



SLOVENSKI STANDARD

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Nadomešča:
SIST EN 50243:2004

Skoznjiki za zunanjo montažo 24 kV in 36 kV ter za 5 kA in 8 kA, za transformatorje, napolnjene s tekočino

Outdoor bushings for 24 kV and 36 kV and for 5 kA and 8 kA, for liquid filled transformers

Durchführungen für Freiluft, 24 kV und 36 kV sowie 5 kA und 8 kA, für flüssigkeitsgefüllte Transformatoren

Traversées d'extérieur pour 24 kV et 36 kV et pour 5 kA et 8 kA, pour transformateurs remplis de liquide

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European foreword

This document (EN 50243:2022) has been prepared by CLC/TC 36A "Insulated bushings".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-06-20
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2025-06-20

This document will supersede EN 50243:2002 and all of its amendments and corrigenda (if any).

EN 50243:2022 includes the following significant technical change(s) with respect to EN 50243:2002:

- Addition of the highest pollution class.

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1 Scope

This document is applicable to ceramic insulated outdoor bushings for highest voltages for equipment of 24 kV and 36 kV, with rated currents of 5 kA and 8 kA for insulating liquid filled transformers and frequencies from 15 Hz up to 60 Hz.

This document establishes dimensions to ensure interchangeability and adequate mounting of bushings.

Two types of construction are specified, type A and type B, both types for highest voltages for equipment 24 kV and 36 kV and rated currents of 5 kA and 8 kA. The mechanical stresses of the conductor tube define the difference between type A and type B. The conductor tube of type A is axially and radially fixed in the top of the bushing. The inner line terminal of the transformer can be flexible and without any special support for the lower end of the conductor tube.

For new installations bushings of Type A are expected to be used. Type B bushings can be supplied at the request of a customer.

In case of type B, the conductor tube is only radially fixed in the top of the bushing. In that case, a rigid support is mounted to fix the lower end of the conductor tube (for example, in combination with a drip proofed sealing end). The drip proofed sealing end is often required in the service requirements. In this case, it is not possible to use type A because of the existing double fixation. Therefore, both bushing types A and B are specified.

The condition for the usage of type B is that the drip-proof sealing end is able to withstand the mechanical stress in axial direction.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12165:2016, *Copper and copper alloys — Wrought and unwrought forging stock*

EN 60137, *Insulated bushings for alternating voltages above 1 000 V (IEC 60137)*

EN 60672-3, *Ceramic and glass-insulating materials — Part 3: Specifications for individual materials (IEC 60672-3)*

EN 62155, *Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1 000 V (IEC 62155)*

EN ISO 286-2, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts (ISO 286-2)*

EN ISO 1101, *Geometrical product specifications (GPS) — Geometrical tolerancing — Tolerances of form, orientation, location and run-out (ISO 1101)*

EN ISO 21920-1, *Geometrical product specifications (GPS) — Surface texture: Profile — Part 1: Indication of surface texture (ISO 21920-1)*

IEC/TS 60815 (all parts), *Selection and dimensioning of high-voltage insulators intended for use in polluted conditions*

ISO 261, *ISO general purpose metric screw threads — General plan*

ISO 2768-1, *General Tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

bushing type A

bushing with a conductor tube which is axially and radially fixed in the top of the bushing

3.2

bushing type B

bushing with a conductor tube which is only radially fixed in the top of the bushing

4 Requirements

4.1 General requirements

Bushings specified by this document shall be installed with the transformer side of the bushing fully immersed in insulating liquid and the other end in air.

Bushings shall meet the requirements of EN 60137.

4.2 Ratings

4.2.1 Standard values of highest voltage for equipment (U_m)

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

4.2.2 Standard values of rated current (I_r)

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

5 000 – 8 000

4.3 Common dimensions and creepage distances of bushings type A and type B

The common dimensions of bushings type A and type B shall be as specified in Figure 1 and Table 1.

The details of the components are given in Annex A.

The provisions for arcing horns should be made if required.

In case of environmental conditions, which do not require site pollution severity class “c” or more according to IEC/TS 60815 (all parts), an insulator with a reduced creepage distance can be agreed between the purchaser and the manufacturer without changing the common dimensions.

Table 1 — Common dimensions of bushings type A and type B

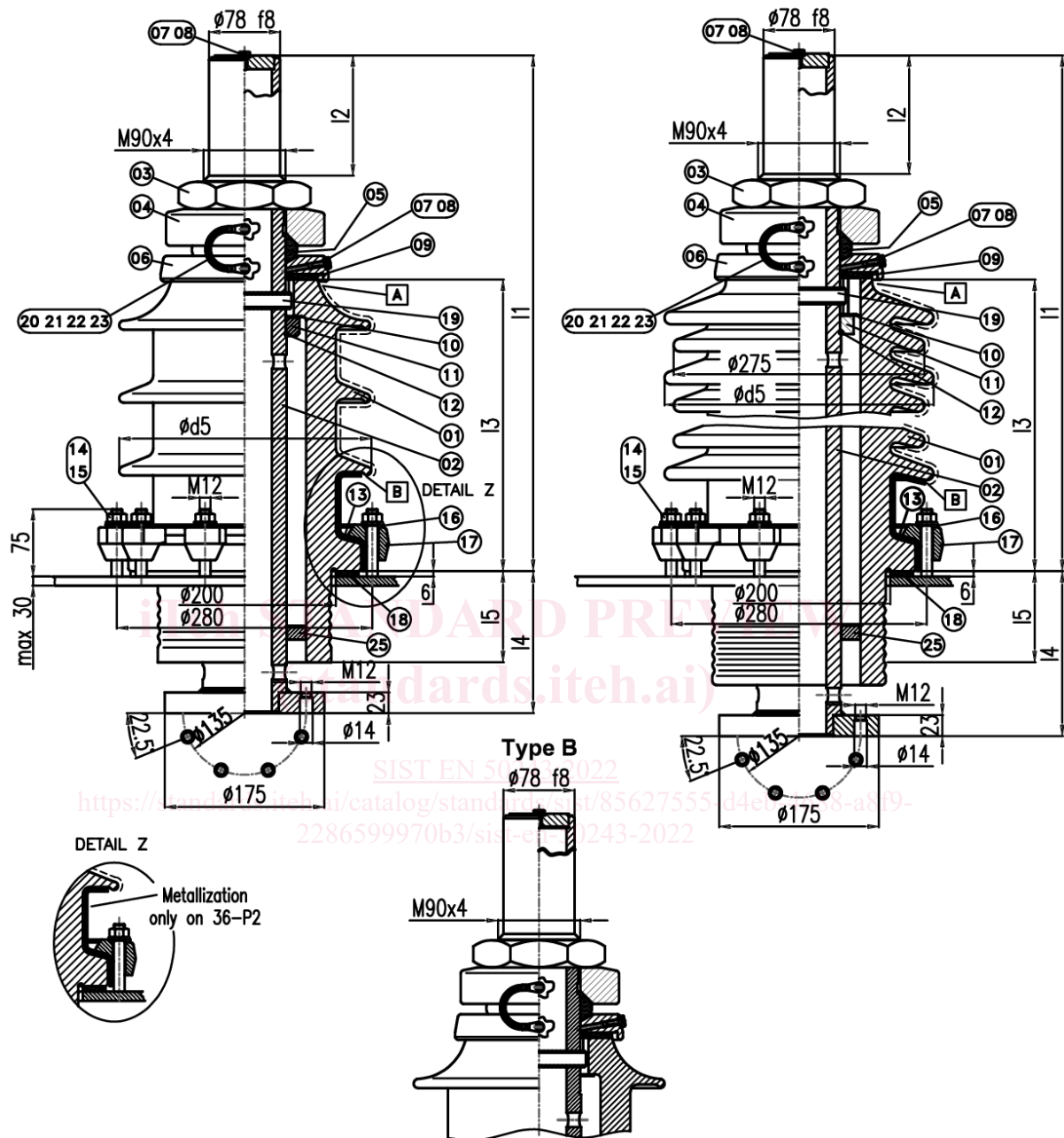
Designation (for design Type A or B)	U_m (kV)	I_r (A)	Minimum Nominal Creepage Distance (mm) For pollution level (IEC/TS 60815 (all parts)				Insulator Type	Arcing Distance (mm)	l_1 (mm)	l_2 (mm) Min	d_5 (mm)	l_3 (mm)	l_4 (mm) Max	l_5 (mm) Max
			b	c	d	e								
24–5/P2	24	5000	384	480			24-P2 (CD 480 mm)	270	540	100	285	320	150	100
24–8/P2		8000							570	130				
24–5/P4	24	5000	384	480	600	744	36-P2 (CD 744 mm)	380	635	100	285	415	175	125
24–8/P2		8000							665	130				
36–5/P2	36	5000	576	720				380	635	100	285	415	175	125
36–8/P2		8000							665	130				
36–5/P3	36	5000	576	720	900		36-P3 (CD 900 mm)	370	635	100	295	415	175	125
36–8/P3		8000							665	130				
36–5/P4	36	5000				1116	36-P4 (CD 1116 mm)	436	701	100	304	481	200	149
36–8/P4		8000							731	130				

NOTE Designation of a complete bushing type A according to EN 50243 for U_m 24 kV and I_r 5 kA, with a creepage distance suitable for pollution level “c” according to IEC/TS 60815 (all parts): 24 – 5/P2 – A.

24 kV / P2 -Type A 36 kV / P3 – Type A

<https://standards.sist/8562286599970b3/sist-en-50243-2022> 24 kV / P3 (36kV/ P2) -Type A 36 kV / P4 – Type A

All dimensions in mm



NOTE 1 Flange metallization only on 36 kV bushings.

It is not permitted to apply a corrosion protection on the metallic coating of the insulating body of the bushings Um 36 kV before the bushing respectively the insulating body is mounted on the transformer cover.

NOTE 2 Dimensions without individual tolerance indications to be according to ISO 2768-1 – m and K, holes and shafts according to EN ISO 286-2. Definitions of threads according to ISO 261.

NOTE 3 The specified tightening torque of the nut M 90 x 4 (Item 3) is 140 Nm (greased).

Figure 1 — Dimensions of bushings type A and type B

4.4 Parts list according to bushing type A

Table 2 — List of components, bushing type A

Item	Quantity										Designation	Remarks		
	24-5/P2-A	24-8/P2-A	24-5/P4-A	24-8/P4-A	36-5/P2-A	36-8/P2-A	36-5/P3-A	36-8/P3-A	36-5/P4-A	36-8/P4-A				
1	1	1										Insulator	24-P2	Porcelain (see A.2)
			1	1	1	1							36-P2	
							1	1					36-P3	
									1	1			36-P4	
2	1											Conductor tube	24-5	Copper (see A.3)
		1											24-8	
			1		1		1						36-5	
				1		1		1					36-8	
									1				36-5/P4	
										1			36-8/P4	
3					1							Nut	(see A.6)	
4					1							Upper cap	(see A.4)	
5					1							Sealing ring	(see A.7)	
6					1							Lower cap	(see A.5)	
7					2							Gasket	Polyamide (PA6)	
8					2							Vent plug	Corrosion-resistant	
9					1							Flat gasket	(see A.8)	
10					1							Flat gasket	(see A.14)	
11					1							Compression ring	(see A.12)	
12					1							Retaining ring	(see A.13)	
13					1							Interlayer	(see A.11)	
14					10							Nut M12	Corrosion-resistant	
15					10							Washer A13	Corrosion-resistant	
16					1							Clamping ring	(see A.10)	
17					10							Clamping paw	(see A.15)	
18					1							Flat gasket	(see A.9)	
19					1							Pipe 18 × 2	E-Cu	
20					1							Cable 10 – E-Cu	70 mm length	
21					2							Cable lug A6 × 4,3		
22					2							Screw M6x8	Stainless steel	
23					2							Spring washer A6	Stainless steel	

Screws and nuts with thread profile according to ISO 261. Stainless Steel A2 minimum A4 optional.

4.5 Parts list according to bushing type B

Table 3 — List of components, bushing type B

Item	Quantity										Designation	Remarks	
	24-5/P2-B	24-8/P2-B	24-5/P4-B	24-8/P4-B	36-5/P2-B	36-8/P2-B	36-5/P3-B	36-8/P3-B	36-5/P4-B	36-8/P4-B			
1	1	1									Insulator	24-P2	Porcelain (see A.2)
			1	1	1	1						36-P2	
							1	1				36-P3	
									1	1		36-P4	
2	1										Conductor tube	24-5	Copper (see A.3)
		1										24-8	
			1		1		1					36-5	
				1		1		1				36-8	
									1			36-5/P4	
										1		36-8/P4	
3					1						Nut	(see A.6)	
4					1						Upper cap	(see A.4)	
5					1						Sealing ring	(see A.7)	
6					1						Lower cap	(see A.5)	
7					2						Gasket	Polyamide (PA6)	
8					2						Vent plug	Corrosion-resistant	
9					1						Flat gasket	(see A.8)	
13					1						Interlayer	(see A.11)	
14					10						Nut M12	Corrosion-resistant	
15					10						Washer A13	Corrosion-resistant	
16					1						Clamping ring	(see A.10)	
17					10						Clamping paw	(see A.15)	
18					1						Flat gasket	(see A.9)	
19					1						Pipe 18 × 2	E-Cu	
20					1						Cable 10 – E-Cu	70 mm length	
21					2						Cable lug A6 × 4,3		
22					2						Screw M6x8	Stainless steel	
23					2						Spring washer A6	Stainless steel	

Screws and nuts with thread profile according to ISO 261.