Tender – Example Sections

General information

Number of phases	
Length (per phase) INDOOR USE	
Length (three phases) INDOOR USE	
Length (per phase) OUTDOOR USE	
Length (three phases) OUTDOOR USE	
Connection point A	
Connection point B	
Connection type point A	
Connection type point B	
Screw/specific connection type	
Number of bends	
Number of wall openings/cover plates	
Number of connection sleeves	
Number of connection boxes	

Technical data

Highest rated voltage	U_m	…. kV
Power-frequency withstand voltage	U_w	…. kV
Rated lightning impulse withstand voltage	BIL/U_B	…. kV (1.2 µs /50 µs)
Rated current	I_r	…. A
Thermal short-time rated current	I_{th}	…. kA/ … s
Dynamic rated current	I_d	…. kA
Rated frequency	f_r	…. Hz

Environmental conditions

Location	
Atmospheric humidity	… % to … %
Installation altitude	….. masl
Max. ambient temperature INDOOR USE	….. °C
Min. ambient temperature INDOOR USE	….. °C
Max. ambient temperature OUTDOOR USE	….. °C
Min. ambient temperature OUTDOOR USE	….. °C

Other relevant environmental conditions

Wind load	
Rain load	
Seismic conditions	
Other relevant (meteorological) conditions	

Additional specifications

Degree of impact resistance	IK
IP protection class INDOOR USE	IP
IP protection class OUTDOOR USE	IP / IP
Corrosion resistance	
Insulating class	Class E
Freedom from halogen	YES
Operating life	≥ 35 years

Applicable standards

Insulated bushings for alternating voltages above 1000 V	IEC 60137
Protection types of enclosures (IP code)	DIN EN 60529
Degrees of protection of enclosures for electrical equipment against external mechanical impacts (IK code)	IEC 62262
Environmental testing - part 2-52: Tests - Kb test: Salt mist, cyclic (sodium chloride solution)	DIN EN 60068-2-52
Wind load	DIN 1055-4:2005-03
Freedom from halogen	IEC 60754-1

DESIGN AND CONSTRUCTION REQUIREMENTS

1. Insulation:

   The insulation of the bus bars and the connection sleeves must be made of paper impregnated with epoxy resin with capacitive control and embedded earth layer. The bus bars and connection sleeves should be impregnated under vacuum.

2. Capacitive control:

   The capacitive control consists of semi-conductive paper embedded in the composite insulation.

3. Conductors:

   The bus bar conductor material should be copper or aluminium. The bus bar system must be simulated using FEM (finite element method) to confirm the conductor dimensions and the distance between the phases.

4. Contact-protected surface:

   The surfaces of the bus bar system must be designed to be contact-protected.
   The insulation of the bus bars and the connecting sleeves, installed indoors, should be protected by robust and halogen-free heat shrink tubing.

   Outdoor components, SISOL version:
   Bus bars and connection sleeves used outdoors should be protected by additional heat shrink tubing made of chemically and UV-resistant polyolefin.

   Outdoor components, SISES version:
   Bus bars and connection sleeves used in outdoor applications should also be protected by a stainless steel sheath made of at least V4A/UNS: S31603.

5. Ambient temperature:
   The bus bar system must be designed for temperatures from (-) 5 °C to (+) 40 °C indoors and from (-) 25 °C to (+) 40 °C outdoors.

6. IP protection Claus:
   The protection class for indoor applications is IP64.
   The protection class for outdoor applications is IP65, IP66, IP67 or IP68.
   Connection boxes must have a minimum protection class of IP23.

7. Degree of impact resistance IK:
   The impact resistance must be IK10 for indoor and outdoor applications.

8. Contact-protected connection of bus bars
   The connections between the bus bars must be fully insulated, protected by suitable sleeves and contact-protected.

9. Connection sleeves:
   The design of the connection sleeves must ensure that moisture that could be trapped during installation can escape to the outside during operation. To compensate for the thermal length change of the bus bar sections, a fixed and a floating bearing must be used in the design of the connection sleeve.

10. The busbar system must have the following characteristics:
    a. Individually insulated, with one separate busbar line per phase
    b. Designed and constructed according to a modular installation concept
    c. Maintenance-free d. The entire busbar system must be halogen-free according to IEC 60754-1

11. The bus bar system must have the following properties:
    a. Bus bar in 1D format
    b. Bus bar in 2D format
    c. Bus bar in 3D format
    d. Medium voltage switchgear connection, screw or specified connection type
    e. Materials for bus bar connections
    f. Material for the earthing connection
    g. Screws, nuts, washers, bus bar clamps, supports, wall clamps, wall plates, flexible connectors and all other items required to install the SIS bus bar system in accordance with the project requirements.

Scope of services

1. The thermal design of the bus bars must be checked using the finite element method with simulation software.

2. The bus bar manufacturer should carry out the necessary 3D measurements on site.

3. The technical drawings must include the bus bar system and the corresponding building components.

4. The seller must carry out the following routine tests on each bus bar and each connection sleeve in accordance with IEC standard 60137:
   a. Measurement of the dielectric loss factor (tan δ)
   b. Measurement of the capacitance
   c. Power-frequency withstand voltage test
   d. Measurement of the partial discharge quantity

5. Before shipping, the seller must carry out a factory acceptance test

6. All components of the bus bar system must be shipped sealed in foil in single-use freight crates in accordance with HPE packaging standards. The wood must be ISPM15-certified according to IPPC standards.

7. The seller shall provide a supervisor during the installation of the bus bar system.

Documentation

1. Language of the documentation
   All technical documentation, including drawings, specifications and certificates, shall be provided in German, English or a combination of both languages.

2. Provision of the documents
   All technical documentation, including drawings, specifications, certificates and manuals, shall be provided in both paper and electronic form.

3. Documents after project completion
   After completion of the project, all documents including drawings must be made available in an updated form in order to ensure comprehensive "AS BUILT" documentation of the project.

Legal information & disclaimer

The content of this document is for general information only. Subject to errors and omissions. Subject to technical modifications. The images are for reference only.

The information contained herein is provided "as is" without warranty of any kind, including, but not limited to, warranties of satisfactory quality, fitness for a particular purpose or accuracy. RITZ Instrument Transformers GmbH assumes no liability for the correctness, completeness and timeliness of the information and specifications contained in this document. RITZ Instrument Transformers GmbH therefore makes no representation as to the use of the content, statements, specifications or information in this document in terms of their correctness, accuracy, adequacy, usefulness, timeliness, reliability or otherwise, to the extent permitted by law. All warranty and liability issues are governed exclusively by the applicable contractual provisions. For further details, please refer to our General Terms and Conditions (GTC).

RITZ INSTRUMENT TRANSFORMERS GMBH · WANDSBEKER ZOLLSTR. 92-98 · 22041 HAMBURG GERMANY · WWW.RITZ-INTERNATIONAL.COM