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Cevni sistemi iz polimernih materialov - Navodila za vgradnjo tlačnih cevovodov za hladno in toplo pitno vodo v stavbah

Plastics piping systems - Guidance for the installation inside buildings of pressure piping systems for hot and cold water intended for human consumption

Kunststoff-Rohrleitungssyteme - Empfehlungen zum Einbau von Druckrohrleitungssystemen für die Versorgung mit Warm- und Kaltwasser für den menschlichen Gebrauch innerhalb von Gebäuden

Systèmes de canalisations plastiques - Guide pour l'installation à l'intérieur de structures de bâtiments de systèmes de canalisations sous pression pour l'eau chaude et l’eau froide destinées à la consommation humaine

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This Technical Report was approved by CEN on 25 July 2011. It has been drawn up by the Technical Committee CEN/TC 155.

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Foreword

This document (CEN/TR 12108:2012) 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 [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes ENV 12108:2001.

This document includes the following:

— Annex A (informative), Thermal length variation as a function of the pipe length and temperature difference for pipe materials;

— a bibliography.

At the date of publication of this Technical Report, System Standards for piping systems of hot and cold water applications inside buildings are the following:

— EN ISO 15874 (all parts), *Plastics piping systems for hot and cold water installations — Polypropylene (PP)*;

— EN ISO 15875 (all parts), *Plastics piping systems for hot and cold water installations — Crosslinked polyethylene (PE-X)*;

— EN ISO 15876 (all parts), *Plastics piping systems for hot and cold water installations — Polybutylene (PB)*;

— EN ISO 15877 (all parts), *Plastics piping systems for hot and cold water installations — Chlorinated poly(vinyl chloride) (PVC-C)*;

— EN ISO 22391 (all parts), *Plastics piping systems for hot and cold water installations — Polyethylene of raised temperature resistance (PE-RT).*

Introduction

This European Technical Report covers the material-related aspects of installation practice. General requirements including design consideration and pipe sizing are given in EN 806 series.

It is essential when dealing with techniques for the installation inside buildings of pressure piping systems to choose the correct type of products for the installation and that a well-established installation technique is used. The system supplier/manufacturer should supply detailed instructions for satisfactory handling, storage and installation.

1 Scope

This European Technical Report recommends practices to be followed in the application and installation of thermoplastics pipes and associated fittings. These fall within the scope of EN 806-1 and, EN ISO 15874, EN ISO 15875, EN ISO 15876, EN ISO 15877 and EN ISO 22391 to be used for hot and/or cold water distribution intended for human consumption inside buildings. This document can also be used for heating installations if applicable, except for under floor heating for which EN 12164 can apply.

Guidance is also given on acceptable methods of jointing polybutylene (PB), crosslinked polyethylene (PE-X), polypropylene (PP), chlorinated poly(vinyl chloride) (PVC-C) and Polyethylene of raised temperature resistance (PE-RT) pipes and associated fittings, together with recommendations for their storage, handling and transportation.

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 806-1, *Specifications for installations inside buildings conveying water for human consumption — Part 1: General*

3 Terms and definitions

For the purposes of this Technical Report, the terms and definitions given in EN 806-1 apply.

4 Storage, transport and handling

4.1 General

Pipe ends should be covered or protected in such a way that dirt is prevented from entering the pipe.

Pipe with end treatment, such as flanging, forming or pre-assembled fittings, should be stacked or supported so that the ends are free from loading and damage.

When storing, transporting and handling, original packing should be used if possible.

4.2 Storage

The storage chosen should not cause any change to pipe dimensions and the storage area should be such that it does not cause any damage to the pipe surface.

All fittings and accessories should be stored in their original containers, or as recommended by the system supplier/manufacturer.

Storage in direct sunlight should be avoided, as extended exposure to UV light can lead to deterioration.

4.3 Handling

Loading and unloading of pipes should be carried out with care to avoid damage.

Where mechanical handling is employed, the techniques used should ensure that no damage to pipes can occur. Metal slings, hooks and chains should not come into contact with the pipe.

Pipes should not be dragged along rough ground or dropped on a hard surface.

4.4 Transport

Vehicles with a flat bed should be used for transporting pipe. The bed should be free from nails or other projections. Straight lengths should be uniformly supported along their length.

Pipes should be loaded on vehicles in such a way that there is no unnecessary overhang.

5 Design considerations

5.1 Service conditions

The installed pipe work system should be capable of operation at the applicable service conditions in accordance with classes specified in EN ISO 15874, EN ISO 15875, EN ISO 15876 EN ISO 15877 and EN ISO 22391.

5.2 Materials and components

Components for hot and cold water pipes should alternatively conform to EN ISO 15874, EN ISO 15875, EN ISO 15876, EN ISO 15877 and EN ISO 22391.

6 Installation

6.1 Pipe supports - General

Pipe supports should be designed to provide a permanent fixing. Where fittings such as valves and manual controls are used, these should be firmly anchored so as to minimize any moment imparted to the pipe by operation e.g. of hand wheels or levers.

Spacing distances should be in accordance with the system supplier's/manufacturer's installation instructions. Clamps/brackets to support pipe should be designed in such a way that the function of the piping system is not affected. Where pipes are adequately supported through joists or on boarding, intermediate clips may not be necessary.

6.2 Installation of pipes allowing thermal length variation

6.2.1 General

NOTE Annex A shows the thermal length variation ΔL as function of length of pipe and temperature difference for, PE-X, PP-R, PB, PVC-C and PE-RT.

Pipes are subjected to thermal length variation, which requires consideration to prevent any damage, particularly for rigid pipes. There are different ways to consider this.

Thermal length variation of a thermoplastic pipe can be calculated according to Formula (1):

$$\Delta L = \Delta T \times L \times \alpha \quad (1)$$

where

ΔL is the thermal length variation, in millimetres;

ΔT is the temperature difference, in Kelvin;

L is the length of pipe, in metres;

α is the coefficient of thermal expansion (thermal length variation), in millimetres per metre, per Kelvin.

Reference values for α are given in Table 1.

Table 1 — Reference values of thermal length variation

Material	α mm/m K	Figure
PVC-C	0,07	A.1
PE-X	0,15	A.2
PP-R	0,15	A.2
PB	0,13	A.3
PE-RT	0,19	A4

6.2.2 Positioning of anchor points

The positioning of anchor points can be used to give direction and to limit to the amount of thermal length variation. The anchor points can be positioned in such a way that variations of lengths can be split in different directions. Examples are given in Figures 1 to 3.

This is also valid for header pipes in a basement.

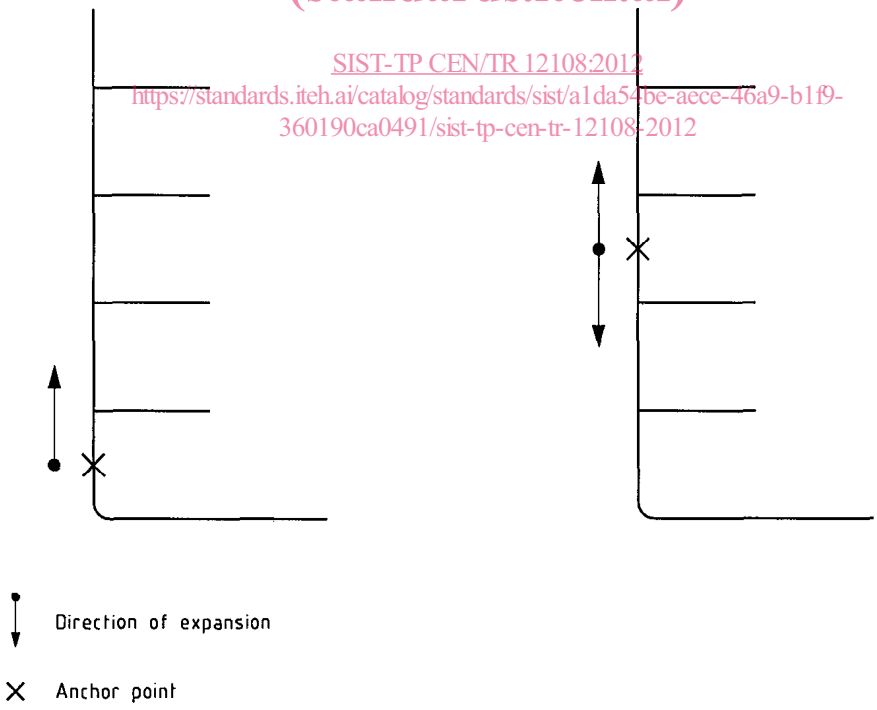

Figure 1 — Positioning of anchor points to guide the direction of thermal length variation (installation with branches)

6.2.3 Installation of pipes allowing thermal length variation by means of a flexible arm

The flexible arm should be sufficiently long to prevent damage.

The guide brackets should allow clearance to the wall also after thermal length variation. This is also applicable in cases where pipes are supported along their length.

A typical installation is shown in Figures 2 and 3.

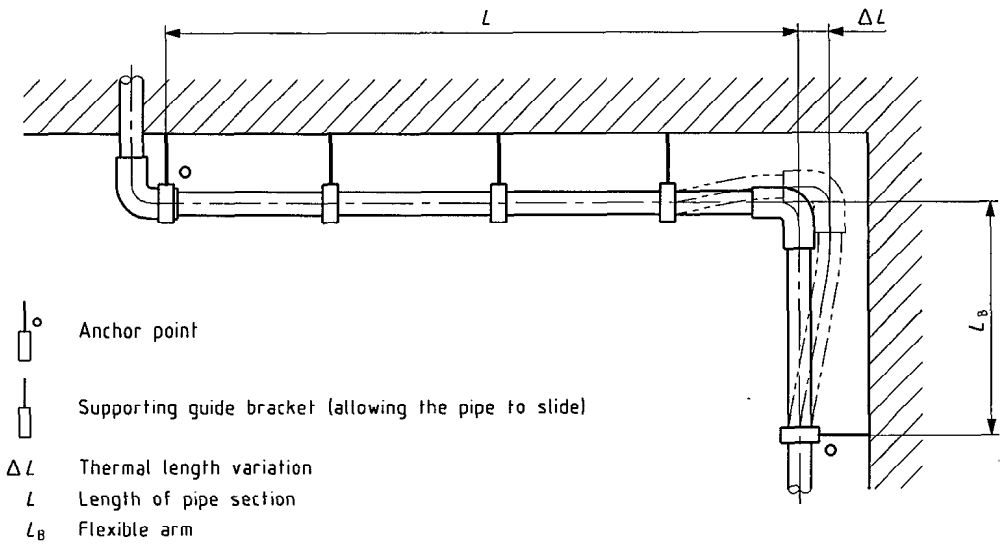

Figure 2 — Compensation of thermal length variation, Δ*L*, by flexible arm, L_B

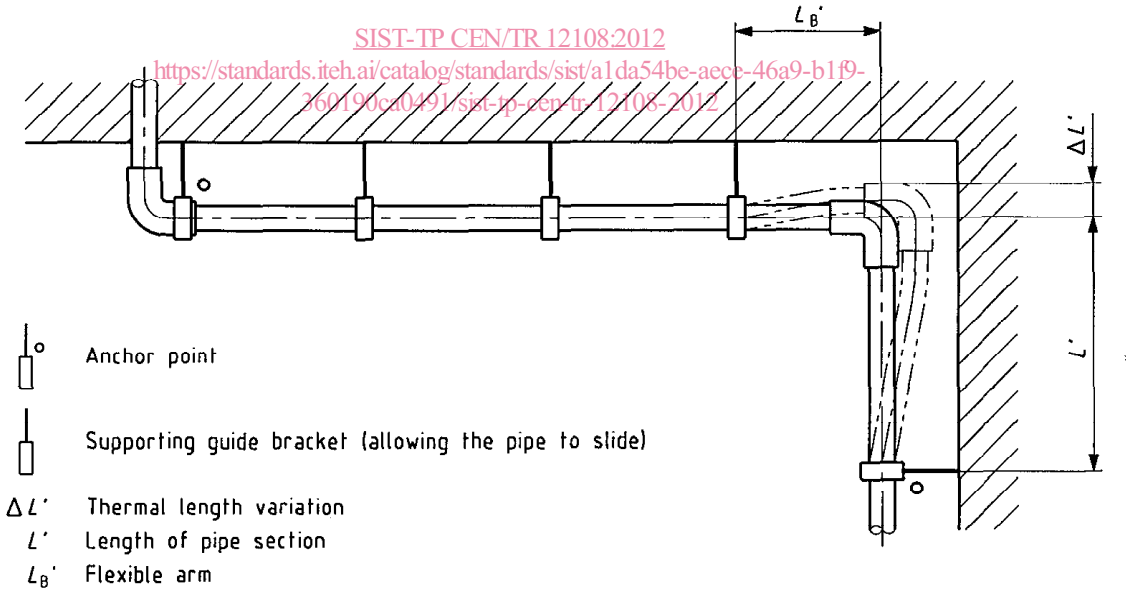

Figure 3 — Compensation of thermal length variation, Δ*L*', by flexible arm, L_B'

The minimum length of the flexible arm, L_B can be calculated according to Formula (2):

$$L_B = C\sqrt{d_e \times \Delta L} \qquad (2)$$

where

ΔL is the thermal length variation, in millimetres (see 6.2.1);

L_B is the flexible arm, in millimetres;

C is the material constant (see Table 2);

d_e is the outside diameter, in millimetres.

Table 2 — Value of *C*

Material	Material constant *C*
PVC-C	34
PE-X	12
PP-R	20
PB	10
PE-RT	14

6.2.4 Installation of pipes allowing expansion by means of an expansion loop

A typical installation is shown in Figure 4.