ENV 1401-3:2002 **en**

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English version

Plastics piping systems for non-pressure underground drainage and sewerage - Unplasticized poly(vinyl chloride) (PVC-U) - Part 3: Guidance for installation

Systèmes de canalisations en plastique pour les branchements et les collecteurs d'assainissement enterrés sans pression - Poly(chlorure de vinyle) non plastifié (PVC-U) - Partie 3:Guide pour la pose

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This European Prestandard (ENV) was approved by CEN on 23 March 2001 as a prospective standard for provisional application.

The period of validity of this ENV 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 ENV can be converted into a European Standard.

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

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

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Foreword

This European Prestandard has been prepared by Technical Committee CEN/TC 155 "Plastics piping systems and ducting systems", the secretariat of which is held by NEN.

This Prestandard is a Part of a System Standard for plastics piping systems of a particular material for a specified application. There is 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 1401 consists of the following Parts, under the general title *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*
- *Part 2: Guidance for assessment of conformity (ENV)*
- *Part 3: Guidance for installation (this prestandard)*

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

1 Scope

This Prestandard, together with prENV 1046:2000 and EN 1610:1997, provides a material-specific set of guidelines for the installation of piping systems made of unplasticized poly(vinyl chloride) (PVC-U) 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 European Prestandard 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 European Prestandard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prENV 1046:2000, *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 1401-1:1998, *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*

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

EN ISO 178:1996, *Plastics — Determination of flexural properties (ISO 178:1993)*

EN ISO 9967:1995, *Plastics pipes — Determination of creep ratio (ISO 9967:1994)*

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

3 Choice of stiffness (SN) series

3.1 General

PVC-U 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 prENV 1046:2000;

- 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: $E_{(1min)} \geq 3000$ MPa determined in accordance with EN ISO 178:1996;
- Creep ratio: $\gamma < 2$ determined in accordance with EN ISO 9967:1995;
- Deflection limits for calculation (according to ISO/TR 7073) given in Table 1.

Table 1 — Deflection limits

Pipe series [1)]	Initial deflection	Long term deflection
SDR 51	0,05 d_n	0,08 d_n
SDR 41 and SDR 34	0,08 d_n	0,10 d_n
1) See EN 1401-1:1998.		

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 1401-1:1998, because of their geometry, have a stiffness greater than the stiffness of the corresponding pipe. Therefore the following applies:

- fittings marked with SDR 41 may be used with pipes up to SN 8 (SDR 34);
- fittings of DN ≥ 400 marked with SDR 51 may be used with pipes up to SN 4 (SDR 41).

NOTE When fittings conforming to one of the product standards listed in Annex C of EN 1401-1:1998 are used in combination with pipes and fittings conforming to EN 1401-1:1998, the appropriate recommended practice for installation applies.

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 PVC-U.

5 Handling and installation at low temperature

Although the impact strength of PVC-U 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 PVC-U 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 PVC-U 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 Solvent cement joints

Jointing should be carried out using the solvent cement recommended by the pipe and/or fitting manufacturer and following his instructions.

NOTE Jointing using adhesives is described in Annex D of prENV 1046:2000.

8 Maximum deviation from straightness

Pipes should normally be installed straight.

However, as PVC pipes are flexible, the following deviation from straightness (see Figure 1) will not cause problems:

$d_n \leq 200$ mm : $R \geq 300\ d_n$;

$d_n > 200$ mm : $R \geq 500\ d_n$.

Care may be necessary to avoid any extra stress on the socket joint itself.

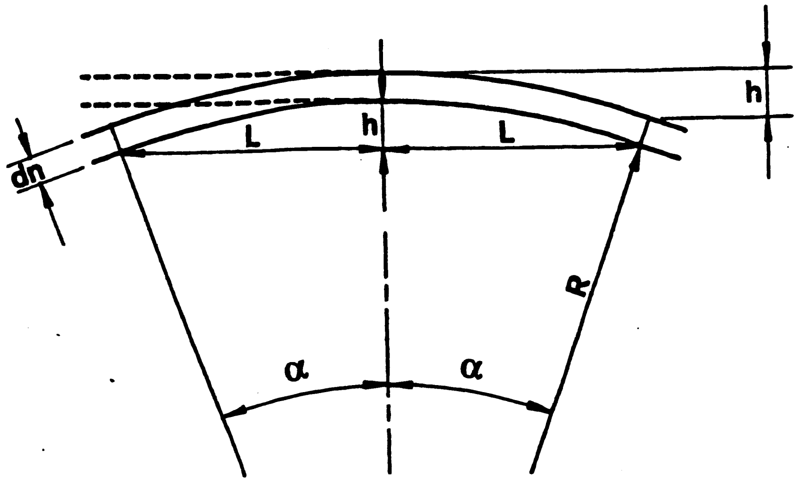
The greatest permitted angular deflection in the socket should be as follows:

2° for $d_n \leq 315$ mm;

1,5° for 315 mm < $d_n \leq 630$ mm;

1° for $d_n > 630$ mm.

Larger angular deflections are permitted in case of joints specifically designed for large angular deflections. In these cases the manufacturer shall declare the designed angular deflection.



NOTE Approximately $h \approx L^2/2R$ and $\alpha \approx L/R$.

Figure 1 — Parameters of deviation from straightness

9 Connection to rigid structures

Special fittings for this purpose are available. In such cases the manufacturer's instructions should be followed.

10 Repairs

Slip-couplers or purpose-designed special fittings are available from manufacturers for effecting repairs. Because designs vary, it is necessary to follow individual manufacturer's instructions. However, in the absence of such instructions, it is recommended that the following instructions are used:

a) the full extent of the damaged or failed section shall be identified and removed;

b) the cut pipe ends shall be square and shall be prepared for push-fit jointing as described in 6c);

c) repair, or slip-, couplings shall be placed in position. The replacement pipe length shall then be laid on the suitably prepared bed and the slip-couplings moved to their final positions (see Figure 2);

d) the embedment shall then be replaced to give compaction values approximately equal to those immediately adjacent to the repair.