



**NAYA RAIPUR DEVELOPMENT AUTHORITY**

**Tender Document for Design, Supply, Installation, Testing,  
Commissioning and Maintenance of 33/0.433 KV  
Distribution Transformers for Office Complex, Commercial  
Complex and Retail Complex buildings at Sector 24 and  
Sector 21 of Naya Raipur (2<sup>nd</sup> call)**

**(Following Three-Envelope Tender Procedure)**

**TENDER DOCUMENT (PART ONE)**

**NIT No. : 110 / DT/VB/ELECT/CE(E)/NRDA/2016-17, Raipur**

**Dated: 04.10.2016**

**Issued by:**

Chief Executive Officer,  
Naya Raipur Development Authority (NRDA)  
4<sup>th</sup> Floor,,Paryavas bhawan, North block  
Sector- 19, Naya Raipur- 492 002, Chhattisgarh  
Tel No: + 91 771 2512500; Fax No.: +91 771 2512400.  
Website: [www.nayaraipur.gov.in](http://www.nayaraipur.gov.in)

## Tender Document Contains

- (a) Only schedule "A" and Section-I of schedule "D" are to be filled & signed by the tenderer
- (b) All the certificates as per pre qualification criteria shall be appended with relevant forms of schedule "D"

### 1. PART ONE (NRDA F-1)-(Attached herewith, to be submit along the tender)

#### Part (A)

- a) Press Notice
- b) Detailed NIT

#### Part (B)

- a) Schedule-A
  - (i) Cost Abstract
  - (ii) Bill of Quantities

- b) Schedule-B –NIL
- c) Schedule-C –NIL
- d) Schedule-D

#### Section-I..... Technical tender forms

- (i) Letter of Technical Tender
- (ii) Tenderer's Information Sheet
- (iii) Annual Turnover
- (iv) Specific Construction Experience
- (v) Declaration
- (vi) Check list for Technical tender evaluation

#### Section –II .....Scope of work

#### Section –III..... Technical specifications of work

#### Section –IV..... Special Conditions of Contract

#### Section –V..... List of approved makes.

#### Schedule-E

- e) Schedule-F

### 2. PART TWO (NRDA F-2/3 )-Standard form (Not Attached herewith, and not to be submitted along the tender)

**Important note: - Link site [http:// nayaraipur.gov.in/documents/gcc.pdf](http://nayaraipur.gov.in/documents/gcc.pdf)**

- 1. General Guidelines
- 2. Tender
- 3. General rules and directions
- 4. Conditions of contract
- 5. Clauses of contract
- 6. Model rules relating to labour, water supply and sanitation in labour camps safety code
- 7. Sketch of cement Godown
- 8. Contract forms
  - (a) Draft Format for Performance Security
  - (b) Earnest Money Deposit Form (Bank Guarantee)
  - (c) Format of Contract Agreement
  - (d) Draft Format for Performance Guarantee for Water Proofing and Anti-termite Works
  - (e) Indemnity Bond
  - (f) Indenture Bond
  - (g) Notice for Appointment of Arbitrator
- 9. Proforma of schedules (Schedule 'A' to Schedule 'F')



NAYA RAIPUR DEVELOPMENT AUTHORITY  
4<sup>th</sup> Floor, Paryavas bhawan , North block, Sector- 19, Naya Raipur- 492 002, Chhattisgarh  
Tel No: + 91 771 2512500; Fax No.: +91 771 2512400., Website: [www.nayaraipur.gov.in](http://www.nayaraipur.gov.in)

### Tender Notice

NIT No 110 / DT/VB /ELECT /CE(E)/NRDA/2016-17, Raipur Dated: 04.10.2016

Sealed tenders are invited from original equipment manufacturers or authorized channel partner or contractor ,who fulfill the Pre-Qualification criteria for the work of **"Supply, Installation, Testing, Commissioning and Maintenance of 33/0.433 KV Distribution Transformers for Office Complex, Commercial Complex and Retail Complex buildings at Sector 24 and Sector 21 of Naya Raipur (2<sup>nd</sup> call) "** Estimated cost of the tender is 228.00 lacs with EMD of 2.28 lacs for a time period of 6 months. Eligibility and qualification criteria are available in the detailed NIT. Tender documents can be downloaded from the website [www.nayaraipur.gov.in](http://www.nayaraipur.gov.in). Last Date and Time of bid submission is by 15.00hrs on 27.10.2016. Amendment in tender, if any, will only be uploaded on the website and shall not be published in any newspaper.

नया रायपुर – मेरा रायपुर

Chief Executive Officer

Signature of Contractor.....

Signature of NRDA.....

**NAYA RAIPUR DEVELOPMENT AUTHORITY (NRDA)**  
**RAIPUR, CHHATTISGARH**  
**DETAILED NIT**

**NIT No.: 110 /DT/VB /ELECT/CE(E)/NRDA/2016-17 , Raipur      Dated: 04.10.2016**

**Last date and time for submission of tenders: 1500 hrs on 27.10.2016**

1. Item Rate Tenders are invited in the prescribed tender documents by the Chief Executive Officer, Naya Raipur Development Authority (NRDA), Raipur Chhattisgarh from Sealed tenders are invited from **original equipment manufacturer or authorized channel partner or contractor** who fulfill the Pre-Qualification criteria for the work.
2. The detailed NIT is as under:-

<b>Name of work</b>	Design, Supply, Installation, Testing, Commissioning and Maintenance of 33/0.433 KV Distribution Transformers for Office Complex, Commercial Complex and Retail Complex buildings at Sector 24 and Sector 21 of Naya Raipur (2 <sup>nd</sup> call )
Estimated Cost (INR in Lacs)	<b>228.00</b>
EMD (INR in Lacs)	<b>2.28</b>
Time allowed including rainy season	<b>6.0 Months</b>
Cost of Tender (In INR)	<b>5,000.00</b>
Tender to be uploaded on NRDA website to enable download	<b>05.10.2016</b>
Last Date and time of submission of Tender	<b>27.10.2016 &amp; 15.00Hrs</b>
Date and time of opening of Tender	<b>27.10.2016 &amp; 16.00Hrs</b>

3. **Pre Qualification Criteria** -To be eligible under the contract, the intending tenderer should meet the mandatory criteria mentioned in **4.1 and 4.2 below:-**

4. **Tender Criteria**

4.1 **Financial Criteria**

**Average Annual Turnover:** The intending tenderer's average annual turnover during last three (3) years ending 31st March ( i.e 20012-13, 2013-2014 & 2014-15) should be equal to INR 228.00 lacs or more. Annual turnover is total certified payments received from contracts in progress and completed during the financial year.

**For above, the Tenderer has to submit audited balance sheets of their financial turn over/ accounts along with profit and loss account for the last three(3) years, duly certified by the Chartered Accountant. Where necessary, the Authority can make enquiries with the Tenderer's Bankers.**

#### 4.2 Technical Criteria

<b>A</b>	Intending tenderer shall be an original equipment manufacturer or an authorized channel partner or a contractor. The Tenderer should have Electrical license to work in Chhattisgarh, if the same is not available with the tenderer the same shall be obtained within 15 days of issue of LOA.
<b>OR</b>	
<b>B</b>	If the tenderer is a Channel Partner of OEM the said Channel Partner shall be associated with company and should have completed supply, Installation, Testing & Commissioning of at least 5 no's of SITC of Transformer of voltage and capacity of i.e. 33/.433 KV and 500 KVA & above during last seven years i.e. after 30/09/2009, in any Government / PSUs/Local bodies.
<b>OR</b>	
<b>C</b>	If the tenderer is a contractor he should have completed satisfactorily supply , installation, Testing & Commissioning of at least 10 no's of SITC of Transformer of voltage and capacity of i.e. 33/.433 KV and 500 KVA & above during last seven years i.e. after 30/09/2009, in any Government / PSUs/Local bodies.

**Note: -**

- a) For the purpose **value of executed works and financial turnover shall be brought to current costing level by enhancing the actual value of work at the rate of 7% per annum (compounded annually), calculated from the date of completion to last date of receipt of applications for tenders.**
- b) In case authorized channel partner of original manufacturer is bidding then his own work experience shall only be considered rather than work experience of the original manufacturer.
- c) Ongoing project / part project experience shall not be considered for evaluation.
- d) For the benefit of the intending tenderers a checklist is enclosed at Schedule-D (vi), for the documents to be submitted along with tender.

For these, the certificate of satisfactory completion from Employer shall be submitted along with the application incorporating clearly the name of Contractor, name of the work, Contract value, billing amount, date of commencement of works, scheduled date of completion, actual date of completion, satisfactory performance of the Contractor, Quality of works executed (Very Good/Good/Fair/Poor), Time overrun if any (whether with or without levy of compensation or levy of compensation).

The works executed by the Applicant as a member of joint venture or as sub-contractor shall not be considered.

In case the similar work, as described above, is only a part of a composite/bigger project, the certificate from Employer should also indicate the cost of similar work out of the total project cost of composite/bigger project .In such case the work experience as an authorized sub vender by the client shall be considered as experience.

Signature of Contractor.....

Signature of NRDA.....

**Certificates:**

- a) a) All tenderers should submit the valid registration certificate. Commercial tax certificate, balance sheet with profit and loss statement for the 3 year ( i.e 20012-13, 2013-2014 & 2014-15) duly certified by Chartered Accountant.
  - b) The tenderers shall also submit satisfactory completion certificates in support of each quoted experience along with work order. The satisfactory completion certificate should be signed by an officer not below the rank of Executive Engineer concerned in case of Government **department or officer not below the rank of General Manager in case of public/ private sector** as the case may be.
  - c) In case of channel partner of the OEM ,a certificate from the OEM of being channel partner along with assurance of technical support shall be submitted
  - d) **All the documents to be submitted shall be duly notarized.**
5. **The** tender document for the above work is available on NRDA's **websites: [www.nayaraipur.gov.in](http://www.nayaraipur.gov.in) and [www.cg.gov.in](http://www.cg.gov.in)** Tenderer will have to download the tender document, and shall submit the tender along with the tender cost as mentioned in the Para 1 above. For tender cost, DD drawn in favor of **“CHIEF EXECUTIVE OFFICER, NRDA”** should be enclosed. The tenderers shall attach the cost of tender document along with EMD as mentioned in the Para 1 above.
6. **Three** envelope Tender procedures shall be followed. Tenderer has to submit three sealed envelopes containing the documents as detailed below simultaneously, enclosed in a **Fourth Envelope**.

<b>ENVELOPE-1</b>	EMD & Cost of tender in the prescribed format
<b>ENVELOPE-2</b>	Technical Tender consisting of the documents/certificate in proof of prequalification criteria PART ONE, <b>Design, Supply, Installation, Testing, Commissioning and Maintenance of 33/0.433 KV Distribution Transformers for Office Complex, Commercial Complex and Retail Complex buildings at Sector 24 and Sector 21 of Naya Raipur (2<sup>nd</sup> call)</b> and tender specification in soft & hard copy and (NRDA F-1) excluding schedule-A
<b>ENVELOPE-3</b>	Financial Tender PART ONE (Schedule-A) <b>( Price Bid should also be submitted as soft copy in MS Excel 2007,in CD)</b>

All the three tenders shall be put in a fourth envelope which shall be dully sealed. All the 4 envelopes shall be super-scribed with the Name of Work and Name of intending tenderer. Respective envelopes shall also be marked as envelope 1, envelope 2, and envelope 3 as detailed above. Tenders who do not conform to the specified requirements will be held non-responsive.

Initially, only the **envelope -1** shall be opened, if found responsive then the **envelope-2** (Technical tender) shall be opened at the date and time given in the Tender Document. The Price tender shall remain sealed and unopened in the custody of NRDA.

7. All Tenders must **be** accompanied with the
- a) **Earnest money** as mentioned in the Para 2 above. The Earnest money shall be payable in favor of *Chief Executive Officer NRDA*, in the form of a **Bank Draft payable at Raipur/ Bank Guarantee Operatable/Encashable at Raipur with their local branch address, drawn from a nationalized bank/ Scheduled Bank. Bank Draft and Bank Guarantee shall be valid for a period of 3 (three) months and 6 (Six) months respectively from the date of submission of tender**

Signature of Contractor.....

Signature of NRDA.....

- b) **Cost of tender** as mentioned in the Para 2 above. The Cost of tender money shall be payable in favor of *Chief Executive Officer NRDA*, in the form of a **Bank Draft payable at Raipur drawn from a nationalized bank/ Scheduled Bank** which shall be valid for a period of **3 (Three) months** from the date of submission of tender.
8. Tenders shall be submitted at the address below on or before due date. Tenders received after the due date or time for tender submission (Late tenders) will either not be accepted or if inadvertently accepted, will not be opened and shall be rejected and returned back to the tenderer subsequently.
9. (a) NRDA reserves full rights to reject any or all the tenders without assigning any reason, and to seek any further information from the tenderers. The selection shall be at the entire discretion of NRDA and the NRDA's decision in this respect shall be final and binding. Further NRDA reserves right to split the contract in two or more parts. This shall be at the entire discretion of NRDA and NRDA's decision in this matter shall be final and without appeal.
- (b) The competent authority on behalf of NRDA does not bind himself to accept the lowest or any other **tender**, and reserves to himself the authority to reject any or all of the tenders received without the assignment of a reason. All tenders in which any of the prescribed conditions is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer, shall be summarily rejected.
10. (a) Tenders shall **be** valid for 90 (Ninety) days from the last date of submission of the tender. NRDA will not be responsible for any costs or expenses incurred by Tenderers in connection with the preparation or delivery of Tenders. If any tenderer withdraws his tender before the said period or issue of letter of acceptance/intent, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the NRDA, then the NRDA shall, without prejudice to any other right or remedy, be at liberty to forfeit entire amount of Earnest Money as aforesaid.
- (b) Any bidder, who has withdrawn his proposal or have been disqualified on the basis of the above clause, shall not be eligible to submit the tender in the recall of such tender.
- (c) Subletting of the contract or Joint Venture in any case shall not be allowed. In case subletting is done or proved during the contract, the work shall be closed at the stage as it is and the SD / Retention money/any other deposits available with department shall be forfeited.
11. **The intending tenderers are advised to send their queries to NRDA either by post or by email to ceo@nayaraipur.com and cee@nayaraipur.com upto the date mentioned in the Para 2 as above.**
12. **Clarification/ amendments, if any shall be uploaded on website only.**
13. **Period for** completion of work as mentioned above at Para 2 is inclusive of rainy season.
14. Approved hard copy of the standard document is available in the office of the employer and could be seen on any working day during office hours at the following address:-
- Chief Engineer (Engg), NRDA**  
**First Floor ,Paryavas bhawan , North block, Sector- 19 Naya Raipur-492002, Phone: 0771-2971000**
15. The intending tenderers are advised to cross check the downloaded version of the tender document with the hard copy available with NRDA.
16. In case of any discrepancy between the downloaded tender and the approved hard copy, the approved hard copy shall hold good for contractual as well as legal purposes.
17. Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders, as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general, shall themselves at their own cost obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect the execution of work and shall incorporate the cost of such effects while quoting the tender, A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed, The tenderer shall be responsible for arranging and maintaining at his own cost all materials tools & plants, water, electricity, access facilities for workers and on all other services required for executing the work unless otherwise specifically provided in the contract documents. Submission of tender by a tenderer implies that he

Signature of Contractor.....

Signature of NRDA.....

has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

18. Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.
19. The successful tenderer shall be required to execute an agreement on a non judicial stamp paper of appropriate value with the **Chief Engineer (Engineering), NRDA** in the Proformas annexed to the tender document, within 7 days of the issue of letter of acceptance/ award by the NRDA. The cost of non judicial stamp paper shall be borne by contractor. In the event of failure on the part of the successful tender to sign the agreement within 7 days, the entire earnest money will be forfeited and tender shall be cancelled.
20. The successful tenderer, upon issue of letter of acceptance, in addition to execution of an agreement on a non judicial stamp paper of appropriate value, shall also be required to furnish an irrevocable Performance Bank Guarantee of requisite amount to the Chief Engineer (Engineering), NRDA in the Performa annexed to the tender document, within 7 days of the issue of the letter of acceptance /award of Tender by the NRDA. In the event of failure on the part of the successful tenderer to furnish the Performance Bank Guarantee within 7 days, the earnest money will be forfeited and tender shall be cancelled.
21. This Notice Inviting Tender shall form a part of the contract document. In accordance with clause 1 of the contract, the letter of acceptance/ award shall be issued in favour of the successful tenderer/ contractor. After submission of the performance guarantee, by the contractor, the General arrangement drawings and other details for commencement of work shall be issued. The contract shall be deemed to have come into effect on issue of communication of letter of acceptance of the tender. On such communication of acceptance, the successful Tenderer/ Contractor shall, within 7 days from such date, formally sign the agreement consisting of:-
  - a) PART ONE of the Tender documents along with detailed NIT as issued to the contractor at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto and
  - b) PART TWO of the Tender document i.e. "General conditions of contract duly modified / corrected to the extent as specified under PART ONE (though not issued to the contractor but always available for inspection on written demand at the office of the officer inviting tenders specified under Schedule F of PART ONE of the Tender Document) and deemed to have been consulted, inspected, understood and considered by the tenderer before quoting and submitting his tender.
  - c) Agreement signed on non-judicial stamp paper of appropriate value as per prescribed proforma of tender documents.
22. GCC is available as a standard NRDA Publication and can also be downloaded free of cost from the NRDA web site under title "General conditions of contract" for Contractors in construction Contracts" However contractors are advised to refer to PART ONE of the tender document carefully and thoroughly for corrections/ modifications in the "General conditions of contract" Standard form NRDA F-2/3 is also available for inspection in the office of the Engineer in charge on written demand from contractors. Link site <http://nayarapur.gov.in/documents/gcc.pdf>
23. While submitting the tender the contractor shall clearly and legibly write his full mailing address including PIN code, Telephone/ mobile no./ Fax Numbers/ e-mail address etc for communication purposes and shall inform the Engineer in Charge about any change from time to time in his postal/ mailing address. The communication shall be dispatched only at the contractor's such latest informed address and NRDA shall in no way be responsible for non-receipt of correspondence by the contractor.
24. It is found that the contractor has misrepresented that facts or has attempted to secure or has secured the work by misrepresenting the facts or by submitting false or forged documents then the Entire Earnest Money submitted by the contractor and or the Performance Guarantee and/ or the Security Deposit as the case may be, shall be liable to be absolutely forfeited and such contractor/ individuals shall also be liable to be prosecuted for cheating/ forgery/ fraud etc as per law.
25. Bill of quantities is enclosed with tender document, the rate shall be quoted against each item separately in **figures as well as in words**

Signature of Contractor.....

Signature of NRDA.....



During price Tender evaluation, the Employer will correct arithmetical errors on the following basis:

- a) if there is a discrepancy between words and figures, following procedure shall be followed:
    - i. the unit price which correspond to the total price for the item worked out by the Tenderer shall be followed;
    - ii. If the total price of an item is not worked out by the Tenderer or it does not correspond with the rates written either in words or figures then the rate quoted by the Tenderer in words shall be taken as correct.
  - b) if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected;
  - c) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.
  - d) The unit wise amounts will be rounded to the nearest rupee
  - e) The minimum quoted rate will be considered for same description of items
  - f) The tendered rates of items against which no rate or price is entered by the tenderer will be taken as zero and the price of the same shall be deemed to have been covered by the rates/amount quoted in other items.
26. The tender document shall be written legibly and free from erasure, overwriting or conversion of figure. Any correction where unavoidable shall be made by crossing out, rewriting and attestation by the tenderer.
  27. All royalties be paid by the contractor as also all tolls, duties, local and other levies including sales tax, insurances & workman compensation act etc.
  28. Applicable service tax shall be reimbursed separately on production of receipt of payments of Service Tax.
  29. Contractor will be bound to follow CG Model rules relating to its water supply & sanitation in labour camp.
  30. The contractor shall pay not less than the minimum wages to labours engaged by him on the work.
  31. Department reserves the right to take up the work departmentally or to award any work on contract in the vicinity without prejudice to the terms of contract.
  32. If the rate quoted by the lowest (L1) of the tenderer is considered unbalanced (in relation to the Department's estimate of cost of work to be performed under the contract) by the CEO, NRDA, then tenderer shall submit detail price/rate analysis of major items of the work within 7 days of such notice so as to demonstrate the internal consistency of these price/rate(s) with his quoted price/rate(s). After evaluation by tender sanctioning authority CEO, NRDA may require the tenderer to submit additional Security upto 5% of the estimated cost put to tender for the performance of the agreement in the shape of F.D. Or a BG receipt in favor of the CEO, NRDA before signing of the agreement, which shall be refunded along with the normal S.D. after Completion of work. If he fails to complete the work or leave the work in complete, this 5% additional SD, shall also be forfeited by the department, in addition to other provision of the contract & the agreement shall be terminated and action shall be taken in accordance of relevant contract clause of the agreement.
  33. Important Instructions to Tenderers :The tenderers who have down loaded the tender documents from the web site, should read the following important instructions carefully before actually quoting the rates & submitting their tender on the tender document downloaded from the web site:
    - a) The tenderer should see carefully & ensure that all the pages of PART ONE (NRDA F-1) of the tender document including schedule of quantities of items of work (NRDA F-1 Schedule-A) has been down loaded properly & completely.
    - b) The printout of the downloaded tender document shall be taken on A-4 size plain white paper only & the printer settings shall be dept to ensure that the downloaded document is printed in the same manner and pattern/ setting as appearing on the web site & there is no change in the formatting, number of paras etc.
    - c) The tenderer should ensure that no page in the down-loaded tender document is missing and all pages in the down-loaded tender document as printed are legible & clear & are printed on a good quality paper.
    - d) The tenderer should ensure that every page of the down-loaded tender document is signed by tenderer himself.

Signature of Contractor.....

Signature of NRDA.....

- e) The tenderer should ensure that the down loaded tender document is properly bound and wax sealed before submitting the same in the envelope. **Loose submission** shall be liable to be rejected.
- f) In case of any correction/ addition/ alteration/ omission in the downloaded tender document Vis a Vis that in the **Standard DRAFT Tender Document** available in the office of NRDA, it shall be liable to be rejected.
- g) The tenderer shall furnish a declaration to this effect that no addition/ deletion/ corrections have been made in the downloaded tender document being submitted by him and it is identical to the tender document appearing on the Web-site and with the **Standard DRAFT Tender Document** available in the office inviting the tenders.

**Chief Executive Officer, NRDA**

4th Floor, Paryavas bhawan, North block  
Sector- 19, Naya Raipur- 492 002, Chhattisgarh  
Tel No: + 91 771 2512500;  
Fax No.: +91 771 2512400.

Signature of Contractor.....

Signature of NRDA.....

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# **SCHEDULE- D**

## **Section-I**

### **Technical Tender Forms**

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## **Schedule-D**

### **Section I - Tender Forms Technical**

This Section contains the forms which are to be completed by the Tenderer and submitted as part of his PART ONE (NRDA F-1).

#### **Table of Forms**

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## (i) Letter of Technical Tender

Date: \_\_\_\_\_

NIT No.: \_\_\_\_\_

To:

Chief Executive Officer,

Naya Raipur Development Authority (NRDA)

4<sup>th</sup> Floor, Paryavas Bhawan, North block

Sector- 19, Naya Raipur- 492 002, Chhattisgarh

Tel No: + 91 771 2512500; Fax No.: +91 771 2512400.

Ref for NIT no:-----

**Subject:** Name of the work:- -----

Dear Sir,

I/We, the undersigned, declare that:

- (a) I/We have examined and have no reservations to the Tender Document, including Addendum if any, minutes of meeting, clarification to the queries etc.
- (b) I/We offer to execute the subjected under in conformity with the Tender Documents and the addendums.
- (c) I/We have satisfied ourselves as to the location of the site and working conditions, examined the requirements of NRDA and have obtained all the information necessary for the successful and timely completion of the work.
- (d) I/We have submitted the Earnest Money Deposit as specified in the tender document which will not bear any interest and shall be subjected to forfeiture on following defaults.
  - (i) if we withdraw our Tender during the period of tender validity as specified in Detailed NIT Para 9 or
  - (ii) if we fail to:
    - furnish a Performance Security in accordance with Detailed NIT Para 19 or
    - sign the Contract in accordance with Detailed NIT Para 18; or
    - Accept the correction of its Tender Price pursuant to Detailed NIT Para 24.
  - (iii) If we have given the false documents in support of qualification with the technical tender.
- (e) My/Our Tender shall be valid for a period of 90 days from the date fixed for the tender submission deadline in accordance with the Tender Document, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (f) If my/our Tender is accepted, we commit to obtain a Performance Security in the amount as specified in the tender document for the due performance of the Contract and sign the agreement;

- (g) I/We are not participating, as Tenderers, in more than one Tender in this Tendering process, in accordance with the Tender Document;
- (h) My/our firm, its affiliates or subsidiaries, including any subcontractors or suppliers for any part of the Contract, has not been declared ineligible by NRDA, Raipur;
- (i) I/We understand that this Tender, together with your written acceptance thereof included in your letter of acceptance, shall constitute a binding contract between us, until a formal Contract is prepared and executed;
- (j) I/We understand that you are not bound to accept the lowest evaluated tender or any other tender that you may receive.
- (k) I/We hereby pay the Earnest Money Deposit of required amount in the form of a demand draft on a nationalized bank/ Scheduled Bank (-----Bank Name and address) and operatable at Raipur in favour of the 'Chief Executive Officer, NRDA, Raipur' for the said amount and is attached.
- (l) I/We hereby declare that, the entire work including Addendum/ Corrigendum, if any, shall be completed in all respect within the time limit specified in the NIT.
- (m) I/We here by authorize the Employer to get all bank guarantee verified and got confirmed from concerned Bank.

Signature: -----

Signed by: ----- (Name)

Designation: -----

For and on Behalf of -----(Name of Tenderer)

Date:

**(ii)Tenderer's Information Sheet**

Tenderer's Information		
Tenderer's legal name		
Tenderer's legal address		
Tenderer's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	Name:	Address:
	Telephone : Fax :	E-Mail:
Tenderer's details of Incorporation	Place of incorporation/ registration:	Year of incorporation:
Attached are copies of the following original documents.		
<input type="checkbox"/> 1. Articles of incorporation or constitution of the legal entity named above.		
<input type="checkbox"/> 2. In the case of government-owned entity, documents establishing legal and financial autonomy and compliance with commercial law.		

**Details of the office closest to Raipur (if available)**

1.	Address of Office	
2.	Telephone :	Contact :
3.	Fax :	E-Mail :

Signature of Tenderer

Date:\_\_\_\_\_

**(iii) Annual Turnover**

<b>Annual Turnover Data for the Last 3 Years</b>			
<b>Year</b>	<b>Amount and Currency</b>	<b>Exchange Rate if any</b>	<b>INR Equivalent</b>
2012-13			
2013-14			
2014-15			
Average Annual Turnover for any 3 years in INR			

All Tenderers are requested to complete the information in this form

The information supplied should be the Annual Turnover of the Tenderer in terms of the amounts billed to clients for each year for contract in progress or completed, converted to INR at the rate of exchange at the end of the period reported.

As a proof of the above, the contractor shall submit the copies of the balance sheet for last three years along with audited profit & loss statement duly signed by the chartered accountant.

Signature of Tenderer

Date: \_\_\_\_\_



### (iv) Specific work Experience

Fill up one (1) form per contract.

Details of Contract			
Contract No . . . . . of . . . ...	Name of work		
Award Date		Completion Date	
Role in Contract	<input type="checkbox"/> Contractor	<input type="checkbox"/> Sub-contractor	
Total Contract Amount			INR
Employer's Name Address Telephone/Fax Number E-mail			
Description of the work executed			

**Note:** Attach copies of work order and satisfied completion certificates in support of each quoted experience. The completion certificate should be signed by the officer not below the rank of concerned Executive Engineer in case of Government department or in the rank of General Manager in case of public sector/private sector as the cases may be.

Signature of Tenderer

Date: \_\_\_\_\_

## (v)DECLARATION

**(TO BE SIGNED BY THE TENDERER SUBMITTING THE TENDR  
ON DOWNLOADED TENDER DOCUMENT)**

I/We hereby declare and certify that:

1. I/We are submitting the tender in the tender document downloaded by me /us from the website & we certify that there is no change in formatting, numbering of pages etc. In the downloaded documents.
2. I/We are submitting the tender in the tender document which is exactly similar and identical to the one available on the website and also as available with the officer inviting tenders.
3. I / We have not made any modifications / corrections / additions / omissions etc in the tender documents downloaded from web by me / us.
4. I / We have checked that no page in the downloaded tender document is missing and all the pages as per web site are available & that all the pages of tender document submitted by us are clear & legible.
5. I / We have signed (with stamp) all the pages of the tender document before submitting the same.
6. I / we have wax sealed the tender documents properly before submitting the same.
7. I / We have submitted the application for issue of tender documents on the prescribed format separately along with the cost of tender documents and also the attested Xerox copies of the eligibility documents prescribed for respective work in the NIT.
8. I / We have read carefully & understood the entire Tender document including important instructions to the tenderers submitting the downloaded tender.
9. In case at any stage whatsoever at a later date it is found/ revealed that there is a difference in our downloaded tender documents from the original **Standard DRAFT Tender Document**, NRDA shall have the absolute right to take any action as deemed fit without any prior intimation to me / us.
10. In case at any stage whatsoever at a later date it is found that there is difference in our downloaded tender document from the Standard DRAFT Tender Document, we clearly understand that our work shall be liable to be cancelled and Earnest Money/ Performance Guarantee / Security deposit etc all are liable to be forfeited by NRDA and in such an eventuality I / We shall have no right or claim for any damages / compensation from NRDA on this account. Further in such case I / We may also be debarred by NRDA for further participation in the tendering in the concerned NRDA & be removed from the approved list of contractors of NRDA.

Dated.....

**(TENDERER)**  
**(SIGNATURE WITH SEAL/ STAMP)**

**(vi) CHECK LIST FOR TECHNICAL TENDER EVALUATION**

Name of the Agency:						
S. No	Document	Details			Enclosed at annexure	
					Page No	
			From	To		
1	Tender Document Cost	<b>Downloaded from NRDA Website</b>				
		<b>Details of DD</b>				
		Amount				
		Name of the Bank & Branch				
		Date				
	D.D no & Photo copy attached	Yes	No			
2	Earnest Money Deposit (EMD)	Amount				
		Form of EMD				
		Issuing Bank & Branch				
		No & Date	Yes	No		
		Photo copy attached				
3	Contractor Registration Certificate	Class in which registered				
		Name of Department				
		Registration Number & Date				
		Validity				
		<b>Notarized</b>	<b>Yes/No</b>			
4	Authorization certificate from OEM for authorized channel partner	Name of OEM				
		<b>Notarized</b>	<b>Yes/No</b>			
5	Commercial Tax Certificate	Registration Number:				
		Name of the Office				
		<b>Notarized</b>	<b>Yes/No</b>			
6	Average Annual Turnover in Lacs	2012-2013				
		2013-2014				
		2014-2015				
		Chartered accountant certificate in original or photo copy duly notarized can be submitted				

Name of the Agency:							
S. No	Document	Details		Enclosed at annexure			
				Page No			
				From	To		
7.	Audited balance sheets and profit and loss account for the last three(3) years, duly certified by the Chartered Accountant	2012-2013					
		2013-2014					
		2014-2015					
		<b>Notarized</b>	<b>Yes/No</b>				
8	Details of the projects/works completed as pre-qualification criteria	Name of the Work					
		Work Completed	<b>Yes/No</b>				
		Year of completion					
		Cost of the Project					
		Certificate Enclosed	<b>Yes/No</b>				
		<b>Notarized</b>	<b>Yes/No</b>				
		Name of the Work					
		Work Completed	<b>Yes/No</b>				
		Year of completion					
		Cost of the Project					
		Certificate Enclosed	<b>Yes/No</b>				
		<b>Notarized</b>	<b>Yes/No</b>				
		9	Details of the bankers of the bidder including address, telephone number, e-mail address	Name of the Bank & Branch			
Telephone number							
E-mail address							
Name of the Bank & Branch							
Telephone number							
E-mail address							

Note: The above check list only provides for those documents which are mandatory for the tender pre-qualification criteria. Tenderers are required to append, other documents also with the technical tender as required in the detailed NIT or elsewhere in the PART ONE (NRDA F-1).

Signature of Tenderer

Date: \_\_\_\_\_

(vii) RETURN OF EMD

Date: \_\_\_\_\_

To:

Chief Executive Officer,  
Naya Raipur Development Authority (NRDA)  
4th Floor,,Paryavas Bhawan,North block  
Sector- 19, Naya Raipur- 492 002, Chhattisgarh  
Tel No: + 91 771 2512500; Fax No.: +91 771 2512400

Ref for NIT no:-----

**Subject:** Name of the work:- -----

Dear Sir,

(a) I/We have submitted the Earnest Money Deposit of amount Rs. \_\_\_\_\_(In words \_\_\_\_\_) as specified in the tender document in the form of a demand draft/Bank Guarantee on a nationalized bank/ Scheduled Bank (-----Bank Name and address) and operatable at Raipur in favour of the 'Chief Executive Officer, NRDA, Raipur.

(b) In case, i/we am/are not found qualified bidder, our Earnest Money Deposit (EMD) may kindly be return back on the provided bank details as below:

Our bank detail (Please attaché a cancel cheque ) are as follows :

(1) Beneficiary Name: \_\_\_\_\_

(2) Beneficiary's Bank: \_\_\_\_\_

(3) Branch: \_\_\_\_\_

(4) IFS Code: \_\_\_\_\_

(5) Account No \_\_\_\_\_

Signature: -----

Signed by: ----- (Name)

Designation: -----

For and on Behalf of -----(Name of Tenderer)

Date:

## INTEGRITY PACT

To,

.....,  
.....,  
.....

Sub: NIT No. .... for the work .....

Dear Sir,

It is here by declared that Naya Raipur Development Authority(NRDA),Naya Raipur(C.G.) is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the Naya Raipur Development Authority,Naya Raipur(C.G.).

Yours faithfully

**Executive Engineer  
Naya Raipur Development Authority  
Naya Raipur(C.G.)**

## INTEGRITY PACT

To,

**Naya Raipur Development Authority (NRDA),  
Naya Raipur (C.G.),**

.....,

Sub: Submission of Tender for the work of .....

Dear Sir,

I/We acknowledge that **Naya Raipur Development Authority (NRDA),Naya Raipur (C.G.)**,is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by **Naya Raipur Development Authority (NRDA),Naya Raipur (C.G.)**. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, **Naya Raipur Development Authority (NRDA),Naya Raipur (C.G.)** shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid is accordance with terms and conditions of the tender/ bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

To be signed by the bidder and same signatory competent / authorized to sign the relevant contract on behalf of Naya Raipur Development Authority Naya Raipur(C.G.)

INTEGRITY AGREEMENT

This Integrity Agreement is made at ..... on this ..... day of .....20.....

BETWEEN

Naya Raipur Development Authority (NRDA),Naya Raipur (C.G.) represented through The CEO or Any Officer oppointed by him,

(Name of Division)

Naya Raipur Development Authority ,

....., (Hereinafter referred as the

(Address of Division)

'Principal/Owner', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

..... (Name and Address of the Individual/firm/Company)

through ..... (Hereinafter referred to as the (Details of duly authorized signatory)

"Bidder/Contractor" and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

Preamble

WHEREAS the Principal / Owner has floated the Tender (NIT No. ....) (hereinafter referred to as "Tender/Bid") and intends to award, under laid down organizational procedure, contract for

(Name of work)

Herein after referred to as the "Contract".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "Integrity Pact" or "Pact"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

Article 1: Commitment of the Principal/Owner

(1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:

- (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.



- (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.
- (c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
- (2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

**Article 2: Commitment of the Bidder(s)/Contractor(s)**

- (1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
- (2) The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:
- (a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
- (b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
- (c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/ Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- (d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/ representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.
- (d) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
- (3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- (4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.
- (5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury

may befall upon a person, his/ her reputation or property to influence their participation in the tendering process).

### **Article 3: Consequences of Breach**

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/Contractor accepts and undertakes to respect and uphold the Principal/Owner's absolute right:

- (1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal/Owner. Such exclusion may be forever or for a limited period as decided by the Principal/Owner.
- (2) Forfeiture of EMD/Performance Guarantee/Security Deposit: If the Principal/Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/Owner apart from exercising any legal rights that may have accrued to the Principal/Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/Contractor.
- (3) Criminal Liability: If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

### **Article 4: Previous Transgression**

- (1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.
- (2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/Contractor as deemed fit by the Principal/ Owner.
- (3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

### **Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors**

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Subcontractors/sub-vendors.
- (2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- (3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/ Owner and the bidder, along with the Tender or violate its provisions at any stage of the
- (4) Tender process, from the Tender process.

**Article 6- Duration of the Pact**

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work under the contract or till the continuation of defect liability period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, Naya Raipur Development Authority, Naya Raipur (C.G.).

**Article 7- Other Provisions**

- (1) This Pact is subject to Indian Law, place of performance and jurisdiction is the Head quarters of the Division of the Principal/Owner, who has floated the Tender.
- (2) Changes and supplements need to be made in writing. Side agreements have not been made.
- (3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- (4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions. It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action taken by the Owner/Principal in accordance with this Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.

**Article 8- LEGAL AND PRIOR RIGHTS**

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....  
(For and on behalf of Principal/Owner)

.....  
(For and on behalf of Bidder/Contractor)

WITNESSES:

1. ....  
(signature, name and address)

2. ....  
(signature, name and address)

Place:

Date

**SCHEDULE– D**  
**Section-II**  
**Scope of work**

Signature of Contractor.....

Signature of NRDA.....

## Works Requirement

**This section contains the brief idea of scope of work, supplementary information drawings etc. regarding the work to be executed under instant tender, may vary as per site requirement. In case of any change the decision of Engineer-in-charge will be final and binding to the contractor.**

**Section-A : Site Information**

**1. SITE INFORMATION**

1.1 Work Site

- 1.1.1 The project sites are at office complex of Sector 24 and Sector 21 of Naya Raipur. The name of buildings are as under:-

Sr.No.	Building Name	Location
1	Office Complex	Office Complex, Sector 24
2	Retail-Commercial Complex	Plot No. 9 & 10, Sector 21
3	Commercial Complex	Plot No. 3, Sector 21

- 1.1.2 The Contractor shall plan his works keeping in view restriction of approach and availability of space and time.

**1.2 GENERAL CLIMATIC CONDITIONS**

- 1.2.1 The area in which the work lies is mostly plain terrain.
- 1.2.2 The highest and lowest temperatures in general range from 48 degree Celsius to 8 degree Celsius.
- 1.2.3 Summer season is from April to June and winter season is from November to March.
- 1.2.4 The mean average annual rainfall in the area over a five-year period is of the order of 1065 mm, a good portion of which is concentrated during July to mid September, when about 75% of the annual rainfall occurs.
- 1.2.5 Naya Raipur experiences extreme climatic conditions and Bidders must acquaint themselves about the same before submitting the Bid. The Employer shall in no way be responsible on this account.

The above site information is being made available to Bidders in good faith and Bidders are advised to obtain relevant information, as may be considered necessary by them, before quoting for the bid. No claims whatsoever on account of any discrepancy in the above information shall be admissible to Bidders.

**Section-B : Scope of Work**

**1. Objective:-**

The objective of the contract is to design, supply, erection, installation, testing, commissioning and Maintenance of 33/0.4 KV Distribution Transformers of various capacities in above mentioned buildings in Naya Raipur as per stipulated standards and within the time stipulated by the Contract along with power supply infrastructure development. In full recognition of this objective, and with full acceptance of the obligations, liabilities and risks which may be involved, the Contractor shall undertake the execution of the Works.

**2. SCOPE OF WORKS**

The work under this contract shall be carried out in accordance with the various documents constituting the contract and shall consist of various salient items for design, supply,

erection, installation, testing, commissioning and maintenance of Distribution Transformer at predefined locations marked in Tender Drawings.

The broad scope for the proposed work shall be :-

**2.1 Submission of General Technical Particulars :-**

The contractor shall submit the general technical particulars of equipments as per requirement mentioned in BoQ and technical specification for approval of NRDA. Manufacturers’ drawings, catalogues, pamphlets and other documents submitted for approval shall be in four sets. Each Item in each set shall be properly labelled, indicating the specific services for which material or equipment is to be used, giving reference to the governing section and clause number and clearly identifying. in ink the items and the operating characteristics. Data of general nature shall not be accepted.

**2.2 Drawings**

The schematic issued with tenders, are diagrammatic only and indicate arrangement of various systems and the extent of work covered in the contract. These drawings broadly suggest the routes to be followed. Under no circumstances shall dimensions be scaled from these drawings. The architectural / interiors drawings and details shall be examined for exact location.

The tenderer shall follow the construction drawings to be issued later, in preparation of his shop drawings, and for subsequent installation work. The tenderer shall check the drawings of other trades to verify spaces in which his work will be installed.

Maximum headroom and space conditions shall be maintained at all points. Where headroom appears inadequate, the tenderer shall notify the project manager before proceeding with the installation. In case installation is carried out without notifying, the work shall be rejected and tenderer shall rectify the same at his own cost.

The tenderer shall examine all architectural, structural and other services drawings before starting the work. Any changes found essential to coordinate installation of his work with other services and trades, shall be made with prior approval of the Project Manager without additional cost to the Owner. The data given in the drawings and specifications is as exact as could be procured, but its accuracy is not guaranteed.

Shop Drawings shall be submitted for approval within two weeks from the award of the work and sufficiently in advance of planned delivery and installation of any material to allow Project Manager / Consultant ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.

Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the tenderer of the responsibility or requirement to furnish material and perform work as required by the contract.

Signature of Contractor.....

Signature of NRDA.....

Where the tenderer proposes to use an item of equipment, other than that specified or detailed on the drawings, which requires any redesign; all such re-design, and all new drawings and detailing required therefore, shall be prepared by the tenderer at his own expense and got approved from the NRDA/Project Manager before starting of manufacturing.

**2.3 Deviations**

Tenderer shall stipulate the deviations, if any, from these Technical Specifications, and reasons thereof

**2.4 Exclusions**

Any items excluded from the offer, but functionally required, shall be clearly defined and listed by the tenderers, giving description of the items, quantity and estimated cost and the reason for excluding the items.

**2.5 Work by Tenderer**

Tenderer shall clearly indicate the structural and electrical requirements for the installation of Distribution Transformers. Plinth foundation and cable for connecting transformer with panel shall be constructed/provided by owners through other agency. The tenderer will connect cable at distribution transformer terminals of both HT and LT side.

The following shall be in the scope of the tenderer and it shall be his responsibility to arrange all items in order to complete the installation.

- Cable supporting structure if required.
- All minor builder works such as chipping of surfaces, cutting and finishing of walls/floors/partitions etc. shall be responsibility of tenderer.
- Cable termination work along with Indoor termination kit for LT and HT side of Transformer

The detail works to be carried out by tenderer is described in technical specification of items.

**2.6 Work by other agencies**

The following associated civil and electrical work is being carried out by Owner through other Agencies:

Foundation: Foundation will kept ready as per design submitted by tenderer

HT & LT Panel : HT & LT panel along with cable will be provided by other agency. Termination of cable at HT & LT panel end will be done by the owner through other agencies.

Except for items of exclusion mentioned above, all items/materials/equipment required for completion and functioning of the installation in all respect are deemed to be included in the scope of this work whether specifically mentioned or not.

The detail works to be carried out by tenderer is described in technical specification of items.

## 2.7 Painting

All exposed metal work furnished under these specifications, unless otherwise specified, shall be shop primed and properly painted. Shop coats of paint that have become marred during shipment or erection, shall be cleaned off with mineral spirits, wire brushed and spot painted over the affected areas, then coated with enamel paint to match the finish over the adjoining shop painted surface.

## 2.8 Tools & Tackles

All tools, tackles, supports, scaffolding and staging etc. required for erection and assembly of the equipment and installation covered by the contract shall be provided by the Tenderer himself. In addition, all other materials such as foundation bolts, nuts etc. required for the installation of the equipment shall also be provided by the tenderer at his cost.

i) Tenderer shall carry out test run of the installation in the presence of representatives of Owner/Service Consultant/Consultant, to establish satisfactory functioning of the installation

ii) The Installations shall be handed over to the Project Manager / representative of the owners after satisfactory testing along with six sets of completion documents each consisting of:

- a) Detailed equipment data and catalogues
- b) Manufacturer's maintenance chart including check chart and chart
- c) Set of "AS INSTALLED DRAWINGS" showing layouts, equipment details, electrical power & control wiring diagrams etc
- d) Test certificates for major equipment
- e) Certificates of approval from Statutory and/or Local Authorities for the operating and maintenance of the installation and equipment, wherever such approval of certification is required. (Electrical inspector's certificate/ license)
- f) Certificate from the, Engineer that the tenderer has cleared the site of all debris and litter caused by him during the Construction
- g) List of spare parts as minimum stock for one year

Submission of the above documents shall form a precondition for the final acceptance of the installation and final payment.

Upon handing over, the Project Manager shall issue to the tenderer the necessary certificate of acceptance

## 2.9 Safety Precautions

A competent and authorized supervisor/Erector shall be on the site whenever the tenderer's men are at work. The supervisor/Erector should ensure that all plant and machinery used on the site are rendered safe for working and meet with the Indian or International safety standards applicable for the use and operation of such machinery. The supervisor/Erector should also ensure that the workmen at site are made to use safety appliances such as safety belts, lifelines, helmets etc.

Smoking shall be altogether strictly prohibited in all areas of work as well as where combustible and inflammable goods/materials are stored or lying about.

Any hot job such as welding, soldering, gas cutting shall not be carried out without the permission of the Engineer. Such jobs shall not be carried out where inflammable materials are stored or lying about.

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All electric connections shall be through adequately sized mechanically protected cables without any joints and with proper and adequate terminals boxes. All power supplies shall be through properly rated fuses with isolating devices. No such hot jobs shall be carried out on holidays and without the presence of the Tenderer's Supervisor and Owners permissions.

It is entirely the responsibility of the Tenderer to practice the principles of 'SAFETY FIRST' during the entire tenure of work with adequate insurance covering injury or death to workmen, loss by theft or damage to materials and property and third party.

The Tenderer should clear the site of all debris every day to avoid accidents. In case this is not done, the owners may engage necessary labor to maintain the cleanliness of the premises and removal of debris and recover all or part of the expenditure so incurred from the Tenderer.

Tenderer shall at his own cost ensure that all of his personnel, employees, work men and other associated persons working with him at site are adequately insured as per labour laws and statutory provisions. The Tenderer shall be responsible for all injuries/damages to men, materials and properties etc. which may arise from the operations or negligence of himself and/or his sub tenderers or sub-contractors and indemnify the owners for all such expenses which shall be solely to tenderer's own account.

Tenderer shall at his own cost, provide and maintain a full-fledged first-aid-box to give immediate medical aid to the workers/supervisory staff, in case of emergencies.

Fire Extinguisher: Fire extinguisher in the machine room shall be provided by the tenderer. The tenderer shall carry out work strictly as per safety aspects.

**2.10 Quality Assurance Program & Test Procedure for Acceptance**

The tenderer will submit the industry approved standard manufacturing quality plan required for manufacturing of transformers for approval of owner. The tenderer will only start manufacturing of transformers after approval of MQP from owner. The test procedure explained in the technical specification section will be strictly followed during contractual period.

**2.11 Storage at site**

The tenderer shall have to make their own arrangement for accommodation of staff, safe storage of materials, etc at the site with the approval of the Client. The tenderer shall be responsible for the safety and security of its staff and Material.

**2.12 Maintenance**

The tender shall maintain the system in a first class and safe manner during AMC period. Such maintenance shall be for the entire system except when failure occurs due to work performed by others. Responsibility entails monthly inspection/maintenance by the supervisor/technician and unlimited call back service including nights, weekends and public holidays.

Apart from the above this maintenance shall include 1 (one) visit by Engineer per quarter during maintenance period of 3 years from the date of handing over of the system. Call back service shall be provided for emergencies, and responded within 2 Hrs.

The tenderer shall anticipate demand on supplies and parts and keep an inventory of a reasonable number of spare parts, at their own cost, on site in a self-provided lockable metal cabinet.

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## 2.12 Uptime guarantee

The tenderer shall guarantee for the installed system an uptime of 99%. In case of shortfall in any month during the defects liability period, the charges as mentioned in special condition of contract will be levying.

## 2.13 Comprehensive Maintenance Program

Tenderer may be required to carry out all inclusive maintenance of the entire system as mentioned below:

1. Full Maintenance period of Three years including Defect Liability Period
2. Defect Liability Period of Three Year
3. The tenderer shall quote for the comprehensive maintenance as per the schedule of work for a period of Three Years from the date of commissioning. The same shall be considered for the evaluation of the tender. The award of work for this item may be carried out separately.

### a) Scope

The Maintenance Contract shall cover all the items installed by the Tenderer including consumable like cable termination kit, bushing, transformer oil, Silica gel, relays etc.

### b) Routine Preventive Maintenance Schedule to be submitted

Schedule to cover manufacturer's recommendation and/or common engineering practice (for all plant and machinery under contract). Plant and machinery history card giving full details of equipment and frequency of checks and overhaul & Monthly status report. The tentative details of works to be carried out during AMC period is shown in technical specification section.

### c) Uptime during maintenance contract

- i. 99% uptime of all systems under contract
- ii. Up-time shall be assessed every month and in case of shortfall during any month.

Break-downs shall be attended to within four hours of reporting.

Spare motor assembly to be made available within seven calendar days in case of total breakdown/burnout.

### d) Manpower

- i. Adequate number of persons to the satisfaction of the owners site representative shall be provided including relievers.
- ii. Statutory requirements of EPF, ESIC and other applicable labour legislations to be complied with; and monthly certification to that effect to be submitted.
- iii. Duty allocation and Roaster control shall be tender's responsibility
- iv. No overtime shall be payable by Owner for any reason whatsoever

**e) Shut Downs**

- i. Routine shut down shall be permitted in consultation with Owner.
- ii. Tenderer shall be at liberty to carry out routine maintenance as and when required but with prior permission of client.

**3. Schedule of Quantities**

All items of work under this Contract shall be executed strictly to fulfill the requirements laid down in the specifications, which shall include type of equipment, material, methods of installation, type of controls as per approved shop drawings and the relevant standards.

The rate for each item of work in the Schedule of Quantities shall, unless expressly stated otherwise, shall also include the following:

All fixing materials, accessories, appliances, tools, plants, equipment, transport, labour and incidentals required in preparation of and in the full and entire execution, testing, commissioning and completion of the work called for in the item as per Specifications and Drawings.

**4. Wastage on materials and labour**

Rates shall include, loading, transporting, unloading, handling/double handling, hoisting to all levels, selling, filling and fixing in position, protecting, disposal of debris and all other labour necessary in and for the full and entire execution and to fully complete the job in accordance with the contract documents, good practice and recognized principles.

**5. Liabilities obligation and risks arising out of condition of contract**

All requirements of specifications, whether such requirements are mentioned in the item or not, the specifications and drawings where available, are to be read as complimentary to and part of the Schedule of Quantities and any work called for in one shall be taken as required for all.

In the event of conflict between schedule of quantities and other documents including the specifications, the most stringent shall apply and the interpretation of the NRDA/Project Manager shall be final and binding.

The unit rate for each equipment or materials shall include cost in Rupees for equipment and material including the excise duty, forwarding, freight and insurance up to contractor's store at site, storage, installation, testing, commissioning, operation and maintenance and other works required.

The extension for (total) amounts against each item shall be based on the quantities indicated in this Schedule.

All equipment, quantities and technical data indicated in this Schedule are for the Contractors guidance only.

The quantities given in this schedule are provisional, the Owner reserves the right to increase or decrease the quantities or to totally omit any items of work and the Contractor shall not be entitled to claim any extras or damages on these grounds. These variations shall be permitted until such time Contractors shop drawings are approved.

This schedule shall be fully priced and the extensions and totals duly checked. The rates for all items shall be filled in INR.

No alteration whatsoever is to be made to the text or quantities of this Schedule unless such alteration is authorized in writing by the Owner. Any such alterations, notes or additions shall unless authorized in writing be disregarded when tender documents are considered.

In the event of an error occurring in the amount column of the Schedule, as a result of wrong extension of the unit rate and quantity, the unit rate quoted by the tenderer shall be regarded as firm and the extensions shall be amended on the basis of the rates.

Any error in totalling in the amount column and in carrying forwarded totals shall be corrected. Any error, in description or in quantity or omission of items from this schedule shall not vitiate this contract but shall be corrected and deemed to be a variation required by the Consultants.

**6. Guarantee**

SAFETY is the essence of this contract. The tenderer shall guarantee all equipment parts, materials and workmanship furnished for the installation. The tenderer warrants replacing for a period of Thirty Six(36) months for the date of handing over. All failed parts or parts exhibiting unusual wear and tear during guarantee period shall be replace without any cost to the owner and such replacement shall be factory approved new, equal or better than original. All labour, tools, materials, transportation, insurance, etc. required in performance of guarantee work shall be at the tenderer's expense

**7. Test certificate**

Type test certificate for each rating is required. Temp rise test shall be conducted in one transformer

# **SCHEDULE– D**

## **Section-III**

### **Technical Specification of Works**

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**A. GENERAL SPECIAL CONDITIONS FOR INSTALLATION AND  
MAINTENANCE OF 33/0.433 KV DISTRIBUTION TRANSFORMERS**

**1. GENERAL**

These special conditions are intended to amplify the General Conditions of Contract, and shall be read in conjunction with the same. For any discrepancy between the General Conditions and these Special Conditions, the more stringent shall apply.

**2. SCOPE OF WORK**

The general character and the scope of work to be carried out under this contract is illustrated in Drawings, Specifications and Schedule of Quantities. The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the Project Manager. The contractor shall furnish all labor, materials and equipment as listed under Schedule of Quantities and specified otherwise, transportation and incidental necessary for supply, installation, testing and commissioning of the Transformers as described in the Specifications and as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned herein or noted on the Drawings/ Documents as being furnished or installed, but which are necessary and customary to be performed under this contract.

**3. AWARENESS OF SITE CONDITIONS AND SITE INSPECTION PRIOR TO TENDER SUBMISSION**

Prior to the preparation and submission of his tender, the contractor shall make visits to the site and carry out all the necessary inspections and investigations in order to obtain all information and to make his own assessment of the conditions and constraints at site including the means of access to transformer installation area. The contractor shall make himself aware of all the features of the site, working conditions and shall be responsible for obtaining all the necessary required information needed for him to prepare and submit his tender.

**4. RATING**

Rating of all equipment shall be appropriate for the conditions on the location where the equipment will be installed and operate. All the equipment shall be suitable for continuous operation under the most severe conditions of site and shall be rated for the following ambient condition.

<u>Ambient Temperature</u>		
Maximum	:	47°C
Minimum	:	5.0°C

The engine and alternator shall be suitably rated for 50 degree centigrade ambient operating condition.

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**5. SHOP DRAWINGS**

All shop drawing shall be prepared on computer through AutoCAD system based on Architectural drawings and site measurement. Contractor shall furnish for the approval of the Project Manager, four sets of detailed shop drawings of all equipment and material giving following information.

- I. Certified foundation details
- II. Layout of Transformers and associated equipment.
- III. Single line diagram, control schematic showing make type and description of all components and accessories.

- 5.1. These shop drawings shall contain all information required to complete the Project as per specifications and as required by the Project Manager. These Drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/ materials/ works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings.
- 5.2. Each item of equipment/ material proposed shall be a standard catalogue product of an established manufacturer strictly from the manufacturers listed in Section V and quoted by the tenderer in technical data part of particular Appendixes.
- 5.3. When the Architect/Project Manager makes any amendments in the above shop drawings, the contractor shall supply two fresh sets of drawings with the amendments duly incorporated along with check prints, for approval. No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/ equipment/ installation.
- 5.4. Shop drawings shall be submitted for approval two weeks in advance of planned delivery and installation of any material to allow Project Manager ample time for scrutiny. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved programme.
- 5.5. Manufacturers drawings, catalogues, pamphlets and other documents submitted for approval shall be in four sets. Each item in each set shall be properly labeled, indicating the specific services for which material or equipment is to be used, giving reference to the governing



section and clause number and clearly identifying in ink the items and the operating characteristics. Data of general nature shall not be accepted.

- 5.6. Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or requirement to furnish material and perform work as required by the contract.
- 5.7. Where the contractor proposes to use an item of equipment, other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundation, piping, wiring or any other part of the mechanical, electrical or architectural layouts; all such redesign, and all new drawings and detailing required therefore, shall be prepared by the contractor at his own expense and gotten approved by the Project Manager. Any delay on such account shall be at the cost of and consequence of the Contractor.
- 5.8. Where the work of the contractor has to be installed in close proximity to, or shall interfere with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Project Manager, the contractor shall prepare composite working drawings and sections at a suitable scale, not less than 1: 50, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordinating with other trades, or so as to cause any interference with work of other trades, he shall make all the necessary changes without extra cost to the Project Manager.
- 5.9. Within two weeks of approval of all the relevant shop drawings, the contractor shall submit four copies of a comprehensive variation statement in quantity, and itemized price list of recommended (by manufacturers) imported and local spare parts and tools, covering all equipment and **materials in this contract. The Project Manager shall make recommendation to Owner for acceptance of anticipated variation in contract amounts and also advise Owner to initiate action for procurement of spare parts and tools at the completion of project.**

## 6. SEISMIC QUALIFICATION CERTIFICATION

The manufacturer shall submit certification that Transformer Set, accessories and components will withstand seismic forces. Basis for Certification shall indicate whether withstand certification is based on actual test of assembled components or on calculation.

- a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
- b. The unit will be fully operational after the seismic event."

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Dimensioned outline drawings of equipment unit shall identify centre of gravity and locate and describe mounting and anchorage provisions. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

**7. COMPLETION DRAWINGS**

Contractor shall periodically submit completion drawings as and when work in all respects is completed in a particular area. These drawings shall be submitted in the form of four sets of CD's and four portfolios (300 x 450 mm) each containing complete set of drawings on approved scale indicating the work as - installed. These drawings shall clearly indicate following:

- a. Location and rating of Transformer.
- b. Complete wiring diagram, as installed and scheduled showing all connections in the complete electrical system.
- c. Routing and particulars of all cables and trays in the Transformer room.
- d. Single line diagram, power schematic, control schematic with detailed bill of materials, showing makes, types and description of all components and accessories.

**8. OPERATING INSTRUCTION & MAINTENANCE MANUAL**

8.1. Upon completion and commissioning of transformer system the contractor shall submit a draft copy of comprehensive operating instructions, maintenance schedule and log sheets for all systems and equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four (4) complete bound sets of typewritten operating instructions and maintenance manuals; one each for retention by Client and Project Manager and two for O& M Team. These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for 3 year period of maintenance of each equipment.

These manuals shall include:

- i. Description of the work carried out/ installed.
- ii. Operating instructions.
- iii. Maintenance instructions including procedures for preventive maintenance.
- iv. Manufacturers catalogues.
- v. Spare parts list.
- vi. Trouble shooting charts.
- vii. Drawings
- viii. Type and routine test certificates of major items.

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The contractor shall submit the O&M manuals clearly explaining the start up and safety checkout procedures along with operational procedures. The manuals must contain the detailed daily, monthly, weekly and yearly maintenance procedures and details.

- 8.2. The routine operation of all transformers are to be done by the experienced and qualified personnel at any time of the day by working on 3 shifts basis.

The periodical and routine maintenance of all the transformers and other connected equipments is to be done.

Consumables will be arranged by the tenderer.

Spare parts required for breakdowns if any is to be provided by tenderer and attended immediately.

The required log books, maintenance schedule charts are to be maintained and be made available for the inspection of employer representatives.

All the required tools and plant for maintenance is to be maintained in good condition and borne by the tenderer.

**8.3. Manpower**

- i. Adequate number of persons to the satisfaction of the owners site representative shall be provided including relievers.
- ii. Statutory requirements of EPF, ESIC and other applicable labour legislations to be complied with; and monthly certification to that effect to be submitted.
- iii Duty allocation and Roaster control shall be tender's responsibility
- iv No overtime shall be payable by Owner for any reason whatsoever

**8.4. Penalty Clause:**

- 8.4.1. Non Availability of manpower or their absence will attract a penalty as under:

Supervisor: Rs. 300/- per day/ shift

Electrician: Rs. 200/- per day/ shift.

- 8.4.2. If work is not done as per approved schedule or any system is not functioning then a penalty @ rate of Rs. 1000/- per day shall be imposed on contractor for each location separately and will be deducted from the AMC amount due to the tenderer and if unsatisfactory performance is continued for more days as felt by Engineer in-charge AMC is liable to be terminated and decision for this shall rest with the Chief Executive Officer, NRDA.

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- 8.4.3. If the tenderer is NOT able to locate and rectify the fault and the reasons attributable to non performance of tenderer as assessed by officials nominated by C.E.O., NRDA, the penalty clause is applicable as follows: System remained non-functional for 2 hours or more. The penalty will be Rs. 1000/- per day.
- 8.4.4. If tenderer is not able to rectify the fault then the same may be got done through some other agency at the risk and cost of tenderer and amount will be deducted from AMC bill and penalty as stipulated above will also be imposed.

However, the decision of the Chief Executive Officer, NRDA in this regard shall be final and binding.

**9. INSPECTION AND TESTING**

The owner / PMC carry out inspection and testing at manufacturer’s works. No equipment shall be delivered without prior written confirmation from Project Manager. All expenses relating to test including traveling, boarding & lodging of three personal from Owner shall be borne by the contractor. Upon completion of work the performance test shall demonstrate the following among other things:

- i. Equipment installed complies with specification in all respects and is of the correct rating for the duty and site conditions.
- ii. All items operate efficiently and quietly to meet the specified requirements.
- iii. All circuits are correctly protected and protective devices are properly coordinated.
- iv. All non-current carrying metal parts are properly and safely grounded in accordance with the specifications and appropriate codes of practice.
- v. Manufacturing/ Assembly defects.

The contractor shall provide all necessary instruments and labor for testing. He shall make adequate records of test procedures and readings and shall repeat any tests requested by the Owner/ Project Manager. Test certificate duly signed by a authorized person shall be submitted for scrutiny.

If it is proved that the installation or part thereof is not satisfactorily carried out then the contractor shall be liable for the rectification and retesting of the same as called for by the Owner/ Project Manager. All tests shall be carried out in the presence of representative of Owner/ Project Manager.

The above general requirements as to testing shall be read in conjunction with any particular requirements specified elsewhere. All tests shall be carried out by a test house approved by the Owner/ Project Manager.

The Transformers shall be tested in the presence of Owner’s representative at Supplier’s works in accordance with latest prevailing standards and codes. The successful passing of any such tests will not however prejudice the right of Purchaser to reject the transformer and its accessories, if they do not comply with specifications when erected or perform complete satisfactory operation as intended. Supplier shall provide the test certificate for the bought out items used, if any in the assembly of Transformers.

All commissioning and performance of startup and safety checkouts of equipments shall be done under the strict supervision of Commissioning agency. All functional testing of equipment

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shall be done under the strict supervision of Commissioning agency. Before the start of commissioning, supplier will conduct detailed training for the operation staff of clients. Contractor to assist Commissioning agency to conduct M&V of equipment/ system after functional testing.

**10. DEVIATIONS**

Deviations from this specification are only acceptable where the tenderer has listed in his quotation the requirements he cannot or does not wish to comply with, and the client has accepted, in writing, the deviations before the order is placed. If the tenderer is also to offer alternatives resulting in technical or price advantages he should submit a supplement to the main tender.

In the absence of a list of deviations, it will be assumed by the client that the tenderer complies with this specification.

**11. SHIPPING, HANDLING AND STORAGE**

- I. Unit shall be shipped in sections to suit ease of handling for transportation and installation.
- II. Each shipping section shall be provided with supports in the form of suitable steel sections, lifting eyes etc. to maintain alignment of parts during shipping, handling, hoisting and installation. Location of lifting points shall be clearly marked on shipping containers and on drawings.
- III. Each shipping section shall have its weight and centre of gravity clearly marked on the container.
- IV. With draw able accessories shall be shipped separately from their housings.
- V. Preparation for shipment shall protect the Unit, its accessories, etc. against corrosion, dampness, breakage or vibration injury during transportation and handling.
- VI. Each shipping container shall be identified with the contents, purchase order number and item number.
- VII. Instructions shall be provided for reassembly of sections in the field.
- VIII. The manufacturer shall comply fully with the 'Packing and Shipping' instructions which form part of the Purchase Order.

**12. PRE-COMMISSIONING CHECKS**

The contractor shall submit written test procedures for each item/ equipment, training manuals and final pre checklist to Commissioning agency for their review prior to commissioning. The Commissioning agent shall approve the pre-functional testing checklist and supervising/ witness the entire commissioning and testing process.

All standards checks including the ones elaborated in the specifications to ensure that the installation of the transformer and associated systems has been carried out satisfactorily shall be done on completion of installation.

**13. PERFORMANCE TESTING**

Transformer shall be tested at varying loads at manufacturer's works/ site prior to dispatch of the sets to site. The performance tests at the works shall be carried out in presence of authorized representative from the Clients. Due notice for the programme of performance testing at works shall be given to the Clients to enable them to arrange for their representatives for this inspection to be at manufacturers works/ site for this inspection and testing.

All instruments, materials, consumables load and labor required for carrying out of the test shall be provided by the Contractor.

**14. MATERIALS AND EQUIPMENT**

All materials and equipment shall conform to the relevant Indian Standards and shall be of the approved make and design. Makes shall be strictly in conformity with list of approved manufacturers as per Section V of tender specification..

**15. COMPLETION CERTIFICATE**

On completion of the transformer installation, a certificate shall be furnished by the contractor countersigned by the licensed electrical supervisor under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply authority.

**16. TRAINING OF OWNER'S PERSONNEL FOR OPERATION AND MAINTENANCE**

Upon completion of all work and all tests, the Contractor shall furnish necessary operators, labour and helpers for operating the entire installation for a period of fifteen (15) working days of ten (10) hours each, to enable the Owner's staff to get acquainted with the operation of the system. During this period, the contractor shall train the Owner's personnel in the operation, adjustment and maintenance of all equipment installed.

The contractor must provide the training manuals for the operational staff prior to process. The draft training manuals must be submitted which shall be reviewed and approved by CA. Training manuals must clearly mention the training plan and the scope of training.

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**17. GUARANTEE**

Upon complete of work and before issuance of certificate of virtual completion by the Project Manager, the contractor shall furnish written guarantee indemnifying the owner against defective materials and workmanship for a period of three year after acceptance.

The contractor shall hold himself fully responsible for reinstallation and/ or replacement, free of cost to Owner the following:

- a. Any defective work or material or equipment supplied by the Contractor.
- b. Any material or equipment supplied by the Owner which is damaged or destroyed as result of defective workmanship by the contractor.
- c. In case of failure of the supplier, to get any defect rectified within forty-eight (48) hours, the Owner reserves the right to get necessary repairs done on his own at the supplier cost.

**18. UPTIME GUARANTEE**

The contractor shall guarantee for the installed system an uptime of 99%.

The Contractor shall provide log in the form of diskettes and bound printed comprehensive log book containing tables for daily record of all temperatures, oil level, tap position, etc, daily services rendered for the system alarms, maintenance and record of unusual observations etc. Contractor shall also submit preventive maintenance schedule.

Each tenderer shall submit along with the tender, a detailed operation assistance proposal for the Owner's site representatives/ Consultant's review. This shall include the type of service planned to be offered during Defects Liability Period and beyond. The operation assistance proposal shall give the details of the proposed monthly reports to the Management.

The tenderer shall include a list of other projects where such an Operation Assistance has been provided.

**19. ENGINEER AND FOREMAN**

The contractor shall employ a competent, fully licensed, qualified full time electrical engineer and foreman to direct the work of installation in accordance with drawings and specifications. The foreman shall be available at all times at site to receive instructions from the Project Manager/ Consultant for day to day activities throughout the duration of the contract. The foreman shall correlate the progress of the work in conjunction with all relevant requirements of the supply authorities.

**20. DEMONSTRATION TO OWNER**

Upon completion, devices subject to manual operation shall be operated at least five times in presence of Employer/Project Manager to demonstrate satisfactory operation.

The contractor shall provide performance tests upon completion of the installation. He shall arrange all necessary instruments, tools and tackles to check sound level, vibration and the effectiveness of acoustical treatment and vibration isolator installed.

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**21. TOOLS AND TACKLES**

The Contractor shall provide and install all necessary hoists, ladders, scaffolding, tools, tackles, transportation of labour and materials necessary for the proper execution and completion of the work to the satisfaction of the Project Manager/ Consultants.

**22. APPROVAL & CLEARANCE**

All associated activities required for necessary clearances/ permissions/ approvals/ licenses from concerned authorities are in the scope of transformer supplier. Only receipted amounts shall be payable by the client.

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**B. TECHNICAL SPECIFICATION FOR DRY TYPE (CRT) DISTRIBUTION TRANSFORMERS OF RATINGS 2000 KVA 33/0.433 KV (INDOOR)**

**1. SCOPE :**

1.1 The specification covers design manufacture, testing, packing and delivery of 3 phase 50 Hz, Dry Type (CRT) distribution transformer of ratings 2000 KVA, 33/0.433 KV (Underground) AN conforming to IS : 2026 1981 Part ( I to V), IS: 11171 1985 and IEC 76.

1.2 The equipment offered shall be complete with all necessary parts for effective and trouble-free operation in the distribution system. Such parts will be deemed to be within the scope of the supply irrespective of whether they are specifically indicated in the commercial order or not

1.3 It is not the intent to specify herein complete details of design and construction. The equipment offered shall conform to all relevant standards and be of high quality, sturdy, robust and of good workmanship and complete design in all respects. The equipment shall be capable to perform continuous and satisfactory operations in the actual service conditions at site and shall have sufficiently long life in service as per statutory requirements.

1.4 The Tender/supplier shall bind himself to abide by these considerations to the entire satisfaction of the purchaser and will be required to adjust such details at no extra cost to the purchaser over and above the tendered rates and prices.

**1.5 TOLERANCES :**

Tolerances on all the dimensions shall be in accordance with provisions made in the relevant Indian standards and in these specifications. Otherwise the same will be governed by good engineering practice in conformity with required quality of the product.

**2. SYSTEM PARTICULARS :**

2.1 The transformers shall be suitable for indoor installation with following system particulars and should be suitable for service under fluctuations in supply voltage as permissible under Indian Electricity Act & Rules there under.

Nominal System Voltage	:	33 KV
Corresponding Highest System Voltage	:	36.2KV
Neutral earthing	:	Solidly earthed
Frequency	:	50 Hz with $\pm 3$ % Tolerance

**3. SERVICE CONDITIONS :**

3.1 Equipment to be supplied against the specification shall be suitably design to work satisfactorily under following tropical conditions:-

Sl No.	Location	At various locations in the state of Chhattisgarh
ii)	Maximum ambient air temperature (°C)	50
iii)	Minimum ambient air temperature (°C)	5
iv)	Maximum average daily ambient temperature (°C)	40

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v)	Maximum yearly weighed average ambient temperature (°C)	32
vi)	Maximum altitude above mean sea level (m)	1000
vii)	Minimum Relative Humidity (%)	26
viii)	Maximum Relative Humidity (%)	95
ix)	Average no of Rainy days/Year	120 mm
x)	Average annual rainfall	900 mm
xi)	Maximum wind pressure	195 kg/m sq.
xii)	Seismic Zone	4

3.2 The climatic conditions are prone to wide variations in ambient conditions and hence the equipment shall be suitably designed to work satisfactorily under these conditions.

**4. APPLICABLE STANDARDS :**

4.1 The design, manufacture and performance of the equipment shall comply with all currently applicable statutes, regulations and safety codes.  
Nothing in this specification shall be construed to relieve the tenderer of his responsibilities.

4.2 The Distribution Transformers shall conform to IS: 2026 as amended up to date or other International Standards for equipment offered shall conform to the latest applicable Indian, IEC, British or U.S.A. Standards and in particular, to the following:-

a.	IS 2026 ( Part 1 to V )	Distribution Transformer
B.	IS 11171	Dry Type Transformers
c	IS 12063	Degree of protection provided by enclosures
d	IEC 60076	Power Transformers Dry Type Transformers
e	IS : 3347	Dimensions for porcelain transformer bushing for use in normally and lightly polluted atmospheres
f.	IS : 5	Colors for ready mixed paints and enamels
g.	IEEE C57.12.01-1988	Dry type transformer
h	IS 10028 : 1985	Code of practice for Installation & Maintenance of Transformers.
i	IS 2099 : 1986	Bushings for alternating voltages above 1000 Volts.
j	IS 1271 : 2012	Thermal evaluation and classification of electrical insulation.

In case of conflict arising out due to variations between the applicable standard and the standards specified here in the provisions of this specification should prevail.  
The equipment shall also conform to the provisions of Indian Electricity rules and other statutory regulations currently in force in the country.

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**5. SPECIFIC TECHNICAL REQUIREMENT :**

**5.1 Standard kVA Ratings:-**

The standard ratings of transformers shall be 2000 KVA.

**5.2 Nominal voltage ratings**

- i. Primary voltage - 33 KV
- ii Secondary voltage - 0.433 KV

**5.3** The windings of the transformers shall be connected to Delta ( A) on the primary side and star (Y) on the secondary side. The neutral of the LT winding shall be brought out to a separate terminal. The vector group shall be Dyn – 11.

**5.4** The recommended percentage impedance at 75 °C is 6.25% for 2 MVA with a tolerance as per IS 1180 ( subject to IS tolerance ).

**5.5 Temperature Rise :**

**5.5.1** Average winding temperature rise over an ambient temperature of 50 deg. C shall not exceed 65 deg. C by resistance method. i.e. Max. Temperature of winding shall not exceed 115 °C.

**5.5.2** Core, metallic parts and adjacent material shall in no case reach a value that may damage these material or reduce their life expectancies.

**5.6 Temperature indication devices and alarm**

**5.6.1** Winding temperature indicator (4 inches dial type thermometer) shall be provided with two electrical contacts (one for alarm and one for trip). CT of suitable ratio shall be provided for WTI.

**5.6.2** The tripping contacts of winding temperature indicators shall be adjustable to close between 60°C and 120°C and alarm contacts to close between 50°C and 100°C accordance to class of insulation class and both shall reopen when the temperature falls about by10°C.

**5.6.3** All connection of control / power & communication cable Connections shall be brought from the device to marshalling box by capillary tube, cables etc. as applicable.

**6. DESIGN & CONSTRUCTION :**

**6.1 CORE:**

**6.1.1** The core shall be of high grade cold rolled grain oriented ( C.R.G.O.) annealed steel lamination, having low loss and good grain properties, coated with insulation on both sides, bolted together to the frames firmly to prevent vibration or noise. All core clamping bolts shall be effectively insulated. The complete design of core must ensure permanency of the core losses with continuous working of the transformers. The entire core assembly shall be covered with heat retardant resin based varnish for corrosion protection before the coils are mounted.

- 6.1.2 Core insulation –C-Class grade insulation paper of thickness 20 mils ( 0.5 mm) shall be used and make should be clearly stated in the offer along with test certificates.
- 6.1.3 The successful bidder shall be required to submit the manufacturer's test report showing the Watt Loss per kg and the thickness of the core plate, to ascertain the quality of Core materials.
- 6.1.4 The purchaser reserves the right to get tested at any Government recognized laboratory.
- 6.1.5 The transformer core shall not be saturated for any value of V/f ratio to the extent of 112.5% of the rated value of V/f ratio ( i.e. 3300 / 50) (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and will not get saturated. The bidder shall furnish necessary design data in support of this situation.

**6.2 FLUX DENSITY :**

- 6.2.1 Flux density should not be more than 1.72 Tesla at the rated voltage and frequency. The value of the flux density allowed in the design shall be clearly stated in the offer along with graph.
- 6.2.2 The No load current shall not exceed 1.5 % of the full load current. The no load current shall not exceed 3 % of the full load current in L.V. Winding when the applied voltage is 112.5%.

**6.3 CORE CLAMPING:**

- 6.3.1 M.S. channel 200x75 for 1000 KVA on top and bottom.
- 6.3.2 2x20 mm. High tensile bolts in parallel at each end will be used.
- 6.3.3 The top yoke channels to be reinforced by adequate size of M.S. flat with thickness not less than 6 mm, at equidistance if holes cutting is done for LT lead so as to avoid bending of channel.
- 6.3.4 MS channels are to be painted by heat resistant paint.

**6.4 TIE BOLTS:**

- 6.4.1 8 nos. of tie rods of 20 mm. dia. high tensile steel in vertical formation.
- 6.4.2 All top and bottom yoke nut bolts, if any, shall be MS and painted with heat and corrosion resistant paint before use.
- 6.4.3 Drawing of the building of core to be approved before start of work.
- 6.4.4 The base channels of the core shall not be cut channel.

**6.5 WINDING:**

H.V.& L.V. Coils should be fully encapsulated type.

I Material – Electrolytic copper.

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- ii. LV Winding – Conventional spiral winding should be in even layers so that the neutral formation will be at top.
- iii. Coil Insulation ( HV/LV) – Insulated with class ‘C’ class insulation paper with vacuum pressure impregnated process in Varnish, Winding design shall be adequate to allow for full encapsulation with filled resin conforming to class ‘F’ , under vacuum. The resin system shall be two components epoxy filled with a mixture of inorganic fillers improving its thermal, mechanical and fire behavior properties. The single resin components and filler will be carefully stirred and degassed under vacuum in order to eliminate all air bubbles and then mixes together throughout a static mixer just before to pour them, under vacuum, into the mould that contains the coil ( winding). The position of this mould shall be horizontal during the casting process that shall assure the total elimination of air bubbles that could create air cavities and critical points of partial discharges. The surface of the encapsulated winding shall be smooth and completely closed and impervious to moisture and common industrial contaminants.
- iv. Coil spacers and duct – For sectional winding high temperature Epoxy fiberglass or porcelain and for disc winding epoxy fiberglass ( Minimum class F insulation & above ) shall be used.

**6.6 CURRENT DENSITY:**

Current density for HV and LV winding should not be more than 2.48 A/sq.mm. (However, ± 5% tolerance for LV winding is permissible) for copper conductor.

**6.7 LOSSES:**

6.7.1 The losses at rated voltage for various ratings of transformers of 33 KV class shall be as shown below subject to tolerance as per relevant IS and shall be calculated at 75 deg. C as per limits specified in IS 2026.

Voltage Ratio In volts	KVA Rating	Load Loss at Rated current (In Watt)	No Load loss at 100% rated voltage and frequency (In Watt)
33000/433	2000	14500	4600

6.7.2 The values given in G.T.P. for flux density, no load current at rated voltage, no load current at 112.5% of rated voltage and no load loss at rated voltage shall be individually met.

**6.8 CLEARANCES:**

6.8.1 The minimum electrical clearance between the winding and body of the enclosure ( between inside surface of the enclosure and outside edge of the winding) should be 200 mm. in case of 33 KV class transformers.

6.8.2 End insulation to earth

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33 KV – 200 mm.

6.8.3 Thickness of locking spacers and thickness of comb teeth between. HV coils HV Disc –20 mm min for 2000 KVA.

6.8.4 Tap lead shall be insulated. Inspection of winding prior to assembly and connection shall be carried out. Manufacturing drawing for the transformer showing various clearances will have to be got approved from the NRDA.

6.8.5 Minimum Clearance

External Clearance of HV	PH to PH	350 mm
	PH to E	320 mm
LV Bushing	PH to Ph	75 mm
LV Terminals	PH to E	50 mm

**6.9 TRANSFORMER ENCLOSURE:**

The T/F enclosure shall be of robust construction and shall be built of electrically welded MS sheet wire mesh or perforated sheet for ventilation. The core is to be securely clamped with heavy structural angle and should hold the entire core and coil assembly in place to ensure most efficient magnet circuit and quit functioning of the transformer. All joints of enclosure and fitting shall be tight. The enclosure design shall be such that the core and winding can be lifted freely. The enclosure plates shall be of such strength that the complete transformer may be lifted bodily by means of the lifting lugs provided. The top cover shall have no cut at point of lifting lug. The shape of the enclosure shall be rectangular only. No other shape will be accepted. The enclosure will be fabricated by wildling at corners. The enclosure should comply with IP 43 protection as per IS 13947 amended up to date. The door shall be provided with a mechanical interlocking system, to ensure that it is possible to open the door only when the protection circuit breakers on HV and LV side of the transformer are in ‘open ‘ position. Also transformer should trip if somebody tries to open the door with its key without opening the HV & LV side breakers. Horizontal or vertical joints in the enclosure side walls or its bottom or top cover will be allowed. The bottom plate of the enclosure shall be 2.5 mm thick min and holes of 2.5 mm of diameter punched sheet for free air circulation.

A	Side wall thickness	For Transformer above 1000 KVA 3.0 mm.
B	Top and bottom plate thickness	For Transformer above 1000 KVA 3.0 mm.
C	Lifting lugs	4 Nos. of heavy-duty eye bolt/lifting lugs suitable reinforces by vertical support shall be provided. 2 Nos. of heavy-duty eye bolt/lifting lugs for top cover of adequate size shall be provided.
D	Pulling lugs	4 Nos. of heavy duty pulling lugs shall be provided to pull the transformer horizontally.
E	Top cover-fixing bolts	GI nut bolts of ½” dia/ screws with one plain

		washers shall be used for top cover fixing spaced at 9" apart.
F	Rollers	4 Nos. 200 diameter and 75 mm width
G	Enclosure base Channel	1000 KVA & Above t/Fs -200 x 75 mm channel

**6.10 SURFACE PREPARATION AND PAINTING**

6.10.1 The painting procedure shall be in line with the NRDA requirement.

- i) All paints shall be applied in accordance with the paint manufacturer's recommendations. Particular attention shall be paid to the following:
  - a) proper storage to avoid exposure as well as extremes of temperature and shelf life for storage
  - b) Surface preparation prior to painting.
  - c) Mixing and thinning
  - d) Application of paints and the recommended limit on time intervals between coats.
- ii) All paints, when applied in normal full coat, shall be free from runs, sags, Wrinkles, patchiness or other defects.
- iii) All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning.
 

The paint shall be applied by airless spray according to the manufacturer's recommendations. However, wherever airless spray is not possible, conventional spray be used with prior approval of purchaser.
- iv) The supplier shall, prior to painting, protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

**6.10.2 Cleaning and Surface Preparation:**

- i) All machining, forming, welding and other manufacturing activities shall be completed before surface preparation. All steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination by sand / shot blast cleaning or chemical cleaning by seven tank process including Phos-phating to the appropriate quality in accordance with IS 605.
- ii) The Pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination.
- iii) All rough surfaces shall be filled with approved two pack filler and then rubbed down to a smooth finish

### 6.10.3 Protective Coating

As soon as all items have been cleaned and phosphate within four hours of the subsequent drying, they shall be given suitable anticorrosion protection of Zinc chromate primer.

### 6.10.4 Paint Material

Followings are the type of paints that may be suitably used for the transformer to be painted at shop and supply of matching paint to site:

- i) Heat resistant paint ( Hot oil proof) for inside surface.
- ii) For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2 coats of polyurethane paint minimum dry film thickness 80 microns. The color of the finishing coats shall be light admiral gray conforming to No. 697 of IS: 5: 1961.

### 6.10.5 Painting Procedure

- i) All paints in anyone particular system, whether shop or site applied, shall originate from one paint manufacturer.
- ii) The paint shall only be applied in the manner detailed by the manufacturer e.g. conventional or airless spray and shall be applied under the manufacturer's recommended conditions.
- iii) Where the quality of film is impaired by excess film thickness ( wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25 % in all instances, where two or more coats of the same paints are applied, such coating should be of slightly contrasting colors.  
Paints applied to items that are not being painted, shall be removed at supplier's expense, leaving the surface clean, un-stained and undamaged.

### 6.10.6 Damaged Paint Work

- i) Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.
- ii) Any damaged paint work shall be made good as follows:
- iii) The damaged area, together with an area extending 25 mm around its boundary, shall be cleaned down to bare metal.
  - a) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the originally damaged.
  - b) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

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**6.10.7 Dry Film Thickness**

To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over –spray, skips, runs, sags and drips should be avoided. Each coat of paint shall be allowed to hardened before the next is applied as per manufacturer's recommendations. Particular attention must be paid to full film thickness at edges. The requirement for the dry film thickness (DFT) of paint and the material is to be used shall be as given below:-

Sr No.	Paint Type	Area to be painted	No. of Coats	Total Dry Film Thickness (Min)
1	Powder Paint a) Thermo setting powder	Inside Outside	01 01	20 Micron 60 Micron
2	Liquid paint a) Zinc Chromate ( Primer) b) Polyurethane paint ( Finish Coat) c) Hot Oil paint	Out side Out side Inside	02 02	45 Micron 80 Micron 3.5 Micron

**7. H.T. & L.T. BUSHING:**

7.1 For 33 KV, 36 KV Bushing will be used and for 433 volts, 1 KV Bushing shall be used Bushing of the same voltage class shall be interchangeable. Bushing with same plain shades as per IS 347 amended up to date shall be mounted on the side of the enclosure and not on the top cover. Only sheet metal pocket shall be provided for mounting of HV bushing and the same shall not be fixed on pipes. Sheet metal pocket shall be designed in such a way that all HT bushing shall be remain parallel and equidistance throughout. Bushing having type tested as per IS 3347 amended up to date shall only be acceptable.

7.2 Minimum creep age distance for all the bushings shall not be less than 25 mm per KV

**8. A. HT/LT CABLE BOXES FOR INDOOR TYPE TRANSFORMER:**

H.T. & L.T. terminal for cable connection shall be brought out through sidewall mounted bushing to a cable end box. Cable end box shall be self-supporting, weatherproof, air filled type with sufficient space inside for termination and connection of cables.

Cable end box shall be furnished complete with removable gland plate, double compression brass glands.

In general, the arrangement shall be such as to permit of core & coil assembly without dismantling the cable installation.

Suitable arrangement for HV side box and LV side box shall be provided. The LV cable box shall be suitable for terminating the cable/busduct, which will approach the boxes vertically from

the bottom or top as per site condition. The cable box shall be suitable for being detached from the main body with suitable mounting arrangement.

The H.T. and L.T. cable box shall be fixed on the opposite sides.

8.1 In the case of indoor transformers, the enclosure shall be fitted with cable boxes on HV/LV sides:

8.2 HV Side cable box :

The LV side cable box with gland shall be provided, suitable for termination of one or more runs of 1 c or 3.5/4C XLPE armoured cables of sizes upto 1CX630 mm<sup>2</sup> and 3.5/4CX400 mm<sup>2</sup> or bus duct as required. The cable/busduct holding clamp is to be provided. Necessary drawings is to be furnished in this regard for approval before supply.

B. Internal Connection

**H.V. Winding.**

In case of H.V. winding all jumpers from winding to bushing shall have cross-section larger than winding conductor.

Intercool connection shall be by crimping and brazing .

In case of Copper Winding Delta joints shall be with Brazing only. Lead from delta join shall be connected to bushing bus by brazing only. Lead from bushing bus bar to cable box bushing rod shall be bolted. H.T. Line Bus shall be of EC grade copper flat having a cross- section of 25X6 sq. mm

**L.V. Winding**

L.T. Star point shall be formed of Copper. Flat of sufficient length and cross section. Lead from winding shall be connected to the copper flat by brazing. Any other arrangement shall be subject to the approval of the Chief Engineer. Transformer L.T. winding connection to bus bar shall be by brazing. L.T. Bus Bar used shall be suitable size & rating of bushing / insulator. Lead from L.T. bus bar to cable box bushing shall be bolted. Use copper jumper of appropriate size of copper jumper. L.T. Line Bus Bar current density shall be 2.0 A/Sq. mm maximum.

9. **TERMINALS:**

Brass rods 12 mm dia. for HT with necessary nuts, check nuts and plain thick tinned washers. Tinned copper rods 30 mm. dia. for 2000 KVA transformer for LT extension for cable lug/busduct connections, with necessary nuts, check nuts and plain thick tinned washers.

10. **Tap Changing Arrangement.**

OFF Circuit tap changing switch should be provided on HV side. Tapping + 5% to – 7.5% in steps of 2.5% Provision shall be made for locking the tapping switch handle in position, Suitable aluminum anodized plate shall be fixed for tap-changing switch to know the position no of tap. Switch position no. 1 shall correspond to maximum plus tapping. The tap position no. should be in increasing order in clock-wise direction. The tap marking should be of engraved in nature. Provision shall be made for locking the tap switch handle at each position. The locking arrangement shall be such that padlock cannot be inserted unless request contracts

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corresponding to the tap position are correctly connected with full contact pressure. Mechanical back stopper should be provided at the limiting tap positions. The tap changing shall be affected by an external three phase gang operated switch. The operating shaft shall be easily accessible. The tap- changer switches used in the transformer shall be of robust design. The stationery brass contact shall be so rigidly fixed to maintain rigidity and co-axiality with operation shaft throughout its life. The operating handle shall not have appreciable play if any position of tap without disturbing the engagement of moving and fixed established by turning the handle in staple. The supplier may be required to give the results of electrical and mechanical tests including endurance tests carried out to ensure its life with reference to any relevant ISS or any other acceptable standard in the transformer with sectional drawings showing the size, arrangement and functioning of the contacts of the tap switch. The sample of the tap switch used for different sizes of transformers and voltage grades shall have to be approved before using them in transformer if called for.

11. **FITTING:** The Fitting on the transformers shall be as under:

1	Rating and diagram plate	1 No.
2	Earthing terminals with lugs	2 No.
3	Lifting lugs	2 Nos ( for enclosure)
4	Platform mounting channal ( With holes suitable for axle of roller)	2 Nos.
5	HT & LT bushing	3 Nos of porcelain bushing & 4 Nos of L.T. bushing shall be provided with P.G. clamps as per relevant IS 3347 amended up to date.
6	Rollers	4 Nos.
7	Arcing horns for HT bushings	In case of outdoor type T/F
8	Pulling lugs	4 Nos.
9	Cable Box	1 Nos each for HV & LV as per drawing in case of indoor type T/F with glands and connecting sockets.

12. **TESTS:**

12.1 **ROUTINE TESTS/ACCEPTANCE TESTS:**

- I. All Transformers shall be subjected to the following routine tests at the manufacture's work in accordance with the details specified in IS 2026 and IS 11171.
  1. Measurement of winding resistance.
  2. Measurement of voltage Ratio and check of voltage vector relationship.
  3. Measurement of Impedance voltage (principal tapping), short circuit impedance and load loss.
  4. Measurement of No-load losses and current.
  5. Separate source voltages withstand test.
  6. Induced over voltage withstand test.
- II. All the routine tests shall be conducted in the supplier's laboratory at a their cost during acceptance tests.

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- III. Heat run test may also be carried out by the manufacturer in the presence of employer's Representative during acceptance testing.
- IV. The calculations to confirm the thermal ability as per Clause no. 9.1 of latest IS: 2026 Part –I equivalent International Standard shall be submitted to Inspecting Engineer.

**13. TYPE TESTS:**

The following shall constitute the type tests:-

- 1. Measurement of winding resistance
- 2. Measurement of voltage Ratio and check of voltage vector relationship.
- 3. Measurement of Impedance voltage ( principal tapping) , short circuit impedance and load loss.
- 4. Measurement of No-load losses and current.
- 5. Separate source voltages withstand test.
- 6. Induced over voltage withstand test.
- 7. Lighting impulse test.
- 8. Temperature rise test

The following special test shall also be carried out:

- 1. Partial discharge measurement.
- 2. Measurement of acoustic sound level .
- 3. Short-circuit test.
- 4. IP test on enclosure

The type test report (s) submitted by the bidder / supplier from any NABL accredited laboratory shall be acceptable for participation of the bidder in the procurement/empanelment process. In case NABL accredited laboratory happens to be that of manufacture itself added precaution shall be taken to get type test and other tests witnessed in the laboratory by Nigam representative at the time of acceptance of material type test certificates for the tests carried out on prototype of same specifications shall be submitted along with the bid. The purchaser may select the transformer for type tests randomly

The supplier shall furnish calculations in accordance with IS: 2026 to demonstrate the thermal ability of the transformers to withstand short-circuit

**14. Test Voltages:**

Transformer shall be capable of withstanding the power frequency and impulse test voltage prescribed below:

Nominal system voltage	Highest voltage	Impulse test voltage	Power frequency voltage
433 V (rms) 33 KV (rms)	36 KV (rms)	170 KV (Park)	3 KV 70 KV (rms)

**15. INSPECTION & TESTING**

All test and inspection shall be made at the place of manufacturer unless other wise especially agreed upon by the manufacturer and the purchaser. The manufacturer shall afford the inspector representing the purchaser all reasonable testing facilities, without charge to satisfy him that the material offered for inspection is in accordance with the requisite specifications.

The owner/ consultant/ PMC carry out inspection and testing at manufacturer’s works. No equipment shall be delivered without prior written confirmation from Project Manager. All expenses relating to test including traveling, boarding & lodging of three personal from Owner shall be borne by the contractor.

The bidder shall give three weeks advance information to enable the purchaser to depute his representative for witnessing routing test and acceptance there of .

The manufacturer shall provide all services to establish and maintain quality of workman ship at his works and that of his sub-contractors to ensure the mechanical/electrical performance of components, compliance with drawings, identification and acceptability of all materials. parts and equipment as per latest quality standards of ISO 9001:2000.

**16. STAGE INSPECTION**

The purchaser’s representative may carry out stage inspection of the transformers during manufacturing/assembling stage. The purchaser shall have absolute right to reject the raw material/component/ sub assemblies or complete equipment not found to be conforming to the requirement of specification or being or poor quality/ workmanship. All expenses relating to stage inspection including traveling, boarding & lodging of three personal from Owner shall be borne by the contractor. The stage inspection will particularly include.

following test/ check besides the general Routine tests to be conducted during manufacturing stages as per manufacturer’s standard practice.

- a) Physical inspection/ checking of winding insulating material, core material for annealing and prime quality and other accessories/ fitting of Transformer.
- b) Measurement of Core area and flux density.
- c) Verification of HV & LV coils, conductor’s size I.D., O.D. Axial length, Weight, Insulation covering etc.
- d) Measurement of thickness of enclosure plates ( Top, bottom and sides).
- e) Sample testing of core material for checking specific loss and thickness of core plates.
- f) Visual and dimensional check during assembly stage of core.
- g) Check for proper provision of spacers and bracing outline drawing, provision for all fittings, finishing tec. The purchaser at his option may collect the sample of the following raw material/ component for independent testing:
  - a) **CRGO Lamination** - One specimen sheet of 300- 500 mm length and 50-70 mm width ( for each lot)
  - b) **HV Winding Wire** 1250 mm length specimen for each type
  - c) **LV Winding Wire** 1250 mm length specimen for each type
- a)The manufacturing program shall not be interrupted in case purchaser’s representative does not reach within seven days of the date of intimation.

**17. WARRANTY PERIOD**

The supplier shall be responsible to replace, free of cost, with no transportation or insurance cost to the Purchaser, up to destination, the whole or any part of the material which in normal and proper use proves the defective in quality or workmanship, subject to the condition that the defect is noticed within 36 months from the date of commissioning i.e. date of taking over and shall be for entire duration of the warranty period. The consignee or any other officer of NRDA actually using the material will give prompt notice of each such defect to the supplier. The replacement shall be effected by the supplier within a reasonable time, but not, in any case, exceeding 15 days. The supplier shall, also, arrange to remove the defective within a reasonable period, but not exceeding 15 days from the date of issue of notice in respect there of, failing which, the purchaser reserve the right to dispose of defective material in any manner considered fir by him(Punchers), at the sole risk and cost of the supplier. Any sale proceeds of the defective material after meeting the expenses incurred on its custody, disposal handling etc, shall however be credited to the supplier's account and set off against any outstanding dues of the purchaser against the supplier. The warranty for 36 months shall be for entire duration of warranty period.

**18. DOCUMENTATION**

All drawings shall conform to International Standards Organization (ISO) 'A' series of drawings sheet/ Indian Standards Specification IS- 656. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in SI Untis.

**19. LIST OF DRAWINGS AND DOCUMENTS:**

The tender shall furnish four sets of following drawings along with his offer"-

- a) General outline and assembly drawings of the equipment.
- b) Graphs showing the performance of equipment in regard to magnetization characteristics.
- c) Sectional views showing:
- d) General constructional features.
  - I. The materials used.
  - II. The Insulation, the winding arrangements, method of connection of the primary/ secondary winding to the primary/ secondary terminals tec.
  - III. Porcelain used and its dimensions along with the mechanical and electrical characteristics.
- e) Arrangement of terminals and details of connection studs provided.
- f) Name Plate.
- g) Schematic drawing.
- h) Type reports in case the equipment has already been type tested.
- i) Test reports, literature, pamphlets of the bought out items and raw material.

- a. The successful tender's shall within 15 days of placement of order. submit three sets of final versions of all the above said drawings for purchaser's approval. The purchaser shall communicate his comments/ approval on the drawings to the supplier within 30 days. The supplier shall, if necessary, modify the drawings and submit three copies of the modified drawings for purchaser's comments. After receipt of purchaser's approval, the suppliers shall within 15 days, submit 12 prints and two good qualities reproducible of the approved drawings for purchaser's use.

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- b. Three sets of the type test reports, duly approved by the purchaser, shall be submitted by the supplier for distribution before commencement of supply. Adequate copies acceptance and routine test certificates, duly approved by the purchaser, shall accompany the dispatched consignment.
- c. The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk
- d. 5 sets of nicely printed and bound volumes of operation, maintenance and erection manuals in English Language, for each type and rating of equipment supplied shall be submitted by the supplier for distribution prior to the dispatch of the equipment. The manual shall contain all the drawings and information required for erection, operation and maintenance of the distribution transformer. The manual shall also contain a set of all the approved drawings, type test reports etc.
- e. Approval of drawings/ work by purchaser shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawing for meeting the requirement of the latest version of applicable standards, rules and codes of practices. The equipment shall conform in all respects to high standards engineering, design workmanship and latest revisions of relevant standards at the time of ordering and purchaser shall have the power to reject any work or materials which, in his judgment is not in full accordance therewith.

**20. PACKING**

Transformer shall be suitably packed as per the standard practice while dispatching from the work. Although the method of packing is left to the discretion of the manufacturer it should be robust enough for handling normally encountered during transportation by road/ rail. All accessories shall be dispatched in suitable boxes or crates. They shall be securely bound with wire and shall have all descriptive marking stamped thereon.

**21. INSTRUCTIONS MANUAL**

Four sets of the instruction manuals shall be supplied at least four (4) weeks before the actual dispatch of equipment. The manuals shall be in bound volumes and shall contain all the drawings and information required for erection, operation and maintenance of the transformer. The manuals include amongst others, the following particulars:

- a) Marked erection prints identifying the components, parts of the transformer as dispatched with assembly drawings.
- b) Salient technical particulars of the transformer.
- c) Copies of all final approved drawings.
- d) Detailed O&M instructions with periodical check lists and Performa etc.

**22. COMPLETENESS OF EQUIPMENT**

- I. All fittings and accessories, which may not be specifically mentioned in the specification but which are necessary for the satisfactory of the plan, shall be deemed to be included in the specification and shall be furnished by the contractor without extra charges. The equipment shall be complete in all details, whether such details are mentioned in the

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specification or not, without any financial liability to the Purchaser under any circumstances.

- II. All deviations from this specification shall be separately listed under the requisite schedules, in the absence of which it will be presumed the all the provisions of the specification are complied with by the bidder.

**23. QUALITY ASSURANCE PLAN:**

- a. The Bidder shall furnish following information along with his bid. Information shall be separately given for individual type of material offered.
- b. Statement giving list of important raw materials, names of sub-supplies for the raw materials, list of standards according to which the raw materials are tested. List of tests normally carried out on raw materials in the presence of Bidder's representative, copies of test certificates.
- c. Information and copies of test certificates as in (1) above in respect of bought out accessories.
- d. List of manufacturing facilities available.
- e. Level of automation achieved and list of areas where manual processing exists.
- f. List of areas in manufacturing process. where stage inspections are normally carried out for quality control and details of such test and inspection.
- g. List of testing equipment available with the bidder for final testing of equipment along with valid calibration reports shall be furnished with the bid. Manufacturer shall possess .0.1 class instruments for measurement of losses -----  
----- to be provided at the time of GTP/Drg./Type test.
- h. The successful Bidder shall within 30 days of placement of order submit following information regarding list of new materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.

**24. DOCUMENTATION:**

The Bidder shall furnish along with the bid the dimensional drawings of the stems offered indicating all the fittings.

- a. Dimension's tolerances.
- b. Weight of individual components and total weight.

**25. PACKING & FORWARDING:**

- a. The packing shall be done as per the manufacturer's standard practice. However, it should be ensured that the packing is such that, the material would not get damaged during by Rail/Road/Sea.
- b. The marking on each package shall be as per the relevant IS.

**26. Transformer & Metallic Box Sealing Facility**

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The transformer should have facility to seal the transformers enclosure & its body and also the Metal box, housing the other equipments(s). The metal box shall have pad-lock arrangement & complete protection from dirt, rain-water & other pollutants & shall comply to IP:53 protection or better.

**27. RATING AND TERMINAL MARKING PLATES:**

There shall be rating plates on the transformer containing the information specified of IS: 2026-1977 (part-i). No load & full load losses of the transformer should also be mentioned on the rating plate. The following additional information must also be punched on the plate and imposed two opposite sides of the body of T/F.

- I. Purchase Order No. & Date.
- II. Date of inspection.
- III. Property of DHBVN
- IV. Make
- V. Guarantee period
- VI. **BEE-Star rating label in accordance with color design, logo etc., shall be provided on the transformer as per the design/ recommendations of Bureau of Efficiency (BEE)**

**28. GUARANTEED TECHNICAL PARTICULARS**

The guaranteed technical particulars of the transformer shall be given by the tenderer (Annexure-A) along with the tender. Tenders without GTP'S shall be out rightly rejected.

**ANNEXURE-A**

**SCHEDULE OF GUARANTEED TECHNICAL AND OTHER PARTICULARS FOR 2000 KVA, 33/0.433 KV, DRY TYPE, INDOOR TYPE DISTRIBUTION TRANSFORMERS**

The Tenderers shall have to submit details applicable to the equipments offered in the forms given below ( along with a copy of the GTP approved by the DHBVN)

SL. N.	Particulars				
1	Name and address of the manufacturer				:
2	Country of origin				:
3	a) Applicable standard b) Service				:
4	Maximum continuous rating ( in KVA)				:
5	No load voltage ratio at Principal (Nominal) Tap (in KV/KV)				:
6	Rated frequency ( in Hz)				:
7	Number of Cooling				:
8	Type of Cooling				:
9	Connections (i) H.V. Winding (ii) L.V. Winding				:
10	Vector Symbol				:
11	Tapings (a) Range (b) Number (c) Variation of voltage in each sep ( in KV) (d) No load voltage ratio in each tap (in				:
	Tap Number	Voltage ratio in KV/KV		Tap Number	Voltage ratio in KV/KV
	1.			4.	
	2.			5.	
	3.			6.	
12	(i) Temperature rise under normal operating condition above ambient temperature				:
	(a) Windings ( in Degree C)				:
	(b) Maximum hot spot temperature of Copper windings (in Degree C)				:
13	Magnetizing current referred to H.V. at rated frequency				:
	(a) at 90% rated voltage : ( in Amps)				:
	(b) at 100% rated voltage : ( in Amps				:
	(c) at 110% rated voltage : ( in Amps				:
14	Power factor of magnetizing current at 100% rated voltage & frequency				:

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15	No load current at rated voltage and Rated frequency ( in Arms)	:
16	No load loss in KW at rated frequency and voltage	:
	(a) at Lowest tap	:
	(b) at principal tap	:
	(c) at highest tap	:
17	:Load loss in KW at 75 Deg. C. at Rated utput and frequency	:
	(a) at Lowest tap	:
	(b) at principal tap	:
	(c ) at highest tap	:
18	Percentage Regulation at full load at 75 Deg. C	:
	(a) at unity power factor	:
	(b) at 0.8 power factor lagging	:
19	Efficiencies at 75 Deg. C ( in percentage)	:
	(a) at full load (i) at unity power factor (ii) at 0.8 power factor lagging	:
	(b) at ¾ full load (i) at unity power factor (ii) at 0.8 power factor	:
	© at ½ full load (i) at unity power factor (ii) at 0.8 power factor lagging	:
20	Impedance voltage on rated KVA base at rated current and frequency for the principal tapping 75 <sup>0</sup> C	:
21	(a) Reactance voltage aat rated current and frequency for the principal tapping at 75 <sup>0</sup> C ( in percentage) (b) Resistance voltage at rated current and frequency for the principal tapping at 75 <sup>0</sup> C ( in percentage)	:
22	Resistance at H.V. base at 75 <sup>0</sup> C	:
	(a) at Lowest tap	:
	(b) at principal tap	:
	© at highest tap	:
23	Reactance at H.V. base at 75 <sup>0</sup> C	:
	(c) at Lowest tap	:
	(d) at principal tap	:
	© at highest tap	:
24	Withstand time without injury for three phase dead short circuit at terminal ( in seconds)	:

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25	Short time current rating for short circuit with duration	:
	(a) H.V. winding ( in K. Amps)	:
	(b) L.V. winding ( in K. Amps)	:
	© Duration ( in seconds)	:
26	Permissible over loading with time	:
27	Core:	:
	i) Type	:
	ii) Flux density of Core and yoke at principal tap	:
	a) at rated voltage at 50 Hz ( in lines/ sq. cm	:
	b) at 112.50% rated voltage at 50 Hz ( in lines/ sq. cm.)	:
	iii) Thickness of Stamping ( in mm)	:
	iv) Type of insulation between core laminations	:
	v) Core bolt withstand Insulation ( in KV rms for 1 min)	:
	vi) Approximate area of Cross Section of Core and yoke ( in sq. mm)	:
	vii) Material of Core clamping plate	:
	viii) Thickness of Core clamping plate	:
	ix) Insulation of Core clamping plate	:
	x) Describe location/ Method of Core grounding	:
28	Terminal Arrangement	:
	I) High Voltage	:
	ii) Low Voltage	:
29	Positive Sequence Impedance between HV & LV winding on rated MVA base at rated Current and frequency at 75 Deg. C. winding temperature	:
	i)At principal tapping ( in percent)	:
	ii) At lowest tapping ( in percent	:
	iii) At highest tapping ( in percent )	:
30	Zero Sequence Impedance at reference temperature of 75 <sup>o</sup> C at principal tap ( in percent	:
31	Details of windings	:
	i)Type if Winding	:
	a) High Voltage	:
	b) Low Voltage	:
32	Winding conductor	:
	i)Material of the winding conductor	:
	a) High Voltage	:
	b) Low Voltage	:
	ii)Conductor Area:	:
	c) High Voltage ( in sq.cm)	:
	d) Low Voltage ( in sq.cm.	:

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iii)	Current density of windings at rated KVA	At principle tapping 1	At lowest tapping 2	At highest tapping 3
a)	High voltage ( Amp. per sq.cm.)			
b)	High voltage ( Amp. per sq.cm.)			
(IV)	Insulating material used for			
	a) High voltage winding			
	b) Low voltage winding			
v)	Insulating material used between			
	a) High voltage and low voltage winding			
	b) Low voltage winding and core			
vi)	Whether adjustable coil clamps are provided H.V. & L.V. Winding ( if yes, details may be given)			
Vii)	Type of Axial Coil Supports			
	a)H.V. Winding			
	b)L.V. Winding			
Viii)	Type of Radial Coil Supports			
	a) H.V. Winding			
	b) L.V. Winding			
33	Insulation withstand Test voltage	H.V.	L.V.	
	i)Lighting Impulse withstand test voltage 95 KV Peak)			
	ii) Power frequency withstand test voltage ( in KV rms for 1 mib)			
	iii) Induced over voltage withstand test voltage ( in KV rms)			
34	Current in the winding at rated KVA	At principle tapping	At highest tapping	At lowest tapping
	i)Low voltage ( in Amps)			
	ii) High Voltage ( in Amps)			
35	Voltage per turn ( KV per turn)			
36	Ampere turn			
37	Number of turns	At principle tapping	At highest tapping	At lowest tapping
	i)Low Voltage			
	ii) High Voltage			
38	Details of Tap changer			

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	i) Number of steps			
	ii) Number of plus taps			
	iii) Number of minus taps			
	iv) Position of taps on HV			
	v) Type of tap changing arrangement			
39	Bushing	High voltage	Low voltage	
i	Make			
ii)	Type			
iii)	Applicable standard			
iv)	Insulation withstand test Voltage			
a)	a) Lighting Impulse withstand test voltage ( 1.2 x 50 miro seconds in KV peak)			
b)	b) Power frequency withstand test voltage ( in KV rms for 1 min)			
	1) Dry			
	2) Wet			
v)	Creep age distance			
	a) Total ( in mm)			
	b) Protected ( in mm)			
vi	Minimum height of the bushing			
40	Minimum clearance ( in mm)			
		In Air		
		Between Phases	Phase to Ground	
	i) H.V.			
	ii) L.V.			
41	Particulars of Enclosures & Fitment			
	I) CRCA Steel Thickness			
	ii) No. of Louvers provided in side enclosures			
	iii) Covering of Louvers- Fine Steel Mesh			
	iv) Proper ventilation is provided			
	v) Structure of Enclosure along with Dimension			
	a) Dimension			
	b) The IP of Enclosure			
	vi) No. of Cowl type inspection Cover provided			
	Vii) No. of Drain plug provided			
	viii) No. of Lifting Hooks provided in the main tank			
	ix) No. of Lifting Lug			
	x) No. of Earthing terminal provided			
	i) Skid Chanel with Round Corner provided			
	ii) No of Explosion Vent provided			

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	iii) The area of Each Vent	
	iv) Thickness of LT cable End Box Metal Sheet	
	v) Thickness of LV Door leaf Sheet Metal	
	vi) Thickness of HT cable End Box Metal Sheet	
	vii) Thickness of HV Door leaf Sheet Metal	
42	Weight of Transformer, Enclosure and fitting with accessories	
	i) Untanking weight	
	ii) Total weight with Core, Winding, Fittings	
	iii) Detail of Thermometer embedded in winding	
	vi) Current rating of each contact of Temp meter	
43	Approximate over all Dimensions(in mm)	
	a) Length	
	b) Breadth	
	c) Height	
	d) Minimum height of bottom most portion of bushing from bottom of base channel	
44	Minimum clearance height for lifting Enclosures ( in mm	
47	Whether all particulars against sl. no. 1 to 44 furnished ?	

**C. TECHNICAL SPECIFICATION FOR OUTDOOR NON SEALED TYPE THREE PHASE 33 KV/0.433-250V DISTRIBUTION TRANSFORMETS OF 1000 KVA, 1600 KVA and 2000 KVA**

**1.0 SCOPE:**

This specification covers the design, engineering, manufacture, shop testing, supply & delivery of oil immersed, naturally cooled, three-phase, 50 Hz, double- wound, outdoor type Distribution transformers of 1000 KVA, 1600 KVA and 2000 KVA capacity. **Distribution Transformers for outdoor use along with metallic enclosure housing LV bushing with sealing facility.**

**1.1** It is not the intent to specify completely herein all the details of the design and construction of equipment. However the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation upto the Bidder’s guarantee, in manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance there with. The offered equipment shall be complete with all components necessary for their effective and trouble free operation. Such, components be deemed to be within the scope of Bidder’s supply interceptive of whether those are specifically brought out in this specification and / or the commercial order or not. Transformers will be plinth mounted.

**2.0 STANDARDS:**

Unless otherwise modified in this specification the transformer/materials shall conform in all respect to the relevant Indian/International Standard Specification, with latest amendments thereof some of them are listed below:

Title	India standard	International & Internationally recognized standard
Specification for power Transformer	IS-2026:1977-81	IEC-76
O/D type oil immersed Distribution transformer upto & including 2500 KVA, 33 KV specification	IS-1180(part-1):2014	
Insulating Oil for transformer & Swichgear	IS-335/1983	BS-148
Fittings & Accessories for Power Transformer	IS-3639:1968	ASTM D-1275
High Voltage Porcelain Bushings	IS-2099:1986	IEC 296-1969
Low Voltage Porcelain Bushings	IS-7421-1988	
Dimensions for Outdoor Bushings	IS-3347	DIN 42531 to 33
Specification for Copper wire rods	IS-1244	ASTM B-49
Specification for colors for ready mixed paints	IS-5/1964	IEC-76

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Guide for loading of oil immersed Transformers	IS-6600/1972	BS-148
Manual on Transformer	CBI&P Publication No.275	ASTM D-1275
Specification for Power Transformer	IS-2026:1977-81	IEC 296-1969
Insulating Oil for transformer & Switchgear	IS-335/1983	

The bidder shall use ISS, however, wherever this standard is not available, corresponding IEC may be followed. Material conforming to ISS or the internationally accepted standards, which ensure equal or higher quality than the standards mentioned above, would also be acceptable. In case the Bidders who wish to offer material conforming to the standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Four copies of such standards with authentic English translations shall be furnished along with the other.

**3.0 SERVICE CONDITIONS:-**

The Distribution Transformers & other equipment/material to be supplied against this specification shall be suitable for satisfactory operation under the following climatic Conditions as per IS-2026 (Part-I) latest revision.

Sr No.	Location	At Various locations in the state of Chhattisgarh
1	Maximum ambient temperature (°C)	60
2	Minimum ambient air temperature (°C)	-5
3	Maximum average daily ambient temperature	40
4	Maximum yearly weighed average ambient temperature	32
5	Maximum altitude above mean sea level (m)	1000
6	Minimum Relative Humidity (%)	26
7	Maximum Relative Humidity (%)	95
8	Average no of Rainy days/ year	120
9	Average annual rainfall	900mm
10	Maximum wind pressure	195 kg/m sq.

The equipment shall be for safe operation in moderately hot and humid tropical climate, conducive to rust and fungus growth.

**4.0 PRINCIPAL PARAMETERS OF THE TRANSFORMER**

The transformer shall be suitable for outdoor service as step down transformer. The electrical parameters of the transformer shall be as follows:

Sr. No.	Particulars	
1	Rated HV Voltage	33 KV
2	Rated LV Voltage	433-250 KV
3	Connection (HV)	Delta
4	Connection(LV)	Star
5	Vector Group	Dyn-11
6	Material of winding	Copper Double Wound
7	Type of cooling	ONAN

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8	Max. Current Density in HV & LV winding for copper wound T/F	2.8 A/mm <sup>2</sup>
9	Method of system earthing Neutral Solidly earthed system	

**5.0 NO-LOAD VOLTAGE RATIO**

The no-load voltage ratio shall be 33000/433 V.

**6.0 TEMPERATURE RISE**

The transformer shall be capable of operating continuously at its normal rating without exceeding the temperature rise limit. The temperature rise shall not exceed the limits of 45 °C (measured by resistance) for transformer windings and 40°C (measured by thermometer) in top oil above the ambient temperature when tested in accordance with IS. The Transformer with higher temperature rise shall not be acceptable. Hot spot temperature shall not exceed 95°C when calculated on an annual weighted average temperature of 45°C as per IS: 1180

**6.1** The limits of temperature rise mentioned above will have to be satisfied by the Manufacture by carrying the Heat run test at the lowest negative tap by feeding losses corresponding to the rated current of the tap.

**7.0 LOSSES**

The maximum allowable losses for 33/0.433 KV shall not exceed the values given in the following table

MVA Rating of T/F	Max Losses at 50 % loading (Watts)	Max losses at 100% loading at 75 Deg C. (Watts)
1 MVA	3225	9675
1.6 MVA	4837.5	14512.5
2 MVA	5805	18275

These losses are maximum allowable and there would not be any positive tolerance.

However, the manufacture can offer losses less than above.

The supplier shall quote No-Load loss in KW at the rated voltage and frequency. The load loss in KW at rated voltage, frequency & output, for the temperature of 75 degree centigrade shall also be quoted. The supplier shall guarantee these loss figures.

**Note:- Losses are taken as per Energy Efficiency Level 1 of IS 1180.**

**8.0 IMPEDANCE:**

The recommended percentage impedance at 75 °C is 5% for 1 MVA and 6.25% for 1.6 MVA & 2 MVA with a tolerance as per IS 1180

**9.0 WINDIG**

**9.1** The primary (HV) windings shall be connected in Delta and the secondary (LV) winding in Star (Vector system DYn11) so as to produce a positive displacement of 30 degree from the primary to secondary vectors of the same phase. The neutral of Secondary windings shall be brought out to a separate earth pit and the transformer body is to be connected to station grounding system. HV windings shall consist of single coil or cross over coil design. The copper wires for coil formation shall be of sufficient cross-sectional area to impart desired mechanical strength. All delta leads

from HT coils as well as HT leads should be taken out through TPC. The current density in these leads should not exceed 0.8A/sq.mm.

9.2 The winding shall be so designed as to produce minimum out of balance forces in the transformers. Transformers shall be copper wound. The current density for copper wound transformer shall be limited to 2.6 A/mm.<sup>2</sup> upto 1 MVA and 2.8 A/mm.<sup>2</sup> for transformer more than 1 MVA

9.3 The winding design shall ensure that all the coil assemblies are of identical voltage ratio and shall be interchangeable and repairing of the winding could be made easily without special equipment.

9.4 The conductor used in the coil shall be best suitable to the equipment and all the permanent current carrying joints in the winding and leads shall be properly sleeved and brazed instead of jointing with solder or welding. All LV Coil ends shall be provided with brazed lugs and HV coil ends by brazing only.

9.5 For transformers HT winding (Crossover Type) shall have enamel conductor with double paper covering(DPC) for transformers upto 1.0 MVA & Triple paper covering (TPC) for transformer more than 1 MVA and LT winding (Spiral Type) shall have enamel copper insulation with Double paper covering. Electrical Grade insulation Kraft paper in layers uniform density and free from and foreign particles and shall conform to IS:698/56 and latest amendments thereof. The end turn of each layer shall be properly and fully covered to avoid interlayer flashover. Corrugated Cylinder made from pre-compressed insulation board should preferably be used between LV and HV winding. The insulation of coils shall be vacuum impregnated in oil to develop full electrical strength in the winding. All material used in the insulation and assembly of the winding shall be insoluble non catalytic and chemically inactive in the hot transformer oil and shall not soften of otherwise be adversely effected under operating conditions. The core and coil assembly shall be fully dried out in 'Air Drying Oven' till the coils are shrunken to the designed level and are completely dried. Only then they will be impregnated in the transformer oil.

9.6 The minimum insulation resistance values in Mega Ohms between winding and earth when the transformer is filled with oil should be:

	Insulation resistance between winding and earth				
	20°C	30°C	40°C	50°C	60°C
<b>HV winding</b>	800	400	200	100	50
<b>LV winding</b>	400	200	100	50	25

The insulation resistance values (HV windings) should be measured with a 2500 V Megger.

9.7 The overloading capacity transformer shall be as per IS-6600.

9.8 The value of unbalance current indicted by the ammeter shall not be more than 2% of the full load current.

**10.0 CORE CONSTRUCTION**

**10.1 MATERIAL – CRGO METAL**

The core shall be stack / wound type of grade M3 of better & generally of high grade rolled grain annealed steel lamination having low and good grain properties, coated with complete design of core must ensure permanency of the core losses with continuous working of the transformers. The value of the maximum flux density allowed in the design and grade of lamination used be clearly stated in the offer. The bidder should offer the core for inspection and approval by the purchaser during manufacturing stage. Bidder's shall give notice for inspection with the following documents as applicable as a proof towards use of prime core material.

10.1.1 Invoice of the supplier

10.1.2 Mills Test Certificate

10.1.3 Packing List

10.1.4 Bill of Loading

10.1.5 Bill of entry certificate to customs

10.2.0 **Core clamping for CRGO Stacked core.**

10.2.1 Core channel on LV side to be reinforced at equidistance, if holes/cutting is done for LT lead in order to avoid bending of channel.

10.2.2 MS channel shall be painted with varnish of oil resistant paint

10.2.3 Clamping & Tie-rods shall be made of HT steel and shall be parkarised.

10.3 **Core clamping for CRGO wound core**

10.3.1 Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped HT steel tie rods for efficient clamping

10.3.2. MS core clamps shall be painted with varnish or oil-resistant paint.

10.3.3 MS rods shall be used as tie rods

Suitable provision shall be made in the bottom core clamp/ bottom plate of the transformer to arrest movement or the active part.

10.4. The transformers core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The Bidder shall furnish necessary design data in support of this situation.

10.5. No load current shall not exceed 2% of full load current and will be measured by energizing the transformer at 433 volts, 50c/s on the secondary, Increase of voltage of 433 volts by 12.5% shall not increase the no load current disproportionately high. Test for magnetic balance by connecting the LV phase by phase to rated phase voltage and measurement of an, bn, cn voltage will be carried out.

10.6 The core material should be imported directly from the required manufacture. Core material shall be processed by slitting only. Core cutting/slitting be done in front of inspecting officers deputed by NRDA". Details of the core shall be filled & supplied as per Annexure.

10.7. **Temperature rise**

The temperature rise over ambient shall not exceed the limits described below:

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- 1) Top oil temperature rise measured by thermometer: 40 deg. c
  - 2) Winding temperature rise measure by resistance: 45 deg. c
- Bids not meeting the above limits of temperature rise will be treated as nonresponsive.

**10.8 AMORPHOUS METAL.**

- 10.8.1 The core shall be high quality amorphous ribbons having very low loss formed into wound cores of rectangular shape, bolted together to the frames firmly to prevent vibration of noise. The complete design of core must ensure permanency of the core loss with continuous working of the transformers. The value of the flux density allowed in the design shall be clearly stated in the offer. Curve showing the properties of the metal shall be attached with the offer.
- 10.8.2 Core clamping for Amorphous metal Transformers.
- 10.8.3 Core clamping shall be with top and bottom U-shaped core clamps made of sheet steel clamped HT steel tie rods for efficient clamping.
- 10.8.4 MS core clamps shall be painted with varnish or oil-resistant paint.
- 10.8.5 Suitable provision shall be made in the bottom core clamp/bottom plate of the transformer to arrest movement of the active part.
- 10.8.6 The transformer core shall be suitable for over fluxing (due to combined effect of voltage and frequency) upto 12.5% without injurious heating at full load conditions and shall not get saturated. The Bidder shall furnish necessary design data in support of this situation.
- 10.8.7 No load current shall not exceed 2% of full load current and will be measured by energizing the transformer at 433 volts, 50c/s on the Secondary. Increase of voltage of 433 volts by 12.5% shall not increase the no load current disproportionately high. Test for measurement of an, bn, cn voltage will be carried out.

**NOTE:**

- l) "Equal weightage shall be given to the transformers with Amorphous Metal Core and CRGO.

**11.0 TANK CONSTRUCTION**

- 11.1 The tank shall be of robust construction in accordance with the best engineering practice. The main tank of the transformer shall be fabricated from tested quality of mild steel of adequate thickness i.e. minimum 4.00 mm. (for side walls) and 6.00 mm. (for top & bottom plates). The tank shall be valid (V shape welding fillet) inside of tank two outside welding of tank to bear more pressure to avoid bursting.
- 11.2 To provide rigidity and to meet the pressure inside the tank, due to short circuit current, the tank shall be suitably stiffened. The stiffeners wherever applicable are provided on all the four side walls of the tank, designed not to retain water.
- 11.3 The tank cover shall be slightly sloping towards HV bushing and shall provide facilities for draining of water.
- 11.4 The transformer tank shall be complete with all accessories, lifting lugs and shall be designed as to allow the complete transformer tank, filled with oil to be lifted by crane or other means without risk of any damage and transported by Rail/Road without straining any joint and without causing leakage of oil.

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**11.5** Bolted inspection covers shall be provided on top cover to inspect core, winding and have access to the bottom of bushing.

**11.6** The tank shall be capable of with standing the pressure of +/- 1kg /cm<sup>2</sup> without deformation. The transformer body should be welded from inside of the main tank body so that the joint is stronger due to V-shape welding fillet besides the outside welding be additional. The word NRDA property shall be engraved on the top cover plate and side of tank body.

**11.7 INSULATION MATERIAL:-**

**Material:-** Electrical grade insulation Kraft papers and press Boards of standard should be used. For the use standard material the names of following firms have been approved.

Sr. No.	Name of Insulating Material	Name of the firms
1	Press Board	a. Senapathy whitely b. Raman Board
2	Craft Paper	a. Ballarpur b. Padamjee c. Triveni d. M/S Skytouch tapes Ltd Mumbai e. M/s Vijaya Mercantile f. M/s Badri Enterprise, New Delhi.
3	Press pahn paper	Senapathy Whitely
4	Gasket	a. New Cork b. talbros c. M/S Skytouch tapes Ltd Mumbai d. M/s Vijaya Mercantile e. M/s Badri Enterprise, New Delhi

**11.8** Spacers, axial wedge / runners used in windings shall be made of pre-compressed pressboard-solid, conforming to type B 3.1 of IEC 641-3-2. In case of cross –over coil winding of HV all spacers shall be properly sheared and dovetail punched to ensure proper locking. All axial wedges / runners shall be properly milled to dovetail shape so that they pass through the designed spacers freely. Insulation shearing, cutting, milling and punching operations shall be carried out in such out in such a way, that there should not be any burr and dimensional variations.

**12.0 SURFACE PREPARATION AND PAINTING**

**12.1** The painting procedure shall be in line with the NRDA requirement.

**12.2** All paints shall be applied in accordance with the paint manufacturer’s recommendations. Particular attention shall be paid to the following:

- a) Proper storage to avoid exposure as well as extremes of temperature and shelf life for storage
- b) Surface preparation prior to painting.
- c) Mixing and thinning.
- d) Application of paints and the recommended limit on time intervals between coats/

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**12.3** All paints, when applied in normal full coat, shall be free from runs, sags, Wrinkles, patchiness or other defects.

**12.4** All primers shall be well marked into the surface, particularly in areas where painting is evident, and the first priming coat shall be applied as soon as possible after cleaning. The paint shall be applied by airless spray is not possible, conventional spray be used with prior approval of purchaser.

**12.5** The supplier shall, prior to painting, protect nameplates, lettering gauges, sight glasses, light fittings and similar such items.

**12.6 Cleaning and surface preparation:**

12.6.1 All machining, forming, welding and other manufacturing activities shall be completed before surface preparation. All steel work surfaces shall be thoroughly cleaned of rust, scale, welding slag or spatter and other contamination by sand/shot blast cleaning or chemical cleaning by seven tank process including Phos-phating to the appropriate quality in accordance with IS 6005.

12.6.2 The Pressure and Volume of the compressed air supply for the blast cleaning shall meet the work requirements and shall be sufficiently free from all water contamination.

12.6.3 All rough surfaces shall be filled with approved two pack filler and then rubbed down to a smooth finish.

**12.7 Protective Coating**

As soon as all items have been cleaned and phosphate within four hours of the subsequent drying, they shall be given suitable anticorrosion protection of Zinc chromate primer.

**12.8 Paint Material**

Followings are the type of paints that may be suitably used for the transformer to be painted at shop and supply of matching paint to site:

- i) Heat resistant paint (Hot oil proof) for inside surface.
- ii) For external surfaces one coat of Thermo Setting Paint or 2 coats of Zinc chromate followed by 2 coats of polyurethane paint. The color of the finishing coats shall be light admiral grey conforming to no. 697 of IS:5:1961.

**12.9 Painting Procedure**

12.9.1 All paints in anyone particular system, whether shop or site applied, shall originate from one paint manufacturer.

12.9.2 The paint shall only be applied in the manner detailed by the manufacturer e.g. conventional or airless spray and shall be applied under the manufacturer's recommended conditions.

12.9.3 Where the quality of film is impaired by excess film thickness (wrinkling, mud cracking or general softness) the supplier shall remove the unsatisfactory paint coatings and apply another. As a general rule, dry film thickness should not exceed the specified minimum dry film thickness by more than 25%. In all instances, where two or more coats of the same paints are applied, such coatings should be of slightly contrasting colors.

12.9.4 Paints applied to items that are not being painted, shall be removed at supplier's expense, leaving the surface clean, un-stained and undamaged.

**12.10 Damaged Paint work**

- 12.10.1 Any damage occurring to any part of the painting scheme shall be made good to the same standard of corrosion protection and appearance as that originally employed.
- 12.10.2 Any damaged paint work shall be made good as follows:
- 12.10.3 The damaged area, together with an area extending 25 mm around its boundary, shall be cleaned down to bare metal.
  - a) A priming coat shall immediately applied, followed by a full paint finish equal to that originally applied and extending 50 mm around the perimeter of the originally damaged.
  - b) The repainted surface shall present a smooth surface. This shall be obtained by carefully chamfering the paint edges before & after priming.

**12.11 Dry Film Thickness**

- 12.11.1 To the maximum extent practicable, the coats shall be applied as a continuous film of uniform thickness and free of pores. Over-spray, Skips, runs, sags and drips should be avoided.
- 12.11.2 Each coat of paint shall be allowed to harden before the next is applied as per manufacturer’s recommendations.
- 12.11.3 Particular attention must be paid to full film thickness at edges.
- 12.11.4 The requirement for the dry film thickness (DFT) of paint and the material is to be used shall be as given below:-

Sr. No.	Paint Type	Area to be painted	No. of coats	Total Dry Film thickness (Min)
1	Powder Paint a) Thermo setting powder.	Inside	01	20 Micron
		Outside	01	60 Micron
2.	Liquid paint a) Zinc Chromate	Out side	02	45 microns

**13.0 CLEARANCES IN CABLE BOX**

The external electrical clearance between phase to phase and phase to earth in air filled cable termination box shall be in accordance with Clause 11.1 of IS:1180 shall not be less than the values given below:-

Voltage	Medium	Clearance Phase to Phase (mm)	Clearance phase to Earth (mm)
33 KV	Air	350	220
433 V	Air	25	20

The aforesaid clearances are minimum, and no negative tolerance on these clearances shall be allowed. The minimum creepage distance of 33 KV bushings should be 900 mm.

**14.0 BUSHINGS**

- 14.1 Terminal arrangement: The transformer shall be fitted with three high voltages and four low voltages outdoor types porcelain bushing of appropriate voltage and current rating and LT bushing shall be provided on the side of the tank. Each terminal including the neutral shall be distinctly marked and colored for phase voltage on both HV and LV sides. The system of marking shall be in accordance with the latest amendment of relevant IS.

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**14.2** The electrical characteristics of high voltage bushing shall conform to latest version of IS:2099 and IS 3347. The low voltage bushing shall conform to latest version of IS: 7421. All porcelain bushing shall be homogeneous, free from flaws effecting its mechanical strength or dielectric quality. They should be well vitrified, uniformly glazed, tough and impervious to moisture. The creepage distance of all the bushing shall be 25mm per KV of highest system voltage suitable for heavily polluted atmosphere and the protected creepage distance not less than 50% of total.

**14.3 HT/LT CABLE BOXES FOR INDOOR TYPE TRANSFORMER:**

H.T. & L.T. terminal for cable connection shall be brought out through sidewall mounted bushing to a cable end box. Cable end box shall be weatherproof, air filled type with sufficient space inside for termination and connection of cables.

Cable end box shall be furnished complete with removable gland plate, double compression brass glands.

In general, the arrangement shall be such as to permit of core & coil assembly without dismantling the cable installation.

Suitable arrangement for HV side box and LV side box shall be provided. The LV cable box shall be suitable for terminating the cable, which will approach the boxes vertically from the bottom. The cable box shall be suitable for being detached from the main body with suitable mounting arrangement.

The H.T. and L.T. cable box shall be fixed on the opposite sides.

In the case of indoor transformers, the enclosure shall be fitted with cable boxes on HV/LV sides:

**HV Side cable box :**

The HV side cable box shall be provided with glands suitable for termination of 33 KV XLPE armored aluminum cables of sizes up to 3C X 400 sq mm. The cable holding clamp shall be provided. Necessary drawing has to be provided in this regard for approval before supply.

**LV Side cable box :**

The LV side cable box with gland shall be provided, suitable for termination of one or more runs of 1 c or 3.5/4C XLPE armoured cables of sizes upto 1CX630 mm<sup>2</sup> and 3.5/4CX400 mm<sup>2</sup>. The cable holding clamp is to be provided. Necessary drawings is to be furnished in this regard for approval before supply

**15.0 FITTINGS AND ACCESSORIES**

The transformer shall be fitted with the following fittings & accessories

- a) Two earthing terminals;
- b) Oil level Indicator;
- c) Lifting lugs and platform lugs
- d) Rating, diagram and terminal marking plate(s)

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- e) Silica gel breather of approved design containing min. 0.25kg dehydrated silicagel.
- f) Drain-cum-sampling valve (steel) welded to the tank.
- g) Thermometer pocket with dial type thermometer on tank cover.
- h) Air Release Plug.
- i) GOR for alarm & trip
- j) Explosion Vent with Diaphragm.
- k) Pressure relief device as standard fitment to operate at a pressure of 0.3 to 0.5 kg/cm<sup>2</sup>
- l) Filling hole having p 1-1/4 thread (with cover) on the conservator. (k) Filter valve-2 nos. on top and bottom ends of tank at opposite sides.
- m) Conservator with filling hole and drain plug.
- n) Porcelain bushings with arcing horns and terminal connectors on HV side.
- o) Porcelain bushing on LV side and HV side conforming to IS-3347, part-I and III of the latest version thereof with brass studs fitted with single gap arcing horns.
- p) Offload tap changer with tapping range of +5% to -7.5% in steps of 2.5% each with a locking device.
- q) Bimetallic terminal connector for HV/LV Bushing connecting to XLPE cable.
- r) PSR Radiators (Detachable) duly tested for leakage and pressure.
- s) Uni-directional flat rollers (4 nos.) suitable for use on 1000 mm gauge track with clamping device or base mounting arrangement as required.

**Note: (I)**

The fitting listed above are indicative and any other fittings which are generally required for satisfactory operation of the transformer are deemed to be included in the quoted price of the transformer.

**16.0 CONSERVATORS**

Conservators along with Silica gel breathers are to be provided in the transformers. The conservator shall be liberally dimensioned such that with the lowest ambient temperature and no load on the transformer, the oil level shall not recede too low and with the highest ambient temperature and permissible overload on the transformer, the oil will not spill into the breather pipe or to the exterior to waste. The conservator shall be provided with oil level indicator with minimum, Normal & Maximum temperature Markings. The inside diameter of the pipe connecting the conservator to the main tank shall be < 25 to 50 mm and it should be projected into the conservator in such a way that its end is approximately 20 mm above the bottom of the conservator. Conservators shall not be provided with drain plug. Filling hole with cover shall be provided as usual. The conservator pipe hole fitted to the tank cover should be provided with a suitable slanted plate, if required so that while pouring oil into the transformer through the conservator, oil does not fall directly on the winding. Care should be taken so that free oil flow is not impeded. Explosion vents for transformers shall also be welded on the cover. Air release plug should be provided in the explosion vent, and in tank cover to release any entrapped air. One suitable inspection hole with cover of adequate size should be provided on the tank top cover so that bushing ends and tap changer assembly may be easily accessible through that hole. The inspection cover should be placed on turret and should be provided with lifting handle and air release plug. All the fitting on the top cover should be placed on the turret. An air release plug should also be provided at the topmost point of the H.V. Bushing turrets so that any accumulated air bubble there in may be released through Air release Plug. Conservator tank shall be provided with plain oil gauge with maximum and normal marking visible from the G.L. conservator tank shall be provided with dehydrating breathers. Drain valve shall be provided on conservator.

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The Buchholz relay shall have two contacts for alarm and for tripping. The relay shall also comprise drain cock, air vent, and facility of testing with air injection/mechanical testing facility.

OTI pocket is to be provided.

Marshalling box is to be provided for housing OTI. OTI shall be DIAL Type Thermometer with mercury contacts

#### 17.0 SEALING GASKETS

All sealing washers and gaskets shall be made of 'oil and heat resistant Nitrile / Neoprene rubber / synthetic. rubber-bonded cork type RC-70C gaskets. The oil level in the transformer shall be made up to the required level while the transformer filled with oil is maintained at a temperature of 55 Deg. C. All steel screws, nuts and fasteners exposed to atmosphere shall be either galvanized or cadmium plated.

#### 18.0 TRANSFORMER OIL

The transformer oil used shall comply with the requirements of the specification as per Annexure-IV enclosed in addition to the provision in the IS:335-1993 (Latest). Oil sample will also be taken out from fresh stock of T/F oil to be tested as per latest IS:335-1993.

#### 19.0 BASE MOUNTING ARRANGEMENT

As per IS: 1180, to make them suitable for mounting on platform or plinth.

#### 20.0 RATING AND TERMINAL MARKING PLATE(S)

Each transformer shall be provided with non-detachable rating diagram and terminal marking plate(s) of weather proof material, fitted in a visible position and showing the complete information as given under clause 17 of IS: 1180 (part-I)-1981. Further each transformer shall have inscription of Owner name-Purchase order and date.

#### 21.0 TESTES:

21.1 **Routine Tests:-** All transformers shall be subjected to routine tests at the manufacturer's works in accordance with IS:2026 and IS:1180(part-I).

21.2 **Acceptance tests:** The following shall tests acceptance tests are to be carried out in presence of purchaser's representative in accordance with procedure mentioned in the General specifications:

- (a) Measurement of winding resistance
- (b) Measurement of voltage ratio and check of voltage vector relationship
- (c) Measurement of impedance voltage/short circuit impedance and load-loss
- (d) Measurement of no-load loss and current at full voltage.
- (e) Measurement of insulation resistance.
- (f) Induced over-voltage withstand test.
- (g) Separate-source voltage withstand test.
- (h) Dielectric tests.
- (i) Oil sample test for BDV and moisture content
- (j) Visual examination & Measurement of Dimensions.
- (k) SFRA Test.

**21.3 Type Tests:**

The proposed transformer design must have type tested from any NABL accredited laboratory. In addition to the Tests mentioned in para 21 following Tests shall be conducted.

- 21.3.1. Temperature rise test for determining the maximum temperature rise after continuous full load run. The ambient temperature and time of test should be stated in the test certificate.
- 21.3.2 Impulse voltage test: As per Clause No. 13 (With chopped wave) of IS-2026 part-III latest version. BIL for 33KV shall be 170 KV peak.
- 21.3.3 Air Pressure Test: As per Cl. -22.5 of IS-1180/part-I/1989.
- 21.3.4 Short Circuit withstand test: Thermal and dynamic ability.
- 21.3.5 Magnetic Balance Test.
- 21.3.6 The type test report (s) submitted by the bidder/ supplier from any NABL accredited laboratory shall be acceptable for participation of the bidder in the procurement.

Type test certificates for the tests carried out on prototype of same specifications shall be submitted along with the bid.

The supplier shall furnish calculations in accordance with IS: 2026 to demonstrate the thermal ability of the transformers to withstand short-circuit.

**22.0 TEST VOLTAGES**

Transformers shall be capable of withstanding the power frequency and impulse test voltage prescribed below:

Nominal system voltage	Highest voltage	Impulse test voltage	Power frequency voltage
433 V (rms) 33 KV (rms)	- 36 KV (rms)	- 170 KV (peak)	3 KV 70 KV (rms)

**23.0 Deleted**

**24.0 GUARENTEED TECHNICAL PARTICULARS**

The guaranteed technical particulars of the transformer shall be given by the tender (Annexure-I) along with the tender. Tenders without GTPS shall be out rightly rejected

GENERAL TECHNICAL REQUIREMENTS				
33/0.4 KV, Distribution Transformer				
Sr. No.	Particulars	Requirement		
1	<b>GENERAL SPECIFICATIONS</b>			
1.1	Rated KVA	1.0 MVA	1.6 MVA	2 MVA
1.2	Service & Duty	Continuous, Distribution Transformer		
1.3	Type/Location	Core / Outdoor		
1.4	Wound	Copper Double wound		
2	<b>SYSTEM PARTICULARS</b>	Copper Double wound		
2.1	Nominal voltage	33000 V		
2.2	Highest System Voltage	36000 V		
2.3	No. of Phases	3		
2.4	Frequency	50 Hz		
2.5	Voltage Variation	+ 10%		
2.6	Frequency Variation	+ 3%		
2.7	Combined Voltage & Frequency variation	+ 10%		
3	<b>RATING</b>			
3.1	Rated Voltage of H.V (Volts)/Current (A)	33000 / 34.99		
3.2	Rated Voltage of L.V (Volts)/Current (A)	433 / 2666.74		
3.3	Max. Temperature rise in oil by thermometer above 50 deg. C ambient Temp.	40 Deg C		
3.4	Max. Temperature rise above 50 deg C ambient Temperature of winding by resistance method	45 deg C		
3.5	Overload Capacity	As per IS: 6600		
4	<b>WINDING CONNECTION DETAILS</b>			
4.1	Connections			
4.2	1. H.V. Winding	Delta		
4.3	2. L.V. Winding	Star		
4.4	3. Neutral brought out for earthing	Yes		
4.5	Tapings			
4.6	1. No. of Tap positions	5 Positions (4 Steps)		
4.7	2. Range	+5% to -5% in steps of 2.5%		

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4.8	Vector Symbol	Dyn 11		
5	<b>LOSSES/EFFICIENCY</b>	1 MVA	1.6 MVA	2 MVA
5.1	Max losses at 50% loading (Watts)	2816	4267	5149
5.2	Max losses at 100% loading (Watts)	7525	12147	15157
5.3	Percentage Impedance at 75 deg C at Normal Tap	5%	6.25%	6.25%
5.4	No load Current	2% of full load current		
5.5	Regulation at full load at 75 Deg C U.P.F	1.17%		
5.6	<b>Efficiency at Unity Power Factor (75 Deg C)</b>			
5.7	100% full load	98.77%		
5.8	75% full load	98.97%		
5.9	50% full load	99.12%		
5.10	<b>Efficiency at 0.8 Power Factor (75 Deg C)</b>			
5.11	100% full load	98.46%		
5.12	75% full load	98.72%		
5.13	50% full load	98.90%		
5.14	Maximum Efficiency (%)	99.1		
6	<b>CONSTRUCTIONAL DETAILS</b>			
6.1	Type of Construction	Core Type		
6.2	Core Grade	M3 or better		
6.3	Insulation class	A		
6.4	H.V. Winding	Crossover		
6.5	L.V. Winding	Spiral		
7	<b>Insulation of Conductors</b>			
7.1	H.V. winding turn Insulation for transformer upto 1 MVA	DPC		
7.2	H.V. winding turn Insulation for transformer above 1 MVA	TPC		
7.2	L.V. Winding turn Insulation	DPC		
7.3	3. Between H.V. & L.V. winding	Oil Duct + Solid Insulation + Oil Duct		
7.4	4. Between L.V. winding & core	Solid Insulation		
7.5	Joints in Winding	Brazed only		
8	<b>Bushing Clearances</b>			
8.1	Phase to Phase (H.V) Air Medium	350 mm		

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8.2	Phase to Phase (L.V) Air Medium	25 mm
8.3	Phase to Earth (H.V) Air Medium	220mm
8.4	Phase to Earth (L.V) Air Medium	20mm
9	<b>Full wave lightning impulse withstand Voltage</b>	
9.1	H.V. Winding (KV Peak)	170
9.2	L.V. Winding (KV Peak)	NA
9.3	Power Frequency Voltage (H.V Winding)	70 KV (rms)
9.4	Power Frequency Voltage (L.V Winding)	3 KV (rms)
10	<b>DETAILS OF TANK AND MATERIALS M.S</b>	
10.1	Thickness of side plates (mm)	4
10.2	Thickness of Bottom plates (mm)	6
10.3	Thickness of Cover plates (mm)	6
10.4	Thickness of radiator (pipes or sheets)	1.2 mm
11	Flux Density	1.9 T
12	Maximum Current Density (Copper)	
12.1	Upto 1 MVA	2.6 A/mm <sup>2</sup>
12.2	Above 1 MVA	2.8 A/mm <sup>2</sup>

**GURANTEED OTHER PARTICULARS FOR DISTRIBUTION TRANSFORMERS ANNEXURE-I**

(To be furnished by the Manufacturer)

GTP OF 1.0, 1.6, 2.0 MVA 33/0.4 KV LT T/F				
SR. NO.	DESCRIPTION	PARTICULARS offered		
		1.00 MVA	1.6 MVA	2.0 MVA
1	Manufacturer's Name & Address			
2	Service			
3	Rated Voltage :			
(a)	HV Winding			
(b)	LV Winding			
4	Rated frequency			
5	Number of phase			

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6	Connections:			
(a)	HV Winding			
(b)	LV Winding			
7	Connection symbol			
8	Type of cooling			
9	Rating available at different cooling (if any) in%			
10	Tap changing equipment			
(a)	Manufacturer			
(b)	Type			
(c)	No. of steps			
11	Guaranteed positive sequence impedance at 75 °C with 100% rating at			
(a)	Principal tap			
(b)	Maximum tap			
(c)	Minimum tap			
12	Temperature rise over an ambient of 50°C			
(a)	Top oil (if applicable) °C			
(b)	Windings (by resistance measurement method) °C			
13	Guaranteed losses at rated voltage on principal tap at rated frequency			
(a)	No load loss or iron loss			
(b)	Copper loss at full load at 75°C			
(c)	Maximum Weighted average loss			
14	Withstand time for three phase short circuit at terminals (secs.)			
15	No load current at rated Voltage and rated frequency			
16	Insulation level			
(a)	Separate source power frequency voltage withstand			
(i)	HV Winding			
(ii)	LV Winding			
(b)	Induced over voltage withstanding			
(i)	HV Winding			
(ii)	LV Winding			
(c)	Full wave lightning impulse withstanding			
(i)	HV Winding			
(ii)	LV Winding			
17	Regulation at full load at 75°C			
(a)	At unity power factor			
(b)	At 0.8 power factor			
18	Terminal arrangement			

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(a)	High voltage			
(b)	Low voltage			
(c)	LV Neutral			
19	Bushings			
(a)	High Voltage			
(i)	Manufacturer			
(ii)	Type			
(iii)	Minimum Creepage distance			
(b)	Low Voltage			
(i)	Manufacturer			
(ii)	Type			
(iii)	Minimum Creepage distance			
(c)	LV Neutral			
(i)	Manufacturer			
(ii)	Type			
(iii)	Minimum Creepage distance			
20	Total quantity of oil (liters) required for first filling (wherever applicable)			
21	Is vacuum filling required if so, stated			
	Absolute pressure			
22	Efficiency at 75 <sup>0</sup> C at unit power factor.			
(a)	At full load			
(b)	At ¾ full load			
(c)	At ½ full load			
23	Approximate dimensions			
(a)	Tank enclosure LxBxH			
(b)	Overall LxBxH			
24	Untanking height			
25	Approximate Weight			
(a)	Core and winding			
(b)	Tank fittings			
(c)	Oil (if applicable)			
(d)	Total Weight			
26	Dispatch details			
(a)	Approximate mass of heaviest package			
(b)	Approximate dimensions of largest package			
(i)	Length			
(ii)	Breadth			
(iii)	Height			
27	Reference Standards			
<p><b>Note: If there is any change in the above GTPs, same shall conform to Technical Specification/relevant ISS. If there is any change in GTPs, so warranted by specific make of equipment, same shall be taken care at the time of approval of drawings.</b></p>				

**ANNEXURE-II**

**ADDITIONAL DETAILS**

Sl. No. Description

1. Core Grade
2. Core diameter (mm)
3. Gross Core area (cm)
4. Net Core area (cm)
5. Flux density (Tesla)
6. Wt. of Core (kg.)
7. Loss per kg. of Core at the Specified Flux density (Watts)
8. Core window height
9. Center to center distance of the core (mm)
10. No. of L.V. Turns
11. No. of H.V. Turns
12. Size of LV Conductor bare/ covered (mm)
13. Size of HV Conductor bare/ covered (mm)
14. No. of parallels
15. Current density of LV winding amps/sq.mm.
16. Current density of HV winding amps/sq.mm.
17. Wt. of the LV winding for Transformer kg.
18. Wt. of the HV winding for Transformer kg.
19. No. of LV Coils/phase
20. No. of HV Coils/phase
21. Height of LV Winding mm
22. Height of HV Winding mm
23. ID/OD of LV Winding mm
24. ID/OD of HV Winding mm
25. Size of the duct in LV winding mm
26. Size of the duct in HV winding mm
27. Size of the duct between HV & LV mm
28. HV winding to LV winding clearance mm
29. HV winding to tank clearance mm
30. Calculated impedance %
31. HV to earth creepage distance mm
32. LV to earth creepage distance mm

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**ANNEXURE-III**

**SOURCE OF MATERIALS/PLACES OF MANUFACTURE TESTING AND INPECTION**

Sl. No. Item source of Material Place of Place of testing and Manufacture inspection

1. Laminations
2. Aluminum/Copper Conductor
3. Insulated winding wires
4. Oil
5. Press Boards
6. Kraft Paper
7. MS Plated / Angles /Channels
8. Gaskets
9. Bushing HV/LV
10. Paints

**ANNEXURE-‘IV’**

**GUARANTEED CHARACTERISTICS OF NEW TRANSFORMER OIL IN DRUMS/TANKERS AND IN TRANSFORMERS**

**A. OIL IN DRUMS/TANKERS**

SR.NO.	Characteristics	Requirement
1.	Appearance	Oil shall be clear & transparent & free from suspended matter or sediments.
2	Density at 29.5 °C (Max.)	0.89 g/cm <sup>2</sup>
3.	Kinematics viscosity at 27 <sup>0</sup> C (Min.)	27 CST
4.	Interfacial tension at 27 <sup>0</sup> C (Min.)	0.04 N/M
5.	Flash point (Min.)	140 <sup>0</sup> C
6.	Pour point (Max.)	-6 <sup>0</sup> C
7.	Neutralization value a) Total acidity (max.) b) In organic acidity	0.03 mg KOH/gm Nil
8.	Corrosive sulphur	Non-corrosive
9.	Electric strength (Break down voltage) Min. a) New untreated oil: If the above value is not obtained the oil shall be treated. b) After treatment.	a) 30 KV (rms) b) 60 KV (rms)
10.	Dielectric dissipation factor (Ten-delta) at 90 <sup>0</sup> C	0.002 (Max.)
11.	Water content (Max.)	50 ppm
12.	Specific resistance (resistivity) a) At 90 <sup>0</sup> C (Min.) b) At 27 <sup>0</sup> C (Min.)	a) 35X10 <sup>12</sup> ohm-cm b) 900X10 <sup>12</sup> ohm-cm
13.	Oxidation stability a) Neutralization value after oxidation (max.) b) Total sludge after oxidation (max.)	0.40 mg KOH/gm 0.10% by weight
14.	Ageing characteristics after accelerated ageing (open breaker method with copper catalyst) a) Specific resistance (Resistivity) i) At 90 <sup>0</sup> C (Min.)	2.5X10 <sup>12</sup> ohm-cm

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	ii) At 27 <sup>0</sup> C (Min.) b) Dielectric dissipation factor (Tan delta) at 90 <sup>0</sup> C c) Total acidity (Max.) d) Total sludge value percent by weight	0.2 X10 <sup>12</sup> ohm-cm 0.2 Max. 0.05 Mg KOH/gm 0.05 Max.
15.	Presence of oxidation inhibitor	Absent

**B. CHARACTERISTICS OF OIL IN THE TRANSFORMERS**

The important characteristics of the transformer oil after it is filled in the transformer (within 3 months of filling) shall be as follows:-

Sr No.	Characteristics	Permissible limit satisfactory for use
1.	Electric Strength (Breakdown voltage KV) Prior to energisation	50 KV minimum
2	Water content (PRM)	25 PPM(max.)
3	Specific Resistance (Resistivity) ohm-cm at 90 <sup>0</sup> C	2X10 <sup>12</sup> ohm-cm (Min)
4	Dielectric dissipation factor tan delta) at 90 <sup>0</sup> C	0.01 (Max)
5	Neutralization value (Total acidity)	0.055 mg. KOH/gm (Max)
6	Sediment and/or perceptible sludge	Absent
7	Flash point	140 <sup>0</sup> C (Min)
8	Interfacial tension at 27 <sup>0</sup> C	0.030 N/m (Min)

**SCHEDULE– D**  
**Section-IV**  
**Special Conditions of Contract**

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## Special Conditions of Contract

### 1. GENERAL

The Special Conditions of Contract are to be read in conjunction with General Conditions of Contract. If there are any variations or discrepancies or conflicting provisions, the provisions in Special Conditions shall take precedence over the provisions in the General Conditions of Contract.

All additional facilities/equipment/ office etc to be provided by the contractor, as mentioned in the tender, document outside the BOQ shall not be paid separately, and shall be deemed to have been included in the rates quoted by the contractor.

### 2. ACCESS

The Contractors are to verify the work site details including:-

- a) Access,
- b) Availability of water supply and electrical energy,
- c) Space for dumping stores and materials and
- d) Space for erection of site office,

The Contractors are deemed to have catered for all contingencies connected with the site, access, water & electricity.

### 3. SUPPLY OF WATER

Water will not be supplied by NRDA and the Contractor shall make his own arrangements. NRDA will give recommendatory letter to the concerned authority if so requested by the Contractor. However, NRDA shall be in no way responsible for obtaining permission and no claim on account of this will be entertained.

### 4. ELECTRIC SUPPLY

- (a) Electric power both for construction and lighting shall not be made available to contractor. Contractor shall arrange at his own cost power with necessary switch boards, energy meter etc. and shall be responsible for their maintenance.
- (b) Further distribution by the Contractor at his cost shall be done as per approved layout. He shall provide required clearances for overhead lines to facilitate easy movement of heavy machinery such as cranes etc. These shall be shifted and rerouted at Contractors cost during execution of work if the same are found to obstruct any other work of any agency working at site or requires shifting due to unforeseen reasons.
- (c) On completion of the work the Contractor shall remove all wiring installed by him and make good to the satisfaction of Engineer if any disturbance or damage is done.
- (d) The Contractor shall employ an Electrical Agency as approved by the Engineer for carrying out this work.
- (e) The Contractor has to keep alternative arrangement ready at his own cost for any failure/interruption of electric power that takes place and under no circumstances can this be deemed to be reason for any consequential delay in the works.
- (f) Any disputes in sharing of power obtained directly/ indirectly from CSPDCL with other agencies shall be resolved by the contractor at his risk and cost. NRDA shall not be responsible or a party for such disputes.

Signature of Contractor.....

Signature of NRDA.....

**5. DEFECT LIABILITY**

The Contractor shall be responsible for rectification of defects, during the defect liability period as per clause 17 of GCC after the certified date of completion by the NRDA. This period shall be known as Defects Liability period as defined in CL. No. 17 of the General Conditions of Contract. Subsequent to the taking over of the works and after it has been in use, its removal/correction of defects would be the responsibility of the Contractor. Any defects or failures during this period shall be rectified by Contractor within one week of intimation in writing. If the same is not carried out in the stipulated time, NRDA shall have the right to get it repaired departmentally or through any other agency, entirely at the risk and costs of the Contractor as detailed in the GCC clause. No. 17.

**6. SAMPLES****6.1 Material**

(a) The Contractor shall furnish to Engineer for approval, with reasonable promptness and with reasonable time for consideration, adequate numbers of samples of all the materials to be used in the work, irrespective of whether material/product is from approved list given in tender. He shall permit and account for all costs in his quotation toward supply, testing, examination at site or at any approved place by the Engineer. The choice of approval of materials rests with NRDA unless otherwise specified.

(b) All material samples shall be delivered to the Engineer's office at the Contractor's cost. Each sample shall be in duplicate and properly labelled as under-

- Name of Project
- Name of Contractor
- Name of Product
- Name of Manufacturer
- Item reference of BOQ
- Date of Submission

(c) Samples shall be accompanied with technical specifications/ catalogues/ test results of manufacturer.

(d) In case the Contractor intends to keep an approved sample in his possession, he shall submit additional set of samples for Engineer's approval.

**6.2 Standards of Acceptability**

(a) In order to establish the standards of acceptability for materials and finishes, the Contractor shall finish in all respect a mock up for one span which include 2 no pole foundation, laying of HDPE pipe between these foundation. The material used in this shall be as approved and special attention shall be paid to establish the workmanship and finishing standards to be achieved for the project.

(b) The Contractor shall give notice in writing in this respect and shall obtain approval through Engineer in Charge from the CE NRDA. Approval should be taken well in advance so as not to delay execution of work.

Signature of Contractor.....

Signature of NRDA.....

**7. TESTING OF MATERIALS IN OTHER LABORATORY**

As a valedictory measure, 10 % (ten percent) of the samples shall be sent for testing in one of the following laboratory:-

- i) Chief Engineer (PWD) Laboratory, Raipur
- ii) National Institute of Technology, Raipur
- iii) Govt. Engineering College, Raipur
- iv) B.I.T., Durg
- v) Sriram Test House N. Delhi
- vi) National Test House N. Delhi
- vii) Any NABL accredited lab

7.1 In case, certain testing facility for typical/ special materials are not available in Chhattisgarh, then it can be tested at a recognized laboratory anywhere in India.

7.2 All testing charges for the above shall be borne by the Contractor. The charges i.e. travelling, boarding & lodging of Inspecting officer shall also be borne by the contractors as per class I officer of Govt of CG. In case, the testing charges demanded by the testing authorities is not paid by the Contractor within 15 (fifteen) days, then the same will be paid by NRDA with due recovery from the Contractor's bill for the project.

**8. CRECHE FACILITIES FOR THE CHILDREN OF CONSTRUCTION LABOURER**

Contractor undertakes to provide creche facilities for the children of construction labour through a volunteer agency within one month from start of work. The facility is open to children of construction labourers employed by the Contractor. In case the Contractor fails to provide this facility within stipulated time, following charge shall be levied on the Contractor.

Range of Contract Amount	Amount of Creche fund
Upto Rs. 50 lacs	Nil
Above Rs. 50 lacs to Rs. 5 Crores	Rs. 50000/-
Above Rs. 5 Crores	Rs. 5 lacs.

8.1 The amount shall be recovered if such facility is not provided by the Contractor from running account bills in one or more instalments but not exceeding 6 (six) instalments.

8.2 If the facility is provide after 3 months 50% of the amount shall be refunded to the contractor, after 6 month 25% will refunded.

**9. SUBMISSION OF DETAILED BAR/ PERT CHART OF COMPLETION**

The Contractor shall, within the stipulated time in Tender, submit to the Engineer for his approval a detailed programme covering-

- a) Descriptive note explaining sequence of various activities.

Signature of Contractor.....

Signature of NRDA.....



- b) Network (PERT/ CPM), bar chart.
- c) Programme for supply of working drawing.
- d) Phased requirements of plant and equipment to be deployed by the Contractor.

**10. Method of Working**

After Contract award and before starting Work at the site, Contractor, NRDA's representative/ Engineer shall together make a thorough survey of the grounds where Work under this Contract will occur and areas to be used as access ways to the Work areas. Contractor shall list, and photograph, if Contractor desires, existing conditions not requiring alterations, shall note discrepancies between Drawings and existing conditions, and shall designate areas of storage and routes of access agreed upon by NRDA.

The Contractor shall, within the stipulated time in Tender, submit to the Engineer for his approval the following information,

- a) A general tentative plan of construction plant and equipment for the execution of work within time period stipulated in schedule.
- b) Layout and details of temporary works that the Contractor wants to carry out to fulfill his obligation under the contract.
- c) Indication of shuttering system to be followed.

**11. Project Monitoring**

11.1 Within 7 (seven) days the Engineer shall give their approval to proceed with the work, with or without modification. However acceptance of programme and method of working as submitted by the Contractor or with any modification there to in the opinion of the Engineer, shall not relieve the Contractor of any of his contractual obligation.

11.2 All these programmes and plans submitted by the Contractor and approved by the Engineer shall become part of the contract.

11.3 The acceptance of programmes as submitted by the Contractor or with any modification thereto in the opinion of the Engineer, shall not relieve the Contractor of any extension of time unless delay, if any, is expressly sanctioned by the Engineer.

**11.4 Construction Photographs-**

A General: Contractor will provide construction photographs taken, developed, printed, and mounted by a recognized commercial photographic studio or reputable photographer acceptable to Owner, in the number and type and at construction stages enumerated below:-

- (i) Before Starting Work: Have photographs taken at site from different points of view sufficient in number to show site (and conditions at existing structures) but not fewer than 25 photographs.

- (ii) During Progress of the Work: Have not fewer than 10 photographs taken at least once a week from points of view (both inside and outside), as necessary to show progress of construction and site development for each part of the Work. Co-ordinate taking photographs with utility Work and back filling. Photograph each buried utility line before back filling. During later stages of the Work, have photographs taken from suitable locations inside the building showing the progress of various stages of the Work, such as piling, centering, reinforcement, water proofing, concreting, etc. Size of photographs will be 125 mm X 250mm. Photographs shall be supplied with negatives/ CD to the Engineer. Each photograph shall be attached with date of photograph and location of work. These photographs shall be from location as fixed by the Engineer at start of work

**12. QUARRY RELATED DEDUCTIONS**

The royalty for Minor minerals used in the work like murrum, stone metals, sand, rubble etc. will be levied as per prevailing practice in PWD of Chhattisgarh and shall be recovered suitably through R.A./ Final bill and will be kept in deposit. The above royalty charges kept under deposit shall be refunded as soon as the Contractor submits relevant NOC from Collector, Raipur, Chhattisgarh.

**13. CONTRACTORS ALL RISK POLICY (C.A.R. POLICY)**

The successful Contractor shall take out a C.A.R. policy from any approved company by IRDA India. Chhattisgarh Govt., administered by Directorate of Insurance. The policy so obtained shall cover the entire period of construction (including all extensions) and also shall cover the defects liability period. The policy shall be for the total contract amount including cost of free supply material by NRDA, if any. All amounts/ charges towards premium etc. on this account shall be borne by the Contractor.

**14. INDEMNITY BOND**

The Contractor shall require to execute an Indemnity Bond for satisfactory performance of the entire project on stamp paper of Rs.100/- (Rupees Hundred only) in the format approved by the NRDA. This Indemnity Bond shall remain in force for the Defect Liability period after completion of the project to be furnished in contract form E of GCC.

**15. ACCIDENTS**

Should any accidents, fatal or otherwise occur, a detailed report about the same shall be made promptly by the Contractor to the Engineer. The Contractor should at all times during execution of work keep the NRDA fully indemnified against all risks, claims, litigations and financial burdens arising out of all incidental operations on work and accidents.

**16. TRAFFIC**

The Contractor shall have to make all necessary arrangements for regulating traffic day and night during the period of construction and to the entire satisfaction of the Engineer.

Signature of Contractor.....

Signature of NRDA.....

This includes the construction and maintenance of diversion, if necessary, at no extra cost to the NRDA. The Contractor shall provide necessary caution boards, barricades, flags and lights, watchmen etc. so as to comply with the latest Motor Vehicle Rules and Regulations and for traffic safety. The Contractor shall be responsible for all claims for the accidents which may arise due to his negligence whether in regulating traffic, in stacking materials on the road or by any other reason. The contractor must comply with the following:-

- A. General: Plan and control use of site and access to site in co-operation with Owner and other contractors working at site to minimise disruption of use of other facilities; portions of buildings and site areas affected by this Contract and to remain in use; and the work of other contractors.
- B. Temporary Access Drives: Construct on the premises as necessary, and maintain in good usable condition; remove when no longer needed. Until permanent improvements have been completed, when necessary to prevent excessive dust, periodically water temporary unpaved access roads.
- C. Construction Site Access: Use most direct route from public streets as agreed to by Owner. Construction traffic elsewhere on Owner's property is prohibited.
- D. Driveways Between and Around Combustible Storage Piles: Maintain at least 15 feet wide and free of accumulation of rubbish, equipment, and materials.
- F. Access for Fire-Fighting Equipment: Maintain.
- G. Access: Refer to other sections for requirements to keep access to site and buildings open to Owner, other contractors, and fire-fighting equipment.
- H. Use of Streets and Sidewalks on Public Property: Make arrangements with authorities having jurisdiction for use. Restrictions shall be those of the Municipal Authorities. Be solely responsible for adherence.
- J. Roadways, Driveways, and Walkways: Where outside indicated Contract limit on Owner's property and on public property, keep open to pedestrian and vehicular traffic at all times. When temporary closing of a roadway, driveway, or walkway is absolutely unavoidable, provide alternative access routes. Such temporary closings shall be approved by Owner in each case and shall be for the shortest possible time. Strictly adhere to requirements of governmental authorities having jurisdiction.
- K. Parking: Owner will issue temporary parking permits for use by construction personnel and will make available, at the location shown. Construction personnel shall not park in any other location on Owner's property, even when bearing permits. Access to allocated parking spaces shall be by most direct route from public streets. Construction personnel shall not drive vehicles elsewhere on Owner's property and shall take the most direct pedestrian way along walks and roadways (not on lawns) from parking lot to construction site.
- L. Barricades and Signs: Should barricades or directional signs for traffic control be necessary, prepare and install such signs and barricades of approved size, colour, and lettering or other markings. Remove signs when no longer needed, or at Substantial Completion, whichever is latest.
- M. Restricted Use of Premises: Enforce Contract requirements, local ordinances and Owner's instructions pertaining to signs, fires, smoking, trucking, parking, and other use of premises.

Signature of Contractor.....

Signature of NRDA.....

N. On-Site Storage:-

- 1 General: Extent of Work and site area available limits amount of on-site material and equipment storage. Do not unnecessarily encumber job site with excess materials or equipment and means of delivery of materials, equipment, and supplies, removal of rubbish, and, hours during which deliveries may be made. Determine, and take into account in the Work, limitations on storage space and of times, rates, and means of deliveries to and removals from the job site whether such limitations are imposed by laws, rules, ordinances, or physical conditions. Owner will not pay extra amounts due to such limitations. Co-ordinate arrangements for delivery and storage of materials.
- 2 Paved Areas: Do not use paved areas on Owner's property to stockpile excavated materials or to store construction materials except where shown. Use of paved areas on public property is subject to requirements of authorities having jurisdiction, and arrangements for such use are solely Contractor's responsibility.
- 3 Protection and Repair: Protect roadways, walks, and other permanent site improvements, and access ways subject to damage. Satisfactorily repair improvements and surfaces damaged during construction operations, or remove damaged improvements or surfaces and provide new acceptable improvements or surfaces. Except where new Work is required, return areas used for temporary access to original condition.

**17. ALIGNMENT AND BENCH MARKS**

The alignment of the work to be carried out under the contract shall be marked on the ground as per the drawing and as per the instructions of the Engineer. For the purpose of facilitating the work, the series of temporary bench marks on masonry pillars will have to be established. These pillars will be constructed along with the alignment and such other locations as may be initiated by the Engineer. The temporary bench-marks shall be established for the work line-out and its connections to other proposed roads in Naya Raipur using the DGPS instrument and Total Station software. All expenses involved in the process of marking alignment on ground, checking the alignment, constructing masonry pillars in establishing bench marks thereon, shall be borne by the Contractor. It will be responsibility of the Contractor to ensure that the masonry pillars so constructed are not damaged during the period of work in progress.

**18. PREVENTION OF MOSQUITO BREEDING AT CONSTRUCTION SITE**

The Contractor shall on the respective construction site install mosquito proof and accessible water storage tanks or to cover/protect the present water storage tanks properly. The Contractor shall periodically give larvaecidal treatment to water storage tanks, sites of water stagnation, water collection.

Any expenditure that may be incurred by NRDA to ensure that the above conditions are fulfilled by the Contractor will be debitable to Contractor's account and will be recovered from the bills of the Contractor from time to time.

Signature of Contractor.....

Signature of NRDA.....

**19. INSPECTION OF SITE AND SUFFICIENCY OF THE TENDER**

If the NRDA is not in a position to deliver to the Contractors the site of the Contract work for any reason whatsoever at the agreed time, delaying the commencement of the contract work, or part thereof not beyond 50 % (fifty percent) of contract period for completion, such omissions of the NRDA shall not be breach of any its obligations under the contractor and the Contractor shall not be entitled to claim from the NRDA for loss or damage, if any, caused thereby, but shall be entitled to a reasonable extension of the period agreed for the completion of contract work. If the contractor shall be obstructed in the execution of the work by any person other than an agent or servant of the NRDA, the Contractor shall exclusively deal with such set by the due process of law but shall not be entitled to attribute thereby the beach of any obligation under the contract to the NRDA compensation for damage or loss, if any, thereby suffered but shall be entitled to an appropriate extension of period agreed for the completion of the contract work, provided that the contractor has reported to the NRDA every such act of obstruction with particular soon after its occurrence and the NRDA has after enquiry found the same to be substantially true and has determined the duration of such obstruction.

**20. PROGRESS OF WORK**

The Contractor shall carry out the work as per the programme approved by the Department from time to time. He will also not be allowed to proceed with the work in a scattered manner.

**21. ENGINEER**

**21.1** Engineer for this project shall be the Engineer or the person nominated or appointed by NRDA from time to time and shall include any person duly authorised by them.

**21.2** Engineer shall be responsible for the execution of the project with regards to management and supervision. Instructions issued by the Engineer to the Contractor shall be deemed to be the Employer's instructions in respect of-

1. Day to day supervision including material testing using ISO formats proforma of which should be got approved from Engineer.
2. Approval of material and workmanship using ISO formats proforma of which should be got approved from Engineer.
3. Matter of urgency involving safety or protection of person or property.
4. Monitoring progress of work using System Application of Projects (SAP). (Refer 3.5 hereunder).
5. Interpretation of drawings
6. Interpretation of specifications
7. Issue of additional drawings
8. Certification of measurements and bills and issue of certificates accordingly for interim and final bills.

**22.3** Engineer shall hold fortnightly progress meetings at site for evaluation and execution of works. The Contractor shall assist in providing revised programmes, cash flow charts in the format required by Engineer/ NRDA.

Signature of Contractor.....

Signature of NRDA.....

22.4 The Engineer shall coordinate works at site of all agencies appointed by the Employer.

**22. EXCAVATED OBJECTS**

All the materials obtained during the process of excavation shall remain the property of the NRDA and shall be disposed off as instructed by the Engineer. The Contractor is supposed to use the selected materials for filling. All operations including loading, unloading, transportation of materials where required with all leads and lifts and handling them and leveling at disposal site etc., shall be included in the quoted cost and no extra payment whatsoever shall be made to the Contractor on the account.

**23. AS BUILT DRAWINGS**

The Contractor shall during the course of execution, prepare and keep updated a complete set of 'as- built' drawings recording all works on the blue prints, which shall be corrected daily, if necessary, to show each and every change from the Contract Drawings as a approved working drawings, shop drawings and the exact 'as-built' location, sizes and kinds of work etc. This set of drawings shall be kept on the site and shall be used for record purposes. Changes recorded shall be countersigned by the Engineer and the Contractor. Copies of 'as-built' drawings shall be supplied to the CE), NRDA/ and the Engineer on request.

The Contractor shall submit complete 'as-built' drawings on reproducible tracings and ammonia prints 10 (ten) sets in form of hard copies and Compact Discs 2 nos. for building work and all services as directed by the Engineer within 30 (thirty) days of the completion of entire work by using AutoCAD facility. Maintenance manuals and original warranties shall be submitted at the time of submitting the As-built drawings. In case the Contractor fails to submit complete 'as-built' drawings as aforesaid [in form of hard copies [10 (ten) sets] and Compact Discs [2 (two) nos.], he shall be liable to pay a sum equivalent to 0.1 percent of the value of work subject to maximum of Rs.10 lakhs (Rupees ten lac only) or as may be fixed by NRDA and this decision shall be final and binding. Pre-final & Final Bill shall not be released until all the as-built drawings are submitted & approved.

**24. ENGINEER'S SITE OFFICE**

Deleted

**25. TRANSPORTATION**

Deleted

**26. PROVIDING COMPUTER & OTHER EQUIPMENTS AT SITE OFFICE**

Deleted

**27. TELEPHONE CONNECTION**

Deleted

**28. TIME SCHEDULE FOR COMPLIANCES**

The tenderers should please note the following time schedule for various compliances and follow the same:

Signature of Contractor.....

Signature of NRDA.....

a) The Initial Security Deposit shall be paid within 15 (fifteen) days of receipt of Letter of Acceptance.

The Contractor should construct the site office within 1 (one) month of date of work order. The site office should be as per relevant clause in the tender document.

The CAR policy and Labour license shall be taken by the Contractor within 1 (one) month from the date of work order.

**29. APPROVAL OF ENGINEER**

The foundation strata as well as steel reinforcement provided in all RCC members shall be got approved from the NRDA/ Engineer or his authorised representative. At every stage of work, approval of the Engineer shall be taken by the Contractor. Before starting any work like concreting, laying of DWC HDPE pipe, cables, Pole erection and installation of feeder pillar etc. detailed information of the work in the prescribed proforma shall be given to the Engineer and his approval shall be taken by the Contractor. It is the responsibility of the Contractor to get all the hidden measurements like foundation work, reinforcement, etc. recorded before covering the same. All the measurements shall be taken jointly by NRDA's representative and the Contractor's authorized representative and then only the measurements will be forwarded by the Engineer, who will forward it for payment to Chief Executive Officer, NRDA through Chief Engineer, NRDA and directions on any matter whether mentioned explicitly or otherwise.

**30. PERMISSION FOR CONSTRUCTION OF SITE OFFICE/ GODOWN/ LABOUR HUTS:**

The Contractor shall be permitted to construct temporary structures such as site office, godown, labour huts, Engineer site office, etc. on the land of NRDA within 1 Km radius of site.

The Contractor will have to submit requirement of land for Godown/ Labour Camp/ Batching Plant etc. with logistic layout in Technical Bid. The land shall be provided to the Contractor on Lumpsum lease rent of Rs. 100/- (Rupees Hundred only) per year with Lease Agreement as per prevailing NRDA format. However the Contractor shall require permission of NRDA for erecting site office, labour huts. In the event the Contractor fail to remove site office/ godown and labour huts from the land immediately after construction is over, NRDA will charge rent as per the rules prevalent at the time. No final bill payment shall be made, unless the site is cleared by the contractor in all respects.

The Contractor shall number the structures and display name of the Company, period for which permission is granted, etc. at such approved sites. No final bill payment shall be made unless the site is cleared in all respects by the Contractor.

**31. CONDITIONAL TENDER**

The Tenderer shall note that the clarifications shall be obtained in the pretender meeting and the tender should be submitted without any conditions, whatsoever. Clarifications given to the various tenderers in the pre-tender meeting would be summarized by NRDA and would be issued to every tenderer as "Minutes of Pre-Tender Meeting". The same will be binding on all the tenderers irrespective of whether they have attended the pre-tender meeting or not. The Minutes of the Pre-Tender Meeting would form part of the Contract

Signature of Contractor.....

Signature of NRDA.....

Agreement and the Tenderers should submit the Financial Offer taking into consideration the same. The Tender submitted with conditions would be summarily rejected.

**32. SITE ORDER BOOK& OTHER BOOKS REQUIRED**

The Engineer will maintain Site Order Book at the site of work. The Contractor or his authorized representative shall sign all the instructions received therein, in token of having received the same and shall comply with them forthwith.

All other books of record at site shall have to be maintained as required in the CPA Code of works.

**33. POUR CARD SYSTEM**

Pour card system/RFI system to be introduced for approval of individual activity. Format to be got approved from engineer before start of work

**34. CLEANING Of SITE**

- a) All water which may accumulate on the site during the progress of the works or in trenches and excavation shall be removed from the site to the satisfaction of the Engineer at the Contractor's cost. Site shall be maintained free from rubbish. Proper stacking of scaffolding material, shuttering material bricks/ brickbats, steel pieces, etc. needed for work on day to day basis shall be organized in proper stacks. Heaps of material lying around in unplanned manner and disorderly fashion shall not be permitted. Engineer's decision in this matter shall be final.
- b) The Contractor shall not, at any time, do cause or permit any nuisance on the site or do anything which shall cause unnecessary disturbance or inconvenience to Employer, tenants or occupiers of other properties near the site and to the public in general. The Contractor shall install mosquito proof and accessible water storage tanks for construction and drinking water.
- c) The Contractor shall periodically give largasidal treatment to water storage tanks, sites of water stagnation, water collection.
- d) Prior to handing over the contractor shall appoint Professional Cleaning Agency to clean the building works prior to handing over. The Agency shall have minimum 5 (five) years prior experience in the hospitality industry and shall be appointed with the prior approval by the Engineer.
- e) Any expenditure that may be incurred by NRDA to ensure that the above conditions are fulfilled by the Contractor will be debitable to Contractor's account and will be recovered from the running bills of the Contractor from time to time.
- f) Cleaning: Remove staining or reactive materials from new surfaces immediately during course of the Work.
- g) Debris: Remove hazardous accumulations of debris promptly, at least daily.
- h) Dust: Confine dust producing operations during painting and finishing. Vacuum immediately after completion.
- i) TRASH DISPOSAL
- j) General: Keep new buildings and site free from accumulations of waste materials.

Signature of Contractor.....

Signature of NRDA.....



- k) Removal: Remove cartons, crates, wrappings, lunch trash, and other trash from each room daily. Provide trash receptacles on each floor of each building and in convenient locations on the site.
- l) Burning: Do not burn trash or other materials on Owner's property.
- m) EXCESS MATERIAL: General: Remove excess materials, including demolished materials, excess earth, and excess building materials from Owner's property and dispose of legally.
- n) Clean: Keep paved drives on Owner's property and public streets and alleys clean, by cleaning daily, or more often if necessary, of earth and debris spillage from trucking involved in construction operations.

**35. FENCING**

During the construction, care shall be taken so that, areas around are not polluted and where required Hessian cloth shall be tied around, while work is in progress. Further, it is obligatory on the part of the Contractor to fence the area allotted and earmarked by NRDA for labour camp, batching plant of the Contractor within a month of issuance of work order. The temporary fencing shall be provided in the area as directed by Engineer using vertical blinds using corrugated GI sheets about 3m high with necessary metal frame work and staging to cordon off the view of the premises. The Contractor shall maintain the fencing properly throughout the construction period.

**36. WATCH AND WARD**

The Contractor shall make necessary watch and ward arrangement for a period of three months from the date of total completion of work. No claim shall be paid to the Contractor towards the watch and ward during this period.

Protection General Requirements:

- a) **Laws:** Comply with applicable laws, ordinances, rules, regulations, and orders of authorities having jurisdiction for safety of people and protection of property from damage, injury, or loss.
- b) **Responsibility:** Be solely responsible for initiating, maintaining, and supervising safety precautions and programs concerning Project security, but obtain Owner's approval of methods to be used and location of safeguards. Submit to NRDA, through Engineer, drawings and written description of methods and devices Contractor intends to use and do not begin Work at the site until such means and methods are mutually agreed on by Owner and Contractor.
- c) **On Public Property:** In addition to other means used in the interest of safety or security, comply with the requirements of governmental agencies having jurisdiction
- d) **Safeguards:** Erect and maintain, as required by conditions and progress of the Work, necessary safeguards, for safety and protection, including temporary fences, guards, railings, barricades, canopies, lighting, shoring, directional and danger signs, signals, and other warnings against hazards.
- e) **Security:** Protect and secure the site, new materials and equipment from theft and

Signature of Contractor.....

Signature of NRDA.....

damage by whatever reasonable means are effective. Use methods such as the following, singly or together: locks, fences, signs, patrols, radio, alarms, locked storage on-site, and off-site warehousing.

- f) **Wall Closures:** Unless other acceptable means are provided, provide temporary closures for openings in walls along adjoining to make the building and site secure. Secure temporary closures when Work is not in progress using suitable means such as dead bolts inaccessible from the public side or locks or padlocks construction master keyed in accordance with Section, "Finish Hardware."
- g) **Entrances:** Do not block entrances to premises to remain in use or in any way inhibit access to them.
- h) **Design Live Loads:** Do not permit placing materials or equipment on new to exceed design load of structure or endanger structure or people.
- i) **Trenches:** Do not permit trenches to remain open for prolonged periods without adequate board covering or fencing.
- j) **Broken Glass:** Be responsible for glass broken during construction period; at completion, replace broken glass.
- k) **Weather Protection:** During construction, provide protection against weather (rain, wind, storms, frost, or heat), and maintain work, materials, apparatus, and fixtures free from damage. At end of each workday, cover new work likely to be damaged.
- l) **Dust:** Take precautions necessary to keep Work under this Contract and adjoining property reasonably free of dust.
- m) **Protection of Construction Materials:** Refer to other specification sections for specific requirements.
- n) **Materials Hoist:** Do not permit transporting of people on materials hoisting facilities.
- o) **Removals:** Except for fences, remove temporary construction and protection specified in this section promptly when no longer needed and when removal is approved.
- p) Maintain temporary fences until date of Substantial Completion, unless approval is obtained for earlier removal; then remove the temporary fence.
- q) **Damaged Site Improvements:** Repair and restore to condition at beginning of construction, or better, existing site improvements, such as pavements, curbs, buildings, fences, lawns, plantings, and lighting which are not to be removed under this Contract but are damaged or defaced by Contractor's operations, except where new Work is required by the Contract.
- r) **First Aid Equipment:** Provide at the site. Also provide continually available trained and qualified personnel to render first aid when needed.
- s) **Emergency Signs:** Provide signs posted at telephones listing telephone numbers of emergency medical services, physicians, ambulance services, and hospitals.

**37. MOBILISATION PERIOD**

This clause shall be read in continuation of Clause No 10 (B) (ii) of GCC. No mobilization advance shall be given by NRDA.

**38. METHOD OF CARRYING OUT THE WORKS**

The Contractor shall, within 15 (fifteen) days of receipt of the Employer's order to commence work under respective clause of General Conditions of Contract submit for his approval a detailed programme and statement with drawings and diagrams

Signature of Contractor.....

Signature of NRDA.....

showing how he proposes to carry out the works based on the tender programme. The statement shall describe the methods to be employed in carrying out the works, the Constructional Plant and temporary works which the Contractor intends to supply or use and shall include a list, classified into trades of labour force envisaged. The programme shall give the estimated dates on which the various sections of the works will commence together with the estimated date of completion and estimated output so that the whole of the works may be completed within the Contract Period.

- a) In addition, the Contractor shall submit to the Engineer drawings and full particulars of Temporary Works he intends to construct at least 8 (eights) days before he intends to commence such works. The Engineer may require modifications to be made if he considers the proposals to be insufficient and the Contractor shall give effect to such modifications at his own cost but shall not be relieved of his responsibility for the sufficiency thereof.
- b) The Contractor shall prepare a detailed survey of existing services on the site which he shall clearly mark up on a drawing for the approval by the relevant service authorities prior to commencement of the works.
- c) The Contractor is to progress the works thoroughly and to take such action as is necessary in order to ensure that the approved programme is strictly adhered to in all its stages. The Contractor shall submit detailed programmes of the various sections of the works as and when required by the Engineer, the Contractor shall take all precautions and cover all contingencies to ensure that adequate spare equipment and materials are available at all times to ensure completion of this work in accordance with the agreed programme.
- d) The acceptance of programmes as submitted by the Contractor or with any modification thereto, in the opinion of Engineer, shall not relieve the Contractor of his responsibility to complete the work within period specified in as per Annexure 'A' unless extension of time limit is expressly sanctioned under respective clause of standard General Conditions of Contract or Special Conditions of Contract.
- e) The Contractor shall prepare the CPM programme on computer and the same to be monitored by proper installation of PC and printer facilities at the site.
- f) The bills shall be on computer and the programme will incorporate the deductions of Mobilisation Advance and other items.

**39. CONTRACTOR RESPONSIBLE FOR SUFFICIENCY OF MEANS EMPLOYED**

The Contractor shall take upon himself the full and entire responsibility for the sufficiency of plant, centering, scaffolding, timbering, machinery, tools or implements and generally for all means used for the fulfilment of the Contract. In the event of any of these means proving insufficient, the Contractor is still fully and entirely responsible for the sufficiency of these means notwithstanding any previous approval or recommendation that may have been given by the Engineer.

**40. DRAWINGS**

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The Contractor will receive from the Engineer, 2 (two) prints of the tender drawings listed hereof, together or thereafter with any further drawings issued for Road and Electrical System. Working drawings shall be progressively issued as per the approved construction schedule submitted by the contractor & approved by NRDA.

**41. STANDARDS**

In various places throughout this specification and the bills of quantities, reference is made to the standards, specifications and byelaws issued by the Indian Standard Institutions and other similar organizations. These references shall in every case be deemed to include the latest edition or issue of such standards, specifications and byelaws including all revisions, amendments and addendum subsequently issued. Where materials are not specified and standard exists in respect of such materials, then the materials shall in all respects comply with relevant and current I.S.I. In such cases where I.S.I. do not exist, the best manufacturers' specification shall be followed; in absence of all these, Engineer's instruction shall be followed.

**42. SUPERVISORY STAFF (As per clause 36 (i) of schedule F of the tender)**

The Contractor shall engage on the work a qualified and experienced Engineers, Supervisor, capable of managing and guiding the work properly as detailed in Cl 36(i) of schedule F of the tender Form F-1. This supervisor shall be authorized by the Contractor in writing to receive the orders issued by the Engineer from time to time. The Contractor shall be responsible for carrying out these orders promptly.

**43. FIRE PRECAUTIONS**

The Contractor shall comply with fire regulations of the controlling authority in force at the site of the works relating to the precautions to be taken against fire hazards.

**44. USE OF SITE**

The Contractor shall not use any portion of the site for purpose not connected with the works without the prior written approval of the Engineer. He shall maintain permanent and site access roads free of spillage and shall not interfere with the flow of traffic. Also same shall apply to terraces and other developed areas. This clause shall be read in conjunction with clause no. 15 of the Special Conditions of Contract.

**45. SAFETY ENGINEER**

The Contractor shall employ and depute at site on full time basis a fully qualified Safety Engineer(s) who shall be responsible to ensure observance of safety precautions and measure required to be taken at site. Further he shall make sure stipulations laid down in safety code as provided in GCC.

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**46. QUALITY ASSURANCE MANUAL AND SAFETY MANUAL**

Successful tenderers will be required to submit Quality Assurance Manual and Safety manual made as per applicable specification for various items of work and get the same approved from Engineer before start of work and the adhere the same during actual execution of work.

**i. Quality Assurance Manual (QAM)-**

A quality assurance manual constituting a base document outlining quality policy of the agency, procedures, name of action, compliance, acceptance criteria and documentation etc. Shall be prepared by the successful tenderer and submitted to the Engineer for approval within 15 (fifteen) days from the date of receipt of work order. The QAM shall be prepared in such a way that it follows all the applicable specifications. The document shall generally cover aspects listed below, but not limited to the same.

**Scope of work**

- a) Planning for items to be executed including method statement and resource deployment both physical and financial.
- b) Identification of all parties involved in QA and their inter-relationship.
- c) Execution plan of Quality System giving reference - standard - frequency and acceptance criteria.
- d) Levels of cross checking/ verification in case of multiple verifications/ controls, including systems of inspection and audit, wherever applicable.
- e) Organization of personnel, responsibilities and lines reporting for QA purpose.
- f) Testing and statistical analysis.
- g) Inspection reports at the end and during defect liability period/ maintenance period.
- h) Items to be covered for maintenance manual,
- i) Check list viz. Forms and formats.

**ii. Inspection of Works at Factory/ Workshop**

For any visits that maybe necessary for the purpose of performance of testing, inspection of factory made goods/ equipments, at a location other than the site ,or Raipur, the actual cost of travel (to & fro airfare/ train A/c 1st class), boarding & lodging, local transport & per diem (per person per day) costs at the rate of Rs. 3000 (Rupees three thousand only) for any visit made by officials from NRDA/ PMC/ Architect/ Consultant (maximum 3 (three) persons per instance), shall be borne by the Contractor. Such visits may be necessary for the inspection of transformers, RMUs, GSM base street light automatic control system, cable, pipes, lighting fixtures and DBs etc. that require inspection prior to shipping from the place of its manufacture. Any other item which is required to be tested before being processed/ fabricated in the factory, such visits shall require the prior written approval from the NRDA.

**47. QUALITY ASSURANCE SYSTEM**

A quality assurance procedure covering all aspects of the work shall be adopted for this work to ensure the desired quality. Details of the procedure shall be decided by

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mutual consultation between the Engineer and the contractor at the start of the works.

- a) The contractor shall submit within the time stipulated by the Engineer in writing, the details of actual methods that would be adopted by the contractor for the execution of any item as required by the Engineer at each of the locations, supported by necessary detailed drawings and sketches including those of the equipment and machinery that would be used, their locations, arrangements for conveying and handling materials etc., and obtain prior approval of Engineer well in advance of starting of such item of work.
- b) The Engineer reserves the right to suggest modifications or make complete changes in the methods proposed by the contractor, whether accepted previously or not, at any stage of work, to obtain the desired accuracy, quality safety and progress of work which shall be binding on the contractor and no claim on account of such change in method of execution will be entertained by the Employer so long as Specifications of the items remains unaltered.
- c) The Contractor shall furnish within the period of 15 (fifteen) days a detailed programmed schedule using PERT/ CPM technique in quadruplicate including the date of actual start, the monthly progress expected to be achieved and the anticipated completion date of each major item of work to be done by him, also indicating, plant and machinery and material procurement schedule.
- d) The schedule is to be such as is practicable of achievement towards the completion of the whole work in the time limit and of the particular items, if any, on the due date specified in the contract and shall have the approval of the Engineer. No revised schedule shall be operative without such acceptance in writing. The Engineer is further empowered to ask for more detailed schedule or schedules say weekly for any item or items, in any case of urgency of work as will be directed by him and the contractor shall supply the same as and when asked for.
- e) The contractor shall furnish sufficient plant, equipment and labour as may be necessary to maintain the progress schedule. The working and shift hours for operations to be done under.
- f) Further, the contractor shall submit the progress of work in forms and statements etc. at periodical intervals in the form of progress charts, forms, statements and/ or reports as may be approved by the Engineer.
- g) The contractor shall maintain proforma, charts, details regarding machinery, equipment, labour, materials, periodical returns thereof as may be specified by the Engineer.

**48. EQUIPMENT MAINTENANCE MANUAL**

The Contractor shall mention the list of machinery procured at site for the work in this manual. This manual shall also reflect the name of the manufacturer, age of machinery and the agency entrusted with the maintenance work of the machinery listed in the manual.

**49. MINIMUM PLANTS, EQUIPMENTS AND SHUTTERING**

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**50. SUBMITTALS:**

Unless otherwise specified or directed by NRDA, the Contractor shall submit to NRDA for his review and approval all Co-ordinated services drawings, shop drawings, samples, materials lists, equipment data, instruction manuals, record documents, manufacturers' equipment manuals, design calculations for proprietary items of work, technical submittals, and other information required by the Contract Documents. Submittals and their contents including deviation shall be properly prepared, identified, and transmitted as provided herein or as the Owner may otherwise direct. Except for record documents and instruction manuals for operation and maintenance, submittals including deviation shall be approved before the material or equipment covered by the submittal is delivered to the site. The contractor shall furnish an authority if required from material suppliers.

**51. PLANT, MACHINERY AND SHUTTERING**

The contractor is required to submit details of plants and machineries to be deployed by him in a Proforma indicating all details such as make, year of manufacture, registration etc be submitted. The details are to be provided with in 10 days after award of contract.

**52. SUB-CONTRACTORS**

All specialised works will be carried out by licensed (where applicable) sub contractors approved by NRDA.

- i. It may be noted that the contractors will have to submit credential of the selected contractors to NRDA for approval.
- ii. It may further be noted that even if the contractor has in house licensed subcontractors for these works, they will have to select and engage contractors with prior approval of NRDA.
- iii. All specialists, merchants, tradesmen and other agency executing any work or supplying and fixing any goods which items have been included in the Schedule of Quantities and/ or Specifications or for Extra/ Substituted items of works, who may be nominated or selected by the Engineer/ Contractor are hereby declared to be Sub-contractors employed by the Contractors. No nominated Sub-contractor shall be employed on or in connection with the works against whom the contractor shall make reasonable objection or (save where the Engineer and contractor shall otherwise agree) who will not enter into a contract provided:
  - 1. That the nominated sub-contractor shall indemnify the Contractor against the same obligations in respect of the sub-contractor as the contractor is under in respect of this contract.
  - 2. That the nominated sub-contractor shall indemnify the Contractor against claims in respect of any negligence by the Sub-contractor, his servants or agents or any misuse by him or them or any scaffolding or other plant, the property of the Contractor or under any Workmen's Compensation Act in force.
  - 3. That the nominated sub-contractor shall submit his bills to the Contractor.
  - 4. That the Contractor shall make payment to the nominated Sub-Contractor within 3 (three) days of the Contractor's receipt of the payment from NRDA against the Engineer certificates of payment providing that before any Certificate is issued, the Contractor shall upon request, furnish to the Engineer proof that the nominated sub-contractor's accounts included in previous certificates have been duly discharged in default whereof NRDA may pay the nominated Sub-

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contractors upon a certificate of the Engineer and deduct the amount thereof from any sums due to the Contractor. The exercise of this power shall not create privity of contract as between NRDA and Sub-Contractors.

5. The Engineer in his absolute discretion may recommend payment to the nominated Sub-Contractor directly by NRDA and deduct the amount thereof from any sums due or which may become due to the Contractor or recover the same amounts from the Contractor.
6. No Labor contracts shall be permitted.
7. Prior approval of the Sub-contractor by the NRDA is mandatory.
8. Required 2 No. of contractors as choice would be of NRDA
9. Further sub-contracting/ sub-letting of the work shall not be permitted.
10. NRDA shall not permit under any circumstances Assigning, Transferring or Subletting of entire work or substantial part of work to be executed under this contract. If the Contractor attempts or assigns, transfers and sublets the entire or substantial work, the contract shall be terminated by the NRDA without prejudice to any right or remedy which shall have accrued or shall accrue thereafter to the NRDA.
11. The Contractor shall not be permitted to give power of attorney for executing the work to any other agency or person on their behalf. The power of attorney for executing the work shall only be given to regular employee of the agency with prior approval of NRDA.

**iv. ESSENTIAL CONDITIONS FOR ELETRICAL WORKS:-**

1. The Sub-contractor for carrying out the electrical works under the contract should strictly be in accordance with the above criteria.
2. All above referred works will have to be carried out under the supervision of Engineer.
3. Power supply distribution scheme given in tender document is only for guideline purpose. However, successful agency will be responsible for obtaining necessary sanctions to over all power supply distribution scheme, from CSPDCL/ applicable local authority and Engineer before starting execution of work. No extra charges will be paid for obtaining necessary approvals/ sanctions to power supply distribution scheme sanctioned by concerned power supply authority CSPDCL/ applicable local authority, successful agency will have to take up and complete the work accordingly.
4. Successful agency will have to obtain the required approvals to the total electrical works such as, LT distribution, etc from CSPDCL/ applicable local authority/ concerned power supply authority, Electrical Inspector, authority or any other statutory body at their own cost before starting execution of the work and the original sanctions obtained should be submitted to NRDA's concerned Electrical Division before execution of the work. Any statutory cost for obtaining the approval will be reimbursed on production of original receipts.
5. The electrical works under the scheme should be carried out strictly in Co-ordination with the concern CSPDCL/ applicable local authority and necessary approvals should be obtained from time to time.
6. Activity Bar Chart and the makes of material should be submitted for electrical works for necessary approvals from the competent authority from NRDA before execution of the work and work should be started only after the approvals.
7. It will be the agency's responsibility to obtain the following listed documents from CSPDCL/ applicable local authority. Electrical Inspector authority and other concerned

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Statutory Body towards completion of the work at their own cost, without which work will not be treated as completed.

- a) Sanction papers for the total external electrification works along with BOQ of material, demand note for supervision charges, if any.
  - b) Charging permission of the installation.
  - c) Inspection report of the various equipments & material supplied under the electrification work certified by CSPDCL/ applicable local authority and NRDA authorities.
  - d) Manufacturers test certificates and guarantee certificates in original for all the equipments and material supplied for execution of electrification work under the scheme.
  - e) As Built drawings as stated Volume I showing all the details and certified by CSPDCL, Electrical Inspector authority (along with soft copy).
  - f) Earth test report for the total installation.
  - h) Work completion report from CSPDCL/ applicable local authority for the total electrification work should be submitted.
  - i) Separate guarantee should be submitted to NRDA against the electrical works carried out under the scheme, for a period of 24 (twenty four) months including defects liability period in order to avoid any inconvenience under the scheme and also to attend any defects in installation during this period.
  - k) All material & equipments to be supplied under this contract shall be offered for inspection at the manufacturing place. No material shall be supplied by the agency without the clearance from the Engineer.
9. The total electrification work under the scheme will have to be carried out as per the terms & conditions mentioned in various sections of the Tender Document.
10. Electrical works under the contract will not be treated as completed unless and until above listed activities are completed by successful agency.

**53. Subject** work is strictly to be completed within stipulated work completion period and in accordance with the activities listed below completely as per the directives from Engineer. The charges and the expenses for completing the following listed activities should be included in the quoted offer and no separate payments against this will be made.

1. Successful agency will have to obtain and submit the Contractor All Risk Insurance Policy (CAR) in original within 1 (one) week from date of work order from Director of Insurance, Government Insurance Fund, Raipur, Chhattisgarh. The Contractors All Risk (CAR) Policy as said above shall be inclusive of insurance coverage under workman's compensation insurance policy for all workmen employed by contractor to complete the works covered under present contract. Further the contractors All Risk Policy period completely as stated in the tender. In case of time period extension (If any), it is essential that, premium of CAR policies should be timely paid by agency in order to ensure the continuity of CAR policy without any break in the same, suitable action will be taken against defaulters as per General Conditions of Contract unless and until the Contractors All Risk Policy as stated in above manner is submitted to the office of Engineer no payments will be released against any work executed.

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2. Obtaining necessary scheme sanctions in detail towards execution and completion of subject work in all respect, from concerned CSPDCL/ applicable local authority. This activity includes required co-ordination and follow-up with concerned CSPDCL/ applicable local authority for obtaining necessary scheme sanctions. The scheme sanction should be inclusive of specifications and required layout and other drawings etc. completely as per the requirement.  
 The payment towards the supervision charges of CSPDCL/ applicable local authority shall be paid directly to CSPDCL/ applicable local authority on behalf and in the name of NRDA by the agency.  
 The original scheme sanctions along with original certified drawings, specification details, quotations, payment receipt against supervision charges etc. should be submitted to the Engineer.  
 The supervision charges paid in the name of NRDA as mentioned above shall be reimbursed on submission of original payment receipts.
3. If required, preparation and submission of execution drawing in co ordination with concerned planning authority of NRDA by engaging Govt. approved Surveyor for confirmation and marking of proposed cable routes, location of control pillar, existing services along the proposed route under the present contract as per the sanctioned scheme obtained from CSPDCL Reports and marked computerized plans duly certified by surveyor in 3 sets of should be submitted after carrying out the details survey as mentioned above.
4. Obtaining necessary road/ soil/ footpath etc. cutting permission for cable trenching from concern authorities like NRDA/ CSPDCL/applicable local authority/ RMNN/ PWD etc. as applicable along the approved route and submit the approval in original along with the drawings and permission to Engineer.  
 The charges required for obtaining the approvals and permission as mentioned above should be directly paid on behalf and in the name of NRDA by the agency.  
 The charges paid in the name of NRDA as mentioned above shall be reimbursed on submission of original payment receipt to the Engineer
5. Preparation and submission of shop/ execution drawing to Engineer for approvals. Submitting list of Makes of various items and material to be used under present contract for approvals.  
 The Contractor or his qualified engineer having updated technical knowledge for execution of the subject work should invariably remain present and co-ordinate during every inspection and testing programme at manufacturers works, similarly during every joint site visits and when required.
7. After supply of material at site, all the documents such as delivery challan, excise gate pass, material test report (in original), etc. should be submitted to Engineer for obtaining installation clearance.\*  
 The complete work under the present contract shall be carried out with required supervision, stage-wise inspection from concerned authority of CSPDCL/ applicable local authority & Electrical Inspector authority in co-ordination with Engineer complete with required power shutdowns. The record of all inspection and shutdowns shall be submitted to Engineer.

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8. The execution work of cable trenching/ foundation for poles/ foundation of feeder pillar/excavation and trenching in all types of surfaces rocks, soils etc. shall be carried out as per approved route plan by using appropriate tools and machines in close co-ordination with concerned authorities from NRDA, CSPDCL/ applicable local authority, etc. completely as per the requirement so as to avoid the damages to the existing services.
9. Obtaining clearance certificate from concern authority of NRDA, RNN, PWD, CSPDCL/ applicable local authority, etc. as applicable, towards completion of re-surfacing work of cable trenches, excavated surfaces and removal of debris and submission of this clearance certificate in this regard obtained from concerned authorities to Engineer.
- \* In absence of activity No. 1 & 15 above, the payment towards cable trenches erection and installation will not be released.
10. Arranging and carrying out pre & post testing and commissioning of the completed installation in presence of Engineer, his representative and the representative of any other statutory authorities like CSPDCL/ applicable local authority & Electrical Inspector etc. as required.
11. Excess saving statement as per final execution of work, item wise measurement break up in detail and escalation claim as applicable along with detail calculations and copies of confirmed indices etc. to be submitted to Engineer.

It is mandatory to complete all the activities listed above from Sr. No. 1 to 11 for releasing the final payment.

**54.** Following conditions are the essential conditions of contract for carrying out and completing the subject work in all respect within stipulated time period. The successful agency will be responsible for completing the same as per the directives of Engineer. The charges and expenditure if any required for completing the same should be including in the quoted offer, and no separate payments against this will be made.

1. The contractor shall visit the site to access the actual quantum of work and period required for completing the same before quoting the offer.
2. Scheme specifications and quantity of the material to be used for the subject work under the contract and specified in the tender document is only for guideline purpose. However it will be the responsibility of the successful agency to obtain the measurements and specifications in detail of each and every item before starting the execution of work and complete the work in accordance with the approvals, clearances obtained for the same. All cost required for completion of work as per statutory approval, shall deemed to have included in the offer quoted.
3. The foundation and excavation for feeder pillar and control pillar, grouting of frames in wall/ ground etc, are require to be carried out by the agency, and cost for the same shall be include in the offer quoted.
4. It will be Agency's responsibility to obtain necessary sanctions and permissions by paying necessary charges towards;
  - a) Obtaining necessary scheme sanctions and permissions for completing the subject work in all respect from any concerned statutory authority.
5. The successful agency will be completely responsible for accidents occurred if any

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during the execution of work as well as during 24 (twenty four) months defect liability period under this contract. It will also be the responsibility of agency, for making police complaints against any thefts and accidents etc. under intimation to NRDA.

- 6. Charges against following listed activates should be included in the quoted offer itself and no separate payments will be made against same.
  - a) Arranging and carrying out the material inspecting at respective manufactures unit as stated in Annexure - I.
  - b) Arrangements for performing site visits and other connected activities as and when required by Engineer or his representative.
  - c) Carrying out necessary co-ordination and follow up with concern authorities for obtaining necessary sanctions and permissions as required towards completion of work in all respects.
  - d) Appointing Govt. approved surveyor for carrying out site survey and preparation of computerized shop drawing, Execution drawing, As built drawing etc. with soft copy.
  - e) Any other incidental charges required towards completion of work in all respect.
- 5. Bills submitted against the executed and completed works at site, will be processed further by Engineer, after necessary scrutiny and verification.

55. The services/ tasks/ works as referred to under clauses shall be suitably applicable to all Utility services executed by the contractor, whether specifically mentioned herein above or no.

**56. Safety, Security and Protection of the Environment**

The Contractor shall, throughout the execution and completion of the Works and the remedying of any defects therein:

- (a) have full regard for the safety of all persons entitled to be upon the Site and keep the Site (so far as the same is under his control) and the Works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons,
- (b) provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Engineer or by any duly constituted authority, for the protection of the Works or for the safety and convenience of the public or others, and
- (c) take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

**57. HANDING OVER PROCESS:-**

The handing over process shall be based on a performance comprising individual activities. The process shall be approved by the Engineer.

**58. EROSION AND SEDIMENTATION CONTROL**

- i. **General:** Prevent pollution of land, air, and water; control erosion, washout, and surface runoff of earth and stockpiled materials. Preclude sedimentation in

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general and especially in existing on-site and public storm-water system and public right of way.

- ii. **Procedures:** Perform erosion, sedimentation and temporary storm-water control. Follow procedures stipulated in local laws and regulations and as shown on Site work drawings.
- iii. **Maintenance:** Maintain controls in place until permanent controls are functioning. Remove when no longer needed.

**59. NOISE AND VIBRATION CONTROL**

Noise and Existing Building Structure Vibration Generated by Construction Procedures, Equipment, Tools, and Operations: Keep to minimum practicable during demolition and removal from building and site, including loading and removing storage containers. Equipment generated noise levels shall not exceed the following in decibels:-

- 1. Concrete mixer: 85
- 2. Concrete pump: 82
- 3. Crane: 83
- 4. Materials elevator: 85
- 5. Pumps: 76
- 6. Generators: 78
- 7. Compressors: 81
- 8. Pneumatic tools: 86
- 9. Saws: 78
- 10. Vibrators: 76
- 11. Other tools: 85

- i. Operation of Air Hammers, Compressors, and Reciprocating Equipment: Not permitted inside existing buildings unless specifically approved in writing by Owner.
- ii. Laws: Comply with applicable noise control laws, ordinances, and regulations.
- iii. Acoustical Enclosures: Stationary equipment may be enclosed to produce required sound attenuation subject to continued maintenance of such enclosures to ensure that specified sound levels are not exceeded.
- iv. Violations: Where field sound measurements reveal sound levels exceeding those specified, cease operating such equipment and repair or replace it with equipment that complies with the sound levels specified.
- v. Cutting and Drilling Concrete: Use only rotary or core drilling for holes through concrete. Do not use impact tools to cut or otherwise remove concrete or to install inserts.
- vi. Power-Activated Tools: Not permitted in or immediately adjacent to existing buildings, except with Owner's written approval in each specific case, except where such use is specifically specified.

**60. EXISTING CONDITIONS**

- i. Contractors Examination of Site:-
  - 1. By executing Contracts, Contractor and subcontractors represent that they have:

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- a. Visited the site and made due allowances for difficulties and contingencies;
  - b. Compared Contract documents with existing conditions and informed themselves of conditions to be encountered, including work by others, if any, being performed; and
  - c. Notified Architect of ambiguities, inconsistencies, and errors they have discovered within Contract documents or between Contract documents and existing conditions.
2. Failure to visit the site and become familiar with conditions shall not relieve Contractor or a subcontractor from furnishing materials or equipment or completing the Work in accordance with Contract documents at no additional cost.
3. Contractor or subcontractors will not be given extra payment for Work related to conditions they can determine by examining the site and Contract Documents.
4. Contractor or subcontractors will not be given extra payment for work related to ambiguities, inconsistencies, or errors within Contract documents, or between Contract documents and existing conditions, when such ambiguities, inconsistencies, or errors are known to Contractor or subcontractor before Contract execution unless Contractor or subcontractor has notified Architect in writing of such condition before execution of Agreement Between Owner and Contractor.
- ii. Make use of public property and make arrangements for that use. No extra compensation will be paid due to costs associated with using public property.
  - iii. Access by Contractor to portions of Owner's property beyond the actual area of Work under this contract is denied, except where necessary to perform the Work, and then only with specific written approval in each case. Refer to other sections for additional requirements.
  - iv. Contractor shall accept the site in the condition in which they exist at the time Contractor is given access to begin the Work.
  - v. Damage caused by Contractor to existing structures, grounds plants, pavements, utilities, work by others, fixtures, or furnishings, shall be repaired by Contractor and left in as good condition as existed before the damaging, unless such existing work is shown to be removed or replaced by new Work.
  - vi. Immediately upon entering the site for purposes of beginning Work, locate general reference points and take such action as is necessary to prevent their destruction; lay out Work and be responsible for lines, elevations, and measurements, and Work executed under this Contract. Exercise proper precautions to verify figures shown on Drawings before laying out Work. See Section "Field Engineering" for additional requirements.
  - vii. Contractor and each subcontractor, before starting work, shall verify governing dimensions at the premises, including floor elevations, floor-to-floor heights, and column locations and shall examine adjoining Work on which Contractor's or subcontractor's Work is in any way dependent. No "Extra" or additional compensation will be allowed on account of differences

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between actual measurements and dimensions shown. Submit differences discovered during the Work to Architect for interpretation before proceeding with associated Work.

- viii. Employment of local labour shall be given priority wherever possible. However,
- ix. this shall not in anyway affect/ dilute the Contractors obligations listed within the Tender document.

**61. LAMINATION OF DRAWINGS**

All drawings issued to site shall be kept in lamination condition.

**62. Handing Over:**

At the time of handing over after completion of work, all the equipment, spare including standby equipment etc. must be in good working order as were taken over before commencement of defect liability period.

**63. Penalties for failure to achieve the functional guarantees during Defect liability Period**

In case of failure to deliver the required quality of work, liquidated damages shall be imposed for such failure to meet the performance criteria, as described below. The Employer will be entitled to recover any such damages from Maintenance bill, the security deposits of the contractor or any other sum due to him. However, the contractor shall be allowed to take up routine/ periodical maintenance as per IS guidelines and mentioned in technical specification.

Non redressal of any complaint or instruction given in writing by NRD/NRDA authorized representative within 4 hours: Penalty @ Rs. 5000.00 for each such complaint.

**64. PAYMENT**

This clause shall be read in continuation of Clause No 7 of GCC, payment schedule for SITC work is as below in percentage cost of the total cost quoted for the item:-

Sr. No.	Particulars	Payment In %	Cumulative Payment in %
a.	As advance against receipt of bank guarantee(as per approved proforma) for equivalent amount	5%	5%
b.	On approval of Shop drawings	5%	10%
c.	After delivery of all items at site	65%	75%
d.	After Installation, testing and commissioning at site	10%	85%
e.	For I <sup>st</sup> year Maintenance period @ 0.75% for each quarter	3%	88%
f.	For II <sup>nd</sup> year Maintenance period @ 1.25% for each quarter	5%	93%
g.	For III <sup>rd</sup> year Maintenance period @ 1.75% for each quarter	7%	100%

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**65. ORDER OF PRECEDENCE**

In case of any discrepancy between the items mentioned in the BoQs/Specifications/Drawing, the Order of precedence should be as follows:

- i. Item details as mentioned in the BoQs, read along with the specification shall prevail. However in case of conflict specification shall hold good.
- ii. Drawings.

Signature of Tenderer

Date :

For

Chief Executive Officer,

Naya Raipur Development Authority (NRDA)

4th Floor,,Paryavas Bhawan,North block

Sector- 19, Naya Raipur- 492 002, Chhattisgarh

Tel No: + 91 771 2512500;

Fax No.: +91 771 2512400

Date :

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Signature of NRDA.....



**SCHEDULE– D**  
**Section-V**  
**List of Approved Makes**

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**NRDA” APPROVED MAKE LIST FOR DISTRIBUTION TRANSFORMER**

<b>S.N</b>	<b>DRY TYPE DISTRIBUTION TRANSFORMER</b>	<b>OIL TYPE DISTRIBUTION TRANSFORMER</b>
<b>1</b>	Voltamp Transformer Ltd.	Voltamp Transformer Ltd.
<b>2</b>	Toshiba Transmission & Distribution Systems india Private Limited	Toshiba Transmission & Distribution Systems india Private Limited
<b>3</b>	Kirloskar Electric Co.Ltd	Crompton Greaves Limited
<b>4</b>	ABB Ltd	Kirloskar Electric Co.Ltd
<b>5</b>	AMES Impex Electrical Pvt Ltd.	Schneider Electric India Pvt .Ltd.
<b>6</b>		Transfix India Pvt. Ltd . ( Make Cohors )

Signature of Contractor.....

Signature of NRDA.....

# SCHEDULE- E

## Reference to General Conditions of contract.

Signature of Contractor.....

Signature of NRDA.....

SCHEDULE-E

**Reference to General Conditions of contract.**

**Name of Work : " Design, Supply, Installation, Testing, Commissioning and Maintenance of 33/0.433 KV Distribution Transformers for Office Complex, Commercial Complex and Retail Complex buildings at Sector 24 and Sector 21 of Naya Raipur (2nd call )."**

Estimated cost of work : Rs 228.00 **Lacs**

(i) Earnest Money : Rs. 2.28 **Lacs**

(ii) Performance Guarantee : 5% of tendered value

(iii) Security Deposit : 5% of tendered value

Signature of Contractor.....

Signature of NRDA.....

# SCHEDULE- F

## General Rules & Directions

Signature of Contractor.....

Signature of NRDA.....

## SCHEDULE-F

**GENERAL RULES & DIRECTIONS** : Officer inviting tender

Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3: See below

**Definitions:**

2(v)	Engineer-in-Charge	<b>Executive Engineer ( E ), NRDA or Any Officer Appointed by CEO, NRDA</b>
2(viii)	Accepting Authority	<b>Chief Executive Officer, NRDA</b>
2(x)	Percentage on cost of materials and Labour to cover all overheads and profits:	15 %
2(xi)	Standard Schedule of Rates	<b>CG SoR with Updated Amendments</b>
2(xii)	Department	Naya Raipur Development Authority

**Clause 1**

- |      |   |               |
|------|---|---------------|
| (i)  | Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance | <b>7 days</b> |
| (ii) | Maximum allowable extension beyond the period provided in (i) above                                 | <b>7 days</b> |

Signature of Contractor.....

Signature of NRDA.....

**Clause 2**

Authority for fixing **CEO, NRDA**  
compensation under clause 2

**Clause 2A**

Whether Clause 2A shall be applicable **No**

**Clause 5**

Number of days from the date of issue **15 days**  
of letter of acceptance for reckoning  
date of start

Mile stone(s) as per table given below:-

***To be submitted by the tendered on award of work***

SI. No.	Description of Milestone (Physical)	Time allowed in days(from date of start)	Amount to be with-held in case of non achievement of mile stone
1.		NA	
2.		NA	
3.		NA	
4.		NA	
5.		NA	

Time allowed for execution of work **6 months including Rainy Season**

Signature of Contractor.....

Signature of NRDA.....

Authority to decide:

- (i) Extension of time **CEO, NRDA** (Engineer in Charge or Engineer in Charge of Major Component in case of Composite Contracts, as the case may be)
- (ii) Rescheduling of mile stones **Chief Engineer ( Engineering)**

### Clause 6, 6A

Clause applicable - (6 or 6A)

**6A**

**Clause 7** Payment on Intermediate Certificate to be Regarded as Advances:- In addition to clause 7 of GCC, payment schedule for SITC work is as below in percentage cost of the total cost quoted for the item:-

Sr. No.	Particulars	Payment In %	Cumulative Payment in %
a.	As advance against receipt of bank guarantee(as per approved proforma) for equivalent amount	5%	5%
b.	On approval of Shop drawings	5%	10%
c.	After delivery of all items at site	65%	75%
d.	After Installation, testing and commissioning at site	10%	85%
e.	For I <sup>st</sup> year Maintenance period @ 0.75% for each quarter	3%	88%
f.	For II <sup>nd</sup> year Maintenance period @ 1.25% for each quarter	5%	93%
g.	For III <sup>rd</sup> year Maintenance period @ 1.75% for each quarter	7%	100%

### Clause 10A

**All the materials as per contract.**

1. .... 2. .... 3. ....
4. .... 5. .... 6. ....

Signature of Contractor.....

Signature of NRDA.....



**Clause 10B(ii)**

Whether Clause 10B (ii) shall be applicable **No**

**Clause 10C**

Component of labour expressed as percent of value of work **Not Applicable**

**Clause 10CA** **Not Applicable**

Sl. No.	Material covered under this clause	Nearest Materials (other than cement, reinforcement bars and the structural steel) for which All India Wholesale Price Index to be followed	Base Price of all Materials covered under clause 10 CA*
1.			
2.			
3.			
4.			

\* Base price of all the materials covered under clause 10 CA is to be mentioned at the time of approval of NIT.

**Clause 11**

Specifications to be followed for execution of work **Tender specification attached with Tender document, CPWD, MOSRTH, CPHEEO and relevant IS Specifications.**

**Clause 12**

12.2. & 12.3 Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for subjected work..... **25%**

12.5 Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for foundation work..... **25%**

**Clause 16**

Signature of Contractor.....

Signature of NRDA.....

Competent Authority for deciding

reduced rates.

**Chief Engineer ( Engineering), NRDA**

### Clause 18

List of mandatory machinery, tools & plants to be deployed by the contractor at site:-

1. JCB
2. Vibratory Roller
3. Concrete Mixers
4. Chain pulley crane
5. Needle/ plate Vibrator
6. Needle Plate
9. ....

### Clause 36 (i)

Requirement of Technical Representative(s) and recovery Rate

Sl. No	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical/ Technical Representative)	Minimum Experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
						Figures	Words
1.	Graduate Engineer	Electrical	Project Manager	8	1	2000/day	Two thousand per day
2.	Diploma Engineer	Electrical	Site Engineer	2	2	1000/day	One thousand per day

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers.

Signature of Contractor.....

Signature of NRDA.....

**Clause 42**

- (i) (a) Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of C.G.S.O.R **Not Applicable**
- (ii) Variations permissible on theoretical quantities:
- (a) Cement  
For works with estimated cost put to tender not more than Rs. 5 lakh. **3% plus/minus.**  
For works with estimated cost put to tender more than Rs.5 lakh. **2% plus/minus.**
- (b) Bitumen All Works **2.5% plus & only & nil on minus side.**
- (c) Steel Reinforcement and structural steel sections for each diameter, section and category **2% plus/minus**
- (d) All other materials. **Nil**

**RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION**

Sl. No.	Description of Item	Rates in figures and words at which recovery shall be made from the Contractor	
		Excess beyond permissible variation	Less use beyond permissible variation
1.	Cement	NA	NA
2.	Steel Reinforcement	NA	NA
3.	Structural Sections	NA	NA
4.	Bitumen issued free	NA	NA
5.	Bitumen issued at stipulated fixed price	NA	NA

Signature of Contractor.....

Signature of NRDA.....