



SLOVENSKI STANDARD

SIST EN 40-3-2:2001

01-april-2001

Drogovi za razsvetljavo - Del 3-2: Projektiranje in preverjanje - Preverjanje s preskušanjem

Lighting columns - Part 3-2: Design and verification - Verification by testing

Lichtmaste - Bemessung und Nachweis - Teil 3-2: Nach durch Prüfung

Candélabres d'éclairage public - Partie 3-2: Conception et vérification - Vérification par essais

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: **EN 40-3-2:2000**

SIST EN 40-3-2:2001
<https://standards.iteh.ai/catalog/standards/sis/cod14d27-a57a-4779-94b3-e186e1b41afc/sist-en-40-3-2-2001>

ICS:

91.160.20	Zunanja razsvetljava stavb	Exterior building lighting
93.080.40	Cestna razsvetljava in pripadajoča oprema	Street lighting and related equipment

SIST EN 40-3-2:2001

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 40-3-2:2001

<https://standards.iteh.ai/catalog/standards/sist/c0d14d27-a37a-4779-94b3-e186e1b41afc/sist-en-40-3-2-2001>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 40-3-2

February 2000

ICS 91.160.20

Will supersede EN 40-8:1982

English version

Lighting columns - Part 3-2: Design and verification - Verification by testing

Candélabres d'éclairage public - Partie 3-2: Conception et vérification - Vérification par essais

This European Standard was approved by CEN on 11 December 1999.

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, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

SIST EN 40-3-2:2001

<https://standards.iteh.ai/catalog/standards/sist/c0d14d27-a37a-4779-94b3-e186e1b41afc/sist-en-40-3-2-2001>



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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references.....	4
3 Terms and definitions	4
4 Test loads	4
5 Acceptance criteria	4
6 Preparation for test.....	6
7 Application of forces	6
8 Test report.....	7
9 Type test certificate.....	7
10 Permissible modifications to type tested columns.....	7
11 Fatigue requirements	7
Annex A (normative) Lighting columns: Report on type testing as specified in prEN 40-3-2:1999	8
Annex B (normative) Lighting columns: Certificate for the type test specified in prEN 40-3-2:1999	10

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 40-3-2:2001

[https://standards.iteh.ai/catalog/standards/sist/c0d14d27-a37a-4779-94b3-](https://standards.iteh.ai/catalog/standards/sist/c0d14d27-a37a-4779-94b3-e186e1b41afc/sist-en-40-3-2-2001)

[e186e1b41afc/sist-en-40-3-2-2001](https://standards.iteh.ai/catalog/standards/sist/c0d14d27-a37a-4779-94b3-e186e1b41afc/sist-en-40-3-2-2001)

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 50 "Lighting columns and spigots", the secretariat of which is held by BSI.

This European Standard replaces EN 40-8:1982.

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 August 2000, and conflicting national standards shall be withdrawn at the latest by August 2000.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

There are six Parts to this standard as follows:

Part 1	Definitions and terms
Part 2	General requirements and dimensions
Part 3	Design and verification
Part 3-1	Design and verification - Specification for characteristic loads
Part 3-2	Design and verification - Verification by testing
Part 3-3	Design and verification - Verification by calculation
Part 4	Specification for reinforced and prestressed concrete lighting columns
Part 5	Specification for steel lighting columns
Part 6	Specification for aluminium lighting columns

1 Scope

This European standard specifies the requirements for the verification of the design of steel, aluminium and concrete lighting columns by testing. It gives type tests and so does not cover testing for quality control purposes. It applies to post top lighting columns not exceeding 20 m height for post top lanterns and to lighting columns with brackets not exceeding 18 m height for side entry lanterns.

The requirements for lighting columns made from materials other than concrete, steel or aluminium (for example wood, plastic and cast iron) are not specifically covered in this standard.

This standard includes performance requirements for horizontal loads due to wind. Passive safety and the behaviour of a lighting column under the impact of a vehicle are not included, this group of lighting columns will have additional requirements (see prEN 40-2:1999).

2 Normative references

This European standard incorporates by dated or undated reference provisions from other standards. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references subsequent amendments 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).

iTeh STANDARD PREVIEW

EN 40-1, *Lighting columns - Definitions and terms*

EN 40-3-1:2000, *Lighting columns - Part 3-1: Design and verification — Specification for characteristic loads*

SIST EN 40-3-2:2001

prEN 40-3-3:1999, *Lighting columns - Part 3-3: Design and verification - Verification by calculation*

prEN 40-4:1999, *Lighting columns - Specification for reinforced and prestressed concrete lighting columns*

3 Terms and definitions

For the purposes of this European standard the terms and definitions given in EN 40-1 apply.

4 Test loads

The serviceability and structural test loads for the verification test are the characteristic dead and wind loads specified in clause 3 and 4 of EN 40-3-1:2000.

5 Acceptance criteria

5.1 General

If the following criteria are satisfied the lighting column shall be deemed to have successfully passed the test and the design for that type of lighting column verified.

5.2 Serviceability requirements

a) The vertical deflection of the lantern connection caused by the vertical forces shall not exceed the value of 0,025 w (see prEN 40-3-3:1999).

NOTE :For the purposes of this calculation γ_f is taken as 1.

b) The temporary horizontal deflection of the lantern connection caused during the load test by the incremental load due to the horizontal forces corresponding to the test load shall not exceed the value given in table 3 of prEN 40-3-3:1999.

5.3 Structural requirements

a) For steel and aluminium alloy lighting columns the residual deflection after removal of the test load shall be no greater than 10 % of the deflection caused by the test load.

b) For concrete lighting columns the residual deflection after removal of the test load shall be no greater than 20 % of the deflection caused by the test load.

5.4 Minimum ultimate requirement

The minimum ultimate load achieved shall be not less than the test load multiplied by the factor γ_u and shall be the greatest value obtained for the cross-sections listed in 5.5. The factor γ_u shall be obtained from the following equation:

$$\gamma_u = \gamma_t \frac{f_{yT} I_T}{f_y I}$$

where f_y is the characteristic strength of the material
 f_{yT} is the actual strength of material in the lighting column
 I is the specified inertia
 I_T is the inertia of the test lighting column
 γ_t is the test factor.
 $\gamma_u = \gamma_t$ for wind loads as specified in 5.4 of prEN 40-3-3:1999.

The ratios shall not be included if less than 1.

Where more than one material, or batch of material, is used in construction of the test lighting column, the highest ratio shall be adopted.

For metal lighting columns f_{yT} shall be the yield stress or 0,2 % proof stress. For concrete lighting columns f_{yT} shall be as defined in prEN 40-4:1999 and shall be determined from test pieces cast at the same time and from the same batch as the test lighting column.

5.5 Critical cross-sections

- 1) The point at which the lighting column is fixed (normally at ground level).
- 2) The lower edge of the door opening(s). If two or more door openings are provided the strength at each opening shall be verified.
- 3) The upper edge of the door opening for tapered columns. If two or more door openings are provided the strength at each opening shall be verified.
- 4) The point at which the bracket begins if the lighting column and bracket consist of one piece, or if the bracket is detachable the point at which the bracket is attached.
- 5) Transition from one diameter to another when the lighting column is stepped.
- 6) Any other critical position, i.e. change of material thickness.

5.6 Ultimate failure test (Optional)

After completion of the minimum ultimate load test in 5.4 the lighting column may, at the discretion of the manufacturer, be taken to ultimate failure. Where this is done the result may be recorded.

6 Preparation for test

The lighting column to be tested shall be representative of the production batch to be tested.

The age of concrete in concrete lighting columns at the time of testing shall not exceed 35 days.

The lighting column shall be tested in either a horizontal or vertical position. When testing in the horizontal position, the dead loads resulting from testing in this position shall be taken into account, or be compensated for by appropriate supports.

During the test the lighting column shall be rigidly fixed over its planting depth. The upper support point shall coincide with the intended ground level. Lighting columns with flange plates shall be bolted to a rigid plate using bolts of the same size as specified for use in final erection of the lighting column.

The position of the door relative to the direction of the horizontal loading shall be in the most onerous position allowed in design and the position shall be stated. Where a bracket is used the position of the bracket projection relative to the position of the door shall be stated.

NOTE: Before carrying out the tests described in clause 7 the lighting column may be loaded once and then unloaded provided that the applied load does not exceed 50 % of the test load calculated in accordance with EN 40-3-1.

SIST EN 40-3-2:2001

7 Application of forces

7.1 General

The forces shall be applied by dead weights or by means of devices such as load cells having an accuracy of $\pm 2\%$.

7.2 Serviceability requirements

7.2.1 Vertical deflection

For lighting columns with brackets the vertical forces corresponding to the masses of the lantern and that part of the bracket deviating from the vertical shall be applied first.

The vertical deflection of the lantern connection caused by the vertical forces shall be measured and entered in the test report. The vertical forces shall remain applied during all subsequent testing.

7.2.2 Horizontal deflection

Horizontal forces shall be applied to act so that the moments caused at the critical sections in the column (see 5.5) are at least equal to the moments resulting from the test loads. At all other points the moments shall be not less than 95 % of the moments resulting from the test loads.

The horizontal forces shall be applied in stages by means of at least five approximately equal incremental loads up to the test load. At the test load the horizontal deflection of the lantern connection shall be measured and entered in the test report.

7.3 Structural requirements

After unloading from the horizontal deflection test the residual linear horizontal deflection shall be measured and recorded.

7.4 Minimum ultimate load test

On completion of the test in 7.3, the horizontal forces shall be gradually and proportionally increased up to the minimum ultimate load as determined from 5.4 of this standard.

At this minimum ultimate load condition the horizontal and vertical deflections shall be measured and recorded.

7.5 Ultimate failure test (optional)

Where this test is carried out the loads shall be applied in increments until failure occurs. The loading at ultimate failure should be recorded.

8 Test report

A test report shall describe the method of testing in detail and contain at least the information listed in annex A.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

9 Type test certificate

SIST EN 40-3-2:2001

<https://standards.iteh.ai/catalog/standards/sist/c0d14d27-a37a-4779-94b3->

A type test certificate shall contain at least the information listed in annex B.

10 Permissible modifications to type tested columns

Where changed requirements produce loads which differ from the test loads, e.g. as a result of a change in the specified wind load or lantern area, new bending and torsional moments shall be calculated as specified in EN 40-3-1 for the new test load. If the moments thus calculated show that the bending and torsional moments do not at any point exceed the moments produced by the test, the type test shall be deemed to verify the modifications.

11 Fatigue requirements

Fatigue requirements are not covered in this standard. However when specified the possibility of fatigue effects may be considered for metal lighting columns above 9m in height. If fatigue testing is required the requirements and methods of test shall be specified.

If fatigue testing of lighting columns greater than 9 m is considered necessary then these will need to be carried out at a specialist laboratory and the apportionment of costs agreed before commencing testing.

NOTE: Due to the inherent rigidity of concrete lighting columns it is not normally necessary to consider fatigue for concrete lighting columns.