



PRODUCT STANDARD

SWITCHGEAR ENGINEERING DIVISION

SG12508 Rev 02

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Specification for MV CONNEX Bushing for 36 kV Application

I. GENERAL

The bushings (Size 2 & Size 3) are fitted on the **Gas Insulated Switchgears** on cable side to allow termination with inside cone cable connectors. With plug in system, it is intrinsically safe and fully encapsulated.

II. APPLICATION

It is used for Indoor Metal Clad Gas Insulated Switchgear.

III. COMPLIANCE WITH NATIONAL/INTERNATIONAL STANDARDS

The bushings designed for gas insulated switchgear should meet the standard EN50181 for connection type size 2 (800 A) and size 3 (1250 A) at operating voltage up to 36 (42) kV.

IV. Scope of supply

Each bushing shall be supplied with its O-ring, and Hardware's as per below BOQ:-

- 1) SIZE-2/3 Bushing -1 No
- 2) **O-ring** – 1 No
- 3) 01 set of Screw & washers in separate small polybag :-
 - 3.a) HEAD CAP SCREW M8 X 20 DIN 912-A4-80 Qty- **3 Nos** &
 - 3.b) SINGLE COIL SPRING LOCK WASHERS 8 LEFT DIN 7980 Qty – **03 Nos.**

V. TECHNICAL SPECIFICATIONS :

No	Item	Unit	Requirement
1.	Electrical performance (at room temperature)		
1.1	Volume resistivity(at 23°C)	Ω.cm	≥1.0x10 ¹⁵
1.2	TGO		≤5.0x10 ⁻¹³
1.3	Dielectric constant		3.5~4.5
1.4	Transient electrical strength under power frequency	MV/m	≥20
2	Electrical performance (at 100°C)		
2.1	Volume resistivity	Ω.cm	≥1.0x10 ¹⁵
2.2	TGO		≤5.0x10 ⁻¹³
2.3	Dielectric constant		3.5~ .5
2.4	AC voltage withstand test under Power frequency	kV/min	48 1
3.	HDT	°C	105~125

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REV.	02	PRINTS TO:-	APPROVED –		
ALTD.	JAG	Issued Online	H R Patel		
APPD.	SKP		PREPARED	ISSUED	DATE
DATE.	04/08/17		Sonali Sinha	VKD	20.10.14



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Bushing Ratings:

Sl No	Technical Parameters	Values			
		001	002	003	004
1.	Item No	001	002	003	004
2.	Material Code	BL9049127649	BL9049127657	BL9049127584	BL9049127592
3.	Description for Indent / PO	Size 2 Bushing, without voltage tap alongwith Oring, and Hardwares	Size 2 Bushing, with voltage tap alongwith Oring, and Hardwares	Size 3 Bushing, without voltage tap alongwith Oring, and Hardwares	Size 3 Bushing, with voltage tap alongwith Oring, and Hardwares
4.	Applicable Standard	EN50181			
5.	Size of Bushing	2	2	3	3
6.	Material of Bushing	Epoxy Resin with SiO ₂ Filler			
7.	Sealing Form	Hexagonal			
8.	OGA Ref	45176600514	45176600514	45176600515	45176600515
9.	Sealing Dimension	a=112 mm d= 4 mm Ref:- 45176600571-001	a=112 mm d= 4 mm Ref:- 45176600571-001	a=137 mm d= 4 mm Ref:- 45176600571-002	a=137 mm d= 4 mm Ref:- 45176600571-002
10.	Material of O-ring	FKM (Viton)/ EPDM			
11.	Max. operating voltage U _m (kV)	42	42	52	52
12.	Nominal Current I _N (A)	800	800	1250	1250
13.	Capacitive Voltage Tap (pF)		8±1.5		15±1.5
14.	Weight (kg)	2.1	2.1	4.6	5.2
15.*	AC withstands				
16.	Partial discharge	<2pc	<2pc	<2pc	<2pc
17.*	Glass Transition Temp Tg (°C)				

* Vendors to fill the respective fields.

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- VI. ROUTINE TEST:** Following routine tests as per standard EN50181 shall be carried out:-
- No oxides and contamination on metal part surface.
 - No impurity and bubbles within the primer layer.
 - Checking of thread size with thread gauge
 - Verification of dimensions to meet the drawing requirement.
 - Ensure screw is vertical to the end surface.
 - Epoxy socket surfaces should be smooth , no defects such as crack/pit, Convex/bubble or flow trace.

- VII. TYPE TESTS :** Following type tests as per standard EN50181 shall be carried out:-

- HV Electrode at 100°C, 120hrs, silver plate layer no bubble and split.
- Appearance check. Stick well, no defects such as Crack/pit, convex /bubble or flow trace.
- Dimensions inspection. Tri-dimensions inspection to the inner surface and out shape of socket, and meet the drawing requirements.
- AC withstands and PD test. Apply 48kV high voltage on the top embedded electrode meanwhile the bottom embedded electrode should be grounded, keep 1 minute and partial discharge should be less than 10pc under room temperature.
- Thermal cycle test, 20 cycles. No break. Single cycle means: (-40°C)6 hrs - (Room temp.) 2 hrs-(105°C) 6 hrs-(Room temp.) 2hrs.
- Epoxy socket should not burst at inner pressure 1Mpa under 20°C.
- Epoxy socket 5kN bending strength test, 1 minute. No break.
- 40Nm installation torque each insert withstand test. No break.
- AC withstands and PD test. Repeat item 2-4 on the product after thermal cycle test. Partial discharge should be less than 10pc under 48kV.
- Epoxy socket should not burst at inner pressure 3Mpa under 20°C.

VIII. QA Plan

QA Plan shall be submitted along with offer & to be approved by BHEL.



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- IX. TEST CERTIFICATE**
Unless otherwise stated, three copies of certificates for parameters specified in Clause VII shall be supplied along with each consignment.
- X. GUARANTEE CERTIFICATE**
The bushings shall meet the requirement of BHEL product standard SG12508 and guaranteed against all manufacturing defects for 12 months from date of supply. Guarantee certificate shall be furnished along with the supply.
If any deviation is observed, manufacturer will replace the material free of cost.
- XI. PACKING AND MARKING**
Bushing shall be suitably packed in separate boxes. Each component shall be first wrapped in plastic and then packed in cardboard to avoid contamination and damage during transit. The lot should be supplied in shock proof, unbreakable containers/boxes. Necessary arrangement shall be made to avoid ingress of water into the container/box. Each package shall be legibly and indelibly marked with the following:
BHEL Purchase Order No.
Batch/Lot No.
Manufacturer's /Suppliers Name and grade
Drawing No. & Item No. if any
Quantity supplied
Net & Gross Weight.
- XII. ACCEPTANCE CRITERIA:**
- Type Test certificate as per clause VII.
 - Routine test reports as per clause VI.
 - Guarantee certificate as per clause X.
 - Packing and marking as per clause XI.