ISSUED TO

M/S ----------

DY.CHIEF ENGINEER (I/C) OFFICE NCZO, KANPUR

TENDER FOR:-

SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF 1500 KVA ELECTRICAL SUBSTATION FOR INVESTMENT BUILDING AT PLOT NO. INS-16, SECTOR-14, VASUNDHARA (GHAZIABAD).

PART-I (TECHNICAL BID)

Date of Downloading of Tenders : From 18/10/2015 Onwards
Pre Bid Discussion on : 02/11/2015
Last date of Submission of Tender : 09/11/2015 up to 15:00 Hours

INDEX

Re: Tender for S /I/ T/ C of 1500 KVA Electrical Substation for Investment Building at Plot No INS-16, Sector 14, Vasundhara (Ghaziabad)

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LIFE INSURANCE CORPORATION OF INDIA

CONDITIONS OF CONTRACT

1.0 INTERPRETATIONS:

1.1 In construing these Conditions, the Specifications, the Priced Schedule of Quantities, Tender and Agreement, the following words shall have the meanings herein assigned to them except where the subject or context otherwise requires.

1.2 "Employer" shall mean THE LIFE INSURANCE CORPORATION OF INDIA and his (their) heirs, legal representatives, assignees and successors.

1.3 "DY.CHIEF ENGINEER (I/C)" shall mean the person occupying the post of head of the Zonal Engineering Department of the Corporation.

1.4 "Corporation's Engineers" shall mean such Deputy CHIEF ENGINEER's, Superintending Engineers and/or Executive Engineers of the Corporation, who shall from time to time be appointed by the DY.CHIEF ENGINEER (I/C) for supervising the work carried out by the Contractor or for any purpose in connection therewith:

1.5 The term "Site Engineer" shall mean the person appointed and paid by the Employer, acting under the order of the Corporation's Engineer to superintendent the work.

1.6 The Contractor shall mean the individual, firm or company whether incorporated or not, who is awarded the contract & shall include the legal representative of such individual or the persons composing such firm or company or the successors of such individual, firm or company & the permitted assignees of such individual, firm or company.

1.7 The "Site" shall mean the lands/buildings and/or other places on, in, into or through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.

1.8 "This Contract" shall mean the Articles of Agreement, these Conditions, the General Instructions to Contractor, General Preambles to Schedule of Quantities, Special Conditions, the priced Schedule of Quantities, the Specifications, the Appendices, the Drawings and other related correspondence.

1.9 "Act of Insolvency" shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any amending Statute.

1.10 "Notice in Writing" or written notice shall mean a notice in written, typed or printed characters, sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.

1.11 Words importing persons include Firms and Corporations, words importing the singular only also include the plural and vice versa where the context so requires.

1.12 The titles of the Clauses shall not affect or alter the meaning of Clauses and are solely for the purpose of facilitating reference.

1.13 The following abbreviations shall be followed for the designations of various LIC Officers:

DESIGNATIONS	***ABBREVIATIONS***
Executive Director (Engineering)	E.D. (E)
Zonal Manager	Z.M.
DY.CHIEF ENGINEER (I/C)	D.C.E.(I/C)
Chief Architect	C.A.
Deputy Chief Architect	D.C.A.
Deputy CHIEF ENGINEER	Dy. C.E.
Superintending Engineer	S.E
Senior Architect	S.A.
Executive Engineer	E.E.
Deputy Senior Architect	D.S.A
Asst. Secretary	A.S.

1.14 Wherever the words “approved”, “directed”, “as required”, “selected” or words of like effect are used, it is to be understood that the approval/direction, requirement or selection of the Corporation’s Engineer are intended unless otherwise specified.

1.15 The words “as described” shall mean the description in the Special Conditions, Specifications, General Instructions, Drawings etc of this tender.

1.16 The words “allow” shall mean that the Contractor shall include in his rates for the particular matter referred to.

1.17 “Day Work” shall mean items of labour and/or materials which in the opinion of the Corporation’s Engineer are not capable of being evaluated by the accepted method of measurement and analysis.

2.0 SCOPE OF CONTRACT:

2.1 The Contractor shall carry out and complete the works in every respect in accordance with this Contract and in accordance with the directions and to the satisfaction of the Corporation’s Engineer. The Corporation’s Engineer may issue further drawings and/or written instructions, details, directions and explanation in regard to:

a. The variation or modification of the Design, quality of works or the addition or omission or substitution of any work;

b. Any discrepancy in the Drawings or between the Schedule of Quantities and/or Drawings and/or Specifications;

c. The removal from the site of any materials brought thereon by the Contractor and the substitution of any other material thereof;

d. The removal and/or re-execution of any work executed by the Contractor;

e. The dismissal from the work of any persons employed thereupon;

f. The opening up for inspection of any work covered thereupon;

g. The amending and making good of any defects under relevant Clause giving details of defects after completion

2.2 The Contractor shall forthwith comply with and duly execute all works comprised in such Instructions subject to the provisions of relevant specific conditions of the Contract. In the event of any dispute or difference of opinion the contractor shall refer the matter within 7 (seven) days of the issue of such instruction to the DY.CHIEF ENGINEER (I/C) whose decision shall be final & binding.

3.0 DISCREPANCIES:

3.1 If there are varying or conflicting provisions made in any one document forming part of Contract, the DY.CHIEF ENGINEER (I/C) shall be the deciding authority with regard to the intention of the document and his decision shall be final and binding on the contractor.

3.2 The several documents forming the Contract are to be taken as mutually explanatory of one another, and the order of precedence shall be as follows;

a. Special conditions
b. General preambles to schedule of quantities
c. General instructions
d. Conditions of contract

3.3 In case of discrepancies between the Schedule of Quantities, the specifications and/or drawings the following order of precedence shall be observed

a. Description in Schedule of Quantities
b. Specifications of relevant Trade

c. Drawings; detailed drawings shall be followed in preference to small scale drawings and figured dimension in preference to scale.

d. Indian Standard Specifications of `BIS'

4.0 DRAWINGS AND SCHEDULE OF QUANTITIES:

4.1 Two complete sets of the Drawings and Specifications and Schedule of Quantities shall be furnished by the employer to the contractor. Two copies of the additional Drawings, if any, shall be furnished within such time as the DY.CHIEF ENGINEER (I/C) may consider reasonable which may be necessary for execution of any part of the work. Such copies shall be kept on the work site and the DCE (I/C) and his representatives shall at all reasonable times have access to the same and they shall be returned to the SE/EE by the Contractor on completion of the contract.

This Contract and the signed Drawings, Specifications and Schedule of Quantities shall remain in the custody of the Employer.

5.0 CONTRACTOR TO PROVIDE EVERYTHING NECESSARY FOR EXECUTION OF WORK :

5.1 The Contractor shall provide everything necessary for the proper execution of the work according to the intent and meaning of Drawings. Priced Schedule of Quantities and Specifications taken together, whether the same may or may not be explicitly shown or described therein provided that the same can reasonably be inferred there from and if the Contractor finds any discrepancy therein he shall immediately and in writing refer the same to the DCE (I/C) whose decision shall be final and binding on the Contractor.

5.2 The Contractor shall supply, fix and maintain at his cost, during the execution of any work, all the necessary Centering, Scaffolding, Staging, Planking, Timbering, Strutting, Shoring, Pumping, Fencing, Boarding, Watching and Lighting by night as well as by day, required not only for the proper execution and protection of the said work, but also for the protection of the public and the safety of any adjacent Roads, Streets, Cellars, Vaults, Ovens, Pavements, Walls, Houses, Buildings, and all other erections, matters or things and the Contractors shall take down and remove any or all such Centering, Scaffolding, Staging, Planking, Timbering, Strutting, Shoring, etc. as occasion shall require or when ordered to do so and shall fully reinstate and make good all matters and things disturbed during the execution of the work to the satisfaction of the Corporation's Engineer.

6.0 AUTHORITIES NOTICES AND PATENTS

6.1 The Contractor shall conform to the provisions of any Acts of the Legislature relating to the work, and to the Regulations and Bye-Laws of any Authority and/or any Water, Lighting and other Companies and/or Authorities with whose system the structure is proposed to be connected and shall before making any variations from the Drawings or Specifications that may be necessitated by so conforming give to the DCE (I/C) written notice specifying the variations proposed to be made and the reasons for making them and apply for instructions

thereon. In case the Contractor shall not within 7 (seven) days receive such instructions, he shall proceed with the work conforming with the Provisions, Regulations or Bye-Laws in question:

6.2 In particular, the Contractors shall be responsible to Register themselves under the Contract Labour (Regulation and Abolition) Act 1970 and Rules there under and any amendment thereto; they must comply with and carry out all the provisions and obligations under the said Act and Rules and furnish all information to Employer as may be required, by it and shall indemnify the Employer against any penalties / claims arising from any default on their part.

6.3 The Contractor shall arrange to give all notices required by the said Acts, Regulations or Bye Laws to be given to any Authority and to pay to such Authority or to any Public Office all fees that may be properly chargeable in respect of the work and lodge the receipts with the Employer.

6.4 The Contractor shall indemnify the Employer against all claims in respect of patent rights and shall defend all actions arising from such claims unless he has informed the DY.CHIEF ENGINEER (I/C) before any such infringement and received his permission to proceed and should himself pay all royalties, license fees, damages, costs and charges of all and every sort that may be legally incurred in respect thereof:

6.5 The Contractor should observe that his work shall not cause any nuisance to the Public in general and to the neighboring occupants in particular.

6.6 Should the Contractor desire to work on Sundays, Holidays and during night hours, permission in writing from the Corporation's Engineer must be obtained in time. It shall be the responsibility of the Contractor to obtain permission from Civil Authorities, if necessary.

7.0 SETTING OUT WORK :

7.1 The Contractor shall set out the work and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time, any error shall appear during the progress of any part of the work, the Contractor shall at his own cost rectify such error, if called upon, to the satisfaction of the Corporation's Engineer. The Contractor must not commence work until the outlines of the building and Centre line layout have been pegged out and approved by the Corporation's Engineer.

8.0 CONTRACTOR IMMEDIATELY TO REMOVE OFFENSIVE MATTER :

8.1 All soil, filth or other matter of an offensive nature taken out of any trench, sewer, drain, cesspool, or other place shall not be deposited on the surface, but shall be at once carted away by the Contractor to some pit or place provided by him.

9.0 MATERIALS AND SAMPLES :

9.1 All the materials stores and equipment required for the full performance of the Contract must be provided through normal trade channels and must include octroi, excise and import duties, sales tax payable to all authorities and other charges. They shall be of approved quality and the best of their kind available and the Contractor must be entirely responsible for the proper and efficient carrying out of the work. The Contractor shall order all materials required for the execution of the work from local/outside sources as early as necessary to the satisfaction of the Corporation's Engineer and to ensure that such materials are on site well ahead of requirement for use in the work.

9.2 Before ordering such materials, the Contractor shall get samples of the materials approved well in time. Preference shall be given to ISI marked products and approved brands of requisite quality as mentioned in the tender. For materials, which are neither approved brands nor ISI marked, the same shall be got tested from approved laboratories at the Contractor's cost before approval. Approved brand and ISI marked product will also be tested if desired by the DCE (I/C) and if the test results are satisfactory, the cost of testing shall be borne by the Employer otherwise by the Contractor. No claim will be allowed for delay to the progress of work caused by test. If called upon by the Executive Engineer the Contractor shall produce proof for having arranged for the supply of materials well in time.

9.3 The Contractor shall furnish well in time before work commences at his own cost, any samples of workmanship that may be called for by the Corporation's Engineer for his approval and any further samples in case of rejection until such samples are approved. Such samples when approved shall be the minimum standard for the work to which they apply. In case of items like suspended ceilings, partitions, etc., typical sample panels or proto-types shall be erected in position for approval before undertaking work. Rates quoted shall cover for such preliminary work.

10. ACCESS :

10.1 Any of the Corporation's Engineers or any persons authorized by any one of them shall at all reasonable time have free access to the work and / or to the workshops, factories or other places where materials are being prepared or constructed for the Contract and also to any place where the materials are lying or from which they are being obtained and the Contractor shall give every facility to all of them necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Public Authorities no persons shall be allowed on the work at any time without the written permission of the Corporation's Engineer.

If any work is to be done at a place other than the site of the work, the Contractor shall obtain written permission of the Corporation's Engineer for doing so.

11. CONTRACTOR'S SUPERVISION & MINIMUM REQUIREMENT OF TECHNICAL STAFF:

11.1 The Contractor shall either himself supervise the execution of the contract or shall depute an experienced foreman supervised by the DY.CHIEF ENGINEER and Superintending Engineer, Ghaziabad and who shall be constantly in attendance at the building while the **Substation work** is proceeding. Any directions, explanations, instruction or notices given by the Corporation's Engineer to such foreman shall be deemed to be given to the contractor.

11.2 Corporation's Engineer shall have power to give notice to the contractor or to his foreman of non-approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the DY.CHIEF ENGINEER (I/C), NCZ is obtained. The work will from time to time be examined by the DY.CHIEF ENGINEER (I/C)/ DY.CHIEF ENGINEER, NCZ and the corporation's Engineers but such examination shall not in any way exonerate the contractor from the obligations to remedy and defects which may be found to exist in such of the work or after the completion of the same.

RECOVERY FOR NON-DEPLOYMENT OF ENGINEER/S AT SITE

If the contractor fails to employ suitable person(s) to supervise the work or fails to appoint replacement(s) when necessitated, amount as stipulated in the Appendix to the conditions of contract shall be recovered from the contractor for each Engineer and each supervisor for the period of non-employment.

12.0 DISMISSAL OF WORKMEN:

12.1 The Contractor shall, on the instruction of the Corporation's Engineer, immediately dismiss from the work any person employed thereon, who may, in the opinion of the Corporation's Engineer, be unsuitable or incompetent or who may misconduct himself and such person shall not be again employed or allowed on the work without the permission of the Corporation's Engineer.

13.0 DATES OF COMMENCEMENT AND COMPLETION:

13.1 The "Date of Commencement" shall be as stated in the Work Order and the Contractor shall thereupon and forthwith begin the work and shall regularly proceed with and complete the same on or before the "Date of Completion" stated in the Work Order, subject to the provisions for extension of time hereinafter contained.

14.0 ASSIGNMENT:

The whole of the work included in the Contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or underlet the Contract or any part, share of interest therein nor shall he take a new partner without the written consent of the DCE (I/C) and no subletting shall relieve the Contractor from the full and entire responsibility of the Contract or from the active superintendence of the work during its progress.

15.0 DEVIATION, VARIATION, EXTRA/DEVIATED ITEMS AND PRICING:

15.1 The Contractor should note that unless otherwise stated, the tender is strictly on Item Rate basis and his attention is drawn to the fact that rates for each and every item should be correct, workable and self supporting. The quantities in the Schedule of Quantities approximately indicate the total extent of work and no variation i.e. additions, omissions or subtractions shall vitiate the Contract. No liability shall attach to the Employer for any error therein or variation there from.

15.2 The contractor may when authorized and shall when directed, in writing by the DCE (I/C) or the Corporation's Engineers, whom the DCE (I/C) may for that purpose appoint, add to, omit from, make alterations in, substitutions for, or vary the works shown upon the Drawings or described in Specifications or included in the priced Schedule of Quantities but the Contractor shall make no additions, omissions, alterations, substitutions or variations without such authorization or direction. A verbal authority or direction by the DCE (I/C), if confirmed by the contractor in writing within 7 (seven) days, be deemed to have been given in writing.

15.3 The rates of such altered, additional or substituted works shall be determined in accordance with the following:

a. The net rates or prices in the original tender shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced therein.

b. The net price of the items in the original tender shall determine the value of the items omitted. However, if omissions vary the conditions under which any remaining items of the work are carried out or if the amount of any omission relative to the amount of the whole of the Contract works or to any part thereof shall be such that in the opinion of the DY.CHIEF ENGINEER (I/C), the net rate or price contained in the Priced Schedule of Quantities or Tender or for any item of work involves loss or expenses beyond that reasonably contemplated by the Contractor and is by reason of such omission rendered unreasonable or inapplicable, the DY.CHIEF ENGINEER (I/C) shall fix another rate or price as in the circumstance he shall think reasonable and proper.

c. If the rate for any altered, additional, or substituted item of work is not specified in the schedule of quantities, the rate for that item shall be derived from the rate for the nearest similar item specified therein.

d. If the rate for altered, additional or substituted item of work cannot be determined in the manner specified above, then such items of work shall be priced on the basis of coefficients of labour and materials as given in the latest CPWD rate analysis handbook and rates for labour and materials wherever applicable shall be the market rate prevailing at the time of execution.

e. Where such coefficients are not available in C.P.W.D. rate analysis, the actual Labour/Materials involved and recorded by the Executive Engineer in executing the items shall be considered.

f. Where extra work cannot be properly measured or valued, the Contractor shall be allowed "Day Work" prices at the net rates stated in the Tender or the Priced Schedule of Quantities or, if not so stated, then in accordance with the local "Day Work" rates and wages for the district, provided that in either case vouchers specifying the date and time (and if required by the DCE (I/C) the names of workmen employed) and materials incorporated be delivered for verification to the DCE (I/C) or his representative at or before the end of the week following that in which the work has been executed. The DCE (I/C) is not bound to recognize the cost of materials furnished in vouchers; the DCE (I/C) at his discretion will fix the price of such materials based upon market value.

g. While fixing rates of extra items 15% (Fifteen percent only) shall be allowed over and above the cost of material, labour and all applicable taxes, cess, statutory levies (excluding income tax) to cover all supervision, overheads, statutory Taxes and Levies and profits. This shall not however apply where 100% advance is given by the employer for purchase of any material (such as cement, steel etc.). In such cases 3.75% of the cost of materials only shall be allowed as handling charges and 15% shall be allowed only on the labour cost apart from above mentioned taxes etc.

h. Items for which the rates, as assessed by the employer are higher or lower by more than 35% of the market rates shall be termed as Abnormally High Rated Items (AHRI) and Abnormally Low Rated Items (ALRI) respectively. The decision of the DY.CHIEF ENGINEER (I/C) on categorization of items as AHRI / ALRI shall be final and binding.

i. For all extra items of work, the contractor should submit to the concerned Corporation's Engineer the necessary particulars along with his analysis and the rate he proposes to claim for consideration within a period of 4 (four) weeks from the time of cropping up of any authorized extra / deviated item. He shall also ensure that all the authorized claims are included in the final bill. If the contractor fails to submit his claim within the stipulated period or the period duly extended by the Corporation's Engineer, then the DCE (I/C) shall proceed to fix the rate for the item(s) and the same shall be final and binding on the contractor.

j. The Contractor shall note that Extra/Deviated items claim and/or any other claim whatsoever if submitted after submission of his Final Bill will not be entertained and considered by the Employer. The Contractor shall not be allowed to make any Additions/ Alterations/ Revisions / Changes/ Modifications/ Variations in the final bill, after the final

bill is submitted by him.

16.0 SUB-CONTRACTORS:

16.1 All specialist Merchants, Tradesmen and others, executing any work or supplying, fixing any goods for which provisional sums are included in the Schedule of Quantities and/or Specifications, who may be nominated or selected by the DCE (I/C), who shall be the final authority are hereby declared to be Sub-Contractors and are herein referred to as nominated Sub-Contractors.

16.2 No nominated Sub-contractor shall be employed on or in connection with the work against whom the Contractors shall make reasonable objection or (save where the DCE (I/C) and the Contractor shall otherwise agree) who will not enter into a Contract providing:-

a. That the nominated Sub-Contractor shall indemnify the Contractor against the same obligation in respect of the Sub-Contractor as the Contractor is under, in respect of this Contract;

b. That the nominated Sub-Contractor shall indemnify the Contractor against claims in respect of any negligence by the Sub-Contractor or his servants or agents or any misuse by him or them of any scaffolding or other plant or the property of the Contractor or under any Workmen's Compensation Act in force.

17.0 THIRD PARTY LIABILITY, DAMAGE TO NEIGHBOURING PROPERTY, LOSS OF MATERIAL AND WORKMEN'S COMPENSATION:

17.1 The Contractor shall be responsible for all injury to persons, animals or things, and for all damage to structural and/or decorative part of property which may arise from the operations or neglect of himself or of any Sub-contractor or any of his Sub-Contractor's employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of his Contract. This Clause shall be held to include inter-alia, any damage to Building, whether immediately adjacent or otherwise and any damage to roads, streets, footpaths, bridges, or ways as well as all damage caused to the building, and the works forming the subject of this Contract by frost, rain, wind or other inclemency of the weather. The Contractor shall fully indemnify the Employer and hold him harmless in respect of all and any expenses arising from any such injury or damage to persons or property as aforesaid and also in respect of all and any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award or compensation or damages consequent upon such claim.

17.2 The Contractor shall fully indemnify the employer against any loss, damage or deterioration for whatever reason, of all materials brought at site and especially material supplied by or paid for partly or wholly by the employer.

17.3 The Contractor shall reinstate all damage and loss of every sort mentioned in this Clause so as to deliver up the whole of the Contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of the third parties.

17.4 The Contractor shall fully indemnify the Employer against all claims which may be made against the Employer by any member of the Public or other third party in respect of anything which may arise in respect of the works or in consequence thereof.

17.5 The contractor shall at his own expense arrange to effect from the date of commencement & maintain till the date of virtual completion of contract, with any licensed general insurance company, a ***POLICY OF INSURANCE (Contractor's All Risk Policy)*** to cover all such risks detailed above viz. loss, damage & third party liability etc. The policy shall be of an amount as mentioned in Appendix to Conditions of Contract and in the joint names of the employer & contractor and shall be deposited with the employer and renewed as required from time to time during the currency of the contract.

17.6 The Contractor shall also fully indemnify the Employer against all claims which may be made upon the Employer, whether under the ***WORKMEN'S COMPENSATION ACT*** or any other ***STATUTE*** in force during the currency of this Contract or at Common law in respect of any Employee of the Contractor or any Sub-Contractor and shall at his own expense effect and maintain until the Virtual completion of the work, with "licensed General Insurance Company" a ***POLICY OF INSURANCE*** of adequate amount in the joint names of the Employer and the Contractor against such risks and deposit such policy or policies with the employer & renew the same as required from time to time during the currency of the Contract.

17.7 The Contractor shall be responsible for anything, which may be excluded from the Insurance Policies above referred to, and also for all other damage to any property arising out of or incidental to the negligence or defective carrying out of the Contract.

17.8 The amount of insurance to be taken for the above policies will be jointly decided between the contractor and the employer before issue of acceptance letter based on the tendered cost, nature of work, location of site, local hazards etc.

RECOVERY FOR NON EXTENSION OF INSURANCE POLICIES (WORKMEN'S COMPENSATION AND CONTRACTOR'S ALL RISK POLICY INCLUSIVE OF THIRD PARTY LIABILITY)

17.9 In default of the Contractor insuring as provided above, or having insured failing to renew the same as required the Employer on his behalf may so insure/renew and may deduct the premiums paid from any monies due or which may become due to the Contractor together ***with penalty amounting to Rs. 10,000/- for each extension of such policy***.

17.10 The Contractor shall also fully indemnify the Employer in respect of any costs, charges or expenses arising out of any claim or proceedings at law and also in respect of any award of compensation of damages arising there from.

17.11 The Employer shall be at liberty and is hereby empowered to deduct fully the amount of any damages, compensation costs, charges and expenses arising or accruing any such claim of damage from any sum or sums due or to become due to the Contractor.

18.0 DELAY AND EXTENSION OF TIME:

18.1 If the works be delayed due to any of the following:

(a) by force majeure,

(b) by reason of any exceptionally inclement weather,

(c) by reason of proceedings taken or threatened by, or disputes with, adjoining or neighbouring owners, or public authorities,

(d) by the work, or delays, of other Contractors or Tradesmen engaged by the Employer,

(e) by reason of any additional work or instruction ordered by the employer,

(f) by reason of Civil Commotion, local commotion of workmen or strike or lock-out affecting any of the building trades,

(g) in consequence of the Contractor not having received in due time necessary instructions from the DCE (I/C) for which he shall have specifically applied in writing,

(h) from other causes which the DCE (I/C) may certify as beyond the Control of the Contractor,

(i) by reason of non-payment of interim certificate at specified time, then upon the happening of any such event causing delay the contractor shall immediately, give notice thereof in writing to the Corporation's Engineer, but shall nevertheless use constantly his best endeavours to make good this delay.

18.2 Request for extension of time shall be made by the contractor well in advance but at least 30 days before schedule date of completion along with revised programme for completion of the work.

18.3 In case of strike or lockout the Contractor shall give written notice thereof to the DCE (I/C) as soon as possible but he shall nevertheless constantly use his endeavours to prevent delay and shall do all that may reasonably be required to the satisfaction of the DCE (I/C) to proceed with the work.

18.4 The DCE (I/C) shall make a fair and reasonable assessment of the delay and grant extension of time accordingly. Such extension shall be communicated to the contractor by the Corporation's Engineer within 3 (Three) months of the date of receipt of such request. Non-application by the contractor for extension shall however not be a bar for giving fair and reasonable extension which shall be as decided by the DCE (I/C).

18.5 The decision of the DCE (I/C) as communicated by the Corporation's Engineer to the contractor on the extension of time shall be final & binding.

18.6 No claim in respect of compensation or otherwise, howsoever arising, as a result of extension granted under the above conditions shall be admissible.

19.0 DAMAGE FOR NON-COMPLETION:

19.1 If the Contractor fails to complete the work by the date of completion stated in the "Appendix to Condition of Contract" or within time properly extended under Clause (18) hereof and the DCE (I/C) certifies in writing that in his opinion the same ought, reasonably so, to have been completed, the Contractor shall pay or allow the Employer the sum named in the Appendix as "Liquidated Damages" for the period during which the said works shall so remain incomplete and the Employer may deduct such damages from any money due to the Contractor. In case liquidated damages in accordance with the above provision accrue to maximum limit as mentioned in the Appendix to the Conditions of the Contract, the DY.CHIEF ENGINEER (I/C) shall be at liberty to rescind the Contract and to get it completed entirely at the risk and cost of the Contractor through any other agency he decides to appoint. All extra expenses incurred shall be recoverable from the money due to Contractor or lying to his credit with the Employer against the present or any other Contract.

20.0 FAILURE BY CONTRACTOR TO COMPLY WITH DCE (I/C)'S INSTRUCTIONS:

20.1 If the Contractor after receipt of written notice from the DCE (I/C), requiring compliance with such further Drawings and/or his instructions, fails within 7 (seven) days to comply with the same the DCE (I/C) may employ and pay other persons to execute any such work whatsoever as may be necessary to give effect thereto and all additional costs incurred in connection therewith shall be deducted from any money due or to become due to the Contractor.

***21.* MEASUREMENT OF WORK:**

21.1 All items having a financial value shall be entered in the Measurement Book. All measurements and levels shall be taken jointly by the Site Engineer or his authorised representative and by the Contractor or his authorised representative from time to time during the progress of the work and such measurements shall be signed and dated by both the parties in token of their acceptance. If any of the measurements recorded are objected by any one of the party, a note shall be made to that effect with reason, signed by both parties and referred to DCE (I/C) whose decision in the matter shall be final and binding. Abstracts of Measurements can also be recorded through electronic medium where specifically approved by DY.CHIEF ENGINEER (I/C).

21.2 If the contractor or his authorised representative does not remain present at the time of such measurements after the contractor or his authorised representative has been given a notice in writing 3 (three) days in advance or fails to countersign or to record objections within a week from the date of measurement, then, such measurements recorded in his absence by the Site Engineer shall be deemed to be accepted by and binding on the Contractor.

21.3 The Contractor shall, without any extra charge provide all assistance with every appliance, labour and other things necessary for taking measurements and recording levels including test checking of such measurements by any person authorised by the Employer.

21.4 All work shall be measured net as fixed in its place. All measurements of 'cutting' shall be held to include for the consequent wastage on the materials used.

21.5 Except where any general or detail description of the works expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items for which procedure is not covered in the specification, measurement shall be taken in accordance with the relevant Standard Method of measurement issued by BIS and if for any item no such standard is available then a mutually agreed method shall be followed.

21.6 Measurements of all hidden/concealed items of work including extra items if any, such as, work in foundations including excavations, plinth filling, masonry, concrete etc. steel in all R.C.C. work, pipe to be encased etc. shall be jointly recorded by the Site Engineer or his authorised representative and the Contractor's Site Engineer, before they are covered up. Immediately after the work is ready for measurements, Contractor will give specific notice to the Site Engineer for recording the measurements. If the Site Engineer or his authorised representative fails to record the measurements, the Contractor will refer the matter to the Corporation's Engineer for instructions, but in no case shall cover up work without the latter's permission.

22. PAYMENT TERM & VALUE OF WORK FOR INTERIM CERTIFICATE:

22.1 The contractor shall be paid by the employer, from time to time, by instalment under Interim Certificate to be issued by the Superintending Engineer to the Contractor on account of the work executed, when in the opinion of the Superintending Engineer, work to the approximate value named in the Appendix as "Value of work for Interim Certificate" (or less at the reasonable discretion of the Executive Engineer) has been executed in accordance with this contract, subject however to a retention of the percentage of such value named in Appendix hereto as "Retention percentage on account of Security Deposit". The Interim Certificate shall be based upon Interim Bills or Running Account Bills to be prepared by the Contractor and supported by the detailed measurements. The Superintending Engineer may include in the Interim Certificate such amount as he may consider proper on account of materials delivered upon the site by the Contractor for use in the work but not incorporated in it.

22.2 In case any materials have been supplied by the Employer to the Contractor in connection with the work, necessary recovery for the same shall be effected form the bills of the Contractor by the DY.CHIEF ENGINEER (I/C) at the issue, rates of such material as stipulated while calling for tenders and in other cases at a stock rate or market rates of such materials, whichever is higher. The Contractor will, however, not be entitled to modify his rates for items of work requiring use of such materials and when the work has been virtually completed and the DY.CHIEF ENGINEER (I/C) shall have certified in writing that it has been so completed on the basis of detailed measurements and after obtaining the written endorsements by the

DY.CHIEF ENGINEER (I/C) that the DY.CHIEF ENGINEER (I/C) has made a final scrutiny and that there are no disputed items, rates and quantities, the Contractor shall be paid by the Employer in accordance with the certificate to be issued by the DY.CHIEF ENGINEER (I/C) the sum of money named in the Appendix as "Instalment after virtual completion" and the Contractor shall be entitled to the payment of the final bill in accordance with the final certificate to be issued in writing by the DY.CHIEF ENGINEER (I/C) with the approval the DY.CHIEF ENGINEER (I/C) with expiration of the period referred to as "Defects Liability Period" in the Appendix hereto from the date of virtual completion or as soon after the expiration of such period as the work shall have been finally completed and all defects made good according to the true intent and meaning hereof, whichever shall last happen;

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22.3 Provided always that the issue by the Corporation's Engineer of any Certificate during the progress of the works or after their completion shall not relieve the Contractor from his liability in cases of fraud, dishonesty or fraudulent concealment relating to the work or materials or any matter dealt with in the Certificate in case of all defects and insufficiencies in the work or materials which a reasonable examination would not have disclosed. No Certificate of the Corporation's Engineer shall of itself be conclusive evidence that any work or materials to which it related are in accordance with the Contract;

22.4 Payment upon the Corporation's Engineer's Certificate shall be made within the periods named in the Appendix "Period for honouring Interim Certificate" after such a Certificate has been delivered to the Employer;

22.5 The DCE (I/C) shall have power to withhold any Certificate if the work or any parts thereof are not being carried out to his satisfaction.

22.6 The measurements and valuation in respect of the Contract shall be completed within the "period of Final Measurement" stated in the Appendix or if not so stated then within six months of the completion of the contract works as defined in Clause (26) hereof. No further claim shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished.

22.7 Final Certificate shall be issued by the DCE(I/C) after the conditions are met with as per 23.4, 23.5, 23.6 and 27 and contractor's submission of **No Claim certificate cum receipt** as per the Proforma given in Appendix to Conditions of Contract.

23. SECURED ADVANCE AGAINST MATERIALS:

23.1 The Contractor shall be entitled to be paid advance along with interim bill against materials which are not perishable and which are in the opinion of Corporation's Engineer, required for the works and have been brought on site for incorporation in the work but have not been so incorporated and are safeguarded against loss due to any cause whatsoever, **(refer clause no-17).** The amount of such advance against materials shall be arrived at on the following basis:

a) 80% of the market value of materials required for the work and brought on site.

OR

80% of the cost of such materials (brought on site) as derived from the relevant accepted tender rate for the particular item involving such materials;

whichever is lower.

b) Such advance payment made against materials shall be recovered from or adjusted from the interim bills as and when the materials are utilized in the work.

Examples of certain perishable materials on which no advance shall be paid are Sand, Paint, Bitumen, Hard Boards/Soft Boards and other paper products, Petroleum Products, Coal Tar, Insulating Boards etc.

23.2 In case of dispute, the decision of the DY.CHIEF ENGINEER (I/C) on whether advance payment can be made against specific materials shall be final and binding.

24. UNFIXED MATERIALS AND EQUIPMENTS:

24.1 All tools, plants and materials brought to the site by the Contractor shall vest in the Employer and shall not be removed from the site of works except by permission of the Corporation's Engineer in writing. The Employer shall have a lien on these materials and plants.

25. REMOVAL OF IMPROPER WORK:

25.1 The Corporation's Engineer shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or as may be specified in the order, of any materials, which in their opinion are not in accordance with the Specifications or instructions, the substitution of proper materials and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the Drawings and Specifications or Instructions and the Contractor shall forthwith carry out such an order at his own cost. In case of default on the part of the Contractor to carry out such an order, the DCE (I/C) shall have the power to employ other persons to carry out the same and all expenses consequent thereon or incidental thereto as certified by the DCE (I/C) shall be borne by the Contractor and may be deducted from any amounts due or that may become due to the Contractor.

26. VIRTUAL COMPLETION:

26.1 The work shall be completed in accordance with the Contract and to the entire satisfaction of DY.CHIEF ENGINEER (I/C). All unused materials, tools, plants, scaffoldings, temporary structures, hutments and things belonging to the Contractor shall be removed and the site of works cleared of rubbish and all waste materials by the contractor at his own expenses and delivered up tidy to the employer. After completion of the work, the contractor will serve a written notice to the DCE (I/C) to this effect. The DY.CHIEF ENGINEER (I/C) after satisfying himself shall thereupon approve the virtual completion. The Defect Liability Period shall commence from the date of such certification.

27. DEFECTS AFTER COMPLETION:

27.1 The equipment supplied and erected shall be guaranteed against defective workmanship, defective material and defective performance for a minimum period of 12 (Twelve) months to be reckoned from the date the **Substation** works are completed and handed over to LICI along with NOC from Electrical Authorities, Ghaziabad. Any defect or defects in performance, workmanship or material arising during the guarantee period shall be rectified by the contractor under this contract free of cost to Life Insurance Corporation of India. During the guarantee period the **Substation** works shall be serviced by the contractor by deputing once every month or earlier when directed by Life insurance Corporation of India. Any supply of oil, grease or silica gel charging required for servicing of the equipment shall be supplied by the contractor at his cost during the guarantee period. In addition to the servicing of the equipment as above, the contractor shall attend to all the breakdown calls during this period of 12 months at his own cost within four hours of reporting of defect. All the travelling expenses, incidental charges, etc. incurred for deputing the personnel for carrying out servicing will have to be borne by the contractor.

28. **PROVISIONAL SUMS, APPLICATION OF:**

28.1 For all the work listed under items for which provisional sums are provided in the tender, the DCE (I/C) reserves the right to invite separate tenders or select or order from any manufacturer or firms at his discretion and reserves to himself the right of paying direct to persons or firms for any such work. The Contractor will not have any claims over these items, but if tenders are invited for such items, he will also be invited to quote along with others.

28.2 If ordered by the DCE (I/C), Contractor shall be required to carry out provisional sum items at the same conditions and rates as applicable for this Contract.

29. OTHER PERSONS ENGAGED BY THE EMPLOYER:

29.1 DCE (I/C) reserves the right to execute any work not included in this Contract, which he may desire to have carried out, by other persons and the Contractor shall allow all reasonable facilities and the use of his scaffolding and plant for the execution of such work, but is not required to provide any special plant or materials for the execution of such work except by special arrangement with the Employer. Such work shall be carried out in such manner as not to impede the progress of the work included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or be occasioned by such work.

30. SUSPENSION BY THE CONTRACTOR:

30.1 If the Contractor, except on account of any legal restraint upon the Employer preventing the continuance of the work, shall suspend the work or in the opinion of the DCE (I/C) shall neglect or fail to proceed with due diligence in the performance of his part of the Contract or if he shall make default in respect of Clause No.2, the Employer shall have the power to give notice in writing to the Contractor requiring that the work be proceeded within a reasonable manner and with reasonable dispatch. Such Notice shall purport to be a notice under this clause. After such notice is given, the Contractor shall not be at liberty to remove from the site

of the work or from any ground contiguous thereto any plant or materials belonging to him, which shall have been placed thereon for the work and the Employer shall have a lien upon all such plant and materials to subsist from the date of such notice being given until the notice shall have been complied with. If the Contractor shall fail for 7 (seven) days after such notice given to proceed with the work as therein prescribed, the DCE (I/C) may proceed as provided in Clause No.31.

31. DETERMINATION OF CONTRACT BY EMPLOYER:

31.1 If the Contractor (being an individual or a firm) commit any "Act of Insolvency" or shall be adjudged as Insolvent or shall make an assignment or composition of the greater part in number or amount of his creditors or shall enter into a deed of assignment with his creditors, or being an Incorporated Company shall have an order made against him or pass an effective resolution for winding up either compulsorily or subject to the supervision of the Court or Voluntarily or if the official Assignee of the Contractor shall repudiate the Contract or if the official Assignee or the Liquidator in any such winding up shall be liable within 7 (seven) days after notice to him requiring him to do so, to show to the reasonable satisfaction of DCE (I/C) that he is able to carry out and fulfil the Contract and if required by the DCE (I/C) to give security therefore or if the Contractor (whether an Individual Firm or Incorporated Company) shall suffer execution to be issued or if the Contractor shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractors or if the contractor shall assign or sublet the Contract without the consent in writing of the DCE (I/C) first obtained or if the Contractor shall charge or encumber this Contract or any payment due or which may become due to the Contractor there under, or if the DCE (I/C)shall certify in writing that in his opinion the Contractor,

a. has abandoned the Contract, or

b. has failed to commence the work, or has without any lawful excuse under these conditions suspended the progress of the work for 7 (seven) days after receiving from the DCE (I/C) written notice to proceed, or

c. has failed to proceed with work with such due diligence and failed to make such due progress as would enable the work to be completed within the time agreed upon, or

d. has failed to complete the work within the stipulated date including authorised extensions or

e. has failed to remove the materials from the site or to pull down and replace the work within 7 (seven) days after receiving a written notice from the Corporation's Engineer that the said materials or work were condemned or rejected or

f. has neglected or failed persistently to observe and perform all or any of the acts, matters, or things, by this Contract to be observed and performed by the Contractor for

7 (seven) days after written notice shall have been given to the Contractor requiring the Contractor to observe or perform the same, or

g. has to the detriment of good workmanship or in defiance of the DCE (I/C)'s instructions to the contrary sub-let any part of the Contract.

then and in any of the said causes, the DCE (I/C) notwithstanding any previous waiver, after giving 7 (seven) days notice in writing to the Contractors, determine the Contract, but without thereby affecting the powers of the DCE (I/C)or the obligations and liabilities of the Contractor, the whole of which shall continue to be in force as fully as if the contract has not been so determined and as if the work subsequently executed had been executed by or on behalf of the Contractor. And further, the Employer, his agents or servants, may enter upon and take possession of the work and all plant, tools, scaffolding, sheds, machinery, steam and other power, utensils and materials, lying upon the premises or the adjoining lands or road and use the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the work or by employing any other Contractors or other person or persons to complete the work, and the Contractor shall not in any way interrupt or do any act, matter, or thing to prevent or hinder such other Contractor, other persons or person employed for completing and finishing or using the materials and plant for the work. When the work shall be completed or as soon thereafter as convenient, the DCE (I/C) shall give a notice in writing to the Contractor to remove his surplus materials and plant and should the Contractor fail to do so within a period of 14 (Fourteen) days after receipt thereof by him, the Employer may sell the same by public auction and shall give credit to the Contractor for the amount so realized. The DCE (I/C)shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Employer for the value of the said plant and materials so taken possession of by the Employer and the expense or loss which the Employer shall have been put to in getting the work to be so completed, and the amount, if any, owing to the Contractor and the amount, which shall be so certified shall thereupon be paid by the Employer to the Contractor or by the Contractor to the Employer, as the case may be and the Certificate of the DCE (I/C) shall be final and conclusive between the parties.

32. TERMINATION OF CONTRACT BY CONTRACTOR:

32.1 If payment of the amount payable by the Employer under any Certificate of the SE shall be in arrears as unpaid for 60 (sixty) days after notice in writing requiring payment of the amount with interest of aforesaid shall have been given by the Contractor to the Employer, or if the work be stopped for six months under order of the DCE (I/C) or by any injunction or other order of any Court of Law, then and in any of the said cases, the Contractor shall be at liberty to determine the Contract by notice in writing to the Employer and he shall be entitled to recover from the Employer payment for all the work executed and for any loss, he may sustain upon any plant or material supplied or purchased or prepared for the purpose of the Contract.

32.2 In arriving at the amount of such payment, the net rates contained in the Contractor's original tender shall be followed or where the same may not apply, valuation shall be made in accordance with Clause No.15 hereof.

33. DETERMINATION OF CONTRACT DUE TO ABANDONMENT OR REDUCTION IN SCOPE OF WORK:

33.1 If at any time after the acceptance of the tender, the Employer shall for any reasons whatsoever not require the whole or any part of the works to be carried out, the DCE (I/C) shall give notice in writing to the Contractor who shall have no claim to any payment of compensation or otherwise whatsoever on account of any profit or advantage which he might have derived from the Execution of the whole of the works.

The Contractor shall be paid at contract rates for the full amount of work executed and in addition:

a. The cost at site of all surplus approved materials collected for incorporation in the work, which the Contractor does not wish to retain and which shall thereafter become the property of the Employer.

b. Where the Contractor desires to retain the surplus of approved materials (excepting materials supplied by the Employer or obtained in Employer's name, which shall, in any case, be returned to the Employer) the cost of handling and cartage charges for removal from the site to a reasonable distance not exceeding 25 kms.

c. If upon the determination of the Contract under this condition, the Contractor is of the opinion that he has suffered hardship by reason of the operation of these conditions, he may refer the circumstances with full details to the DY.CHIEF ENGINEER (I/C), who on being satisfied that such hardship exists or has existed, shall make such allowance, if any as in his opinion is reasonable, and his decision shall be final, conclusive and binding.

34. DISPUTES TO BE FINALLY DETERMINED BY DY.CHIEF ENGINEER (I/C):

34.1 The Instruction, Decision, Opinion, Direction, Certificate or Valuation of the DCE (I/C) with respect to all or any of the matters under Clause (2), (3), (5), (6), (9), (14), (15), (18), (23), (27), (30), (31) and (33) hereof (which matters are herein referred to as EXCEPTED MATTERS) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other Decision, Opinion, Direction, Certificate or Valuation of the DCE (I/C) or any refusal of the DCE (I/C) to give any of the same shall be subject to the right of Arbitration and review as given under Clause No.36.

35. SECURITY DEPOSIT AND PERFORMANCE GUARANTEE:

35.1 Amount towards Security deposit shall be calculated as per details given in "APPENDIX TO CONDITIONS OF CONTRACT" in Part-II of the tender. Security Deposit can be either in Cash or in the form of Bank Guarantee.

In case of cash option, the EMD shall be retained as part of Security Deposit and balance Security Deposit shall be accumulated through deductions from Running Account Bills at 7.5% (maximum) of gross amount of bill. In case of Bank Guarantee option, the Contractor shall furnish one Bank Guarantee for full amount of Security deposit valid till end of defects liability period and three year period of comprehensive annual maintenance contract period OR, two

Bank Guarantees of like amounts each equal to half the security deposit; one valid till virtual completion and the other till end of defects liability period and three years of comprehensive annual maintenance contract period.

35.2 Performance Guarantee under "Appendix to Conditions of Contract" shall be only in the form of Bank Guarantee valid upto scheduled date of completion.

35.3 The Bank Guarantee/s shall be from any Nationalised / Scheduled Bank approved by the DY.CHIEF ENGINEER (I/C), which is located at the Zonal Office Headquarters of L.I.C within whose jurisdiction the work falls or at the place of work.

35.4 Bank Guarantee/s (BGs) against Security Deposit (SD) and Performance Guarantee (PG) shall be executed as per the specimen pro-forma at Annexures A and C. These guarantee/s shall be submitted within 21 (twenty one) days of issuance of letter of acceptance. The Bank Guarantee/s against Performance Guarantee (PG) shall be submitted within 20 (twenty) days from the date of commencement of work.

35.5 In case of failure by the contractor to furnish the Bank Guarantee against Performance Guarantee as per Cl.35.2 by the stipulated date or extended date if any, Employer shall without prejudice to any other right or remedy available in law, be at liberty to cancel the tender and forfeit the Earnest Money absolutely.

35.6 50% of the Security Deposit (cash option) shall be refunded after the certificate of virtual completion is issued to the contractor & provided that the employer has no claim for forfeiture of part or whole of the said deposit.

35.7 Balance 50% of Security deposit will be refunded to the contractor after the satisfactory completion of the defects liability period and three year period of comprehensive maintenance contract period, subject to deductions for any appropriations thereof required to be made by the employer as per the conditions of contract.

35.8 If one Bank Guarantee in lieu of total Security Deposit is furnished, the same will be released only after the successful completion of Defects Liability period and three year period of comprehensive maintenance contract period subject to any appropriations as aforesaid.

35.9 If two Bank Guarantees in lieu of Security deposit are furnished, the First Bank Guarantee will be released after the certificate of Virtual completion is issued to the contractor and second shall be released after the satisfactory completion of Defects Liability Period and three years of comprehensive annual maintenance contract period subject to any appropriations as aforesaid.

35.10 Bank Guarantees towards Performance Guarantees (where applicable) shall be released after the virtual completion is issued.

35.11 Contractor shall keep the Security Deposit and Performance Guarantee, where applicable, replenished to its full value whenever any recovery or appropriation there from occurs. The employer reserves the right to do so from any money(s) due to the contractor lying with them.

35.12 The Contractor should note that no interest will be allowed on any part of the Security deposit.

35.13 No deductions will be effected from the bills when the total security deposit is paid in the form of Bank Guarantee(s) and the E.M.D shall be refunded after acceptance of Bank Guarantee(s).

35.14 In the event of failure by the contractor to submit Bank Guarantee(s) by the specified / extended date, recovery of Security deposit shall be effected from the R.A Bills. However, where the contractor fails to furnish Bank Guarantee against Performance Guarantee the matter shall be dealt with as per Cl. 35.5 above.

35.15 In all cases of Bank Guarantees, there shall be further provision of claim period of 6 months. If the contract period gets extended for any reason whatsoever, the contractor shall obtain the required extensions to the Bank Guarantee(s).

36. SETTLEMENT OF DISPUTES, ARBITRATION:

36.1 All disputes and differences of any kind whatsoever arising out of or in connection with the Contract or the carrying out of the work (whether during the progress of the work or after its completion and whether before or after determination, abandonment or breach of the Contract) shall be referred by the Contractor to the DY.CHIEF ENGINEER (I/C) within 15 (fifteen) days of any such matter arising. The DCE (I/C) shall upon receipt of such reference convey his written instructions or decision within 30 (Thirty) days to the contractor. If the contractor be dissatisfied with the decision of the DCE (I/C) on any matter, other than EXCEPTED MATTERS, then and in any such case, the Contractor shall within 30 (Thirty) days after receiving notice of such decision give a written notice to the Employer requiring that such matters in dispute (other than excepted matters) be arbitrated upon. Such written notice shall specify the matters which are in dispute or difference of which such written notice has been given and no other shall be and is hereby to be referred to the Arbitration. In case the Contractor fails to serve the written notice on any or all the issues in dispute within 30 (Thirty) days the decision conveyed by the DCE (I/C) shall be taken as final, binding and conclusive and shall not be open to arbitration.

36.2 Any disputes or differences that the employer may have with the contractor shall also be referred to Arbitration.

36.3 All disputes between the parties to the contract (other than those for which the decision of the DCE (I/C) or any other person is by the contract expressed to be final & binding) shall after written notice by either party to the contract to the other of them be referred to sole arbitration by an Arbitrator to be appointed by the Executive Director (Engineering), which shall be final and binding.

36.4 The sole Arbitrator shall be a qualified and experienced professional Engineer/Architect who is holding or held office in Central / State Govt. or public undertaking (of the rank DY.CHIEF ENGINEER (I/C) / Senior Surveyor of works / Dy. Chief Architect and above), OR a member of Indian Council of Arbitration.

36.5 If the arbitrator so appointed resigns his appointment or vacates his office or is unable or unwilling to act due to any reason whatsoever, the appointing authority shall appoint a new arbitrator in his place.

36.6 Unless both the parties agree in writing, reference of such disputes to arbitration shall not take place until after the completion or alleged completion of the work or termination or determination of contract.

36.7 The Sole Arbitrator shall determine all matters in disputes other than EXCEPTED MATTERS (referred in Cl.No.34) which shall be referred to the Sole Arbitrator.

36.8 The Arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act 1996 or any statutory modifications thereof.

36.9 The Contractor hereby also agrees that Arbitration under this Clause shall be a condition precedent to any right of action under the Contract.

37. LUMP SUM ADVANCE (APPLICABLE TO CONTRACT COSTING Rs.25 LAKHS AND ABOVE):

37.1 Loan will be available if required by the Contractor, and may be given as under on submission of application by him subject to other conditions being fulfilled.

37.2 A lump sum amount not exceeding 10% in two instalments (5%+5%) of the Contract sum may be advanced against a Bank Guarantee and at the simple interest at the rate of 10%. The advance shall be utilised by the Contractor for the purpose of this Contract only and for no other purpose.

37.3 The Bank Guarantee (Proforma at Annexure 'B') shall be for the equivalent amount of loan. The Bank Guarantee shall be from any Nationalised or approved scheduled Bank preferably located at Zonal Head Quarters of LIC or place of work and shall be valid till the date of completion as specified in Appendix to Conditions of Contract.

37.4 The amount of loan which may be given to the Contractor shall be at the sole discretion of the DCE (I/C) and may be in not less than two instalments.

37.5 Recovery of the sums advanced by way of loan as above and of interest, thereon shall be made by deduction from the Contractor's running account bills after 10% of the work is completed as fixed by the DCE (I/C) subject to the condition that entire amount of loan with interest thereon shall be fully recovered by the time the work amounting to 80% of the Contract sum is completed or completion period whichever is earlier. Provided that if at any time the Contractor fails to execute the Contract to the satisfaction of the Employer for any reason whatsoever, the Employer shall be entitled to recall forthwith the entire amount so advanced with interest, cost and legal expenses, etc. and/or recover the whole/balance amount as the case may be, from the bill if any, payable to the Contractor or by enforcing the Bank Guarantee.

37.6 Whenever extension of time is granted to the Contractors for the completion of the project and where the loan is not fully recovered, Contractor shall furnish fresh Bank Guarantee for extended period of Contract for the outstanding loan amount together with specified simple interest for the remaining period.

37.7 Whenever the full amount of loan plus interest has been fully recovered, the Bank Guarantee shall be released.

38 REWARD FOR EARLY COMPLETION:

38.1 If the Contractor completes the work 3 months earlier in all respects with respect to the final date of completion stated in the "Appendix to Condition of Contract" and the Dy. Chief Engineer (I/C) certifies in writing that in his opinion the same has been completed, 0.5% of Final Contract Sum stipulated in the original contract shall be rewarded.

If the contractor completes the work in less than 3 months in advance in all respects with respect to the final date of completion stated in the "Appendix to Condition of Contract" and the Dy. Chief Engineer (I/C) certifies in writing that in his opinion the same has been completed, 0.1% of Final Contract Sum stipulated in the original contract shall be rewarded.

LIFE INSURANCE CORPORATION OF INDIA

GENERAL INSTRUCTIONS TO CONTRACTORS

1.0 DRAWINGS:

1.1 The contractor upon commencement of work shall submit Drawings and the same shall be kept open for inspection at places as mentioned in the letter to the contractor from the DY.CHIEF ENGINEER (I/C). Drawings generally include the site plan, floor plans, elevations and sections of the proposed work. The contractor shall prepare detailed working drawings and get them approved by the consultants, ultimately by the DY.CHIEF ENGINEER (I/C) of LICI.

2.0 INSPECTION OF SITE:

2.1 The Tenderer shall visit and examine the site of work and satisfy himself as to the nature of the existing roads or other means of communication, the character of the soil and of the excavations, the correct dimensions of the work and facilities for obtaining materials and shall obtain generally his own information on all matters affecting the execution of the work. No extra charge made, in consequence of any misunderstanding or incorrect information on any of these points or on the grounds of insufficient description will be allowed. All expenses incurred by the Tenderer in connection with obtaining information for submitting this tender including his visits to site and efforts in compiling the Tender shall be borne by the Tenderer and no claims for reimbursement thereof shall be entertained.

3.0 WHOLE WORK TO BE COMPLETED IN THE SPECIFIED COMPLETION PERIOD:

3.1 The whole work is to be completed within the completion period stated in the Appendix to Conditions of Contract or the extended date of completion, if any. The Contractor will be required if necessary, to work overtime to complete the work by the stipulated date. No extra will be allowed on the Contract sum for such overtime work.

4.0 TIME AND PROGRESS CHART:

4.1 A time and Progress Chart shall be submitted by the successful contractor. The Contractor shall submit his version of time and progress chart fitted within the specified overall period of completion (as stated in Appendix to Conditions of Contract) within 21 (Twenty One) days of the communication of acceptance of the tender, to the Corporation's Engineer.

4.2 Ancillary work should be so started that all such work is completed before the specified overall contractual period of completion.

4.3 The Contractor shall assume full responsibility for any delay in delivery of materials by Merchants or nominated Sub-Contractors not having completed the work in accordance with the Time and Progress Chart. Such excuses shall not form any criterion for extension of time, or any claims by

the Contractor.

5.0 DRAWINGS ON SITE:

5.1 The Drawings maintained on the site are to be carefully mounted on boards of appropriate size and covered with a coat of approved transparent varnish or laminated at the cost of the Contractor. They are to be protected from the ravages of termites, ants, silver fish and other insects.

6.0 ORDER OF WORK:

6.1 The DY.CHIEF ENGINEER (I/C) reserves the right to fix the order in which the various items of work involved in this Contract is to be executed and Contractor shall comply with the same. There shall be no extra claims on account of this.

7.0 WORKMANSHIP:

7.1 The Work calls for a high standard of workmanship combined with speed.

8.0 REJECTED WORKMANSHIP OR MATERIALS:

8.1 Any workmanship, or materials not complying with the specific requirements or approved samples, or which have been damaged, contaminated or deteriorated, must be removed immediately from the site and replaced at the Contractor's expense as directed.

9.0 QUOTED RATES:

9.1 Rate quoted by the contractor shall be firm throughout the currency of the contract (including extensions of time, if any granted) No price fluctuation due to variation in cost of materials or labour or any variation under any state or Central Legislation or any other reason whatsoever shall be allowed. Contractor should note that unless otherwise stated the tender is strictly on Item Rate basis and his attention is drawn to the fact that rates for each and every item should be correct, workable and, self supporting.

10.0 WATCHING AND LIGHTING:

10.1 The Contractor from the time of being placed in possession of the site must allow for watching, lighting and protecting the work, the site and surrounding, properly by day and night on all days including Sundays or other holidays, at his own cost.

11.0 SECURITY AND PROTECTION:

11.1 The Contractor shall at his cost, provide any necessary temporary enclosures, gates, entrances, etc. for the protection of the work and materials and for altering and adapting same as may be

required and removing at completion of the works and making good all works disturbed.

11.2 Should the work be suspended by reason of rain, strike, lock-outs or any other cause, the Contractor shall at his cost take all precautions necessary for the protection of the work and shall make good any damage arising from any of these causes.

11.3 The Contractor shall at his expense cover-up and protect from injury from any cause, all new work and supply all temporary doors protection to windows, and any other requisite protection for the whole work executed, whether by himself or special tradesmen of Sub-Contractors and any damage caused must be made good by the Contractor at his own expense.

11.4 The Contractor shall, at his expense, protect all projecting sills, jambs, copings, stone or concrete treads and mouldings and all concrete steps, wood work and joinery and the like from injury during the progress of the work.

12.0 MINIMUM WAGES ACT:

12.1 The Contractor shall pay rates of wages and observe hours of work and conditions of employment to existing rules under Minimum Wages Act. Further, it shall be Contractor's responsibility to ensure that he pays his workmen wages, which are not lower than the minimum prescribed by the Union Government and State Government in which area this Contract, is being operated.

13.0 SHEDS FOR MATERIALS:

13.1 The Contractor shall at his cost provide and maintain proper approved sheds for the storage and protection of materials etc. and other work that may be executed on the site including the tools and materials of Sub-Contractors and remove on completion. Sheds for storage of Cement are to have floors raised from the ground.

14.0 WORKS AND SITE TO BE KEPT AND DELIVERED UP CLEAN:

14.1 All shavings, cuttings and other rubbish as it accumulates from time to time during the progress of the work and at completion, including that of Sub-Contractor and special tradesman to be cleared and carted away. All rejected materials shall be removed. Contractor's quoted rates shall allow for these factors.

15.0 SIGN BOARD AND HOARDINGS:

15.1 The Contractor shall not affix or place any placards or advertisement of any description or permit the same to be affixed or placed in or upon any hoarding, gantry, buildings or structure other than that approved by the DY.CHIEF ENGINEER (I/C).

16.0 SCIENTIFIC AND MEASURING INSTRUMENTS:

16.1 All necessary instruments for installation and checking as required shall be provided by the Contractor at his expense for the due performance of this Contract as instructed by the Corporation's Engineer.

17.0 ATTENDANCE ON SUB-CONTRACTORS:

17.1 **Co-ordination:** The Contractor shall be responsible for the co-ordination of all the work including that of Sub-Contractors, for arranging runs of all services and working to the requirements and layout of the specialist trades, in all matters necessary for the complete execution of the work.

17.2 The Contractor shall accept liability for and bear the cost of the supply of all necessary water, electricity, lighting, watching etc. for the Sub-Contractors work.

17.3 The Contractor must allow in his rates for making good any holes and chases left by the Sub-Contractors or other Contractors nominated by the Employer before the Builder's Work is completed and handed over.

17.4 The Contractors shall, at all times, give access to workmen employed by the local or other authorities or any men directly employed on the buildings and to provide such parties with proper, sufficient, and if required, special scaffolding, hoists and ladders and provide them with water and lighting, and leave or make any holes, grooves etc. in any work directed by the DY.CHIEF ENGINEER (I/C), as may be required, to enable such workmen to lay or fix pipes, electric wiring, special fittings etc. Contractor's quoted rates shall allow for these factors.

18.0 OCCUPATION BY EMPLOYER:

18.1 The Employer reserves the right to take possession of the **Substation** work in sequence as completed, as may be considered deemed fit by the DY.CHIEF ENGINEER (I/C) both practicable and reasonable and without hindrance to the Contractor's progress.

19.0 TAXES, DUTIES, LEVIES AND DEDUCTION AT SOURCE:

19.1 The Contractors shall be responsible to pay all statutory levies/ taxes/ cess imposed by the State and Central Government such as Income Tax/ Work Contract Tax/ Sales Tax on works contract, Value Added Tax (VAT), Excise Duty, Octroi, etc., and the rates quoted in the tender shall allow for the same. The price quoted shall be firm until completion of work. The rates are exclusive of Service Tax.

19.2 Deduction at source of Income/Sales Tax on works contract etc. shall be made by LIC of India as per the provisions prevailing from time to time from the Running Account or Final Bills and remitted to the concerned Taxation Authorities/State Government on behalf of the contractor.

Service Tax: The rates are exclusive of service tax. Quantum of service tax shall be reimbursed

19.3 to the contractor on production of proof of payment of service tax deposited. Balance portion of service tax shall be paid by LICI to Govt. Of India as per Financial Act.

20.0 WATER:

20.1 The rates quoted by the Contractors shall include for providing all water required for the work including that required by special tradesmen and Sub-Contractors and pay all charges required by Local Municipal or other Authorities. Water must be clean, fresh, pure and free from earth, vegetable or organic matters, acid or alkaline substance in solution or suspension. The Contractors shall make their own arrangements for water supply. If supply from the Municipality or other local bodies be inadequate, the Contractor should provide tube well or wells or open well at his own cost. The Contractors must execute any temporary plumbing and pay all fees and charges. All health regulations in force shall be strictly observed by the Contractor and pay all necessary charges.

21.0 ELECTRICITY:

21.1 The Contractor shall arrange with the concerned Electricity Supply Authorities for a temporary meter and supply to the site and shall provide all temporary wiring, power and lighting points for the whole of the works and clear away when no longer required.

He shall pay all charges for the same and for electricity consumed, including that consumed by Sub-Contractors. The Contractor should submit disconnection & no dues certificate from the supplying authority along with his final bill.

SPECIAL CONDITIONS OF CONTRACT

Re: Tender for S /I/ T/ C of 1500 KVA Electrical Substation for Investment Building at Plot No INS-16, Sector 14, Vasundhara (Ghaziabad)

1. VISIT OF SITE OF WORK:

The tenderer shall visit the site of work before filling in his tender and get acquainted with all the information required before submitting the tender.

The dimensions given on the drawings, if any, supplied along with the tender should be considered as only indicative and it is obligatory on the part of the tenderer to satisfy themselves regarding actual dimensions available on the site. Depending on the actual dimensions of the Substation work etc. at site, the contractor shall include in his quotations for any additional structural steel work (like brackets to support guide rails, etc.) that may be necessary to erect and install the Substation etc. in its final position within the available space. No extra claims on account of any such extra work will be entertained at a later date.

2. PRICES :

The price quoted shall be firm until completion of the work and not subject to any variations. The tender prices shall include for all packing and unpacking, all loading and unloading, all freight, custom duty, Octroi duty, etc. insurance for the equipment during the storage as well as during the erection and for all damages from any cause whatsoever during the contract and defects liability period and CAMC period of three years. The charges shall also include for delivery of the equipment at the site of work. No claim for extra or otherwise on account of the foregoing shall be entertained as the rates quoted shall be deemed to be inclusive of all the charges applicable.

3. TAXES & DUTIES, ETC.:

Tenders are invited on the basis of works contract. The contractors shall be responsible to pay the Sales Tax/ Trade Tax / Commercial Tax on works contract and such other duties and taxes as Turn Over Tax, Sales Tax on materials, Excise Duty, Octroi etc.. Service tax shall be reimbursed subject to submitting of documentary proof for payment of same to the concerned authority.

Deduction of Trade / Commercial /Works contract Tax/ Sales Tax on works contract at source shall be made by LIC of India as per the provisions prevailing and as per directive of Government from time to time from the running account or final bills and remitted to the concerned taxation authorities / State Government on behalf of the contractor under whose jurisdiction of work is executed (DY.CHIEF ENGINEER (I/C), LICI, North Central Zonal Office, Jeevan Vikas , 16/275 Mahatma Gandhi Marg, Civil Lines, Phool Bagh, Kanpur -208001).

4. OVERRIDING AND PRINTED CONDITIONS :

Overriding conditions, if any, imposed by the tenderer, having financial implications or otherwise are to be submitted with the technical bid.

5. PART I – (TECHNICAL BID):

Part I shall contain the un-priced tender consisting of complete technical specification including drawings and documents and commercial terms and conditions technical aspects of the tender such as equipment data sheets, tests and inspection, makes of materials, technical description, drawings in envelop super scribing Part I. Earnest money in the form of DD/ Pay Order shall be submitted with the Part I of the tender in two separate envelopes.

Part I of the tender shall contain the following:

a) Power of Attorney/authorisation with the seal of the company/firm in the name of the person signing the tender documents.

b) List of deviations, if any, in commercial terms and conditions.

c) List of deviation, if any, in technical specification.

d) Detailed proposed layout drawing and full equipment details.

Detailed specifications of each of the offered items such as transformer, HT VCB, Main Panels, APFCR Panel, cables etc. matching with the specifications contained under this contract along with manufacturer's catalogue / product brochure. If there are some variations in specifications and dimensions of the equipment / products as contained under the manufacturer's catalogue / product brochures vis-à-vis those given under the specifications contained under this tender document, the specifications and dimensions given in this tender document shall prevail.

Complete technical details and any special features proposed for incorporation must be given for full technical evaluation. Supporting documents for the claimed facilities/ features shall also be attached while submitting the technical bid.

The tenderer should have maintenance set-up at Ghaziabad or in National Capital Territory New Delhi, address & telephone / fax nos. of maintenance set-up shall be indicated.

Other Certificates / Declarations as per Annexures enclosed to be submitted.

The Tenderers are advised to visit the site of installation and acquaint themselves of the site conditions before tendering.

The tenderers are advised to submit the tender based strictly on the General Conditions of the Contract and Technical Specifications contained in the tender documents, and not to stipulate any deviations. If acceptance of the terms and conditions given in the tender documents has any price implications, the same should be considered and included in the quoted price. A tender containing deviation from the terms and conditions may be liable for rejection.

The tenderers shall submit full details of the patent, trade mark, registered design, intellectual property rights, and copy rights, industrial property rights held by them or used by them of any third party with regard to design or any part of the system.

All information, correspondence letters shall be addressed to The DY.CHIEF ENGINEER (I/C), LIC of India, Engg Dept. North Central Zonal Office, Jeevan Vikas , 16/275 Mahatma Gandhi Marg, Civil Lines, Phool Bagh, Kanpur -208001

6. PART II – (PRICE BID):

Part II containing price bid in envelope, super scribing Part II – "Price bid", supplied along with the tender.

(a) This part shall contain prices in Indian Rupees only with detailed break-up of price as per format (Part II) both in figures and words. No other enclosure is permitted in Part II. Change of terms and conditions and technical deviations, if any, found in Part II of the tender will not be taken into account and will be treated as null and void.

The rate quoted shall include supply of the transformer, HT VCB, Main Panels, APFCR Panel, cables, accessories and any other equipment shall cover packing, freight and insurance up to the site and any other charges as applicable to deliver the equipment upto the site. .

(The rate shall include Furnishing of test certificate at Full load capacity test in factory with design operating conditions in conformance with IER/required standards. The rates also shall inclusive to attend Routine service / break down calls for substation during the warranty / defects liability period)

(b) The tenderer must use only the forms issued by the LICI to fill in the rates. The tender form must be filled in English and all entries must be made by hand and written in ink. If any of the documents is missing or unsigned, the tender may be considered invalid by the LICI in its discretion.

(c) Rates should be quoted both in figures and words in columns specified. All erasures and alterations made while filling the tender must be attested by initials of the tenderer. Overwriting of figures is not permitted. Failure to comply with either of these conditions will render the tender void at the LICI's option.

(d) No request for any change in rate or conditions after the opening of the part II of the tender will be entertained.

(e) The rates quoted shall be deemed to be for the finished work and shall be firm and binding without any escalation whatsoever till the system is handed over to the LICI.

(f) For any item, if the rate and amount do not tally with respect to the quantity, then the amount arrived on the basis of quoted rates shall only be acceptable and in case of variation of rates in figures and words, the rate quoted in words will only be considered for arriving at the total amount for that item.

7. BRIEF SCOPE OF WORK: The scope of work shall include the following:

- Design, Supply, Installation, Testing and Commissioning of all equipment's/ materials for the captioned work, to LICI's site at CP-8,Sector 18, Vasundhra, Ghaziabad including packing, handling, transporting, loading/unloading etc. at site.
- Providing Regular Maintenance inclusive of periodic service including all spares, etc. during warranty period.
- The tenderer should indicate in his tender the complete description of the working of the system/ sub-systems and their power requirements with all relevant brochures/literature etc. in addition to those called for in the Technical Specifications:
- The Tenderer shall carefully check the specifications and shall satisfy himself that the equipment offered is suitable as per the LICI's Technical Specifications.
- Tenderer shall supply all tools, plants, scaffolding, labour and consumables etc as required for installation, testing and commissioning of the system.
- The tenderer shall state clearly in his tender the standard tools, spare parts which he will supply free of cost when installing the equipment's and handover same to the LICI after completion of the work.
- The tenderer shall furnish a separate Bank guarantee of 5% of the contract value as Security for due fulfilment of terms and obligation of defects liability period from the date of commissioning and handing over of the works as specified in the tender to the LICI. The amount of Bank Guarantee will be valid till satisfactory completion of the defects liability period of one year and comprehensive annual maintenance contract of three years for entire Substation work.

8. TERMS OF PAYMENT:

The payment for the works to be executed under this contract shall be made as follows and no variation in the mode of payment will be acceptable.

(j) Manufacturer's Inspection and Test Certificates

(ii) Contractor's Certificate that all components, parts, sub systems, consumables etc. for successful installation, commissioning and testing of the systems including maintenance have been received at site in good condition and if any shortfall is noticed during installation, commissioning and testing they will be supplied free to the LICI.

(iii) Policies of insurance covering all the risks during transit, storage, installation, commissioning, testing and handing over including third party liabilities.

(iv) The pro-rata payment against all inclusive Maintenance contract shall be made half yearly on completion of satisfactory services rendered and on confirmation regarding achievement of specified inside temperature.

9. SERVICE TAX:

The rates quoted shall be exclusive of service tax under partial reverse charge mechanism. Contractor quoted rate excluding the service tax liability for its full extent i.e. 100 % service tax on Serviceable portion .In case of service provider being a corporate entity, service tax shall be paid fully by them to the concerned authority directly and reimbursement will be made by LICI on production of proof of remittance. No recovery towards service tax will be effected from their bill. However, if the service provider is other than corporate entity (Individual, HUF, Proprietary, Partnership firm, LLP and AOP), LIC will remit 50 % of Service tax liability towards service recipient (LIC) liability and Contractor has to directly remit to the concerned Authorities remaining 50% of Service tax towards their liability (Service provider) and reimbursement will be made by LICI on production of proof of remittance. No recovery towards service tax will be effected from their bill.

10. WARRANTY/ DEFECTS LIABILITY PERIOD:

The mechanical structures, transformer, HT VCB, Main Panels, APFCR Panel, cables, electrical works including power connections/ digital meters / switchgear/, etc. and overall workmanship from the date of successful commissioning of Substation works must be warranted against any manufacturing /design/ installation defects for a minimum period of one year. During this period, the successful tenderer shall make periodical inspection of the working of the system free of charge at least once in a month or less and attend to various equipment's and other service/settings that may be required of him.

12. ALL INCLUSIVE MAINTENANCE DURING WARRANTY PERIOD:

All Inclusive Maintenance Contract of the entire substation as provided, including all spares and consumables for a period of 01 years after successful completion of work.

13. PACKING AND DESPATCH:

The equipment shall be properly and securely packed in boxes for multiple handling and transportation by air / rail / road under Indian conditions. All equipment/components shall be delivered at site i.e. LICI's proposed INS-16 building at sector 14, Vasundhara, Ghaziabad (U.P.)

14. SIGNING OF CONTRACT AGREEMENT:

The General instructions to the tenderers and special conditions, conditions hereinbefore referred to Conditions of Contract and Technical Specifications and drawings enclosed with the tender documents, the subsequent correspondence exchanged between the LICI and the tenderer and the work order placed shall be the basis of the final contract to be entered into with the successful tenderer.

The Tenderer shall go through the terms and conditions given in the general conditions of contract herewith and his offer shall be strictly in line with the terms specified therein. No deviation from the terms and conditions specified shall be acceptable. Each page of the tender documents should be signed for his/their having acquainted himself/themselves in the general conditions of contract, Technical specifications, etc.

The tender submitted on behalf of a firm shall be signed by all the partners of the firm or a partner who has the necessary authority on behalf of the firm to enter into the proposed contract. Otherwise the tender may be rejected.

The contractor shall not assign the contract. He shall not sublet any portion of the contract except with the written consent of the Employer. In case of breach of these conditions, the Employer may serve a notice in writing on the Contractor rescinding the contract whereupon the security deposit shall stand forfeited to the Employer, without prejudice to his other remedies against the Contractor

15. SUFFICIENCY OF SCHEDULE OF QUANTITIES:

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the prices stated in the Schedule of Quantities and/or the Schedule of Rates and Prices which shall cover all his obligations under the Contract, and all matters and things necessary for the proper completion of the works.

The quantities in the schedule of quantities approximately indicate the total extent of work, but may vary to any extent and even be omitted thus altering the aggregate value of the contract. However, during actual execution of work if the quantities of any of the items of work exceeds by more than 25% of the tender quantities, the quantities of such items executed, by the authority of the DY.CHIEF ENGINEER (I/C), in excess of 25% of the tender quantity shall be considered as an extra item of work for which the contractors shall submit fresh rates supported by rate analysis worked on the actual cost basis plus 15% towards establishment charges, contractor's overhead and profit. The rate for all such items of work, being current ones, will not be eligible for price adjustment due to increase or decrease in prices of materials and labour rates as per escalation formula, if any, given in the tender. If any of the items of work is omitted from the accepted tender at the sole discretion of the employer, the contractor shall not be entitled to any claim on this account.

Right to Accept Part Tender

The LICI reserves the right to accept the tender either in whole or in part at the same prices quoted by the Tenderer.

16. TESTING:

Before dispatching the equipment to site, the equipment, will be inspected at the discretion of the LICI and tested for various parameters by the LICI's Engineers at the manufacturer's works and then cleared for transportation. This will however, not in any way absolve the contractor of his responsibility for the continued performance of the system/components after erection & commissioning at the designated site during the period of defects liability.

17. DRAWINGS:

All required drawings for all the equipment lay out viz: substation layout etc. should be prepared by the tenderer and submitted to the LICI's engineer for approval before commencement of work.

Other Issues

The Contractor shall carry out all the work strictly in accordance with the approved drawing, detailed specifications and instructions of the LICI's engineer. If in the opinion of the DY.CHIEF ENGINEER (I/C), nominal changes have to be made to suit the site condition and with the prior approval in writing of the Employer, the Contractor shall carry out the same without any extra charge.

The rates quoted in the tender shall include all charges for scaffoldings, watching and lighting by night as well as day including Sundays and holidays, protection of all other erections, matters or things and the Contractor shall take down and remove any or all such centring, scaffolding etc. as occasion shall require or when ordered so as to do, and fully reinstate and make good all matters and things disturbed during the execution of work and to the satisfaction of the LICI.

18. Recovery of Charges against Electricity /Water from Contractors (Bill):

Contractors shall have to make its own arrangement for temporary Electrical supply for installation work. However for testing and commissioning of plant, LICI will provide three phase 415 volt, electric power supply.

19. Electrical Safety N.O.C.:

Electrical safety NOC from statutory authority for whole Substation is deemed to be included in the quoted rates and nothing extra shall be paid on this account. Any statutory fees to be paid to authority, only shall be paid by LICI of India / reimbursed to the contractor based on receipt for the said amount/fees to authorities.

20. ENROLMENT FORM:

Enrolment form along with Annexures duly filled-in enclosing therewith related documents duly self attested with credentials of contractor, copies of work order, completion certificates, solvency, proof of turn over as per requirement along with non-refundable processing fees of Rs. 2000/- in the form of DD/ Pay Order in favour of LICI payable at Kanpur.

ANNEXURE – 'A'

LIFE INSURANCE CORPORATION OF INDIA

(Refer Clause No. 35 of Conditions of Contract)

FORM OF BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT IN INDIVIDUAL CONTRACTS

To
THE LIFE INSURANCE CORPORATION OF INDIA

1. In consideration of the Life Insurance Corporation of India having its _____ Zonal Office at _____ in the State of _____ (hereinafter called **'the Corporation'** which expression shall unless repugnant to the subject or context include its successors and assignees) having agreed under terms and conditions of contract (vide its acceptance letter No._____ dated_____) made between _____(_____ (hereinafter called the said Contractor) and the Corporation in connection with _____ (hereinafter called 'the said contract') to accept a Deed of Guarantee and Indemnity as herein provided for Rs._____ from the _____((_____ in lieu of the Security Deposit to be made by the contractor and/or in lieu of the deduction to be made from the Contractor's bills, for the due fulfillment by the said contractor of the terms and conditions contained in the said contract, we the _____ _____ (hereinafter referred to as 'the said Bank') and having our office at _____ do hereby undertake and agree to indemnify and keep indemnified the Corporation from time to time to the extent of Rs._____ (Rupees _____ only) against any loss or damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation by reason of any breach or breaches by the said contractor in respect of the said contract or of any of the terms and conditions contained in the said contract, or in respect of all its claims for money and / or material found due and recoverable from the said contractor and to unconditionally pay the amount claimed as such by the Corporation on demand and without demur to the extent aforesaid.

2. We, the said Bank further agree that the Corporation shall be the sole judge of and as to whether the said contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation from time to time on account thereof and the decision of the Corporation in this respect shall be final and binding on us.

3. The Corporation shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or Indemnity from time to time to vary any of the terms and

conditions of the said contract or to extend time of performance by the said contractor, or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or securities available to the Corporation and the said Bank shall not be released from its liability under these presents by any exercise by the Corporation of the liberty with reference to the matters aforesaid or by reason of time being given to the said contractor or any other forbearance, act or omission on the part of the Corporation or any indulgence by the Corporation to the said contractor or of any other matter or thing whatsoever, which under the law-relating to sureties would but for this provision have the effect of so releasing the Bank from its liability.

4. It shall not be necessary for the Corporation to proceed against the contractor before proceeding against the Bank and the Guarantee and Indemnity herein contained shall be enforceable against the said Bank, notwithstanding any security which the corporation may have obtained or obtain from the contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

5. Notwithstanding anything contained in any of the foregoing clauses the liability of the Bank under this Guarantee shall not exceed Rs. _____ (Rupees _____ only). The guarantee shall remain in force till_____. If any extension of time be granted to the contractor, we undertake to extend the guarantee with the consent of the contractor. Unless a claim or demand under this guarantee is made or presented to the Bank within six months from the expiry date, all the rights of the Corporation under this Guarantee shall cease and the Bank shall be released and discharged from all liability hereunder.

6. We, the said bank lastly undertake not to revoke this guarantee and indemnity during its currency except with the previous consent of the Corporation in writing and agree that any change in the constitution of the said contractor or the said Bank shall not discharge our liability hereunder.

For and on behalf of the Bank
(Name and Designation)

The above Guarantee is accepted by the
LIFE INSURANCE CORPORATION OF INDIA.

For and on behalf of the LIC of India
(Name and Designation)
Dated:

Note No.1 (: FILL IN AS APPLICABLE

A) For Proprietary concerns:-

Shri _____ son of _____ resident of _____ carrying on business under the name and style of _____ at _____ (hereinafter called 'the said contractor' which expression shall unless the context requires otherwise include his heirs, executors, administrators and legal representative).

OR

B) For Partnership concerns:-

1. Shri _____
   son of _____
   resident of _____

2. Shri _____
   son of _____
   resident of _____

carrying on business in partnership under the name and style of _____ of _____ at _____ (hereinafter collectively called 'the contractor' which expression shall unless the context requires otherwise include each of them and their respective heirs, executors, administrators and legal representatives)

OR

C) For Companies:-

M/s. / Shri _____ a company under the Companies Act 1956 and having its registered office at _____ in the state of _____ (hereinafter called 'the said contractor' which expression shall unless the context requires otherwise include its successors and assignees).

Note No.2:

**** Please fill in the name and address of Bank.**

ANNEXURE – 'B'

LIFE INSURANCE CORPORATION OF INDIA

(Refer clause 39.1 of Conditions of Contract)

FORM OF BANK GUARANTEE TO SECURE A LUMP SUM ADVANCE

To
THE LIFE INSURANCE CORPORATION OF INDIA

In consideration of the Life Insurance Corporation of India having its……. North Central Zonal Office at…….in the State of ……..(hereinafter called the 'Corporation' which expression shall unless repugnant to the subject or context include its successors and assignees) having agreed under the terms and conditions of contract (vide its acceptance letter No……dt……) made between M/s……..(hereinafter called "the said contractor) and the Corporation in connection with……..(hereinafter called the said contractor) to accept a Deed of Guarantee and Indemnity as herein provided for Rs. …… from the……..(name of the Bank) in lieu of the Security Deposit to be made by the contractor and/or in lieu of the deduction to be made from the contractor's bills, for the due fulfilment by the said contractor of the term and conditions contained in the said contract, we,……..(hereinafter referred to as "the said bank") and having our office at…….do hereby undertake and agree to indemnify and keep indemnified the Corporation from time to time to the extent of Rs……..(Rupees …… Only) against any loss or damage, costs, charges and expenses caused to or suffered by or that may be caused by the Corporation by reason of any breach or breaches by the said contractor of any of the terms and conditions contained in the said contract and/or in respect of all its claims for money and/or material found due and recoverable from the said contractor in respect of the said contract and to unconditionally pay the amount claimed as such by the Corporation on demand and without demur to be extend aforesaid.

2.0 We, the said Bank further agree that the Corporation shall be the sole judge of and as to whether the said contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation on account of thereof and the decision of the Corporation that the said contractor has committed such breach or breaches and as to the amount or amounts of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation from time to time shall be final and binding on us.

3.0 The Corporation shall have the fullest liberty without affecting in anyway the liability of the Bank under this Guarantee or Indemnity, from time to time to vary any of the terms and conditions of

the said contract or to extend time of performance by the said contractor or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said contract or securities available to the Corporation and the said Bank shall not be released from its liability under these presents by any exercise by the Corporation of the liberty with reference to the matters aforesaid or by reason of time being given to the said contractor or any other forbearance, act or omission on the part of the Corporation or any indulgence by the Corporation to the said contractor or of any other matter or thing whatsoever which under the law relating to sureties would even for this provision have the effect of so releasing the Bank from its such liability.

4.0 It shall not be necessary for the Corporation to proceed against the contractor before proceeding against the Bank and the guarantee and Indemnity herein contained shall be enforceable against the said bank not withstanding any security which the Corporation may have obtained or obtain from the contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealised.

5.0 Notwithstanding anything to the contrary hereinbefore contained the Bank's liability hereunder shall not exceed Rs…….. (Rupees……. only). The Guarantee shall remain in force till the……day of the year 2015 unless a claim or demand under this guarantee is made or presented to the Bank within 6 months from the expiry date i.e. on or before……. All rights of Corporation under this guarantee shall cease and the Bank Guarantee shall be released and discharged from all liabilities thereafter.

6.0 We, the said Bank lastly undertake not to revoke this Guarantee and indemnity during its currency except with the previous consent of the Corporation in writing and agree that any change in the constitution of the said contractor or the said Bank shall not discharge our liability hereunder.

For and on behalf of the Bank

(Name & Designation)

The above Guarantee is accepted by the
Life Insurance Corporation of India.

For and on behalf of the
Life Insurance Corporation of India

……
(Name and Designation)

Note No.1 (: FILL IN AS APPLICABLE

* For Proprietary concerns:

Shri……..…….son of ……. ……..resident of ……. Carrying on business under the name and style of …….. at ……..(hereinafter called 'the said contractor' which expression shall unless the context requires otherwise include his heirs, executors administrators legal representatives).

OR

* For Partnership concerns:

1. Shri……..son of ……..……. ……..resident of ……. …….

2. Sri……son of ……. ……..resident of ……. ……. carrying on business in Co partnership under the name and style of …….. (Hereinafter collectively called 'the said contractor, which expression shall unless the context requires otherwise include each of them and their respective, executors, administrators and legal representatives)

OR

* **For companies:**

S/Shri……a company under the companies Act 1956 and having its registered office at …….... in the state of …….. (Hereinafter called the said contractor' which expression shall unless the context requires otherwise include its successors and assigns).** Please fill in the name of any Nationalised Bank.

Note No.2:

((Please fill in the name and address of Bank.

ANNEXURE – 'C'

LIFE INSURANCE CORPORATION OF INDIA

(Refer Clause No. 35 of Conditions of Contract)

FORM OF BANK GUARANTEE FOR PERFORMANCE GUARANTEE
IN INDIVIDUAL CONTRACTS

To
THE LIFE INSURANCE CORPORATION OF INDIA

1. In consideration of the Life Insurance Corporation of India having its _____ Zonal Office at _____ in the State of _____ (hereinafter called 'the Corporation' which expression shall unless repugnant to the subject or context include its successors and assignees) having agreed under terms and conditions of contract (vide its acceptance letter No._____ dated_____) made between _____(_____ (hereinafter called the said Contractor) and the Corporation in connection with _____ (hereinafter called 'the said contract') to accept a Deed of Guarantee and Indemnity as herein provided for Rs._____ from the _____((_____ for the due fulfillment by the said contractor of the terms and conditions contained in the said contract, we the _____ (hereinafter referred to as 'the said Bank') and having our office at _____ do hereby undertake and agree to indemnify and keep indemnified the Corporation from time to time to the extent of Rs._____ (Rupees _____ only) against any loss or damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation by reason of any breach or breaches by the said contractor in respect of the said contract or of any of the terms and conditions contained in the said contract, or in respect of all its claims for money and / or material found due and recoverable from the said contractor and to unconditionally pay the amount claimed as such by the Corporation on demand and without demur to the extent aforesaid.

2. We, the said Bank further agree that the Corporation shall be the sole judge of and as to whether the said contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation from time to time on account thereof and the decision of the Corporation in this respect shall be final and binding on us.

3. The Corporation shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or Indemnity from time to time to vary any of the terms and conditions of the said contract or to extend time of performance by the said contractor, or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor and either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or securities available to the Corporation and the said Bank shall not be released from its liability under these presents by any exercise by the Corporation of the liberty with reference to the matters aforesaid or by reason of time being given to the said contractor or any other forbearance, act or omission on the part of the Corporation or any indulgence by the Corporation to the said contractor or of any other matter or thing whatsoever, which under the law-relating to sureties would but for this provision have the effect of so releasing the Bank from its liability.

4. It shall not be necessary for the Corporation to proceed against the contractor before proceeding against the Bank and the Guarantee and Indemnity herein contained shall be enforceable against the said Bank, notwithstanding any security which the corporation may have obtained or obtain from the contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

5. Notwithstanding anything contained in any of the foregoing clauses the liability of the Bank under this Guarantee shall not exceed Rs. _____ (Rupees _____ only). The guarantee shall remain in force till_____. If any extension of time be granted to the contractor, we undertake to extend the guarantee with the consent of the contractor. Unless a claim or demand under this guarantee is made or presented to the Bank within six months from the expiry date, all the rights of the Corporation under this Guarantee shall cease and the Bank shall be released and discharged from all liability hereunder.

6. We, the said bank lastly undertake not to revoke this guarantee and indemnity during its currency except with the previous consent of the Corporation in writing and agree that any change in the constitution of the said contractor or the said Bank shall not discharge our liability hereunder.

For and on behalf of the Bank

(Name and Designation)

The above Guarantee is accepted by the
LIFE INSURANCE CORPORATION OF INDIA.

For and on behalf of the LIC of India
(Name and Designation)
Dated:

Note No.1 * : FILL IN AS APPLICABLE

A) For Proprietary concerns:-

Shri _____ son of _____ resident of _____ carrying on business under the name and style of _____ at _____ (hereinafter called **'the said contractor'** which expression shall unless the context requires otherwise include his heirs, executors, administrators and legal representative).

OR

B) For Partnership concerns:-

1. Shri _____
son of _____
resident of _____

2. Shri _____
son of _____
resident of _____

carrying on business in partnership under the name and style of _____ of _____ at _____ (hereinafter collectively called **'the contractor'** which expression shall unless the context requires otherwise include each of them and their respective heirs, executors, administrators and legal representatives)

OR

C) For Companies:-

M/S / Shri _____ a company under the Companies Act 1956 and having its registered office at _____ in the state of _____ (hereinafter called **'the said contractor'** which expression shall unless the context requires otherwise include its successors and assignees).

Note No.2:

**** Please fill in the name and address of Bank.**

ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made at…….. this…….. Day of ……20 between **THE LIFE INSURANCE CORPORATION OF INDIA,** a body corporate constituted and established by the Life Insurance Corporation Act. 1956 (Act 31 of 1956) having its Central Office at "Yogakshema", Jeevan Bima Marg, Mumbai and its Zonal Office at 16/275, M G Marg, Kanpur hereinafter called the Employer (which expression shall include its successors and assignees wherever the context or meaning shall so require or permit) of the one part and M/s…… …… (Hereinafter called "The Contractor") of the other part. WHEREAS the Employer is desirous of constructing the …… and has prepared Drawings and Specifications and the Schedule of Quantities which have been signed by or on behalf of the parties hereto. AND WHEREAS the Contractor has agreed to execute upon and subject to the conditions and instructions set forth (hereinafter referred to as "the said Conditions") the works shown upon the said drawings and /or described in the said specifications and included in the said Abstract Schedule of Quantities at the Item Rates therein set forth amounting to the Contract sum of Rupees……Hereinafter referred to as "the said Contract Amount".

NOW IT IS HEREBY AGREED AS FOLLOWS

1. In consideration of the said Contract Amount to be paid at the times and in the manner set forth in the said conditions, the contractor shall upon and subject to the said conditions execute and complete the works shown upon the said drawings and described in the Specifications and/or the priced Schedule of Quantities.

2. The Employer shall pay the Contractor the said Contract Amount or such other sum as shall become payable at the times and in the manner hereinafter specified in the said conditions.

3. The said conditions and Appendices thereto shall be read and construed as forming part of this Agreement and the parties hereto shall respectively abide by and submit themselves to the conditions and perform the agreement on their part respectively in such conditions contained.

4. All disputes arising out of or in any way connected with this Agreement shall be deemed to have arisen in Kanpur (Zonal Head quarters) and only the Court in New Delhi (Zonal Head quarters) shall have jurisdiction to determine the same.

5. This contract comprises

i) Tender documents serial pages……..……..……..
ii) Subsequent Correspondences Serial pages……..……..……..
iii) Architectural Drawings serial pages……..……..

6. Only…… ( ) alterations have been made in these documents and as evidence that these alterations were made before the execution of Contract Agreement, they have been initialled by the Contractor and …….. Engineers, North Central Zone, Life Insurance Corporation of India, Kanpur. The said Officer is hereby authorised to sign and initial on behalf of the Employer, the documents forming part of this contract.

7. IN WITNESS WHERE OF THE official seal of LIFE INSURANCE CORPORATION OF INDIA, North Central Zonal office, was thereto affixed and signed on its behalf by its Dy. Chief Engineer (I/C) and the Contractor/s has/have signed this Agreement on the dates respectively mentioned against their signature in the presence of the following witnesses:

In the presence of

Signed by Dy. Chief Engineer (I/C) or
His Authorised Representative
FOR AND ON BEHALF OF THE
LIFE INSURANCE CORPORATION OF INDIA
Date:

1. Signature :
   Name :
   Address :

2. Signature :
   Name :
   Address :

In the presence of

Signed by M/s ……. or His Authorised Representative
FOR AND ON BEHALF OF THE CONTRACTOR
Date:

1. Signature :
   Name :
   Address :

2. Signature :
   Name :
   Address :

LIST OF APPROVED MAKES

SR. NO.	DESCRIPTION	APPROVED BRANDS/ MANUFACTURERS
1	ACB	L&T, Siemens, C&S, ABB
2	MCCB	ABB, Siemens, Legrand, Merlin Gerin
3	MCB/ DB/ RCCB	Siemens, Merlin Gerin, Hager, MDS, Load Kontact
4	SF UNIT	GE, Siemens, ABB, L&T
5	HRC FUSES	GE, Siemens, L&T
6	STARTERS AND CONTACTORS	Siemens, L&T, Telemecanique
7	PANEL FABRICATION	To CPRI Specs & ISO Certified Manufacturer Only
8	CT'S/ Meters etc	AE, Kappa, Nippen, Conzerv
9	LT Fuses	Siemens, L&T, Schenider
10	Capacitor Bank/ APFCR	Siemens-Epcos, P-Max, Visa-Power
11	Amp/V/KW/KWH/AVF Meter	Conserv, Nippen
12	Transformer	Kirloskar, Crompton, Alstom, Uttam Bharat
13	VCB	Crompton, Schenider, ABB, Siemens
14	Indicating Light	Vaishno, EMCO
15	Relays	L&T, Siemens, GE, Schenider
16	Switches	L&T, Siemens, GE, Schenider, ABB
17	Power and Control Cable	CCI, Polycab, Gloster, Finolex
18	End Termination Kit	Denson, Birla, Equivalent Make

TECHNICAL REQUIREMENTS

General:

The electrical installation of 1500KVA sub- station and other works mentioned in the Bill of Quantities shall as per specification given under technical requirements and shall be complete in all respect and any item not included in the specification but essential for proper installation and functioning of the electrical system shall be deemed to be included in the scope of specification whether specifically mentioned or not.

1.0 Statutory and Reference Standards:

Statutory requirements are those which are mandatory and governed by Electrical Inspectorate of the state. These rules are covered under Indian Electricity Rules 1956.

1.10 Amendment to IE Rule 4 (IV) : Residential & Commercial Building

This amendment notification made in November 2000, stipulates that the transformers installed inside a residential and commercial buildings shall be only Dry type transformers.

1.11 IE Rule 35: Danger Notice

This rule specifies affixing permanently a danger plate on transformer in a clearly visible location. The descriptions shall be in English and local language of the place and approved by electrical Inspector.

1.12 IE Rule 45

This rule stipulates the precautions to be adopted by consumer, owner, electrical contractor, workman and supplier. It states that installation work shall be carried out by licensed contractor/person holding supervisor's license or party recognized by state government.

1.13 IE Rule 50

This rule deals with supply and use of energy and gives the requirement of isolation facility on both primary and secondary side of transformer.

1.14 IE Rule 51

This rule stipulates the minimum clearances to be kept around switchgear transformer (though not explicitly said) (for the indoor installation of transformer, detail guidelines are given by IS: 10028 (Part-II) 1981.

1.15 **IF Rule 61 and 67: connections with Earth**

This is dealt in under “earthing”.

1.16 **IE Rule 63: Approval by Inspector**

This rule stipulates the necessary of getting the installation approved by Inspector.

1.17 **IE Rule 64: Use of Energy at High or Extra High Voltage**

This rule stipulates the requirement of providing fire proof walls use of soak pit for transformers having oil more than 2000 litres, land requirement of cable trenches.

These guidelines are given in detail by both IS: 10028 Part-II 1981 and TAC, which are subsequently described in this guide.

1.18 **IE Rule 65: Testing operation and maintenance**

This rule stipulates the necessity for testing and maintaining record of testing operation and maintenance carried out on the transformer and other equipment connected with it.

1.19 **IE Rule 68: General Conditions As to Transformation and Control of Energy**

The requirement given under this Rule is elaborated in guidelines given by IS: 10028.

1.19 **IE Rule 114: Isolation and Fixing of Transformer/Switchgear etc.**

1.20 All the above rules shall be considered along with the guide lines given in IS: 10028 (part-II): 1981 Code of Practices for selection, Installation and maintenance of Transformer (part-II: Installation)

1.21 **IS: 10028 (part-II)**

1.22 **Isolation: Clause 3.5 of IS: 10028:**

A circuit breaker or a linked switch of requisite breaking capacity shall be installed on both sides of transformer, unless specifically exempted by the authorities so as to break the current on all phases and to isolate the transformer from both sides.

TECHNICAL PARTICULARS FOR 11KV (H.T.) BREAKER

SR NO	TECHNICAL PARTICULARS	RATINGS
1.	Voltage Level	11000 volts
2.	NATURE OF INSTALLATION	**OUTDOOR**
3.	Material of the Bus bar	aluminium
4.	Type Of Bus bar –	Rectangle
5.	Short time Rating –	1 second
6.	Normal Supply frequency	50 hz
7.	Type of enclosure	**Cubical IP65**
8.	Normal Current Rating of the Switch	630 A
9.	Auxiliary Switch	6 No. + 6 NC
10.	Shunt Trip Coil Voltage	24 V.D.C. [Preferred built in power pack]
11.	Closing Coil Voltage	24 V.D.C. [Preferred built in power pack]
12.	Spring Chargeable Motor Voltage	230 V.A.C.
13.	Operation Counter	Yes
14.	Current Transformer	Resin Cast, Epoxy Model
15.	Current Transformer	**60/5**
16.	Current Transformer	5P 10 + Class .5
17.	Current Transformer – V.A. Burden	15 VA
18.	Potential Transformer	Resin Cast, Epoxy Moulded
19.	Potential Transformer - Ratio	11KV/1.732/110v /1.732
20.	Potential Transformer – V.A. Burden	100 VA
21.	Control Switch	Yes
22.	Local / Remote / Changeover Switch	Local
23.	A.C. Control Switch	Yes
24.	D.C. Control Switch	Yes
25.	Indicating Lamps	
a.	Breaker on	Red : One
b.	Off	Green : One
c.	Auto Trip	Amber : One
d.	Spring	Blue : One
e.	Trip Circuit Healthy	White : One with P B
f.	Cubical Illuminating	Yes
g.	Test/ Service Position Lamp	Yes
h.	Extra Position	-----
26.	Ammeter with selector switch Range- 6” Dial Type Flush	Yes – One 0-150 A
27.	Voltmeter with selector switch Range- 6” Dial Type Flush	Yes – One 0-26 KV
28.	KWH Meter–3 phase + 3 wire UN–B	Yes – One
29.	Power Factor Meter	Yes
30.	Frequency Meter-Range45Hz–52Hz	-----

31.	Trivector Meter – Range 45Hz –52Hz	-----
32.	Triple Pole ND IDMT relay with 2 o/c With setting 50-2000%+1E/F Setting 10–40%	Yes
33.	Auxiliary Relay for Auto Trip -for Antipumping	-----
34.	Cubical Space Heater with A switch + Thermostat	Yes
35.	Cable Termination (Aluminum) Cable end box / sealing kit No. of cores / sizes mm2	Suitable for A1 3 C x 300 sq.mm With Raychem, Heat, Shrinkable Kit
36.	Mounting of Breaker	Fixed
37.	Confirms to IS specifications IS 2516 with latest amendments	Yes
38.	Contact Separation	Vertical
39.	Safety gear–Automatic Shutters/ Locking Arrangement	Yes
40.	Mechanical Interlock	Yes
41.	Earthing Arrangement-Integral / Separate	Integral

42.	Insolating plugs and sockets of The self aligning type for the main auxiliary circuits	Yes
43.	Cable Testing Sockets	Yes
44.	Incoming Cable Entry–Top / Bottom	Bottom
45.	Short-circuit MVA Rating –	**1000 MVA**
46.	Quantity	Refer SLD /BOQ
47.	Spare Parts	As recommended by supplier for two years
48.	Type of Switchgear	**Vaccum Circuit Breaker**
49.	Application	To control incoming 11Kv **3C x 300 sq.mm XLPE Cable**

50. The following drawings shall be submitted for approval after the order is placed:

a. Dimensional Drawings

b. Sectional Drawings

c. Foundation Details

d. Wiring Circuits

51. The following Manual for Installation, Maintenance and Operation shall be supplied with the equipments:

1. Four copies of approval Drawings.

2. Parts list with enlarged Drawings for each part.

3. If any of the parts are not manufactured by the firm part list number & manufacturers / supplier's name and address.

4. Four copies of Manual for installation, maintenance and operation of Incoming Breaker shall be forwarded along with Incoming Breaker supplied by the manufacturer.

52. Inspection & Testing Procedure:

1. Tests at Manufacturer's Work:

The Incoming Breaker shall be subjected to following tests at the Manufacturer's work in accordance with procedure laid down in the appropriate I.S. Specification or B.S. Specification (wherever they are applicable) and the General Conditions of Contract.

2. i) The routine test shall be in accordance with IS : 2516.

ii) Pressure test on all Switch Tanks in accordance with manufacturer's Standard Practices.

iii) Type Tests in accordance with I.S. 2516.

3. Ammeters:

High Voltage test & calibration test.

4. Operating Tests:

Each components part of the Incoming breaker & other equipment shall be assembled and tested for satisfactory fitness and operated to prove that the operating gear, tripping, devices, protective gear, interlocking, etc., are satisfactory.

5. Test Certificate:

The manufacture / Suppliers shall furnish test certificates in four copies for Incoming Breaker for tests as mentioned above for all the items separately.

6. Test on Site:

After receipt of the Incoming Breaker, the purchaser shall carry out the following tests:

i. Overpotentical Tests:

Each component part as also assembled Incoming Breaker shall be subjected to High Voltage tests as far as practicable.

7. Earth Connection:

Resistance tests shall be carried out to determine the resistance to earth connections of Incoming Breaker and Main earth etc.

8. Additional Tests:

In addition to the test specified above, the purchaser reserves the right of carrying out any inspection or reasonable tests at the manufacture's work during all stages of manufacturer of the breaker as well as such tests as may be considered necessary after installation.

TECHNICAL PARTICULARS FOR DISTRIBUTION TRANSFORMER

1) TYPE: ONAN (Oil Cooled Type)
2) CAPACITY IN KVA: 1500 KVA
3) Winding Material: Copper Winding
4) No Load Voltage Ratio: 11/0.433KV.
5) Quantity: 1 No.
6) Nature of Installation: **Outdoor**
7) Nature of DUTY: Continuous
8) Phases: Three Phase
9) Type of Cooling: Air natural (AN).
10) Vector Group: Delta/ Star, **Dyn11**.
11) Temperature rise: Winding temp.Rise shall not be exceed 90°C (ambient temp 50°C)
12) Tapping on L. V. side: ON/Off load steps of 0, 2.5% Circuit taps links)(as called)
13) Tapping on H. V. side: Constant
14) Acceptance Tests: Routine as per IS 2026 in
15) Inspection: Final inspection required before Dispatch
16) SHOP Drawings: To be approved before manufacture.
17) Guaranteed losses11171 &2026 for copper & no load: Within limit stipulated by IS
18) H. V. Terminals: HT cable end box suitable for **3CX300 sq.mm XLPE 11KV cable.**
19) L. V. Terminals: L. V. cable box – Terminal suitable for **10 Nos. 3.5 C x 300sqmm** /Al
20) Accessories:
a. On/Off load tap changing Switch: With Handle (as Called)
b. Bi-directional Rollers: to be provided
c. Digital Thermometer: to be provided
d. Rating Plate: Yes
e. Terminal Marking Plate: Yes
f. Two Earthed Terminals: Yes
g. Marshaling Box: Yes
h. Lifting arrangements: Yes
i. Platform Lugs: Yes
j. Cover Lifters: Yes
21) Impedance Volts: details to be provided by Vendor.

22) Inspection & Testing at factory Procedure: As per IS standards.

22.1) Transformer Manufacturer shall refer to the specification under code of IS 2026 with latest Amendment. The Routine tests shall be as follows:

1. Visual Inspection.
2. Insulation Resistance Test
3. Induced over voltage withstand
4. Ratio, Polarity, Vector Group test.
5. Winding resistance.
6. Measurement Impedance Voltage.
7. No load Losses & No load Current.
8. Load (Copper) Losses.
9. Separate source voltage withstands.

22.2) Type test certificates shall be submitted.

22.3) The Manufacturer/ Supplier shall supply Five copies of certificates of the test. Certified in respective of each carried out on the transformer.

22.4) The test Certificate shall give the actual measurements and Also the derived value for:

1. Losses
2. Impedance voltage
3. Efficiency at 50%, 75% full load at unity & 0.8 P. f. Lagging and at 75° C.
4. Regulation at unity & 0.8 P.f. Lagging.

The tenderer shall forward copies of test certificate for short circuit withstand capability test from any reputed laboratory such as CRPI on Transformer manufactured by the firm having design similar to the transformer offered.

22.5) In addition to the test specified above, the client/ Consultants reserves the rights to have any Reasonable. Tests carried out the manufacture's work at site.

22.6) The client/ consultants reserves the rights to witness the test at the manufacturer's work at its directions. The suppliers shall intimate complete manufacturing program to be undertaken well In advance.

23) Drawings:

23.1) Tenders shall submit in four copies the following drawings along with the quotations:

a. Dimensional Drawing of the transformer offered

b. Diagram of connection.

c. Drawing showing the arrangements of tapping and tap changing switch.

d. Dimensional Drawings showing L. V. cable box & H. V. connections.

e. Foundation Drawings.

23.2) the drawing shall be to scale & fully detailed. All important dimensions shall be given & Materials of each component shall be indicated.

22.3) The successful Tenders will be required to supply in four copies, copies of drawings as specified above.

24) Manual for installation, maintenance & operation. Four copies of Manual for installation, Maintenance and operation of Transformer shall be forwarded along with transformer supplied by the manufacturer.

TECHNICAL SPECIFICATIONS

1.0 SCOPE:

a. The of work covers Loading, unloading at site, inspection, handling assembly & erection, testing & commissioning of oil cooled transformer.
b. Loading, unloading and assembling of whether proof enclosure/Kiosk of unitized substation.
c. Loading, unloading, at site, inspection, handling assembly & erection, testing & commissioning of 11 KV switch gear.
d. Foundation/plinth for substation.
e. Earthing.
f. H.T, & L.T. cabling and associated work.

1.1 Standards:

The transformer shall confirm the latest edition of the following and other revelant Indian Standards.

1. IS :2026/IS: 11171 – Power Transformers.
2. IS :2099 – High Voltage Porcelain Bushings.
3. IS :3639 – Power Transformers Fittings & Accessories.

1.2 Fittings:

a. Conservator with oil Gauge.
b. Cooling Radiators.
c. Lifting Hooks/Terminals.
d. Oil filling/Drain Valve.
e. Bi- Directional Rollers.
f. Explosion Vent.
g. Thermometer Pocket.
h. Air release Plug.
i. De hydrating silica Gel.
j. Double float Buckholz Relay with Trip & alarm contacts.
k. Marshalling Box with OTI.
l. MOG for low oil level alarm.

1.3 Tests:

The transformer shall be tested for routine as per relevant Indian Standards.

The type test certificate shall be furnished along with routine test certificate with offer.

1.4 **Unloading at site:**

In case where the substation is having adequate crane facility the transformer is unloaded by crane. Alternatively mobile cranes shall be use for keeping the transformer into position.

1.5 **INSPECTION AND STORAGE:**

1.6 **Inspection:**

Transformers are liable to get damaged during transit and therefore, it is recommended that immediately on arrival the transformer shall be unpacked and examined for any sign of transit damage & particular attention being paid to the following:

a- Bushings cracked or broken.
b- Bolts lose due to vibration in transit.
c- Damaged due to Auxiliaries.

If it is suspected that the transformer has suffered physical damage it shall be brought to the notice, serious damages shall be reported to the manufacturer. It is advisable that the representatives of the manufacturer be present before for further inspection to ascertain the extent of damage.
A slight damage which does not appear to be serious but which indicates heavy knocks shall be treated with caution in consultation with manufacturer consultant & client & report of this examination shall be made.

1.7 **Storage**:

Transformer received at site and not expected to be installed immediately are like to absorb moisture. Transformer shall b e stored under cover and the transformer shall preferably be filled with oil to reduce the extent of possible condensation of moisture and the breathing pipe shall be plugged.

1.8 **INSTALLATION:**

1.9 **General:**

A set of record plans shall be provided by the contractor or his installation Engineer clearly indicating the complete layout of the installation. A schedule of the works to be carried out with time required shall be charted out.

1.10 **Precautions**:

As for as possible no work shall be done during rainy seasons to avoid moisture absorption by the transformer.

Extreme care shall be taken to prevent any foreign material from being dropped into the transformer. Workmen having excess to the interior of a transformer shall empty their pockets of all loose materials . Any spanners or other tools used shall be securely tied so that they can be recovered easily if accidentally dropped.

The transformer shall be erected on a outdoor platform.

1.11 **Handling**

Transformers shall have lifting hooks provided for the purpose lifting &keeping the transformer on foundation. Before lifting the complete transformer it shall be ensured that all covered bolts are tightened. No Jacks shall be used for lifting.

1.12 **Site preparation**

All tools and other equipments required for the erection work to be arranged by the contractor at the site before the work started.

1.13 **Indoor Sites**:

The most important thing to be ensured with transformer installed indoors is proper ventilation that is free movement of air round all the four sides' .The level of the transformer base shall be higher than the highest flood and storm water level of that area.The transformers shall be kept well away from the wall. The minimum recommended spacing between the walls of the transformer periphery from the point of proper ventilation given below shall be generally followed, in absence of manufacturers guide lines, as under:

When there is only one wall	-	0.50	Mtr.
Two side wall	-	0.75	Mtr.
Three side wall	-	1.00	Mtr.
Four side wall	-	1.25	Mtr.

1.14 **Earthing of transformer**

Transformer neutral shall connect to two separate and distinct earth electrodes using appropriate size of the earthling conductors.

The body of the transformer shall be earthed at least at two points using appropriate size of earthing conductor and shall be connected to at least two separate &distinct earth electrodes.

1.15 **Foundations:**

The foundation shall be done by other agency; however the required drawing execution shall be furnished by the contractor.

1.16 **Bushings and cables boxes**:

If bushings are removed from the transformer they shall be carefully inspected for cracks or chips before installing them and making sure that gaskets are in proper places. Nuts or bolt which exerts pressure on the porcelain shall be tightened evenly or else bushing may crack.

If the transformer is fitted with cables boxes and it to be connected by cables the cable ends shall be sealed to prevent their absorbing moisture .PVC& XLPE cable boxes need not be filled with compound or oil.

1.17 **General consideration**:

1.18 **Parallel operation:**

For satisfactory operation in parallel the concerned transformer shall have identical (a) phase displacement (b) voltage ratio and equal percentage impedance within permissible tolerances. They shall be so connected that their polarity and phase rotation are identical. Provided the polarities of the winding correspond transformers with the following connections in Group 'A' shall not be paralleled with those in Group 'B'.

Group 'A' – stat/ star, delta / delta and delta /zig – zag

Group 'B' – Delta /star, star/ delta and star /zig –zag

Transformers designated for parallel operation shall not be required to divide the load within limits closer than to permit an individual variation from the rated output of any transformer of the group amounting to+/-10%of such rated output when the total on the group is equal to the sum of the rated output of the entire transformer so connected. In addition, the rated output of the smallest transformer in the group shall be not less then 33% of the rated output of the largest transformer in the group.

1.19 **Polarity and Phasing out:**

a) When connecting a new transformer, special care shall be taken to do so in accordance with the diagram of connections supplied by the manufacturer taking into account, at the same time, the phase sequence of the supply. In case of three phase transformer, if connections are not made in the correct phase sequence, the outgoing supply may also be of wrong phase sequence. This would necessitate breaking down of connections and remaking the high voltage cable connections.

b) It is immaterial whether the phase rotation is clock wise or anti-clockwise so long as it is the same for the entire transformer that have to work in parallel. However, it is recommended

that the standard phase sequences in accordance with the Indian and international practice, viz red, yellow and blue sequences in the anti-clockwise direction shall be adopted. A positive check will help in ensuring correct external corrections. the simplest way is to connect two transformer in parallel on primary sides, connect the secondary terminal of one transformer to its bus bars and connect one terminal of the second transformer to the bus bars which. It is assumed, corresponds to the second transformer to the first transformer. After ensuring that both transformers are on the same tap, voltage readings between the remaining secondary terminals of the two transformers and the bus bars be taken. If both reading are zero, the transformers are of the same polarity and phase rotation and the connections may be made permanent.

c) In the case of star connected secondary's, an alternative arrangement to the secondary connection indicated above is to connect the star points to each other (these connections may be via earth in which case, of course, none of the secondary terminals will be connected to the bus bars before closing.)

Note : It shall be noted that under the above circumstances, it is also possible for the voltage reading to be double of the secondary voltage which will be when the voltage reading happens to be across unlike phases, It is, therefore, necessary that care is taken to see that the range of the voltmeter is equivalent to the sum of the secondary voltages of the two transformers.

1.20 Factory Testing of Transformer:

a) Polarity Test/ Phasing Test.
b) Voltage Ratio Test with tapping changing.
c) Resistance Measurement.
d) No Load Test & No Load Losses.
e) Short Circuit Test & Full load losses.
f) Insulation Resistance Test.
g) Voltages Regulation Test.
h) percentage Impedence Test.
i) Oil Temperature, Alarm & Trip Test.

1.21 Site Testing of Transformer before commissioning:

1-	General inspection	a.	Control & Relay panels etc.
		b.	Junction boxes & marshailing kiosks.
2-	Secondary injection	:	On all transformer protection relays.
3-	Primary injection	: a	Tests on operation of earth fault

			relay on H.V. side.
		: b	Tests on over current of relay on low voltage side.
		: c	Tests on over current relay on high voltage side.
4-	Ratio Test	a.	With 415 V applied on high voltage side measure the voltage between all phase on the how-voltages side for every tap position.
		b.	To check phasing, measure volts: A to a, band c B to a, band c C to a, band c Where A, B and C are terminals of three phase on high voltages side and a, b & c are the corresponding terminals on low-voltages side,
5-	Tripping tests	a.	High voltages
		b.	Low voltages.
		c.	Inter-tripping tests.
		d.	Winding temperature trips.
6-	Alarm circuits	a.	Winding temperature Thermometer.
		b.	Cooling gear failure.
7-	Tap changing tests to check	mechanism/Links.	
8-	Insulation tests	a.	On high and low voltages windings.
		b.	On current and voltages transformer. circuits etc.
9-	Voltages compensation test (if compensating current transformer are fitted)	a.	Primary injection
		b.	Load tests.
		c.	If necessary, switch in with relays connected to correctly compensated voltages from the other transformer.
10-	Neutral earthing switches are closed before making alive.		
11-	Load tests	a.	Voltmeter, ammeters etc. on both

high and low voltages sides.

b. Over current

c. No spill in high voltages star point

d. Voltages on relays.

1.22 DESIGN REQUIRMENT:-

The transformer tank and cover shall be of robust welded construction and sufficiently strong to withstand shocks to be encountered during transportation and installation. It shall be made of mild steel of adequate thickness. he tank shall be made of mild steel plates as per IS : 2026, properly welded and gasket to ensure rigid construction. It shall be able to withstand partial vacuum against standard atmospheric pressure. All welding shall be uniform. All joint shall be fitted with suitable oil tight gaskets. All welded joints in the transformer tank as well as radiatiors shall be as per IS specifications.

The radaitors shall be provided on the tank to facilitate cooling. These shall be provided with isolating valves at both. The cooling radiator shall be as per IS : 6600 The tank shall be equipped with gun metal valves of standard screw connections for external piping for drainage, filtering and sampling of oil.

The transformer tank shall be supported on a structural steel base equipped with forged steel or cast steel single flanged bi-directional rollers suitable for moving the Transformer completely filled with oil. Suitable jacks for lifting the Transformer for changing the plane of rotation of bi-directional rollers shall be provided by the supplier.

The inside and outside of the tank shall be cleaned thoroughly by chemical de rusting agents and shall be coated with insulating paint or varnish.

1.23 Core:

The design of core should ensure low core losses. The core shall be made of good quality cold rolled grain oriented silicon steel laminations of high permeability. It shall be coated with hot oil proof insulation and bolted together with and to frame firmly to avoid vibration. Its design should ensure minimum excitation and eddy current losses. The core shall be fully insulated from the windings.

All core clamping bolts shall be effectively insulated from the lamination in order to eliminate any short circuit path, magnetic or electrical. The core clamping bolts shall be insulated with enamel or varnish or impregnated paper.

The core and the coil shall be properly secured to the tank such that core does not shift its position in case the Transformer is shifted or during short circuit conditions. The core shall be provided with hugs for lifting the complete core and coil assembly of the transformer.

The core shall be effectively earthed to the tank.

1.24 Windings:

The Transformer windings shall be of high conductivity annealed copper conductor. These shall be fully insulated for rated voltage with paper of high dielectric strength, slow ageing characteristics and oil resistant properties. It is preferable to provide two bushing for neutral point earthing (One inside the terminal block and one outside).

The winding shall be would to closes tolerances and the coils be thoroughly vacuum dried and impregnated with varnish or oil.

Adequate mechanical bracings of the windings shall be provided and insulation shall be designed in such a manner so as to ensure a uniform voltage distribution throughout the length of the winding during surge and short circuit conditions.

The windings shall be clamped securely in place so that they will not be displaced or deformed during short circuits. Maximum current density in the input & output shall be clearly stated in the tender. It is essential that winding should be subjected to through Shrinking and seasoning process so that move further shrinking occurs at site.

The percentage of end turn insulation provided of the Transformer shall be clearly stated in the tender. Whole winding of the transformer shall be fully insulated.

The bushing insulators of the transformer shall be of sufficient creepage length and shall be unaffected by atmospheric condition due to weather, dust or rapid change of temperature likely to be met at site. These should be fully glazed porcelain type. All bushing should be marked by means of label with symbols corresponding to connection diagram indicated in the diagram plate.

1.25 Oil:

The insulating oil used in the transformer shall be mineral of high flash point, low sludge value, low viscosity, low moisture content as per IS: 6792-1972 (latest issue) and should not be less that 40 KV for 60 sec. and minimum 50 KV instantaneous.

The transformer shall be supplied with first filling of oil and additional will be supplied if required for topping of the level if required for which no extra payment shall be paid.

The bidder shall offer the following in Guaranted parameters (subject to IS Tolerances) along with tender Documents.

1- Type of Cooling.
2- Continuous maximum rating.
3- No Load voltages Ratio at u.p.f.
4- Operating Frequency.
5- Vector Symbol.
6- Tap Changer Type and make.
7- Tapping of HV for HV/LV variation.
8- Tapping range and steps.
9- No load losses & full load losses.
10- Effiency at a) At full Load.
    b) At 75% of the rated load
    c) At 50% of the rated load
    d) At 25% of the rated load
11- Percentage Impedance.
12- Maximum/ Avg. Ambient Temerature
13- Termination arrangement.
14- Temperature rise in winding/oil
15- Any other specific information about the design of the transformer

1.26 INSTALLATION:

As far as possible no work shall be done during rainy seasons to avoid moisture absorption by the transformer.

Extreme care shall be taken to prevent any foreign material from being dropped into the transformer. Workmen having excess to the interior of a transformer should empty their pockets of all loose materials. Any spanners or other tools used shall be securely tied so that they can be recovered easily if accidentally dropped.

Fibrous cleaning materials shall not be use the presence of loose fibers in suspension in transformer oil can reduce materially its insulating properties. All components dispatched separately shall be cleaned inside and outside before being fitted. If any internal material temporary transportation braces are provided they are to be removed without disturbing any permanent internal arrangements. The transformer shall be erected on al level foundation.

1.27 Handling:

Transformer should be lifted by the lugs or shackles provide for the purpose and simultaneous use should by made of all such lugs or shackles in order to avoid any unbalanced in lifting. Before lifting the complete transformer it should be ensured that all covered bolts are tightened.

Where it is necessary to use jacks for lifting the projections provided for the purpose of jacking should never be placed under valves or cooling tubes. In certain circumstances in consultation with the manufacture jacks may be placed under stiffening curbs on the tank base.

1.28 Making of leak proof joints:

Only such materials as recommended by the manufacture should be used for the gaskets. However, if no recommendations from the manufacture are available, gasket may be made of high grade cork or synthetic material like neoprene or neoprene bonded cork. The surface should be thoroughly cleaned by alcohol, naphtha or any other cleaning or degreasing material recommended by the manufacture. Synthetic material gasket does not require do not require any sealing compound to obtain tight joints. It may only be necessary to use some type of adhesive compound to spots on vertical faces to retain the gasket in place until it is tightened. Mechanical stops are generally provided to limit compression of the gasket material to two third of its original thickness.

Medium grained cork or gasket of synthetic material is recommended for use with un machined surface such as tank bands and covers and hard composition cork of circular gaskets such as those under bushings and manhole covers Any approved gasket compound should be used for joints made of cork. Whenever gaskets are not made in one piece, sear fed or dovetailed joints should be used by tapering the ends. Whenever tightening the cover bolts they should be tightened with care slowly and uniformly increasing the pressure as too much pressure will disrupt the jointing materials, further and unevenly compressed gasket may spring up a leak.

If liquid leaks cannot be stopped by retightening, new gaskets should be used. When covers, bushings or radiators are removed, the old gaskets should be replaced by new ones when the unit is reassembled.
Leaks through screw joints such as nipples (if due to poor threads) are remediable only by rethreading the nipple to proper dimensions re-tapping the female threads and cleaning them thoroughly. Filler which is insoluble in the insulation oil does not adversely affect it does not shrink and remains plastic should be used for threads.

Note: Shellac should not be used as filler since it shrinks as much as by 50% when the solvent evaporates.

Minimum clearance between the highest point of the conservator tank to the ceiling of the transformer room should be sufficient to remove the mounting on the transformer like the conservator. However this clearance should not be less than 0.5M.

Transformer neutral should be connected to two separate and distinct earth electrodes using appropriate size of the cable conductors. If more then one transformer is installed in the substation one independent electrode for each transformer neutral and one common electrode for all the transformer neutral should be sufficient.

The body of the transformer should be earthed at least on two points using appropriate size of conductor and should be connected to at least two electrodes/earth grid having at least two earth electrodes.

1.29 Bushings:

If Bushing is removed from the transformer they should be carefully inspected for cracks or chips before installing them and making sure that gaskets are in proper places. Often the leads are trapped between two nuts the first nut holding the bushing stem while the second nut holds connection. One nut should be held with a thin spanner whilst tightening the other. Nuts or bolts which exert pressure on the porcelain should be tightened evenly or else bushing may crack.

1.30 Cable Boxes:

If the transformer is fitted with cable boxes and it to be connected by cables, the cable ends should be sealed to prevent their absorbing moisture. The cable boxes should be filled with compound, after making the connections. PVC& XLPE cable boxes need not be filled with compound or oil.

1.31 Oil:

When oil is dispatched to site separately, it is usually is sealed drums. At the time of fitting the drums is shall be ensured that the oil is filtered. clean and dry. The oil to be use for filling or topping up shall comply with IS: 355-1972. Insulation oils complying with IS355-1972 are supplied for electrical equipment, but from time to time the oil received, it is subjected to deterioration or contamination in storage or in handling. Causes of oil deterioration and recommendation for supervision tests are made in IS: 1866-1978.

1.32 Oil Sampling:

The condition of oil should be checked before use. Both water and water saturated oil are heavier than clean and dry oil and sink to the bottom of the container. Sample of oil from the transformer should be taken from the bottom of the tank. When samples are taken from the drum, they should be taken from the bottom only after the oil has been allowed to settle at least for 24 hours.

1.33 Receptacles for samples:

Receptacles for samples should preferably be bottles of clear glass with ground glass stoppers and of one litre capacity. Sample bottles should not be filled to the top. They shall be cleaned and dry. If electrical test cannot be carried out immediately these bottles shall be hermetically sealed to prevent contamination of oil while awaiting the test. Touching the inside of a receptacle with damp hand or wiping round with an apparently Touching the inside of a receptacle with damp hand or wiping round an apparently clean dry cloth may seriously reduce the breakdown strength of a sample of a good oil.

1.34 Samples from tank:

When taking samples from the tank, remove all dirt from the sampling valve or plug. To ensure that the valve is clean, allow some oil to flow into some receptacle before collecting samples for testing. Sample should be collected in clay glass receptacles so that any water present settle at the receptacle and is clearly visible.

1.35 Samples from oil drums:

Before taking samples from an oil drum, the oil drum shall have been allowed to stand with the bung vertically upwards for at least 24 hours. The area around the bund should then be cleaned carefully. A clean glass or brass tube long enough to reach within 15 mm of the lower most part of the drum should be inserted, keeping the uppermost end of the tube tightly closed with the thumb. The first two samples should be discarded. Thereafter, the samples should be released into a suitable receptacle.

1.36 Testing of Oil:

The samples of oil shall be tested in accordance with IS: 355-1972

1.37 Filling transformers with Oil:

Before filling with oil, transformer should be fitted all accessories such as, valves, gauges, thermometers & plugs and made oil-tight. Oil samples should be taken and tested before filling the

transformer tank. It should be ensured in oil filling operation that no air pockets are left in tank, that no dust or moisture enters the oil and that it is at least as warm as the surrounding air. All air vents should be opened. Oil should be filled through centrifuge or metal housed or other house pipes of synthetics material resistant to transformer oil. Rubber hoses should be not used since the sulphur in the rubber would dissolve in oil causing the dielectric strength of the oil to be lowered and also the dissolve sulphur would attack the copper in the windings. If no filters are available, other means of straining the oil such as, to or more layers muslin cloth thoroughly washed and dried to remove the sizing may be use. To prevent aeration of the oil, the transformer tank should be filled through the bottom drain valve. In conservator type of transformer, the ratye of oil flow should be reduced when the level is almost up to the bottom of main cover to prevent internal pressure from rupturing the relief pipe diaphragm. Sufficient time should be allowed (12 to 24 hours) for the oil to permeate the transformer and also the locked up air bubbles to escape. Any air accumulated in the buchholtz relay should be released. The side of the transformer tank may be tapped with a hammer on all the sides to release locked up air. An alternate method for removing the trapped air from large transformer is to keep the transformer energised at no load for about 6 to 12 hours at the end of which the air cocks on the transformer are opened to allow the released air to escape.

Vacuum filling may be use for large transformer with tanks designed to withstand full vacuum. A vacuum pump may be connected to the top valve of the transformer and the oil house to the top filter press valve. The tank shall be tightly sealed and evacuated to approximately 700mm of mercury and the vacuum maintained for 2 hours or longer depending on the size and voltage of the transformer. The oil valve may then be opened and the oil allowed to flow slowly into the tank. The vacuum should be maintained for a short time after the tank is full. While evacuating the transformer tank, the diaphragm or pressure releasing devices of the explosion vent should be removed and replaced by a blanking plate so as to avoid rupture while drawing vacuum and while filling oil to break the vacuum. Care should be exercised to see that large Bakelite panels such as, those used for load-ratio control units are not subjected to pressure (both sided of the panes may be connected to equalise the pressure).

1.38 DRYING OF TRANSFORMERS:

If as a result tests carried out in accordance with 3.9.6 presence of moisture is indicated or the oil does not withstand the tests as recommended by the manufacture or the insulation resistance readings are not satisfactory, it shall be necessary to dry out the transformer.

a- Precautions when drying :

a.1 Only spirit type themometer are to be use for temperature measurement. Mercury thermometers shall not be used anywhere except in the pockets provided for this purpose.

a.2 The maximum sustained temperature to which transformer oil should be subjected is 85 c. Therefore, the maximum sustained temperature to which anything in contact with the oil should be raised is 90 0 C.

a.3 In no case should the transformer be left unattended during any part of the dry out period. The transformer should be carefully watched throughout the dry out process and all observations shall be carefully recorded.

a.4 It is recommended to keep fire fighting equipment ready during the day out period. Naked lights and flames should be kept away while the drying operation is in progess.

b. Methods of drying:

b.1 There are a number of approved methods of drying out transformer core and coils. If the drying out process is carelessly or improperly performed, great damage may result to the transformer insulation through over-heating.

b.2 Drying with core and coils in oil by the short circuit method.

b.2.1 This method is well suited for core transformer but is not recommended for shall type transformers because of the mass and locations of fibrous materials used. The oil should be lowered a few centimeters below the cover and the windings should then be heated by short circuiting one of them by means of connection suitable for the full load current of the shorted winding and applying a suitable voltage on the other. If the required power is to be obtained from a long overhead transmission line, suitable protection against over voltage should be provided to avoid damage to the transformer during the dry out period. The success of this method depends upon.

a- Correct loading to maintain the temperature of windings and insulation within safe limits.
b- Correct oil temperature by reducing the normal load.
c- Thorough ventilation to remove water vapour given off the hot oil
d- Thorough lagging of the cover to prevent condensation of moisture.
e- Careful filtering and dielectric strength tests of the oil to determine when the transformer is dry.

b.2.2 The diaphragms of relief pipe should be removed and the manhole covers should be removed or raised about 15 cm to allow moist air to escape. All openings should be protected from the weather. The top of the main cover and relief pipe should be thoroughly lagged. Radiation from radiators or tubes may be valves; the top valve may be closed to

prevent circulation. Both the valves should not be closed since high pressure caused due to expansion may damage the valves. If the transformers are provided with taps, the connections should be so made that all the windings is in the circuit so that the entire winding may be dried. Filtering the oil will and materially in removing the moisture and hasten the process of drying.

b.2.3 The more important points concerning the method of drying on which attention is to be focused are the following :-

a. Importance of continuing the drying out process without a break, maintaining the temperature of the oil in the transformer at a specified value of say 80 dag. C. It may take week's time is some case before the drying out is completed.

b. Maintaining a log sheet

c. Introducing a purifier of the centrifugal or vacuum type provided with suitable heating elements and thermostat in addition to the heating of oil by the short circuit method. The thermostat on the purifier is usually set to maintain an outlet temperature of 90 deg. C. Oil is drawn from the transformer tank through a pipe dipped to the bottom and delivered back into the transformer tank at the top. The purifier has also to work continuously excepting for about an hour per day when it is opened up for cleaning the cones in the case of the centrifugal type or the filter pads in the case of the vacuum type.

d. In extreme cases where the dielectric strength of oil fails to improve despite this treatments over a period of 15 to 20 days, it may become necessary to blow a gentle stream of hot air a temperature of about 150 deg. C in space between the top of the oil and the covering of the which is normally lifted for ventilation purposes.

Note : It is preferable to record the resistance value of each transformer winding before and after the heat run test in order to calculate the maximum temperature of the winding and compare is with the oil temperature in order to ensure that no abnormal conditions occur during the drying process.

b.2.4 The following tables shows the short circuit in percent of full load current which may be used for this method of drying of transformers with the corresponding maximum allowances of top oil temperature. Usually, less than 5% of normal voltage will given sufficient current circulation in the windings. These temperature limits and loads shall be strictly adhered to in order to obtain desired results without damages to transformers.

Self- cooled	Water cooled	Top oil

Transformers Percent	transformers percent	Temperature (max.) Deg. C
50	50	85
75	60	80
85	75	75

Note: It may be noted that the higher the allowable oil temperature, the smaller the load. Which means that additional blanketing of the tank or deduced use of artificial cooling is required for the smaller currents that for higher currents in order to bring the oil temperature up to the values shown in the above table.

1.39 Measurement of Insulation Resistance:

The Measurement of insulation resistance is of importance in determining the status of dying only when the transformer is without oil. is the initial insulation resistance is measured at ordinary temperature, it may be high although the insulation is not dry but as the transformer is heated up, the insulation resistance value drops rapidly.

As the drying proceeded at a constant temperature, the insulation resistance will generally increase gradually until towards the end of the drying period when the increase becomes more rapid. Sometimes, the resistance rises and falls caused by short range one or more times before reaching a steady high point which is caused by moisture in the interior parts of the insulation working its out through the outer portions which were dry at the beginning.

As the temperature varies, the insulation also varies greatly. Therefore the temperature should be kept nearly constant and the resistance measurements should all be taken at nearly the same temperature as possible. The insulation resistance in meg ohms varies inversely with the temperature and for a 10 deg. C Change of temperature, the meg ohms changes by ratio generally in the range of 2:1 to 1:4:1 measurements should be taken every 2 hours during the drying period.

The insulation resistance should be measured by at least 2500 V megger. Every time the Voltage should be applied for 1 minute.

10 Important fittings and accessories and their installation:

1.40 Gaskets:

Whenever blanking plates are removed to fix detached parts such as bushing, turrets etc. a new gasket shall be use while fixing the same. A set of new unused gaskets of correct size and thickness is supplied with every transformer for this purpose. Gaskets shall be stored in hermetically sealed containers in a cool place. They shall be protected from damp. oil and grease. To make a gasketed joint, first clean the metal surfaces ensuring that they are free from oil, rust scale etc. Then a film of the special gasket adhesive if supplied by the manufacture may be applied to one of the surface. The gasket may be then stuck to the surface after the lapse of a few minutes. The other metal surface also be given a film of adhesive and placed over the gasket. Both may then be tightened according to the special instructions of the manufacturer.

1.41 Tap Changers:

a. Changeover switch or link arrangement provided in a multi-ratio transformer has to be checked for proper radio.

b. Off-circuits tap switch :

c. The off circuit tap switch from an integral part of the transformer, since the operation is to be carried out from outside the operating handle may at times be dispatched separetely. This has to be fitted as per manufacture instructions. Care has to be taken to have correct alignment of the handle. The tap number on the outside should correlate with the actual position of tap changer. This is confirmed when the ratio tests are done. Before changing taps. isolate the transformer from supply on all windings. in no case should the tap switch handle be left half way and unlocked to prevent damage due to inadvertent operation.

1.42 Cooling equipments:

The cooling equipments and associated pipe work and fittings are to be thoroughly cleaned and cleaned and flushed with clean dry transformer oil before assembly. The pressure gaugegs, differential pressure guages etc. If any are fitted in position, the cooler and associated pipe work is then filled with clean dry oil keeping all the cooler circuit open except the transformer inlet and outlet valves, Air is released from all the pipe work during filling. The oil is circulated through a filter press using the filter valves provided in the cooler inlet and outlet branches.

The cooler control circuit is to be checked for correct operation in all positions of the selector switch. Test push buttons are provided for checking of the working of motors individually. The cooler system is then connected to the tank by opening the tank inlet and outlet valves.

1.43 Conservator:

All transformers of ratings of 50 KVA and above are normally provided with conservator tanks and dehydrating breathing devices, hermetically sealed or nitrogen filled tanks or other equally suitable means to prevent ingress of moisture into transformer tanks.

Conservator, where fitted, should be assembled with its pipe work etc. making sure that all gasket joints are oil tight and the pipe work is clean and free from moisture. The mechanism of the float type oil gauge inside the Conservator might be locked to prevent damage during transit. After placing the conservator in position, it should be released by turning the locking bolt in the direction indicated on the plate.

While topping up oil in the transformer it should be ensured that oil is filled to a level indicated by the oil gauge on the conservator commensurate with the filling oil temperature.

1.44 Buchholz Relay:

The Buchholz is checked for functioning of the mercury switches by injecting air through the test petcock when full of oil. When mounting on the pipe work. the correct direction is maintained with the help of arrow provided the angle of inclination is also to be checked and should be between 3 deg. & 7 deg. the gas release pipe if provided is to be connected to the petcock. In service the top petcock should be open and the gas release pipe should be full with oil. When the gas is to be collected through the gas release pipe, initially the oil will flow out and then the gas can be collected.

Each time after removal of trapped gas from the relay, this should be primed to the full with oil. If there is any residual air left in the pipe, this would vitiate the correct analysis of the accumulated gas.

1.45 Dehydrating Breathers:

The breather pipe work shall properly clean. The oil level in the oil seal at the bottom should be filled to the correct level with transformer oil. Any oil that might have over flown should be wiped off. It is to be ensured that the breathing hole at the bottom of the seal is not blocked by dirt etc. The silica gel to be filled into the breather shall have blue colour.

1.46 Explosion vent:

The temporary cover which is provided over the explosion vent flange on the tank cover should be removed and the explosion vent fitted with suitable gaskets, care being taken to ensure that a

top diaphragm with its gaskets makes and air-tight joint. As the top diaphragm is sent blanket from works, the blanking plate shall not be removed till the oil level inside the transformer comes above the tank cover.

1.47 Temperature Indicators:

Before installing the accuracy of the instrument shall be checked by hot oil or water bath. The switches are adjusted to make contact at the desired temperature depending upon the site condition that is, ambient temperature, loading conditions etc.

The capillary tube is protected adequately to withstand all handling. It should not, however, be bent sharply or repeatedly and should be supported by clips to prevent sagging. On no account it shall be cut.

The thermometer pocket should be filled with sufficient transformer oil to ensure good thermal contact between the pocket wall the thermometer bulb. The connection of the winding temperature indicator CT is made to the thermometer pocket as per instruction given on the Terminal Board.

TECHNICAL PARTICULARS FOR 11KV HT CABLE

SR NO	PRODUCT DETAILS	SPECIFICATIONS
1.	System Voltage	11 KV Earthed
2.	Conductor Insulation	XLPE (Cross Link Polyethylene)
3.	Cable Size	3C X 300 SQ.MM **stranded** conductor
4.	Type of Conductor	EC grade **Aluminum** as per IS 8130
5.	Type Of Armour	G. I. Steel Flats
6	Outer sheath	**with type ST2** PVC as per IS 5831
7.	Method Of Installation	a) Partially on M. S. tray, in air with single layer & partially in R. C. C. trench with sand bed & earth filling & partially in the ground with 30º C temperature b) Depth of laying ion case of ground shall be **1050mm**
8.	Maximum Conductor temperature	At normal current 90º C at short circuit current 250° C
9.	Operating Frequency	50 Hz + 3%
10.	Transportation	**STEEL Drums** suitable for the length approximate 200mtrs cable in single length
11.	Inspection & Testing	As per IS 7098 inspection & testing for Routine tests shall be carried out in presence of Consultants/ Client's discretion.
12.	Technical Particular to be given by Manufacturer	a) Normal Current Rating b) Dimensions c) Recommended Bending radius d) Electrical Parameters of the cables