SLOVENSKI STANDARD

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Bushings up to 1 kV and from 250 A to 5 kA, for liquid filled transformers

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English version

Bushings up to 1 kV and from 250 A to 5 kA, for liquid filled transformers

Traversées jusqu'à 1 kV
et de 250 A à 5 kA,
pour transformateurs
à remplissage de liquide

Durchführungen bis 1 kV
und von 250 A bis 5 kA
für flüssigkeitsgefüllte Transformatoren

This European Standard was approved by CENELEC on 2002-10-01. CENELEC 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 CENELEC 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 CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the Harmonization Document HD 596 S1, prepared by the Technical Committee CENELEC TC 36A, Insulated bushings, was approved by CENELEC on 1995-11-28.

This Harmonization Document was submitted to the formal vote for conversion into a European Standard and was approved by CENELEC as EN 50386 on 2002-10-01.

The following date was fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2003-10-01

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Introduction

The object of this standard is to specify the requirements and the dimensions of bushings for rated voltages up to 1 000 V and rated currents from 250 A up to 5 000 A for insulating liquid filled transformers.

1 Scope

This standard is applicable to ceramic insulated bushings for rated voltages up to 1 000 V, rated currents from 250 A up to 5 000 A and frequencies from 15 Hz up to 60 Hz for insulating liquid filled transformers.

NOTE These bushings are suitable for operation at 1,1 kV in compliance with HD 428.1 S1.

2 Requirements

2.1 Application

Bushings covered by this standard shall be suitable for operation with one end partially or fully immersed in an insulating liquid and with the other end in air.

2.2 Standard value of rated voltage (U_r)

The rated voltage U_r is 1 000 V (phase to phase). When a bushing is used only partially immersed, a reduced rated voltage shall be agreed between the purchaser and the manufacturer.

2.3 Standard values of rated current (I_r)

The values of I_r of a bushing shall be chosen from the standard values as given below, in amperes:

250 - 630 - 1 250 - 2 000 - 3 150 - 4 000 - 5 000

2.4 Minimum nominal creepage distance

The minimum nominal creepage distance for bushing ends intended for use in air, is given in Table 1.

Table 1 – Minimum nominal creepage distance

I_r (A)	250	630	1 250 – 3 150	4 000 – 5 000
Minimum nominal creepage distance (mm)	55 (standard type) 115 (extended type) [a]	70	75	85
[a] Type with extended creepage distance.				

2.5 Dielectric characteristics

Power-frequency withstand voltage (60 s): dry and wet 10 kV

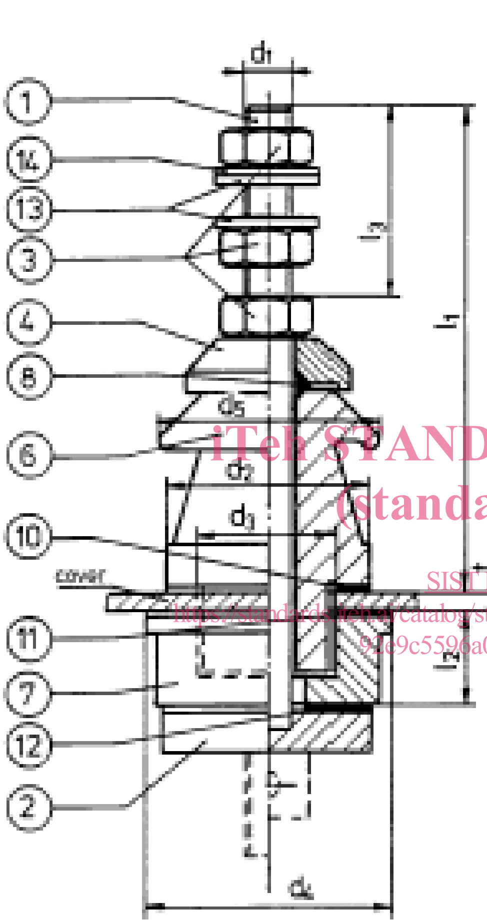
Lightning impulse withstand voltage (1,2/50 µs): 20 kV

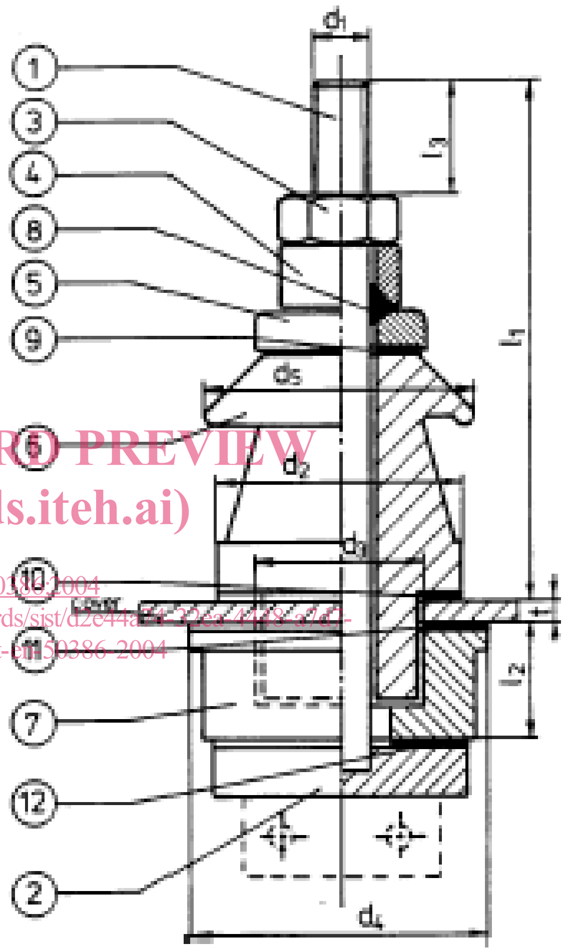
When a bushing is used only partially immersed, the reduced dielectric characteristics shall be agreed between the purchaser and the manufacturer.

2.6 Dimensions and components

Figure 1 and Figure 2 show the basic construction of the bushings and the dimensions covered by this standard. They do not purport to show constructional details.

The dimensions shall be as specified in Table 2.
The list of components is given in Table 3.





NOTE Internal terminal connections are not defined in this standard.

Figure 1 – Type 1 - 3 bushings (250 A to 630 A)

Figure 2 – Type 4 - 8 bushings (1 250 A to 5 000 A)

Table 2 – Standard dimensions

Types	I_r (A)	l_1 max. (mm)	l_2 min. (mm)	t max. (mm)	d_1 (mm)	d_2 max. (mm)	d_3 $^{+2}_{0}$ (mm)	d_4 max. (mm)	l_3 min. (mm)	d_5 max. (mm)
1	250	138	30	6	M12	56	28	60	40	56
2	250 [a]	160	30	6	M12	56	28	60	40	70
3	630	178	30	6	M20	70	45	85	65	70
4	1 250	200	35	6	M30×2	90	56	110	70	90
5	2 000	240	35	10	M42×3	104	70	125	90	104
6	3 150	250	35	10	M48×3	125	90	150	90	125
7	4 000	300	40	10	M55×3	160	118	180	110	180
8	5 000	310	40	10	M64×3 or ∅ 58 [b]	160	118	180	110	180

[a] Type with extended creepage distance.

[b] Plain terminations are allowed but are limited to the length l_3.

Table 3 – List of components

Item	Designation	Remarks
1	Terminal stud	Types 1 - 3: Brass Types 4 - 8: Copper If brass is used for types 4 - 8 or if aluminum-alloy for all types the rated current I_r shall be reduced subject to an agreement.
2	Conductor	Formed as terminal stud, busbar or flange
3	Nut	
4	Pressure plate	
5	Pressure plate	Only for types 4 – 8
6	Ceramic body	
7	Insulation body	
8	Gasket	Oil resistant rubber
9	Gasket	Only for types 4 – 8, oil resistant rubber
10	Gasket	Oil resistant rubber
11	Packing	Only necessary if material of insulation body item 7 is ceramic
12	Packing	Only necessary if material of insulation body item 7 is ceramic
13	Washer	Only for types 1 - 3
14	Spring washer	Only for types 1 - 3