



# SLOVENSKI STANDARD

## SIST HD 596 S1:1997

01-november-1997

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

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

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

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

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**Ta slovenski standard je istoveten z: HD 596 S1:1996**

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#### **ICS:**

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**en**

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HARMONIZATION DOCUMENT  
DOCUMENT D'HARMONISATION  
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**HD 596 S1**

February 1996

ICS 29.180

Descriptors: Bushing, liquid filled transformer, dimensions

English version

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This Harmonization Document was approved by CENELEC on 1995-11-28. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

Up-to-date lists and bibliographical references concerning such national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

**CENELEC**

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

This Harmonization Document was prepared by the Technical Committee CENELEC TC 36A, Insulated bushings.

The text of the draft was submitted to the formal vote and was approved by CENELEC as HD 596 S1 on 1995-11-28.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 1996-06-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 1996-12-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 1996-12-01

For products which have complied with the relevant national standard before 1996-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-12-01.

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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

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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 *)	70	75	85
*) 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  $\mu$ s): 20 kV

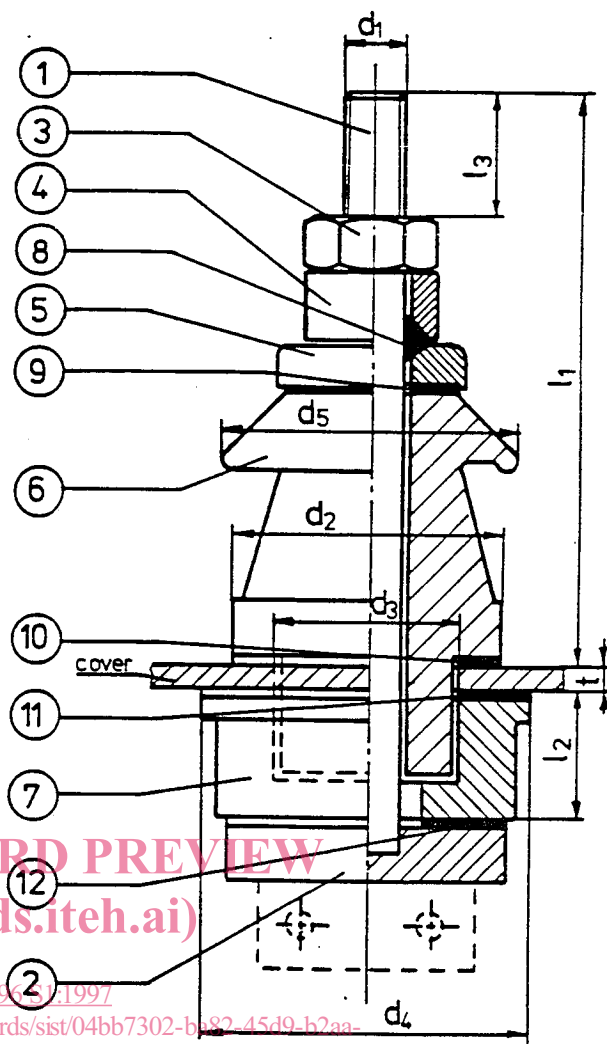
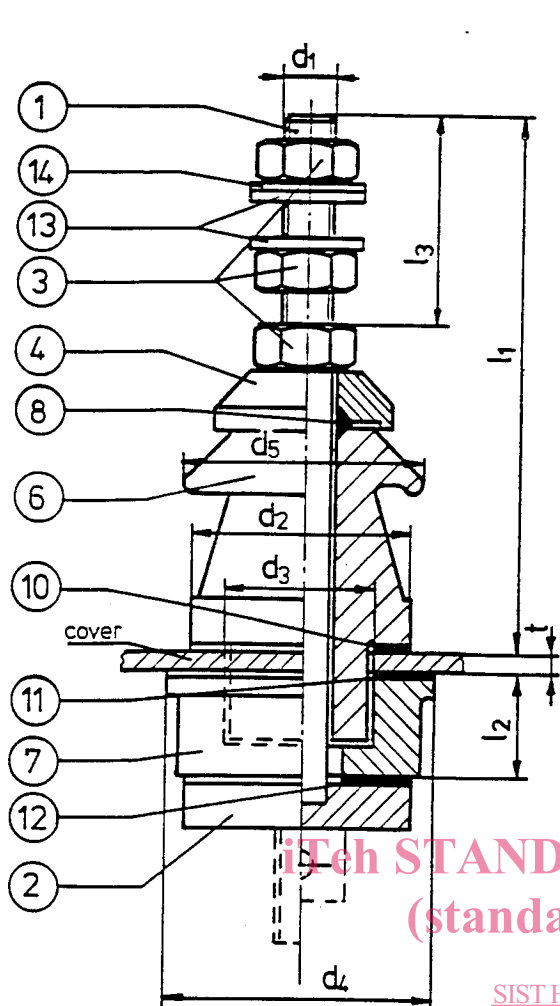
When a bushing is used only partially immersed, the reduced dielectric characteristics shall be agreed between the purchaser and the manufacturer.

### 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 à 630 A)

Figure 2: Type 4 - 8 bushings  
(1 250 A à 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)	$d_3^{+0.2}$ 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*	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	M30x2	90	56	110	70	90
5	2 000	240	35	10	M42x3	104	70	125	90	104
6	3 150	250	35	10	M48x3	125	90	150	90	125
7	4 000	300	40	10	M55x3	160	118	180	110	180
8	5 000	310	40	10	M64x3 or $\varnothing 58^{**}$ )	160	118	180	110	180

\*) Type with extended creepage distance

\*\*) 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 aluminium-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