

Bus bar support (Post Insulator)

Technical Terms of Delivery



IRAN TRANSFO **DISTRIBUTION TRANSFORMERS** **STANDARD**
Transformer Research Institute of Iran

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FOREWORD

Iran Transfo Distribution Transformer Standard consists of a series of standards which are prepared on the basis of valid International standards, in conformity with Iran Transfo Distribution's technical requirements.

The initial draft has been prepared in Transformer Research Institute of Iran (ITRI) which is also responsible to issue the final documents approved by professional committees in the form of IDS standards. It should be mentioned that all departments of Zangan Distribution Transformer Co. are obligated to apply the issued IDS Standards.

All users must be assured that the latest edition of this standard will be used. The latest edition of IDS standards is also available on the ITRI web site:

<http://filer.irantransfo.com>

About this standard:

The present standard has been approved in Zangan Distribution Transformer Co.'s Electrical Committee by:

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All users should ensure that they have the latest edition of this publication.

CONTENTS

1	Scope	4
2	Designation	4
3	Specification	4
3.1	Bus bar support (Post insulator)	4
3.1.1	Resin bus bar support (Epoxy resin type).....	4
3.2	Resin type.....	4
4	Dimensional characteristics.....	5
5	Values which characterized a bus bar support.....	6
6	Metal fitting	6
7	Electrical characteristics	6
8	Mechanical characteristics.....	6
9	Tests	6
9.1	Type Tests	6
9.2	Sample tests.....	6
9.3	Routine tests.....	6
10	Kind of delivery.....	7
11	Storage conditions	7
12	Packing & Shipping.....	7
13	Normative References	7

1 Scope

These technical terms of delivery applied to bus bar supports (post insulator) that are used in transformer bus ducts, supporting for neutral connection to ground on transformer, cable box or connection of dry type transformer. Ceramic, epoxy resin and silicon rubber with composite core are types of bus bar supports commonly used for outdoor and indoor services.

2 Designation

Designation for bus bar support is according to the following code:

Bus bar support- IDS-MEO02-03- Epoxy resin- Description Code

Table 1: Description Code

Type	Description Code
Epoxy resin	R-60, R-75, R-125, R-170

3 Specification

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

A post insulator is intended to give rigid support to a live part which is to be insulated from earth and from another live part.

The whole or part of the material composing the post insulator consists of organic material.

3.1 Bus bar support (Post insulator)

A bus bar support is intended to give rigid support to a live part which is to be insulated from earth and from another live part.

3.1.1 Resin bus bar support (Epoxy resin type)

A bus bar support is intended to give rigid support to a live part which is to be insulated from earth and/or from another live part.

- **End fitting**

Integral component or formed part of an insulator, intended to connect it to the supporting structure, or to a conductor, or to an item of equipment, or to another insulator.

Note: Where the end fitting is metallic, the term "metal fitting" is normally used.

- **Creepage distance**

Shortest distance or the sum of the shortest distance along the surface of an insulator between two conductive parts which normally have the operating voltage between them.

- **Unified specific Creepage distance (USCD)**

Creepage distance of an insulator divided by the maximum operating voltage across the insulator (for AC systems usually the highest voltage for equipment $U_m/\sqrt{3}$) which is generally expressed in mm/kV and specified as a minimum value.

- **Highest voltage for equipment (U_m)**

The values of the highest voltage for equipment, defined in IEC 60038, in kilovolts.

- **Mechanical failing load**

The maximum load reached when a bus bar support tested under the prescribed conditions of test.

3.2 Resin type

Resin type insulators are suitable for indoor use. This type of insulators categorized according to table 2 and table 3 that shown below.

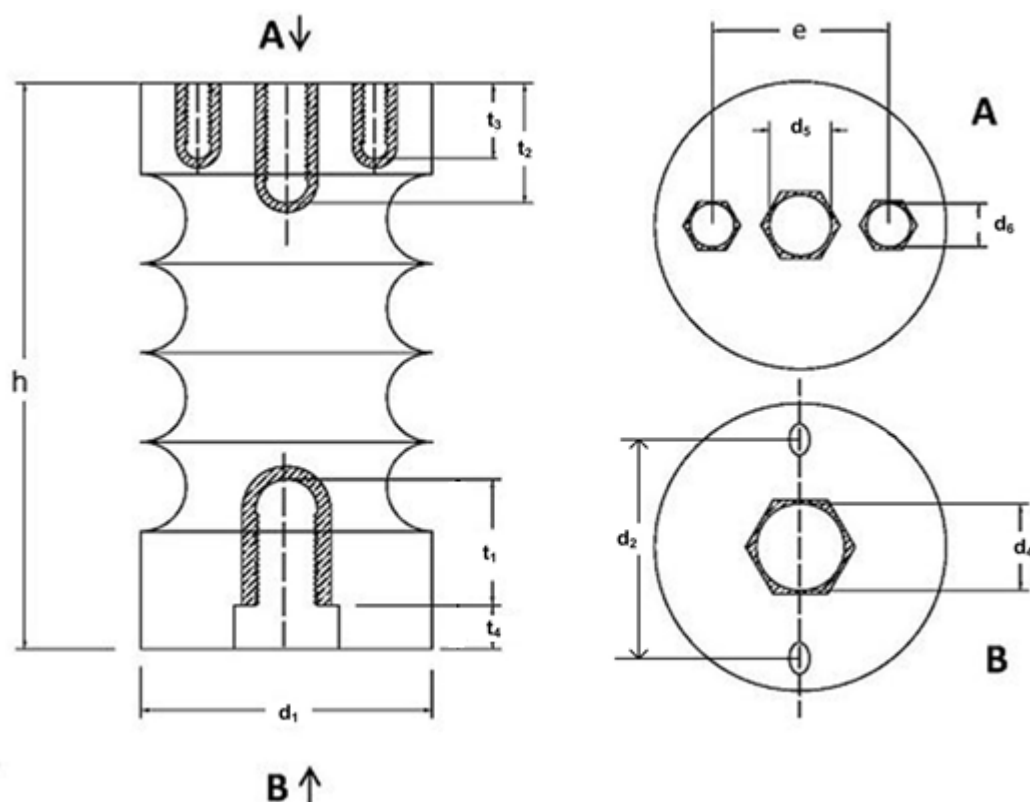


Figure 1: Resin type- overall view and dimensions

Table 2: Resin type bus bar insulator- electrical and mechanical properties

Designation	Permissible Operating Voltage kV	Lightening impulse withstand voltage kV	AC withstand voltage, dry kV	Minimum Creepage distance mm	Failing load bending		Maximum distance on deflection between 20% and 50% of the specified failing load mm
					$P_0(N)$	$P_{50}(N)$ $(\frac{P_{50} = P_0}{\frac{H}{H+50}})$	
PIA 10-N-375	12	75	50	162	4000	2900	2
PIA 20-N-375	24	125	85	323	4000	3200	3.2
PIA 30-N-375	36	170	100	452	6000	5100	5

4 Dimensional characteristics

The following dimension characteristics are specified:

- Overall height.
- Maximum nominal diameter of the insulating part.
- Fixing arrangement.
- Tolerances.
- Minimum creep distance.

Table 3: Resin type bus bar insulator- Dimensions and tolerances in mm

Designation	h	d ₁	d ₄	d ₅	d ₆	e	t ₁	t ₂	t ₄
PIA 10-N-375	130	57	M16	M10	M6	36	33	19	12
PIA 20-N-375	250	69	M16	M10	M6	36	33	19	12
PIA 30-N-375	350	80	M16	M10	M6	36	33	19	12

5 Values which characterized a bus bar support

A bus bar support is characterized by the following values, where applicable

- The specified dry lightning impulse withstands voltage.
- The specified dry power frequency withstands voltage (for indoor insulating only).
- The specified bending load.
- The specified significant dimension, including creep distance.

6 Metal fitting

End fittings are often used at the ends of the insulating body to transmit mechanical loads. For Resin type, the fitting materials should be metal, hot dip galvanized according IEC60383-1.

7 Electrical characteristics

Each bus bar support is designated for specified lightning impulse withstands voltage based on the standardized values given IEC publication 60071-1.

8 Mechanical characteristics

Bus bar insulators are standardized in mechanical strength classes based on values of the specified failing load in the bending test.

9 Tests

The tests must be performed according to IEC 62231 for composite station post insulators.

9.1 Type Tests

- Verification of dimensions
- Electrical tests
- Mechanical tests

9.2 Sample tests

- General rules
- Verification of dimensions (E1 + E2)
- Re-testing procedure

9.3 Routine tests

- Identification of the station post insulator
- Visual examination
- Tensile load test

10 Kind of delivery

The material should be delivered in proper boxes, covered and protected against dirt, chemical and mechanical damages.

Labeling: each packing should be identified by attached labeling and marked with following data:

- Dimensions
- Quantity
- Manufacturer name and factory mark
- Order No.
- Standard No. IDS-MEO02-03
- Gross and net weight
- Date of production

11 Storage conditions

Keep away from any mechanical damages.

12 Packing & Shipping

They are fragile and must be protected against damage. Inspect the item to be shipped to ensure no signs of damage.

Use a dual-wall corrugated box which is rated to the size and weight of the item being transported. Pack the contents so that they are well cushioned with at least 6cm of separation from the external walls of the box. For added protection use the box-in-box packing method.

- Packing Materials to Keep Items Safe
- Bubble cushioning or foam wrap or foam planks

Note: The maximum dimensions of the pallet should be (HxLxW: 90x120x85 cm) as shown in figure 2.

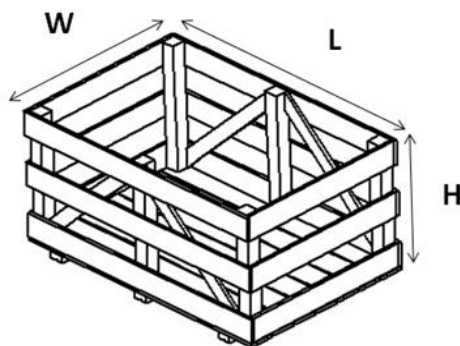


Figure 2: schematic of box

13 Normative References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For undated references, the latest edition of the referenced document applies.

IEC 60273

Characteristics of indoor and outdoor post insulators for systems with nominal voltages greater than 1000 V

IEC 62231-1

Composite station post insulators for substations with AC voltages greater than 1000 V up to 245 KV

IEC 60168

Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000 V

IEC 60660

Tests on indoor post insulators of organic material for systems with nominal voltages greater than 1000 V up to but not including 300 KV

IEC 62231

Composite station post insulators for substations with AC voltages greater than 1000 V up to 245 KV-
Definitions, test methods and acceptance criteria