

**POWER GRID CORPORATION OF INDIA LTD.
(A Government of India Enterprise)**

**TECHNICAL SPECIFICATION
FOR**

Conductor Package – CD02 for supply of balance quantity of ACSR Moose conductor for 400kV D/C (Quad Moose) Diding –Dhalkebar – Bathnaha Transmission Line corresponding to Tower Package- TW02 associated with Arun-3 HEP in Nepal under Consultancy services to SJVN Arun-3 Power Development Company Pvt. Ltd. (SAPDC)

VOLUME-II

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**TECHNICAL SPECIFICATION
(VOLUME-II)**

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TECHNICAL SPECIFICATIONS

SECTION-I

1.0 General Information

- 1.1 The conductor covered in this specification shall be used for 400kV D/C (Quad Moose) Diding –Dhalkebar – Bathnaha Transmission Line corresponding to Tower Package- TW02 associated with Arun-3 HEP in Nepal under Consultancy services to SJVN Arun-3 Power Development Company Pvt. Ltd. (SAPDC)

Package	Transmission Line
CD02 (for supply of balance quantity of ACSR Moose conductor)	400kV D/C (Quad Moose) Diding –Dhalkebar – Bathnaha Transmission Line

2.0 Scope

- 2.1 The conductor to be supplied on final destination at site basis, as covered in this volume, shall be designed, manufactured and tested as per the requirements specified. Final destination shall mean the stores established by the contractor of the purchaser along the transmission lines.

The details of the conductor required under this specification are mentioned in the bidding documents.

3.0 Weights and Measures

All weights and measures shall be in System International (S.I.) units.

4.0 General Technical Conditions

- 4.1 The following provisions shall supplement all the detailed technical specifications and requirements brought out in the accompanying Technical Specifications. The bidder's proposal shall be based on the use of equipment and materials complying fully with the requirements, specified herein.

4.2 Equipment Performance Guarantee

- 4.2.1 The performance requirements of conductor are detailed separately in this specification. These guarantees shall supplement the general performance guarantee provisions covered under General Terms and Conditions of Contract in clause entitled 'Guarantee'.

4.2.2 Liquidated damages for not meeting specified performance shall be assessed and recovered from the supplier. Such liquidated damages shall be without any limitation whatsoever and shall be in addition to damages, if any payable under any other clause of Conditions of Contract.

4.3 **Drawings**

4.3.1 The standard drawing of the drum for conductor is enclosed at Section-IV of this specification. The Bidder shall supply the conductor in the drum conforming to the specification drawing and details given in the Section-II of this volume.

4.4 **Manufacturing Schedule**

The supplier shall submit to the purchaser the manufacturing, testing and delivery schedules of conductor within thirty (30) days from the date of the Letter of Award in accordance with the delivery requirements stipulated. Schedules shall also include the materials and items purchased from outside suppliers, if any.

4.5 **Reference Standards**

4.5.1 The Codes and/or Standards referred to in specifications shall govern, in all cases wherever such references are made. In case of a conflict between such Codes and/or Standards and the specifications, latter shall govern. Such Codes and/or Standards, referred to shall mean the latest revisions, amendments/changes adopted and published by the relevant agencies.

4.5.2 Other internationally acceptable standards which ensure equivalent or better performance than those specified shall also be accepted.

4.6 **Design Improvements**

4.6.1 The purchaser or the supplier may propose changes in the specification of the conductor or quality thereof and if the parties agree upon any such changes, the specification shall be modified accordingly.

4.6.2 If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the supplier proceeds with the change. Following such agreement, the provision thereof, shall be deemed to have been amended accordingly.

4.7 **Quality Assurance**

4.7.1 To ensure that the conductor under the scope of this Contract whether manufactured within the supplier's works or at his sub-supplier's premises is in accordance with the specifications, the supplier shall adopt Standard Quality Assurance Plan to control such activities at all points necessary.

4.7.2 The Standard Manufacturing Quality Plan (SMQP) document is enclosed at section-III of this volume.

4.7.3 The purchaser or his duly authorised representatives reserves the right to carry out Quality Audit and quality surveillance of the systems and procedures of the supplier's/his vendor's Quality Management and Control Activities.

4.8 Purchaser's Responsibility

4.8.1 The scope of the duties of the purchaser, pursuant to the contract, will include but not be limited to the following:

- (a) Interpretation of all the terms and conditions of these documents and specifications.
- (b) Review and interpretation of all the drawings, engineering data, etc.
- (c) Witness or authorise his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the Contract.
- (d) Inspect, accept or reject any equipment, material and work under the Contract, in accordance with the specifications.
- (e) Issue certificate of acceptance and/or progressive payment and final payment certificate.
- (f) Review and suggest modification and improvement in completion schedules from time to time, and
- (g) Supervise the Quality Assurance Programme implementation at all stages of the works.

4.9 Inspection, Testing & Inspection Certificate

4.9.1 The purchaser, his duly authorised representative and/or outside inspection agency acting on behalf of the purchaser shall have at all reasonable times access to the supplier's premises and works and shall have the power at all reasonable times to inspect and examine the materials and workmanship of the product during its manufacture. If part of the product is being manufactured or assembled at other premises or works, the supplier shall obtain for the purchaser and/or his duly authorised representative permission to inspect as if the equipment/ materials were manufactured or assembled on the supplier's own premises or works.

4.9.2 The supplier shall give the purchaser/ inspector fifteen (15) days written notice of any material being ready for testing. Such tests shall be to the supplier's account except for the expenses of the inspector. The purchaser/inspector, unless witnessing of the tests is waived, will attend such tests within fifteen (15) days of the date of which the equipment is notified as being ready for test/inspection or on a mutually

agreed date, failing which the supplier may proceed with the test which shall be deemed to have been made in the inspector's presence and he shall forthwith forward to the inspector duly certified copies of tests in triplicate.

- 4.9.3 The purchaser/inspector shall, within fifteen (15) days from the date of inspection as defined herein give notice in writing to the supplier, of any objection to any drawings and all or any equipment and workmanship which in his opinion is not in accordance with the Contract. The supplier shall give due consideration to such objections and shall make the modifications that may be necessary to meet the said objections.
- 4.9.4 When the factory tests have been completed at the supplier's or sub-supplier's works, the purchaser/inspector shall issue a certificate to this effect within fifteen (15) days after completion of tests but if the tests are not witnessed by the purchaser/inspector, the certificate shall be issued within fifteen (15) days of receipt of the supplier's Test Certificate by the purchaser/inspector. The completion of these tests or the issue of the certificate shall not bind the purchaser to accept the equipment should it, on further tests after erection, be found not to comply with the Contract.
- 4.9.5 In all cases where the Contract provides for test whether at the premises or works of, the supplier or of any sub-supplier, the supplier except where otherwise specified shall provide free of charge such item as labour, materials, electricity, fuel, water, stores, apparatus and instruments as may be reasonably demanded by the purchaser/inspector or his authorised representative to carry out effectively such tests of the equipment in accordance with the Contract and shall give facilities to the purchaser/inspector or to his authorised representative to accomplish testing.
- 4.9.6 The inspection by purchaser and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the supplier in respect of the Standard Quality Assurance Programme forming part of the Contract.

5.0 **Technical Description**

- 5.1 The technical description of Conductor shall be as specified in Section-II of this Technical Specifications.

6.0 **Tests and Standards**

6.1 **Tests**

The following type, acceptance and routine tests and tests during manufacture shall be carried out on the conductor. For the purpose of this clause:

- 6.1.1 Type Tests shall mean those tests which are to be carried out to prove the process of manufacture and general conformity of the material to this Specification-The Bidder shall indicate his schedule for carrying out these tests, if required.

- 6.1.2 Acceptance Tests shall mean those tests which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purpose of acceptance of that lot.
- 6.1.3 Routine Tests shall mean those tests, which are to be carried out on the material by the manufacturer to check requirements which are likely to vary during production.
- 6.1.4 Tests during manufacture shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the supplier to ensure the desired quality of the end product to be supplied by him.
- 6.1.5 The norms and procedure of sampling for these tests will be as per the Standard Quality Assurance Programme.
- 6.1.6 The standards and norms to which these tests will be carried out are listed against them. Where a particular test is a specific requirement of this Specification, the norms and procedure of the test shall be as specified in Annexure-B or Standard Quality Assurance Programme.
- 6.1.7 For all type and acceptance tests, the acceptance values shall be the values specified in this Specification.

7.0 **Standard Technical Particulars**

- 7.1 The Standard Technical Particulars of the conductor which the bidder has to guarantee are specified in Section-II of this volume. The Bidder shall furnish any other information as in their opinion is needed to give full description and details to judge the item(s) offered by them

8.0 **Technical Information**

400 kV transmission line

1.	Nominal Voltage	kV	400
2.	Maximum system voltage	kV	420
3.	BIL (Impulse)	kV (Peak)	1550
4.	Power frequency withstand voltage (Wet)	kV (rms)	680
5.	Switching surge withstand voltage (Wet)	kV (peak)	1050
6.	Minimum Corona extinction voltage at 50 Hz AC system under dry condition	kV (rms) phase to earth.	320
7.	Maximum Radio interference voltage at one MHz for phase to earth voltage of 305 KV under dry condition.	Micro Volts	1000

9.0 Service Condition

Conductor to be supplied against this specification shall be suitable for satisfactory continuous operation under conditions as specified below:

Maximum ambient temperature (°C)	45
Minimum ambient temperature (°C)	0
Relative humidity (% range)	10-100
Maximum annual rainfall & snowfall (Cm)	as per published Meteorological/ climatological data
Wind zone (as per IS: 875)	4
Maximum wind velocity (m/sec.)	47
Maximum altitude above mean sea level(m)	2000
Isokeraunic level (days/years)	60

Climate varies from moderately hot and humid tropical climate to cold climate.