

PART 2: EMPLOYER'S REQUIREMENTS

CHAPTER 7: DEFINITION AND LISTS

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1. DRAWING LIST

This tender is BoQ based tender. Therefore, bidder has to verify the design submitted by engineer/employer. However, for reference purpose the tender drawings have been provided in Part-2 of tender documents.

2. MAIN APPLICABLE INTERNATIONAL STANDARDS

All equipment of the RSS Contract shall comply with the EMC standards EN 50-121-1 to 5. Concerning the tests, when not defined into the EN 50121, the equipment shall comply with the relevant EMC standard of the series IEC 61000.

Standard Number	Title
IEC 60038	IEC standard voltage
IEC 61869	Instructions related to protection current transformer for transient state response
IEC 62271-100	High voltage circuit breaker for alternating current
IEC 61869-1, -2, -3, -5	Instructions related to instrument transformers including transient state response
IEC 60059	IEC standard current
IEC 60099-4	Metal oxide surge arrester without gaps for ac systems
IEC 62271-102	Alternating current dis-connectors and earthing switches
IEC 60383-1 & 2	Insulators and fittings for overhead lines. Insulators of ceramic material or glass for overhead line with nominal voltage higher than 1000 V. Requirements
IEC 60502	Power cables with extruded insulation and their accessories for rated voltage from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV). Part 2: rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
IEC 60529	Degrees of protection provided by enclosures (IP code)
IEC 60617	Graphical symbols for diagrams. Part 2: symbol elements, qualifying symbols and other symbols having general application.
IEC 62271-1	Common specifications for high-voltage switchgear and control gear standards
IEC 60721-3-4	Classification of environmental conditions- Classification of groups of environmental parameters and their severities- Stationary use at non-weather protected locations.
IEEE 802-3	Ethernet based LANs
UIC 812-3	Technical specification for the supply of solid (monobloc) wheels in rolled non-alloy steel for tractive and trailing stock
IEC 60840	Power cables with extruded insulation and their accessories for rated voltage above 30kV (Um = 36 kV) up to 100 kV. Test methods and requirements.
IEC 60865	Short-circuit currents - Calculation of effects

IEC 60889	Hard-drawn Aluminium wire for overhead line conductor
IEC 60071	Insulation co-ordination
IEC 60076	Power transformer
IEC 61000	Electromagnetic compatibility
IEC 61508-3	Functional safety of electrical/electronic/programmable safety-related systems. Part 3: software requirements
IEEE 575- latest	IEEE guide for the application of Sheath Bonding method for single conductor cable and the calculation of induced voltage & current in cable sheath
IEEE-80	Guide for Safety in AC Substation Grounding
EN 10025	Hot Rolled Products of Non-Alloy Structural Steels: Delivery Conditions
EN 10034	Structural Steel I and H Sections - Tolerances on Shape and Dimensions
EN 10055	Hot Rolled Steel Equal Flange Tees with Raduised Root and Toes - Dimensions and Tolerances on Shape and Dimensions
EN 10056	Structural Steel Equal and Unequal Leg Angles
EN 10083	Quenched and Tempered Steels
EN 10088	Stainless Steels
EN 1301	Aluminium and Aluminium Alloys
EN 50163	Supply Voltage of Traction System
EN 60811	Insulating and Sheathing Materials of Electric Cables
ENV 50121-5	Railway Application Electromagnetic Compatibility Part 5: Fixed Power Supply Installations
EURONORM 19	IPE Beams; I-Beams with Parallel Flange Facings and Steel Products - IPN Beams - Dimensions
IEC 60398	General Test for Electro-heating Equipment
IEC 61131	Programmable controllers
IEC 265.1	High Voltage Switch
IEC 61869	General for Instruments Transformers
IEC 61869-2	Current Transformers
IEC 61869-3	Voltage Transformer
IEC 60137	Insulated Bushing for rated Voltage above 1 kV
IEC 61039	Classification of Insulation Liquids
IEC 60168	Tests on Indoor and Outdoor Post Insulators of Ceramic Material or Glass for Systems with Nominal Voltages greater than 1000 V
IEC 60228	Conductor of Insulated Cables
IEC 60273	Dimensions of Indoor and Outdoor Post Insulators and Post Insulator Units for Systems with Nominal Voltages greater than 1000 V
IEC 60296	Insulating oils for transformers
IEC 60297	Dimensions of mechanical structures of the 482.6 mm (19 in)
IEC 60372	Locking Devices for Ball and Socket Couplings of String Insulator Units - Dimensions and Tests
IEC 60376	Sulphur Hexafluoride
IEC 60383	Insulators for Overhead Lines with a nominal Voltage above 1000 V

IEC 60721	Environmental conditions: Specifications for painting
IEC 60623	Sealed Nickel-Cadmium prismatic rechargeable single cell.
ISO 1035	Hot Rolled Steel Bars
ISO 1190	Copper and Copper Alloys
ISO 1234	Split Pins
ISO 1337	Wrought Coppers (having Minimum Copper Contents of 99,85%) - Chemical Composition and Forms of Wrought Products
ISO 1460	Metallic Coatings - Hot Dip Galvanized Coatings on Ferrous Materials - Gravimetric Determination of the Mass per Unit Area
ISO 1461	Metallic Coatings - Hot Dip Galvanized Coatings on Fabricated Ferrous Products - Requirements
ISO 2092	Light Metals and their Alloys - Code of Designation based on Chemical Symbols
IEC 60028	International specification of soft annealing type copper
IEC 60099-1	Non-linear resistor type gapped surge arresters for A.C. system
IEC 62271-200	Alternating current dis-connectors and earthing switches
IEC 60146-1-3	Semiconductor converters, general requirements and line commutated converters. Transformers and reactors
IEC 60146-1-1	Semiconductor converters, general requirements and line commutated converters. Specifications of basic requirements.
IEC 60196	IEC standard frequencies
IEC 60076-10	Determination of transformer and reactor sound level
IEC 60721-3-3	Classification of environmental conditions- Classification of groups of Environmental parameters and their severity- Stationary use at weather protected locations.
IEC 60076-11	Power transformers - Part 11: Dry-type transformers
IS 2062	Hot Rolled Medium and High Tensile Structural Steel
RDSO ETI OHE 13-4- 84	For GI coating on structural steel
IEC 60255-27: 2013	Measuring Relays and Protection Equipment
IEC 60068-1 & 2	Environmental Testing of Electronic Equipment
IEC 60815-2	Selection & Dimensioning of High Voltage Insulators intended for use in Polluted Conditions
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IEC 60815-2	Selection & Dimensioning of High Voltage Insulators intended for use in Polluted Conditions
IEC 60571	Electronic equipment specification
IEC 60870	Transmission Protocol
IEC 61000-4-2 ed1.0	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
IEC 61000-4-3	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
IEC 61000-4-5 ed2.0	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
IEC 60848	Preparation of block diagrams for control systems
IEC 60870-1-1	Control equipment and systems – General principles
IEC 60870-2-1	Control equipment and systems – Power supply and environment conditions
IEC 60870-3	Control equipment and systems – Interfaces (electrical characteristics)
IEC 60870-4	Control equipment and systems – Performance requirements
IEC 60870-5	Control equipment and systems – Transmission protocol
IEC 61850	Communication networks and systems in substations

3. DEFINITION OF ABBREVIATIONS

Abbreviations	Meaning
AC	Alternating Current
ACOCB	Alternating current outgoing circuit breaker
ACRC	Alternating current rectifier contactor
ACRCB	Alternating current rectifier circuit breaker
AMS	Auxiliary main sub-station
ASS	Auxiliary Sub Station
AT	Auxiliary transformer
ATCB	Auxiliary Transformer Circuit Breaker
ATIS	Auxiliary Transformer Isolator
B	Traction bus bar
BA	Batteries
BAIT	Batteries interrupter
C&C	Control & Communication
CAMS	Computer Aided Maintenance System
CB	Circuit Breaker
CCB	Coupling circuit breaker
CIS	Coupling Isolator
CTATP	Current Transformer for protection of Auxiliary Transformer
CTC	Current transformer for coupling
CTIM	Incoming Current Transformer for Measures
CTTT	Current transformer for traction transformer
CTTTP	Current Transformer for Protection of Traction Transformer
DC	Direct Current
DCAC	Direct current auxiliary contactor
DCACC	Direct current auxiliary coupling contactor
DCOCB	Direct current outgoing circuit breaker
DCRC	Direct current rectifier contactor
DTN	Data Transmission Network
TRANSCO	Transmission Company (erstwhile DVB)
ECC	Energy Control Centre
EIS	Earthing Isolator
EMIS	Energy Management and Information System
GRC	General Remote Control
IED	Intelligent Electronic Device
IS	Isolator
IR	Indian Railways
IT	Interrupter
OCC	Operations Control Centre
ITC	Coupling interrupter
L	Hand operated traction isolator

LAAT	Surge arrester for Auxiliary Transformer
LAN	Local Area Network
LATT	Surge arrester for Traction Transformer
LBCB	Lighting bridge circuit breaker
LBCCB	Lighting bridge coupling circuit breaker
LBCCT	Lighting bridge coupling current transformer
LBCT	Lighting bridge current transformer
LBCVT	Lighting bridge coupling voltage transformer
LBEIS	Lighting bridge earthing isolator
LBVT	Lighting bridge voltage transformer
LEIS	Line Earthing Isolator
LFCB	Lighting feeder circuit breaker (spare)
LFEIS	Lighting feeder earthing isolator
LIS	Line Isolator
LV	Low Voltage
LVACB	Low voltage auxiliary circuit breaker
LVACCB	Low voltage auxiliary coupling circuit breaker
LVAT	Low voltage auxiliary transformer
LVATCB	Low voltage auxiliary transformer circuit breaker
LVATEIS	Low voltage auxiliary transformer earthing isolator
LVCB	Low voltage circuit breaker
LVCCB	Low voltage coupling circuit breaker
MC	Metro Corridor (Underground Alignment Line 2)
MCCB	Metro corridor circuit breaker
MCEIS	Metro corridor earthing isolator
MCIS	Main coupling isolator
MMI	Main Machine Interface
HMI	Human Machine Interface
MVCB	Medium Voltage Circuit Breaker
NMS	Network Management System
NGR	Neutral Ground Resistor
OCC	Operation Control Centre
OHE	Over-Head Equipment
PCW	Power Control Workstation
PICOP	Person In Charge Of Protection
PLC	Programmable Logic Controller
PNCT	Primary neutral current transformer
PNEIS	Primary neutral earthing isolator
PNLA	Primary neutral surge arrester
PST	Power Supply & Traction
RC	Rail Corridor
RCCB	Rail corridor circuit breaker
RCEIS	Rail corridor earthing isolator
RSS	Receiving Sub Station
SCADA	Supervisory Control and Data Acquisition System

SNCT	Secondary neutral current transformer
SNEIS	Secondary neutral earthing isolator
SNLA	Secondary neutral surge arrester
SP	Sectioning and Paralleling Post
SSP	Sub-Sectioning and paralleling Post
T	Transformer
TCB	Traction Circuit breaker
TEIS	Transformer Earthing Isolator
TSS	Traction Sub Station
TT	Traction transformer
TTCB	Traction Transformer Circuit Breaker
TTIS	Traction Transformer Isolator
UPS	Uninterruptible Power supply
VDU	Video Display Unit
VT	Voltage Transformer
VTB	Voltage Transformer for traction bus bar
VTBB	Bus Bar Voltage Transformer
VTC	Voltage transformer for coupling

4. SPARE PART LIST

4.1 GENERAL

The following list indicates the description and quantities of requirement of spare parts, to be supplied by the Contractor. The Contractor shall deliver these spare parts, at the same time as of handing over the first lot of erected equipment, if not earlier in a phased manner. The spare parts shall be adequate to meet the maintenance requirement for five years.

If, however, the Tenderer feels that some more items or more quantities of the items mentioned herein are required for the proper operation and maintenance of the installations supplied and erected by him, for a period of at least 2 years commencing from the expiry of the Defects Liability Period, the Tenderer shall, in that case, add such items and/or quantities to this list and shall include the amended list in his bid.

The spare parts should be delivered to designated storage space in RSS/Depot as advised by BI-RIDE.

Please refer Table A in Milestone/Bill of Quantities (pricing Document).

Please note that the quantities of items appearing in the list may be decreased or increased as required by BI-RIDE. Contractors should procure these items only after approval by KRIRE.