

SLOVENSKI STANDARD**SIST EN 50180:1997****01-november-1997**

**Bushings above 1 kV up to 36 kV and from 250 A to 3,15 kA for liquid filled
transformers**

Bushings above 1 kV up to 36 kV and from 250 A to 3,15 kA for liquid filled transformers

Durchführungen über 1 kV bis 36 kV und von 250 A bis 3,15 kA für flüssigkeitsgefüllte
Transformatoren

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Traversées de tensions supérieures à 1 kV jusqu'à 36 kV et de 250 A à 3,15 kA pour
transformateurs à remplissage de liquide

[SIST EN 50180:1997](#)

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ICS:

29.080.20	Skoznjiki	Bushings
29.180	Transformatorji. Dušilke	Transformers. Reactors

SIST EN 50180:1997**en**

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**EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM**

EN 50180

May 1997

ICS 29.180

Supersedes HD 506 S1:1989 and its amendment

Descriptors: Bushing, liquid-filled transformer, dimensions

English version

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CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

This European Standard 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 EN 50180 on 1996-10-01.

This European Standard supersedes HD 506 S1:1989 and its A1:1992.

The following dates were 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) 1997-12-01
 - latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-12-01
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Introduction

The object of this standard is to specify the requirements to ensure interchangeability of bushings for rated voltages above 1 kV up to 36 kV and rated currents from 250 A up to 3150 A for insulating liquid filled transformers.

1 Scope

This standard is applicable to ceramic and resin insulated bushings for rated voltages above 1 kV up to 36 kV, rated currents from 250 A up to 3150 A and frequencies from 15 Hz up to 60 Hz for insulating liquid filled transformers.

This standard establishes essential dimensions, to ensure interchangeability of bushings and to ensure adequate mounting and interchangeability of mating plug-in separable connectors of equivalent ratings.

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.

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HD 329 S1: 1977	Tests on hollow insulators for use in electrical equipment (endorsing IEC 233: 1974)
HD 426.3 S1: 1987	Specification for ceramic and glass insulating materials; Part 3: individual materials (endorsing IEC 672-3: 1984)
EN 60137: 1996	Bushings for alternating voltages above 1000 V
IEC 815: 1986	Guide for the selection of insulators in respect of polluted conditions

3 Definitions

For the purposes of this standard, the following definitions apply:

- 3.1 Open type bushing:** A bushing, one end of which is immersed in an insulating liquid with the other end in ambient air and exposed or not exposed to external atmospheric conditions.
- 3.2 Plug-in type bushing:** A bushing, one end of which is immersed in an insulating liquid and the other end designed to receive a separable insulated cable connector without which the bushing cannot function.
- 3.3 Separable connector:** A fully insulated termination permitting the connection and disconnection of the cable to and from the mating plug-in type bushing.
- 3.4 Interface type:** Bushing dimensions that insure mechanical and electrical interchangeability of bushing and separable connector of similar rating and type. Each interface type is designated by a letter or a number.
- 3.5 Bail holder:** A fixture which facilitates anchoring of an externally mounted device (called the bail) designed to prevent undesirable separation of a separable connector and a bushing. A bail holder may or may not be an integral part of a bushing and is an optional feature.

4 Requirements

4.1 Application

Open type bushings covered by this standard shall be suitable for operation with one end fully immersed in an insulating liquid and with the other in air.

Plug-in type 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 in a separable connector.

4.2 Standard values of rated voltage (U_r)

The value of U_r of a bushing shall be chosen from the standard values of the highest voltage for equipment U_m , as given below, in kilovolts:

12 - 24 - 36

4.3 Standard values of rated current (I_r)

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

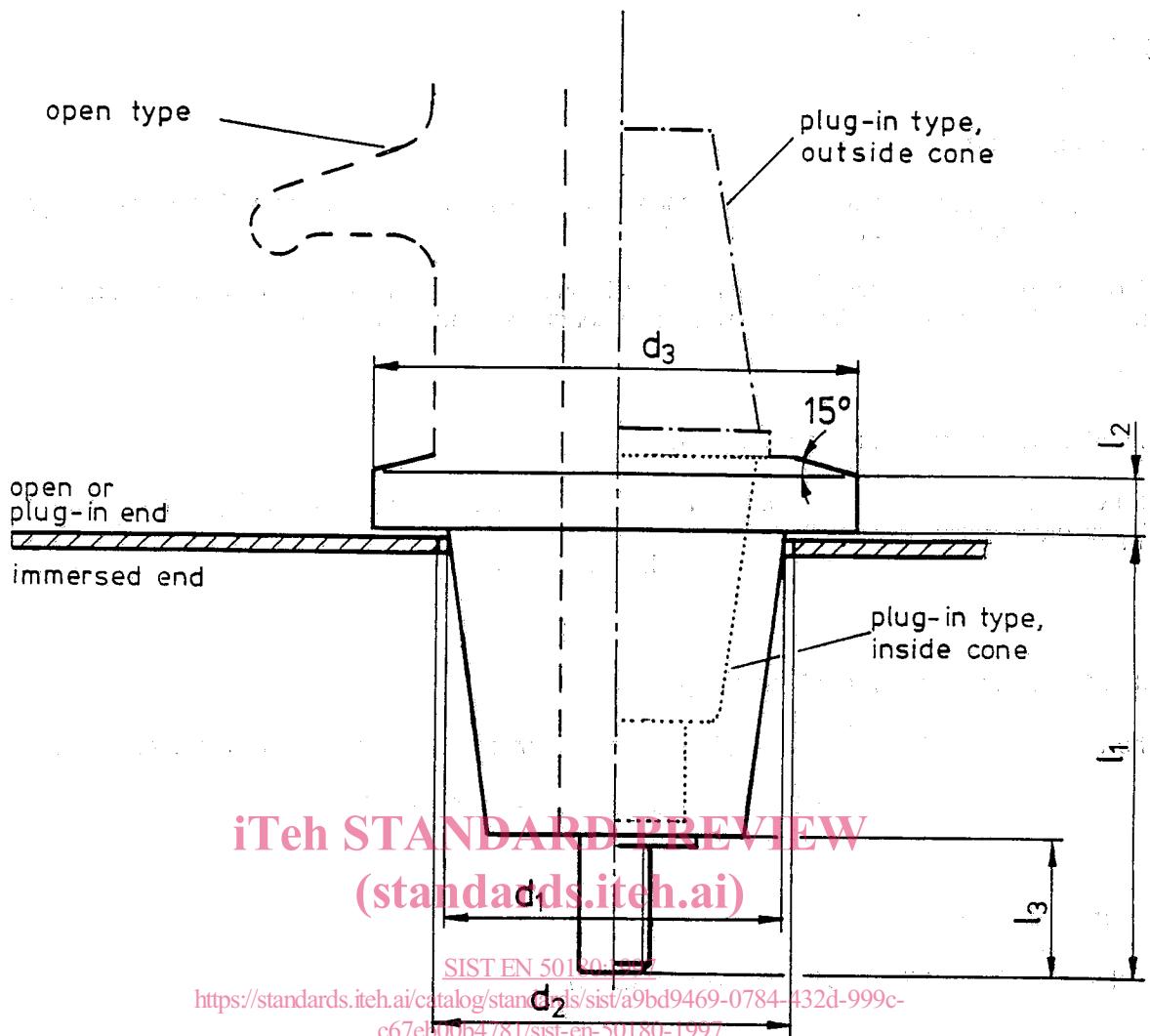
250 - 400 - 630 - 800 - 1 250 - 2 000 - 3 150
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4.4 Compliance

Bushings shall meet the requirements of EN 60137.
<https://standards.iteh.ai/catalog/standards/sist/a9bd9469-0784-432d-999c-c67eb00b4781/sist-en-50180-1997>

4.5 Common dimensions

The dimensions necessary for interchangeability between open and plug-in type bushings shall be as specified in Figure 1 and Table 1.



NOTE: For open type bushings the internal connection may be a flexible conductor or a stem.

Figure 1: Common dimensions for open and plug-in type bushings

Table 1: Common dimensions for open and plug-in type bushings

I _r (A)	d ₁ (mm)	d ₂ ₀ ⁺² (mm)	d ₃ (mm)	l ₁ max. (mm)	l ₂ ₋₁ ⁰ (mm)	l ₃ max. (mm)
250	77 ₋₅ ⁰	80	111 ₋₇ ⁰	145	25	45
400	87 ₋₆ ⁰	90	128 ₋₈ ⁰	195	25	75
630						
800	107 ₋₇ ⁰	110	165 ₋₁₀ ⁰	215	30	100
1 250						
2 000	132 ₋₈ ⁰	135	185 ₋₁₁ ⁰	215	30	100
3 150						

4.6 Detail dimensions and creepage distances of open type bushings

The dimensions necessary for interchangeability of open type bushings shall be as specified in the following figures and tables.

These figures do not purport to show constructional details. The provision for arcing horns should be made if required.

The details of the porcelains and the creepage distance AB of each insulator type are given in the normative Annex A.

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4.6.1 250 A, upright types

Insulator types for 250 A may be clamped to the transformer tank using either the fixation method illustrated or a separate insulation piece on the inside of the tank.

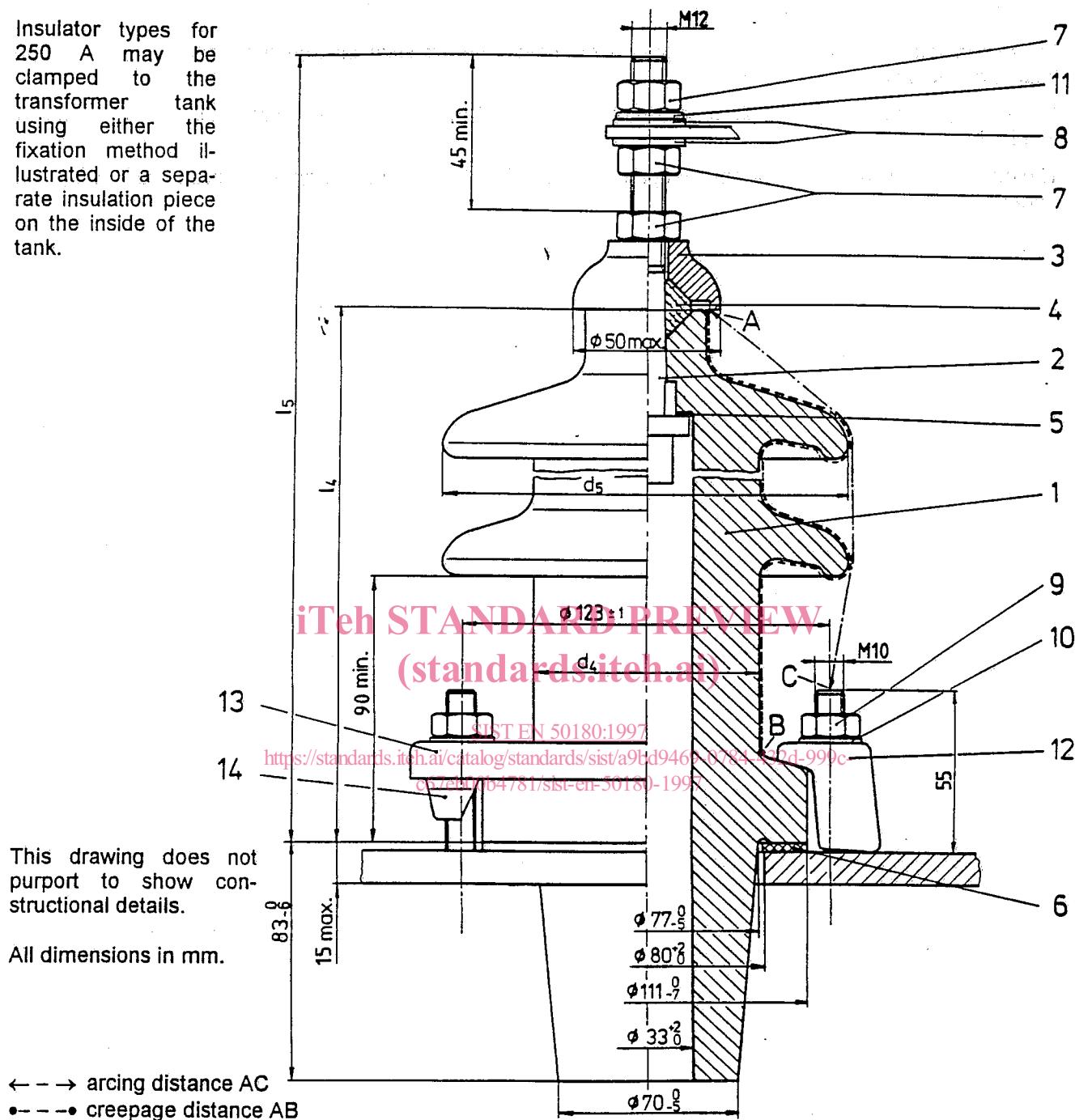


Figure 2: 250 A upright types

Table 2: Dimensions, 250 A upright types

Designation	U_r (kV)	Min. nominal creepage distance AB (mm)				Insulator type	Arcing distance AC (mm)	l_4 max. (mm)	l_5 max. (mm)	d_4 max. (mm)	d_5 max. (mm)
		I	II	III	IV						
12-250/P1	12	192				1	145	190	270	75	140
12-250/P2	12		240								
12-250/P4	12										
24-250/P2	24	384	480	300	372	2	260	304	384	80	150
24-250/P3	24			600							
36-250/P1	36	576				3	315	357	437	80	155
24-250/P4	24										
36-250/P3	36		720	900	744	4	465	516	596	80	155
36-250/P4	36					5	485	516	596	80	190
					1 116						

Table 3: List of components, 250 A upright types

Item	Quantity								Designation	Remarks
	12-250/P1	12-250/P2	12-250/P4	24-250/P2	24-250/P3	24-250/P4	36-250/P1	36-250/P3	36-250/P4	
1	1	1							Insulator	Porcelain
			1	1						
				1		1				
					1		1			
								1		
2			1						Terminal stud *)	Brass
3				1					Cap *)	Brass
4									Gasket *)	Oil-resistant rubber
5					1				Spacer *)	
6						1			Packing *)	Oil-resistant rubber
7				3			SIST EN 50180:1997		Nut	Brass
8					2		https://standards.itech.ai/catalog/standards/sist/a9bd9469-0784-432d-999c-c67eb00b4781/sist/en-50180-1997		Washer	Brass
9				as required					Nut	Corrosion-resistant
10				as required					Washer	Corrosion-resistant
11					1				Spring-washer	Corrosion-resistant
Variant A: By means of clamping pieces										
12				as required					Clamping piece *)	Corrosion-resistant
Variant B: By means of clamping ring										
13					1				Clamping ring *)	Corrosion-resistant
14					as required				Clamping paw *)	Corrosion-resistant

4.6.2 250 A, inclined types

Insulator types for 250 A may be clamped to the transformer tank using either the fixation method illustrated or a separate insulation piece on the inside of the tank.

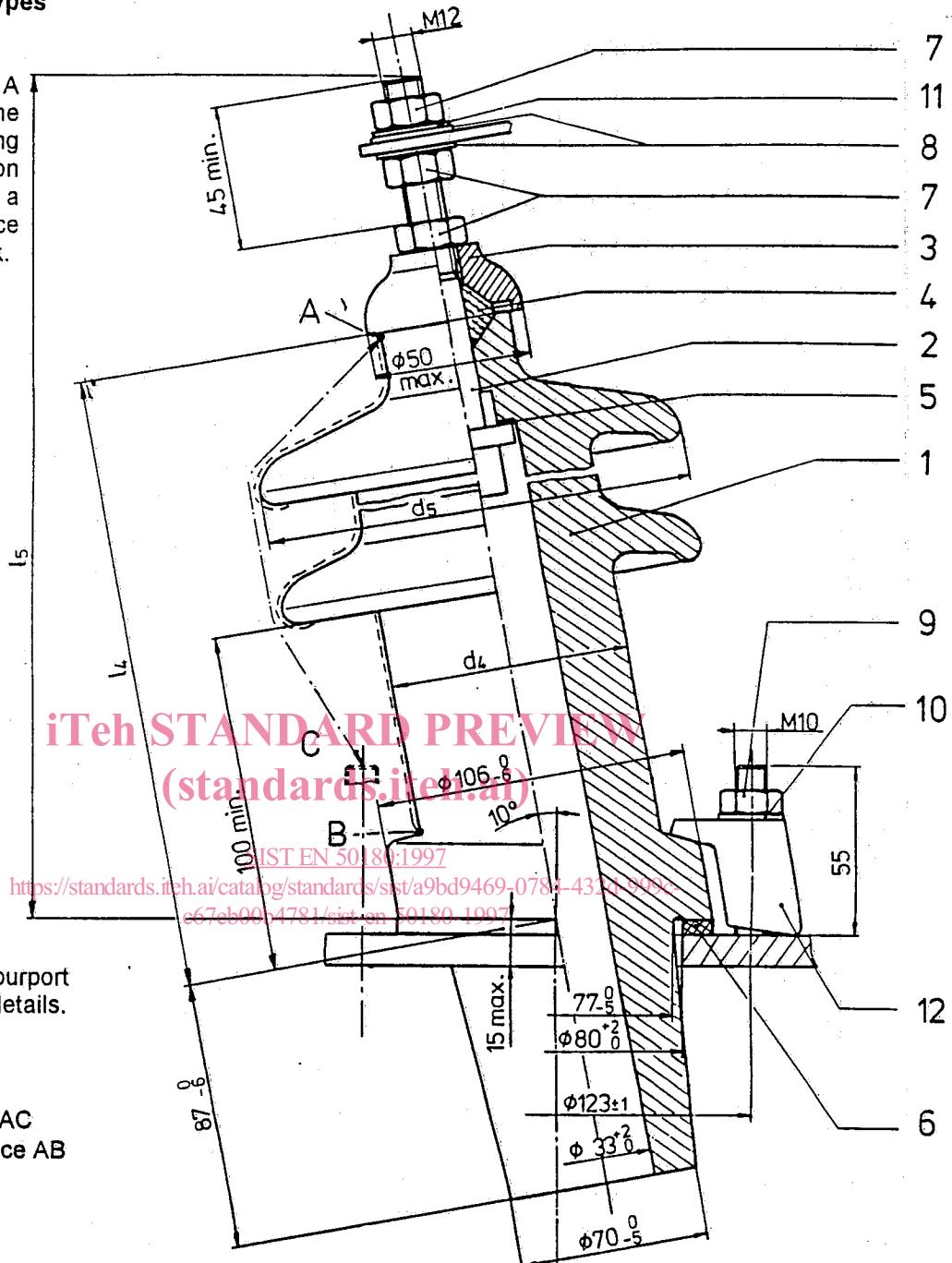


Figure 3: 250 A inclined types

Table 4: Dimensions, 250 A inclined types

Designation	U_r (kV)	Min. nominal creepage distance AB (mm)				Insulator type	Arcing distance AC (mm)	l_4 max. (mm)	l_5 max. (mm)	d_4 max. (mm)	d_5 max. (mm)
		Pollution level (IEC 815)	I	II	III						
I-12-250/P1	12	192				11	150	200	270	75	140
I-12-250/P2	12		240								
I-12-250/P4	12					12	265	314	390	80	150
I-24-250/P2	24	384	480	300	372						
I-24-250/P3	24			600		13	315	367	495	80	155
I-36-250/P1	36	576									
I-24-250/P4	24				744	14	470	526	600	80	155
I-36-250/P3	36		720	900							
I-36-250/P4	36				1116	15	490	526	600	80	190