SECTION-PROJECT

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1 GENERAL

1.1 Power Grid Corporation of India Ltd. (POWERGRID), A Govt. of India Enterprise is responsible for Bulk Power Transmission of electrical energy from various central Govt. Power Projects to various utilities/ beneficiaries and interconnecting regional grids, operating and maintaining the National Electrical Grid of India. It is established with mission of "We will become a Global Transmission Company with Dominant Leadership in Emerging Power Markets with World Class Capabilities by:

- World Class: Setting superior standards in capital project management and operations for the industry and ourselves
- Global: Leveraging capabilities to consistently generate maximum value for all stakeholders in India and in emerging and growing economies.
- Inspiring, nurturing and empowering the next generation of professionals.
- Achieving continuous improvements through innovation and state-of-the-art technology.
- Committing to highest standards in health, safety, security and environment." as its mission.

1.2 This specification covers technical requirements for supply, erection & commissioning of 13 nos. 500 MVA, 765/400/33KV, 1-phase Transformers **under "Transformer Package-7TR-22 for procurement of 13 x 500 MVA, 765/400kV 1-Ph Transformers Under Bulk Procurement-Lot 8"**

1.3 SPECIAL NOTE:

Price Basis: Bids are being invited on Ex-works basis and Bidder shall be required to quote prices for Schedule-1 (Ex-Works prices including Type Test charges, if any), Schedule-2 (Local Transportation, In-transit insurance, loading and unloading charges, referred to as F&I charges) and Schedule-3 (Installation/Erection prices), for the present scope. The bidder shall quote price for Schedule 2 based on methodology as per Annexure-II.

1.4 INTENT OF SPECIFICATION

i) The specification includes design, engineering, manufacture, fabrication, testing at manufacturer's works, delivery, unloading at site, storage, erection, testing and commissioning at site.

ii) It is the intent of this specification to describe primary features, materials, and design & performance requirements and to establish minimum standards for the work.

iii) The specification is not intended to specify the complete details of various practices of manufactures/ bidders, but to specify the requirements with regard to performance, durability and satisfactory operation under the specified site conditions.

2 SCOPE

The scope of this specification shall cover following:

2.1 The broad scope of this Transformer Package (7TR-22-Bulk (Lot-8)) shall cover :

i) 13 X 500 MVA ,765/400/33kV, 1-phase **OLTC-less** Transformers excluding Insulating oil, Common Marshalling Box (CMB for 3-Ph Bank) and Online-Drying System (ODS).

ii) Insulating oil for Transformers as per BPS.

iii) Common Marshalling Box and Online-Drying System (ODS) as per BPS.

iv) Mandatory Spares: as per BPS.

2.2 The detailed scope is brought out in the subsequent clauses of this section.

a) Design, Engineering, Manufacture, testing at Manufacture's works, supply, transportation, unloading and delivery at site, insurance & Storage. erection, testing & commissioning at site for the Transformers, including insulating oil, HV & IV Bushings, all fittings, accessories including Online-Drying System (ODS), Individual marshaling box(IMB) for each Auto-Transformer, Common Marshalling Box (CMB for 3-Ph Bank) ,foundation bolts and cables as per Technical specification & BPS.

b) Bidders shall quote for Schedule-1 (Supply), Schedule-2 (Local Transportation, In-transit insurance, loading and unloadingcharges) and Schedule-3 (Installation)

c) Cables & Accessories:

Cable of each 1-phase 765kV Transformer required for interconnection of IMB toCMB, shall be supplied as per BPS. However, all cables (Power, Control, shielded twisted pair cable for 4-20mA signal& any special cable as required from individual Transformer unit to Cooler ControlCabinet /Individual Marshalling Box (IMB)/ any other cubicle (associated with 765kV Class Transformer as applicable) is deemed to be included & shall be treatedas Part of each 1-phase 765kV class Transformer. This shall also include the following:

- FO cable (100 m) per 1-phase 765kV class Transformer unit
- CMB shall be supplied with LIU & associated Patch cords and One Ethernetswitch, as part of each CMB.

2.3 The contractor shall be fully responsible for providing all equipment, materials, system and

services specified or otherwise which are required to complete the successful erection, testing and commissioning of the equipment in all respects.

2.4 Based on actual destination as decided by Employer prior to scheduled dispatch of the Individual Transformer/Transformer Banks (as applicable), the conditions of roads, capacity of bridges, culverts etc. in the route shall be assessed by the contractor. The scope of any necessary modification/ extension/ improvement to existing road, bridges, culverts etc. shall be included under present scope. The contractor shall carry out the route survey along with the transporter and submit the detailed proposal and methodology for transportation of Individual Transformer/Transformer Banks (as applicable), for approval of purchaser within three(03) months from the date of finalization of location, as intimated by POWERGRID.

3 SPECIFIC EXCLUSION

The following items of work are specifically excluded from the scope of this specification.

i) Earthing works and civil foundation works for Transformers, its fittings, fire protection walls, HV Bus, IV Bus, auxiliary bus & neutral as applicable for 765kV Transformer.

ii) Terminal connectors for HV, IV and LV Bushing of Transformer

iii) High Velocity Water system (HVWS) Fire Protection System for Transformers.

iv) Civil works for Road within the boundary walls of substations.

v) Cables from One Bank to other/existing Bank of Transformers.

vi) Cables from control room / Bay control room of Owner/ Employers to Transformer cooler control cabinet /Common Marshalling box (CMB) (associated with 765KV Class Transformer as applicable).

vii) Online Dissolved Gas (Multi-gas) and Moisture Measuring Equipment and Nitrogen Injection type Fire Prevention & Extinguishing System.

However, Provisions of valves (for future use) for Online Dissolved Gas (Multi-gas) and Moisture MeasuringEquipment and Nitrogen Injection type Fire Prevention & Extinguishing System shallbe considered included in the scope & shall be deemed to be included in the price of each Transformer.

viii) Formation of Tertiary delta and common neutral for bank of 765kV Transformer.

ix) Neutral Current Transformer (Outdoor type) at Common Neutral Side (for each three-phase bank)

x) 765kV HV, 400kV IV and Neutral auxiliary buses for connecting spare unit of 765kV Transformer.

4 PHYSICAL AND OTHER DESIGN DATA

Meteorological data - For design purposes, meteorological data are as below:

Altitude	Less than 1000 meter above mean sea level (MSL)
Snow fall	NIL
Seismic Zone	Transformer to be designed as Zone-V (IS 1893) however, bushing shall be suitable for Zone-III (min.).
Wind Zone	Max. 50m/sec
Min./Max. Ambient Temperature	0 / 50 degree centigrade
Coastal area Consideration	NA

5 SCHEDULE OF QUANTITIES

The bill of quantity is indicated in the Bid price Schedules. Bidder should indicate all such items in the bid proposal sheets which are not specifically mentioned but are essential for the execution of the contract. Items which explicitly may not appear in various schedules and required for successful commissioning of the Transformers shall be included in the bid price and shall be provided at no extra cost to Employer.

6 REFERENCE DRAWINGS

The reference drawings that form a part of the specifications are given in Section – 765kV Auto-transformer (Rev-08).

In case of any discrepancy between the drawings and text of specification, the requirements of text shall prevail in general. However, the Bidder is advised to get these clarified from Employer.

7 DIFFERENT SECTIONS OF TECHNICAL SPECIFICATION

For the purpose of present scope of work, technical specification shall consist of following sections, and they should be read in conjunction with each other.

a) Section – Project (Rev 00)
b) Section – Section- 765 kV Auto-transformer (Rev 08)
c) Section-Power and Control Cable (Rev-06)
d) Section – General Technical Requirements (Rev 15)

In case of any discrepancy between Section - PROJECT and other sections, Section - PROJECT shall prevail over the other sections. In case of any discrepancy between Section - GTR & other sections, other sections shall prevail.

8 MANDATORY SPARES

The Mandatory Spares shall be included in the bid proposal by the bidder. The prices of these spares shall be given by the Bidder in the relevant schedule of BPS and shall be considered for

evaluation of bid. It shall not be binding on the Employer to procure all of these mandatory spares.

The bidder is clarified that no mandatory spares shall be used during the commissioning of the equipment. Any spares required for commissioning purpose shall be arranged by the Contractor. The unutilized spares, if any, brought for commissioning purpose shall be taken back by the Contractor.

Wherever spares in BPS/Technical Specification have been specified as "each type/each rating/each type & rating": If the offered spare/spares is sufficient to replace the respective main equipment of all types/ratings, then such offered spare/spares shall be acceptable. It implies that common spare/spare set fulfilling the spare requirement of all types/ratings shall also be acceptable, provided it is configurable at site itself without special assistance of OEM.

Mandatory Spares, wherever mentioned, are envisaged for the equipment/items being supplied under the main equipment heads under present scope meeting the requirements of Technical Specifications. The component/sub-component of an equipment/item specified in BPS/Break-up under Mandatory Spare, which is not applicable as per the offered design of respective main equipment, shall not be referred to.

9 SPECIFIC REQUIREMENT:

9.1 Clause 9.2 of Section – General Technical Requirements (Rev 15) is amended as below:

The reports for all type tests as per technical specification shall be furnished by the Contractor along with equipment / material drawings. However, test reports of similar equipment/ material already accepted in POWERGRID shall be applicable for all projects with similar requirement. The type tests conducted earlier should have either been conducted in accredited laboratory (accredited based on ISO / IEC Guide 25 / 17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by POWERGRID/representative authorized by POWERGRID/representative of Utility /representative of accredited test lab/ representative of The National Accreditation Board for Certification Bodies (NABCB) certified agency shall also be acceptable.

Unless otherwise specified elsewhere, the type test reports submitted shall be of the tests conducted within the years specified below from **the originally scheduled last date of bid submission (Soft Copy)**. In case the test reports are of the test conducted earlier than the years specified below from the **originally scheduled last date of bid submission (Soft Copy)**, the contractor shall repeat these test(s) at no extra cost to the Employer: -

S. No.	Name of Equipment	Validity of type test (in years)
1	Power Transformer	**10**
2	LT Transformer	**10**
3	Shunt Reactor/**Series Reactor /Neutral Grounding Reactor**	**10**
4	OLTC	**10**
5	Bushing of Power Transformers/Reactors	**10**
6	Fittings and accessories for Power transformers & Reactors	10

7	Circuit Breaker	**15**
8	Isolator	**15**
9	Lighting Arrester	**15**
10	Wave Trap	**15**
11	Instrument transformer	**15**
12	GIS & Hybrid GIS	15
13	LT Switchgear	10
14	Cable and associated accessories	10
15	Relays/**BCU/Process Interface units /Standalone Merging unit**	**10**
16	Capacitors	10
17	Battery and Battery charger	10
18	Conductor & Earth wire	10
19	Insulators (Porcelain/Glass)	10
20	Composite Insulators	**10**
21	PLCC	**10**

Note: -

1. For all other equipment's validity of type test shall be 10 years from **the originally scheduled last date of bid submission (Soft Copy)**.

2. Equipment shall be supplied from the same manufacturing work, where from the sample unit was manufactured and successfully type tested as per relevant standard.

   Further, where offered equipment is based on the design of technology transfer of Parent organization / Joint Venture (JV), type test reports of Parent organization / Joint Venture (JV) shall also be acceptable for the initial period of 03 years from the date of establishment manufacturing facility for offered equipment provided that the design, material, and manufacturing process of the offered equipment are identical to those of the type-tested sample of the original facility. In such cases, while submitting the Type Test Reports, the Original Equipment Manufacturer (OEM), shall furnish an undertaking with it declaring that there is

   i) No change in the Design,
   ii) No change in the material,
   iii) No change in manufacturing process, and
   iv) No amendment/revision in the relevant standard as regard to type test conditions, since the type test

3. In case of own manufacturing plant at different location within India, the type test of the original manufacturing works shall also be acceptable for the equipment manufactured and supplied from the different location subject to the following conditions:

   i) The relevant standard does not bar the same,
   ii) The equipment being manufactured at different locations shall be identical in design, drawings, specifications, ratings to that of the type tested sample in the original facility (where it was manufactured and successfully type tested),

iii) The equipment being manufactured at different locations shall be identical in material & critical components, manufacturing process/ practices, and quality control to that of the type tested sample in the original facility (where it was manufactured and successfully type tested),

Also, while submitting the Type Test Reports, the Original Equipment Manufacturer (OEM), shall furnish an undertaking for above conditions (i), (ii) and (iii).

Further, in the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes or due to non-compliance with the requirement stipulated in the Technical Specification or any/all type tests not carried out, same shall be carried out without any additional cost implication to the Employer. The Contractor shall intimate the Employer the detailed program about the type tests atleast two (2) weeks in advance in case of domestic supplies & six (6) weeks in advance in case of foreign supplies

9.2 In addition to requirement stipulated in technical specification for 765 kV Auto-transformer (Rev 08), the following requirement shall also be considered:

i) Buchholz Relay (including GCD), Pressure Relief Device, Sudden Pressure Relay, Magnetic Oil Level Gauge, Aircell rupture relay, Oil Flow Indicator, Oil Temperature Indicator and Winding Temperature Indicator shall comply with requirement of IEC 60076-22-1 and shall be suitable for 220V DC application.

ii) Contact details for body protection relays shall be as follows:

Sr. No.	**Equipment**	**Contacts (Minimum)**
1	PRD	1 NO + 1 NC
2	SPR	1 NO
3	MOLG	1 NO
4	Buchholz Relay	1NO for alarm + 1 NO for trip
5	Aircell rupture relay	1 NO
6	OTI	4 NO contacts
7	WTI	4 NO contacts

iii) Additional requirements for PRD, SPR, Buchholz Relay, Aircell rupture relay and MOLG

a) Limit switch shall be placed inside the metallic enclosure to avoid ingress of water
b) Double compression type metallic cable gland to be provided.
c) Suitable arrangement for cable entry to be provided to avoid water ingress through cable
d) Gasket (O' ring) of high temperature withstand material and having adequate thickness shall be provided. Gasket shall be placed inside the slot
e) Transformer/Rector manufacturer shall furnish the flow rate of Buchholz trip contact with technical document/calculation. Buchholz relay should not operate during external fault, pump operation and seismic activity

f) Adequate physical clearances (space of minimum one terminal block between two connections) to be provided.
g) Complete PRD and SPR shall be enclosed by Polycarbonate transparent material or stainless-steel enclosure.
h) Terminal Box protection class shall be IP 55 (minimum) as per IEC 60529

iv) Additional requirements for OTI & WTI

a) OTI and WTI must be installed inside cubicle with anti-vibration pad
b) Manufacturer to ensure no water leakage inside cubicle through lifting hook
c) The capillary entry should be always from the bottom side.
d) Double compression type metallic cable gland to be provided.
e) Minimum protection class shall be IP 65 as per IEC 60529

9.3 Relevant/applicable clauses of Specific Requirements as mentioned at C/ENGG/SPEC/SECPROJECT/SPECIFIC REQUIREMENT Rev. no. 10 (attached as Annexure-I) shall also be referred for specified scope of work.