



SLOVENSKI STANDARD

SIST EN 1433:2003

01-junij-2003

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Drainage channels for vehicular and pedestrian areas - Classification, design and testing requirements, marking and evaluation of conformity

Entwässerungsrinnen für Verkehrsflächen - Klassifizierung, Bau- und Prüfgrundsätze, Kennzeichnung und Beurteilung der Konformität

Caniveaux hydrauliques pour l'évacuation des eaux dans les zones de circulation utilisées par les piétons et les véhicules - Classification, prescriptions de conception et d'essai, marquage et évaluation de la conformité

Ta slovenski standard je istoveten z: EN 1433:2002

ICS:

93.080.30

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ICS 93.080.30

English version

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Bau- und Prüfgrundsätze, Kennzeichnung und Beurteilung
der Konformität

This European Standard was approved by CEN on 9 October 2002.

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 Management Centre 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 Management Centre has the same status as the official versions.

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



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

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

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Foreword

This document (EN 1433:2002) has been prepared by Technical Committee CEN/TC 165, "Wastewater engineering", 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of an identical text or by endorsement, at the latest by May 2003, and conflicting national standards shall be withdrawn at the latest by August 2004.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

Annexes A, B and C are normative. Annex D is informative.

This document specifies the application and use of drainage channels both as single or multi-part assemblies. An assembly is defined as a single unit and can be used in conjunction with other similar units to provide a drainage system. Guidance is given on the location of units, the strength of the units and appropriate grating or cover. Fittings and other special adapters are excluded from the scope of this standard.

Installation does not form part of this standard but can form part of a future related standard. Drainage channels are installed so that sufficient support is provided to enable them to withstand proposed service loads.

Due regard has been taken of formalized Quality Assurance Systems and this standard details those specific and relevant quality control activities necessary for both manufacturer and external assessors (if applicable).

This standard specifies materials currently used in the manufacture of drainage channels. However, with some materials there are limited data currently available.

Rainwater forms the main application of drainage channels. Other liquids can be carried, subject to correct selection of the drainage channel.

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

1 Scope

This European Standard specifies requirements for linear drainage channels for the collection and conveyance of surface water when installed within areas subjected to pedestrian and/or vehicular traffic.

These channels are defined as either Type I, which requires no further support or Type M, which requires additional support to accommodate the vertical and horizontal loads in service, in accordance with the manufacturers' recommendations.

This standard specifies requirements for gratings and covers integral with a linear drainage system. This standard applies to grid units, slot units and kerb units up to a clear opening of 1 000 mm.

This standard specifies definitions, classes, design and testing requirements, marking and quality control for drainage channels.

2 Normative references

This European Standard 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 Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1169, *Precast concrete products — General rules for factory production control of glass-fibre reinforced cement.*

EN 1170-5, *Precast concrete products — Test methods for glass-fibre reinforced cement — Part 5: Measuring bending strength, "Complete bending test" method.*

EN 1563, *Founding — Spheroidal graphite cast irons.*

ENV 10080, *Steel for the reinforcement of concrete - Weldable ribbed reinforcing steel B 500 — Technical delivery conditions for bars, coils and welded fabric.*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels.*

EN 10088-2, *Stainless steels — Part 2: Technical delivery conditions for sheet/plate and strip for general purposes.*

EN 10088-3, *Stainless steels — Part 3: Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes.*

EN 10142, *Continuously hot-dip zinc coated low carbon steels strip and sheet for cold forming — Technical delivery conditions.*

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EN 10214, *Continuously hot-dip zinc-aluminium (ZA) coated steel strip and sheet — Technical delivery conditions.*

EN 10215, *Continuously hot-dip aluminium-zinc (AZ) coated steel strip and sheet — Technical delivery conditions.*

EN 12163, *Copper and copper alloys — Rod for general purposes.*

EN ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines (ISO 7500-1:1999).*

ISO 185, *Grey cast iron — Classification.*

ISO 630, *Structural steels — Plates, wide flats, bars, sections and profiles.*

ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods.*

ISO 3755, *Cast carbon steels for general engineering purposes.*

ISO 4012, *Concrete — Determination of compressive strength of test specimens.*

ISO 8062, *Castings — System of dimensional tolerances and machining allowances.*

3 Terms and definitions

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

3.1

drainage channel

linear assembly composed of prefabricated units permitting the collection and conveyance of surface water along its total length for onward discharge

3.2

type I

drainage channel which requires no further support to accommodate the vertical and horizontal loads in service (see Figure 1)

3.3

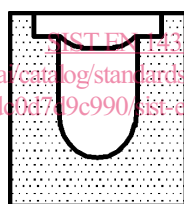
type M

drainage channel which requires additional support to accommodate the vertical and horizontal loads in service (see Figure 1)

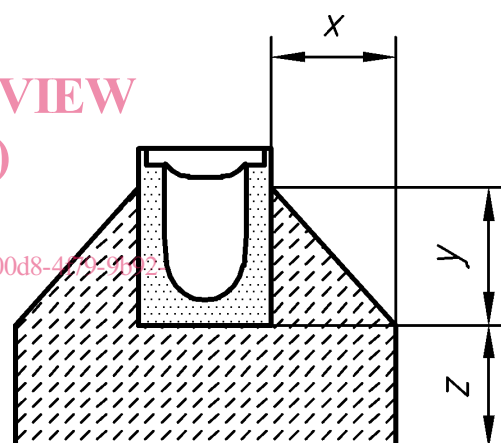
Key

x, y and z Dimensions of additional support

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Example of Type I



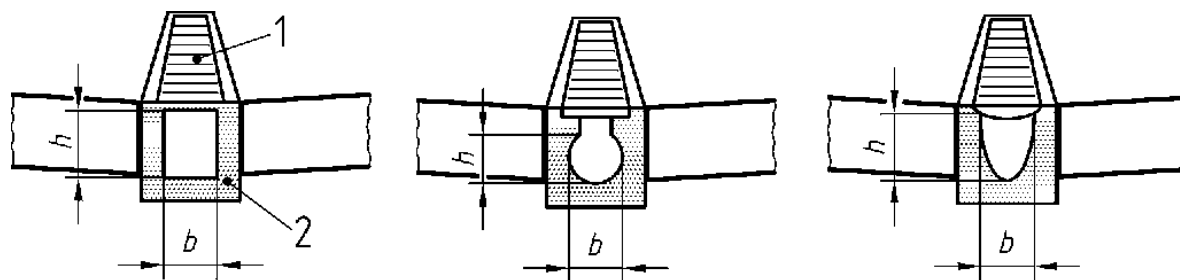
Example of Type M

Figure 1 — Example of Type I and Type M

3.4

grid unit

prefabricated drainage channel unit with an open top with inserted gratings and/or covers (see Figure 2)



Key

- 1 Grating
- 2 Channel body
- h, b Internal dimensions (wetted perimeter)

Figure 2 — Examples of grid units

3.5 grating/cover

removable parts of the grid unit which permits, in the case of gratings, the intake of water (see Figure 3)

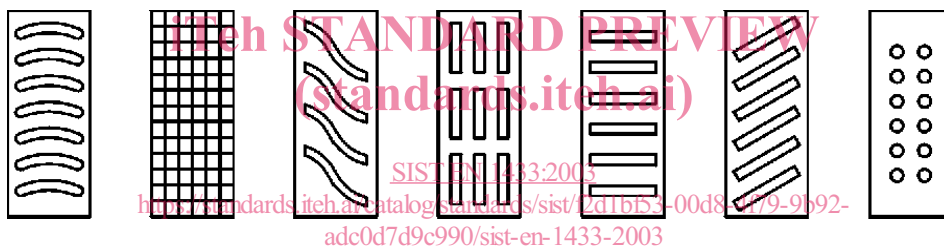
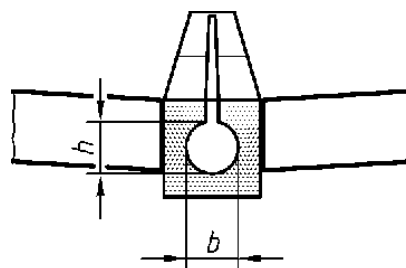


Figure 3 — Examples of gratings

3.6 slot unit

prefabricated drainage channel unit having closed profile and a continuous or intermittent inlet slot on top to permit the intake of surface water (see Figure 4)



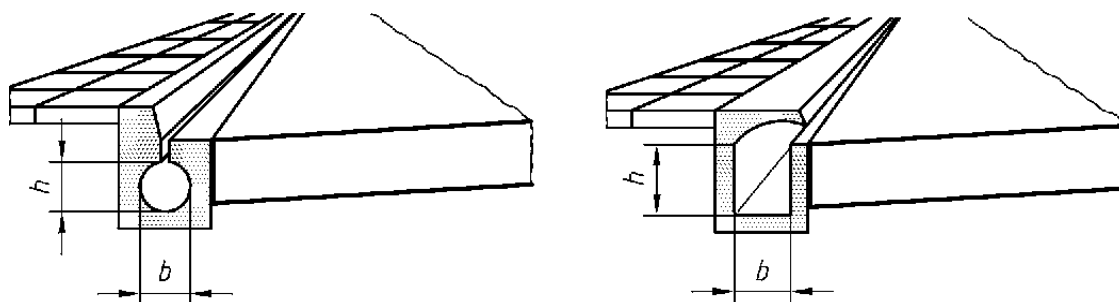
Key

- h, b Internal dimensions (wetted perimeter)

Figure 4 — Example of slot unit

3.7 kerb unit

drainage channel with a kerb type profile and having continuous or intermittent drainage openings (see Figure 5)

**Key**

h, b Internal dimensions (wetted perimeter)

Figure 5 — Examples of kerb units

3.8**surface water**

water drained from the surface of buildings, structures or the ground

[EN 476]

NOTE Drainage channels can convey other liquids, for example oils and chemicals. In that case, their suitability should be checked with the manufacturer.

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3.9**nominal size**

numerical designation of size of components, which is a convenient integer approximately equal to the manufacturing dimensions in mm

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[EN 476]

NOTE For components conforming with this standard the nominal size corresponds numerically to the width b in millimetres (mm), i.e. the maximum horizontal drainage dimension see Figures 2, 4 and 5.

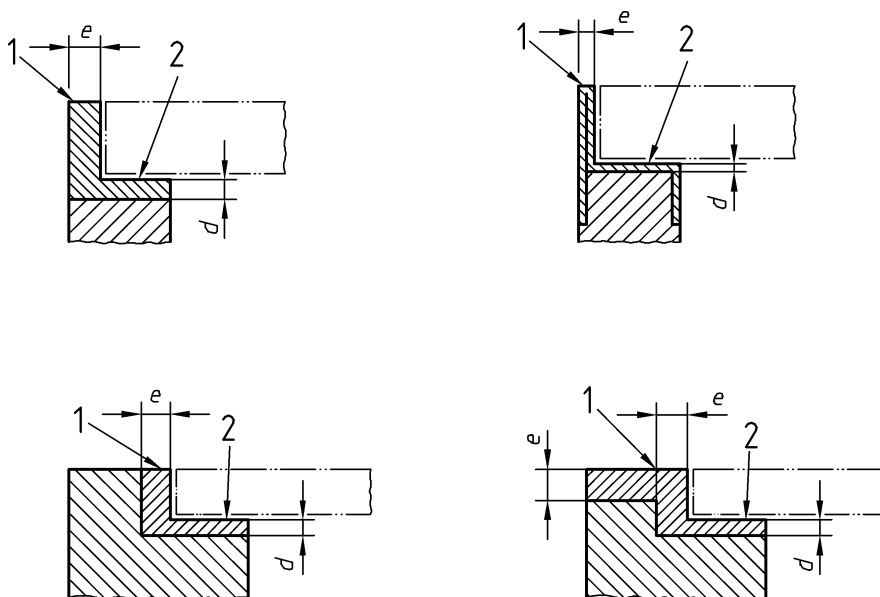
3.10**seating**

surface on which the grating or the cover rests on the channel body of a grid unit

3.11**contact surfaces and trafficked edges**

metal edges or similar components applied to or inserted into the channel body as seating for gratings and covers and as protection of the channel body against damage from traffic

NOTE Typical examples of contact surfaces and trafficked edges are shown in Figure 6.



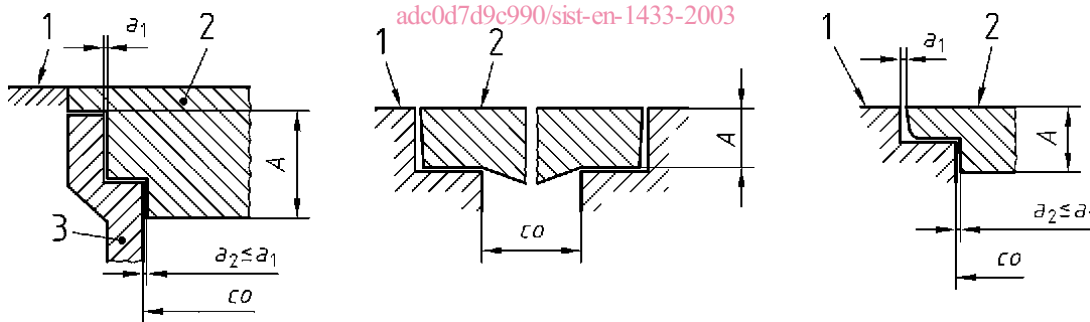
Key

- 1 Trafficked edge; e - Thickness of trafficked edge
- 2 Contact surface; d - Thickness of contact surface

Figure 6 — Examples of contact surfaces and trafficked edges
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3.12 depth of insertion of gratings and covers

dimension A, shown in Figure 7, which is instrumental in securing the gratings or covers in the channel



Key

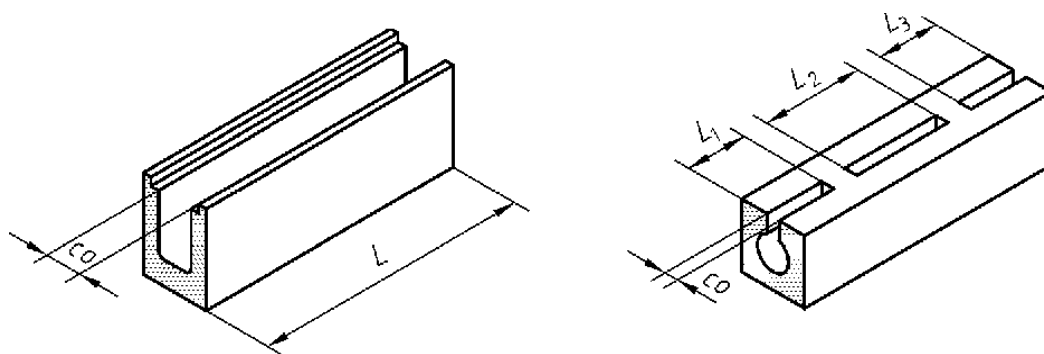
- 1 Floor level
- 2 Overlay grating/cover
- 3 Channel wall
- a_1, a_2 Clearances between channel body and grating or cover

Figure 7 — Examples of depth of insertion

3.13 clear area

unobstructed area between the seating or slot edges

NOTE The clear area is expressed in square millimetres (mm²) or multiples of the unit (e.g. cm²)

**Key**

Clear area = $CO \times L$

$$L = l_1 + l_2 + l_3$$

Figure 8 — Examples of clear areas

3.14**clear opening****CO**

unobstructed width between the seating of grid units or slot edges of slot units. Examples of the dimension CO are shown in Figures 7 and 8

NOTE The clear opening is expressed in millimetres (mm).

3.15**mass per unit area**

total mass of the grating or the cover in kg divided by the clear area in m^2 of the grid unit

NOTE The mass per unit area is expressed in kilograms per square metres (kg/m^2).

3.16**cushioning insert**

material in a channel body, grating or cover used to provide a non rock seating

3.17**test load**

load applied to a grating/cover or to a drainage channel unit during a test

NOTE The test load is expressed in kilonewtons (kN).

3.18**ultimate (collapse) load**

maximum load reached by the testing machine during a loading test (i.e. when the load-recording facility does not show any further increase)

3.19**pedestrian area**

area reserved for pedestrians but which may also be trafficked occasionally by, for example, delivery, cleaning or emergency vehicles

3.20**pedestrian street**

area subjected to regular vehicular traffic but during controlled periods only e.g. outside business hours

3.21**dirt bucket**

removable component of a drainage channel system which collects debris

3.22

waterway area

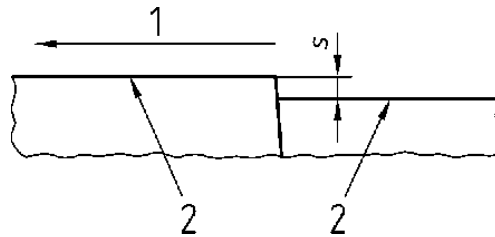
total area of all slots and slots in gratings within the clear area, or other drainage inlet openings in kerb units

NOTE The waterway area is expressed in square millimetres (mm²).

3.23

step of invert

s
difference in height between the inverts of adjacent channel units, as shown in Figure 9



Key

- 1 Direction of flow
- 2 Invert of channel units

Figure 9 — Example for step of invert
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3.24

type test

test to prove the design and which is carried out once to demonstrate conformity with this standard and which is repeated after significant manufacturing, design, or material changes

4 Classification

Drainage channels shall be classified as follows according to their intended use (see also clause 5):

A 15, B 125, C 250, D 400, E 600, F 900.

5 Places of installation for drainage channels

The appropriate load class of drainage channel to chose depends upon where the channel is to be installed. Typical places of installation have been divided into groups numbered 1 to 6 as listed below. Figure 10 and Figure 11 show the location of some of these groups in a highway environment. An indication as to which minimum load class of drainage channel should be selected is shown in parenthesis for each group. The selection of the appropriate load class is the responsibility of the designer.

Where there is any doubt, a higher load class should be selected.

Groups of installation:

Group 1 (min. class A 15)

Areas which can only be used by pedestrians and pedal cyclists.

Group 2 (min. class B 125)

Footways, pedestrian areas and comparable areas, private car parks or car parking decks.

Group 3 (min. class C 250)

Kerb sides (Figure 10) and non-trafficked areas of hard shoulders and similar; Kerb units are always group 3.

Group 4 (min. class D 400)

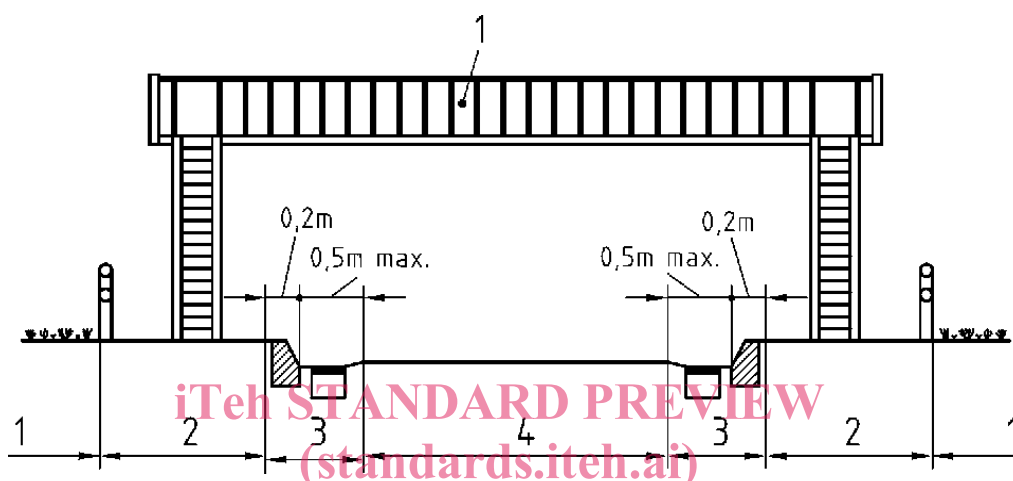
Carriageways of roads (including pedestrian streets), hard shoulders (Figures 10 and 11) and parking areas, for all types of road vehicles.

Group 5 (min. class E 600)

Areas subjected to high wheel loads, e. g. ports and dock sides.

Group 6 (class F 900)

Areas subjected to especially high wheel loads e. g. aircraft pavements.

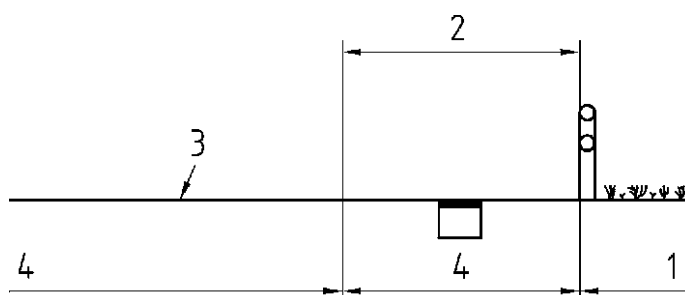
**Key**

- 1 Group 1 (e.g. on pedestrian bridges)
- 2 Group 2
- 3 Group 3
- 4 Group 4

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Figure 10 — Typical highway cross section showing the location of some installation groups

**Key**

- 1 Group 1
- 2 Trafficked area of hard shoulder
- 3 Carriageway
- 4 Group 4

Figure 11 — Typical hard shoulder section showing the location of some installation groups