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| PSGSG/<br>2020-21/<br>017 | <b>Specifications for<br/>Electrical Grade MOS<sub>2</sub> filled PTFE<br/>Bushes</b> | Drg.No. |            |
|                           |                                                                                       | Date    | 10.03.2021 |
|                           |                                                                                       | Product | GSM-400    |

| S.NO | BHEL Specification | Vendor compliance |         |
|------|--------------------|-------------------|---------|
|      |                    | YES/NO            | Remarks |

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| <b>1.0</b> | <b>APPLICATION:</b><br>PTFE bushes are used as nozzles in gas circuit breakers for effective short circuit current interruption.                                                                                                   |  |  |
| <b>2.0</b> | <b>SPECIFICATIONS:</b>                                                                                                                                                                                                             |  |  |
| <b>2.1</b> | <b>Configuration:</b> Hollow cylindrical bush.                                                                                                                                                                                     |  |  |
| <b>2.2</b> | <b>Material:</b><br>MOS <sub>2</sub> filled PTFE<br>PTFE – 99.8% (By weight)<br>Molybdenum disulphide 0.2% (By weight)<br>Color - Grey<br>Highest quality granular resin shall be used to achieve the required material properties |  |  |
| <b>2.3</b> | <b>Dimensions &amp; Quantities:</b><br>Ø150±0.5 mm x Ø20±0.5 mm x 350±1 mm long - 8 Nos.                                                                                                                                           |  |  |
| <b>2.4</b> | Exposure to high current arcing should not carbonize the material and result in deep penetration burns, impairing the dielectric strength of the material. Quality control check certificate should be furnished.                  |  |  |
| <b>2.5</b> | Compression-molded PTFE bush with MoS <sub>2</sub> filler uniformly distributed, free from occlusion and air pockets suitable for High Voltage Applications.                                                                       |  |  |

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| 2.6 | Properties:                                                                                                                                                                                           |                                                 |                        |  |
|     | #                                                                                                                                                                                                     | Property                                        | Value                  |  |
|     | 1                                                                                                                                                                                                     | Density                                         | 2.1 to 2.2 gm/cc       |  |
|     | 2                                                                                                                                                                                                     | Water absorption                                | < 0.01% max            |  |
|     | 3                                                                                                                                                                                                     | Melting point                                   | 320 to 340°C           |  |
|     | 4                                                                                                                                                                                                     | Continuous use                                  | 260 °C                 |  |
|     | 5                                                                                                                                                                                                     | Thermal conductivity                            | 6x10-4 cal/sec/cm      |  |
|     | 6                                                                                                                                                                                                     | Compressive strength                            | 50 – 60 Kgf/Cm2        |  |
|     | 7                                                                                                                                                                                                     | Hardness                                        | 57+/- 3                |  |
|     | 8                                                                                                                                                                                                     | Elongation                                      | 200 to 400 %           |  |
|     | 9                                                                                                                                                                                                     | Tensile modulus                                 | 4500 Kgf/cm2           |  |
|     | 10                                                                                                                                                                                                    | Impact strength                                 | ~ 3.0 J/cm             |  |
|     | 11                                                                                                                                                                                                    | Static coefficient of friction                  | <0.1                   |  |
|     | 12                                                                                                                                                                                                    | Dielectric break down Strength (2.03 mm sample) | 20-24 kV/mm.           |  |
|     | 13                                                                                                                                                                                                    | Tracking index                                  | Min. 600 volts         |  |
|     | 14                                                                                                                                                                                                    | Volume resistivity                              | >10 <sup>18</sup> Ω-cm |  |
|     | 15                                                                                                                                                                                                    | Dielectric constant                             | 1.9 to 2.1             |  |
|     | 16                                                                                                                                                                                                    | Dissipation factor                              | < 0.0002               |  |
|     | 17                                                                                                                                                                                                    | Flex modulus                                    | 350-600 MPa            |  |
| 18  | Surface arc resistance                                                                                                                                                                                | > 300 sec                                       |                        |  |
| 2.7 | This filler shall improve surface hardness, stiffness, and to reduce the starting coefficient of friction and steady-state wear. Its effect on electrical and chemical properties must be negligible. |                                                 |                        |  |
| 2.8 | Tests:<br>Test reports for the properties like density, hardness shall be furnished along with the supply                                                                                             |                                                 |                        |  |

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| <b>2.9</b>  | <b>. General:</b><br>Material must be free from defects, cavities, pin holes and the same shall be ensured by the supplier. Uniform composition of the material shall be ensured. The finished bush shall not have any ovality, bend and the outer surface should be free from dents/visible surface defects. Perpendicularity of the flat surface (base) shall be maintained at +/-0.1. The component shall be free from dirt, grease and moisture. |  |  |
| <b>2.10</b> | <b>Packing:</b><br>Each bush should be individually wrapped in polyethylene and packed in separate high density, dust free card board boxes. The lot should be supplied in shock proof, unbreakable containers.                                                                                                                                                                                                                                      |  |  |

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