HARYANA POWER GENERATION CORPORATION LIMITED

1X800 MW EXPANSION UNIT DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT YAMUNA NAGAR, HARYANA

EPC PACKAGE TENDER SPECIFICATION

SPECIFICATION #

SECTION - VII

BOOK 2 OF 3

			BID FORM	
		BID FORM PART-II PRICE BID		
Name of Package:	EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA, Bidding Document No.: 03/EPC/DCRTPP/800 MW			
BIDDER'S NAME				
	Bid Proposal No			
	Dated			
1.0	Having examined the Bidding Document No. 03/EPC/DCRTPP/800 MW including subsequent amendments and clarifications if any, the receipt of which is hereby acknowledged, we the undersigned, offer to design, manufacture, test, deliver, construct, install and commission (including carrying out Guarantee Test) the facilities under the above-named Contract in full conformity with the said Bidding Documents for the sum (excluding taxes & duties indicated by us in Schedule-7& 7A) as mentioned in Bid invitation at e-tender site https:etenders.hry.nic.in or such other sums as may be determined in accordance with the terms and conditions of the Contract.			
2.0	ATTACHMENTS TO THE BID FORM PAR	RT-II (PRICE) BID:		
2.1	In line with the requirements of the Bidding	Documents, we enclose herewith the following Attachments & Price Schedules, du	ly filled-in as per your proforma:	
(a)	Attachment-1(P)	Deleted		
(b)	Attachment-2 (P)	A power of attorney duly notarized by a Notary Public indicating that the person(s) signing the bid have the authority to sign the bid and thus that the bid (price bid) is binding upon us during the full period of its validity in accordance with the ITB Clause No.13. As required, the Attachment-2(P) (i.e. Power attorney) has been furnished in physical form in a separate sealed envelope.		
(c)	Attachment-3 (P)	Certificate of Compliance to all provisions of bid documents		
(d)	Attachment-4 (P)	Declaration regarding Import Content as per your format enclosed in the Bidding Documents.		
(e)	Attachment-4A (P)	The declaration regarding Custom duty benefits for import of Construction Equipment considered in the Bid.		
(f)	Attachment-5 (P)	Deleted		
(g)	Attachment-6 (P)	Declaration on Guaranteed value of parameters as per format in this Attachment for bid evaluation		
	PRICE SCHEDULES			
2.2	In line with the requirements of the Bidding	Documents, we enclose herewith the following Price Schedules, duly filled-in as per	r your proforma:	
(a)	Schedule1	Plant and Equipment including type Test and Mandatory Spares to be supplied from Abroad		
(b)	Schedule2	Plant and Equipment including type Test and Mandatory Spares to be supplied from within the Owner's Country		
(c)	Schedule3	Local Transportation including Port Handling, Port Clearance & Port Charges, Inland Transit Insurance and other local costs incidental to delivery of plant & equipment and mandatory spares at site.		
(d)	Schedule4	Installation Services [Erection, Civil, Steel Structural works (Site fabricated structures as permitted as per Specifications), Factory Fabricated Steel Structural Works (Erection) & Allied works] including insurance (other than transit insurance and other services as specified in the Bidding Documents).		
(e)	Schedule5	Grand Summary		
(f)	Schedule6	Recommended Spare Parts		
(g)		GST as applicable on schedule 2, 3 & 4, not included in Bid Price		
(h)		GST as applicable on schedule 1, not included in Bid Price		
(i) (j)		Breakup of TypeTest Charges in Schedule 1 & 2 respectively. Deleted		
(k)	Schedule10	Deleted	<u> </u>	
(1)	Schedule11	Deleted		
(m)	Schedule12	Schedule of Optional Items/ Works		
3.1	Technical Specifications, Drawings and otl	do not generally give a full description of the work to be performed under each in her sections of the Bidding Documents to ascertain the full scope of work included a shall be deemed to include the full scope as afores	in each item while filling in the rates and prices.	
3.2	We declare that as specified in the Genera Price Adjustment, Annexure-K (Price Adjust	al Conditions of Contract (Clause 14.1) prices quoted by us in the Price Schedule strment) to the GCC.	hall be subject to adjustment in accordance with	
3.3	We understand that in the price schedules, where there are discrepancy between the unit price and the total price, which is obtained by multiplying the unit price and quantity, or between subtotals and the total price, (even in case of carry forward of prices) the unit or subtotal price shall prevail and the total price shall be corrected accordingly. Similarly, in case of any discrepancies between the total bid price and the summation of Schedule prices (price indicated in a Schedule indicating the total of that Schedule), the total bid price shall be corrected to reflect the actual summation of the Schedule prices.			
3.4	We declare that prices left blank in the Schedules will be deemed to have been included in the prices of other items. The TOTAL for each Schedule and the TOTAL of Grand Summary shall be deemed to be the total price for executing the Facilities in complete accordance with the Contract, whether or not each individual item has been priced.			
4.0		ifically provided, our Bid Prices include all taxes, duties, levies and charges includicipal, State or National Government authorities in connection with the Facilities, in		
4.1	Sub-Vendor, or their employees by all Municipal, State or National Government authorities in connection with the Facilities, in and outside of India. We understand that notwithstanding 4.0 above, you shall bear and promptly pay/reimburse all custom duties and GST, if imposed on the Plant and Equipment including Mandatory Spares to be supplied from abroad and specified in Schedule No.1, (and on recommended spare parts to be supplied from abroad and specified in Schedule No.6, if awarded) to be incorporated into the Facilities, by the Indian Laws. Further you will reimburse the above custom duties and GST subject to furnishing of documentary evidence by us. However, we understand that if we choose to ship the equipment in Shipper's Containers, then the custom duty, GST and any other tax/duty levied on the cost of such empty Containers shall not be borne by you and shall be borne and payable/reimbursable by us. Further, in case any additional duties under Customs like Anti-dumping duty, Countervailing duty on subsidised articles, Safeguard duty etc. and any other tax including GST, levies, cess etc. applicable in such additional duties, is imposed on Plant and Equipment including Mandatory Spares/ Recommended Spares, the same shall be borne and paid/reimbursed by us. Further, payment of custom duty, custom clearances, any wharf age /demurrage /penalty, if levied on account of non fulfillment of contractual obligation /documentation shall be to Contractor's account			

4.2	"We further understand that notwithstanding 4.0 above, you shall also bear and pay/reimburse to us GST applicable on: (a) Plant and Equipment (including Type Test Charges) and Mandatory Spares to be supplied from within the Owner's country specified in Price Schedule 2 (and also on locally supplied Recommended Spare Parts quoted in Price Schedule 6, when awarded) to be incorporated in the Facilities, by the law of country where the site is located, (b) local transportation & insurance, other local costs incidental to delivery of plant & equipment including mandatory spares specified in Price Schedule 3 (and also of locally supplied Recommended Spare Parts quoted in Price Schedule 6, when awarded) and (c) Installation Services including Erection, Civil & Allied Works and other services specified in Price Schedule 4. However, all other taxes, duties & levies as may be applicable on goods and services specified in Price Schedules 2, 3 & 4 and on the materials used for civil construction works and erection & commissioning shall be to our account and no separate claim in this regard will be entertained by you. Taxes and Duties which are payable by the Owner under the Contract shall be reimbursed by the Owner to the Contractor after receipt of equipment/spares at site and on production of satisfactory documentary evidence by the Contractor. However, GST as applicable on Advance sanctioned to Contractor shall be paid to the Contractor alongwith the Advance sanctioned. We undertake that the amount of this GST shall be progressively adjusted against Tax Invoices at the time of supply/dispatch of equipment.		
4.3	We confirm that we shall get registered as per relevant GST laws		
4.4	INCOME TAX We hereby declare that if any Indian Income Tax, surcharge on Income Tax and any other tax is attracted under the law, we agree to pay the same to the concerned authorities and you shall have no additional tax liabilities whatsoever irrespective of the mode of contracting.		
5.0	COMPLIANCE TO THE PROVISIONS OF THE BIDDING DOCUMENTS		
5.1	We have read all the provisions of the Bidding Documents and confirm that notwithstanding anything stated anywhere in our bid to the contrary, the provisions of the Bidding Documents are acceptable to us and we further confirm that we have not taken any deviation to the provisions of the Bidding Documents anywhere in our bid.		
	We have furnished our compliance to the provisions of the Bidding Documents and its subsequent Amendment(s)/Clarification(s)/Addenda/Errata by submitting Attachment-3P(certificate of compliance to all provisions of Bid Document).		
	Submission of above Attachment-3P shall be considered as our confirmation that any deviation to the Provisions of Bidding Documents found anywhere in our Bid Proposal, implicit or explicit, shall stand unconditionally withdrawn, without any cost implication whatsoever to the Owner, failing which our bid security shall be forfeited.		
5.2	We further declare that additional conditions, variations, deviations, if any, found in the Price Bid, save those pertaining to any rebates offered, shall not be given effect to.		
6.0	We declare that we have quoted the plant and equipment including spares to be supplied from abroad on CIF (Indian port-of-entry) basis.		
6.1	For payments related to Erection/Civil/Site Fabricated Structural Works		
	We confirm that a single designated ESCROW account shall be opened by us in any scheduled bank of India under intimation to Owner. All payments related to Erection/Civil/Site Fabricated Structural works by the Owner due under the contract to us shall be released into above mentioned ESCROW account set up as per the Tri-Partite ESCROW Agreement between us, Owner, and Escrow Bank. The payment shall be disbursed in accordance with the mechanism set out in the Contract and Escrow Agreement. The purpose of the Escrow Account would be to ensure that payments received under the contract are solely used for implementation of the Contract. Under Tri-partite Escrow Agreement, the Escrow Bank will agree to ensure that amounts received in the ESCROW Account are utilized for making payments only to suppliers of goods and services related to Erection/Civil/Site Fabricated Structural Works, Statutory Authorities, establishment expenses etc. as may be required in the performance of the contract.		
	We further confirm that all expenses/charges for opening/operation (including Annual Fee) of the Escrow Account shall be paid by us.		
	The draft agreement as annexed as Annexure-D , GCC shall be followed for executing Escrow Account Agreement.		
	The detailed Operative Procedure and Terms and Conditions of Escrow Account (Schedule-III of Draft agreement) shall be finalized between us, the Owner, and the Escrow Bank within 15 days of the placement of award.		
7.0	We undertake, if our bid is accepted, to commence work on the facilities immediately upon your Letter of Intent (LOI) to us and to achieve Completion of Facilities, Trial operation, conduct Guarantee Tests and achieve Final taking Over within the time specified in the Bidding Documents		
7.1	We confirm that, in terms of the requirement of Clause 44.0 of Erection Conditions of Contract of Vol-I, Section-5, the 'Safety Plan' shall be submitted within 60 days from the date of award of contract for approval of Engineer-in-change (EIC) / Project Manager of Owner.		
7.2	Deleted		
8.0	Deleted		
9.0	If our bid is accepted, we undertake to provide Advance Payment Security, Contract Performance Securities, Performance Securities for Phase manufacturing program and securities for Deed(s) of Joint Undertaking (as applicable) in the form and amounts and within the time specified in the Bidding Documents.		
10.0	We agree to abide by this Part-II (Price) Bid for a period of 180 days from the date of opening of price bids as stipulated in the Bidding Documents and it shall remain binding upon us and may be accepted by you at any time before the expiration of that period. Techno - Commercial Bid (Part-I) including this Price Bid (Part-II) shall remain valid and open for acceptance for One Hundred Eighty (180) days from the date of opening of price bid. Further, the prices of recommended spares contained in our Bid shall remain valid for a period of 18 months from the date of LOI.		
11.0	Until a formal Contract is prepared and executed between us, this bid, together with your written acceptance thereof in the form of your Letter of Intent (LOI) shall constitute a binding contract between us.		
12.0	We understand that you are not bound to accept the lowest or any other bid you may receive.		
13.0	We confirm that cost of Special Tools & Tackles furnished by us in Attachment-4A of our Part-I (Techno-Commercial) Bid is included in lumpsum price quoted in this Price Bid.		
14.0	We, hereby, declare that only the persons or firms interested in this proposal as principals are named here and that no other persons or firms other than those mentioned herein have any interest in this proposal or in the Contract to be entered into, if the award is made on us, that this proposal is made without any connection with any other person, firm or party likewise submitting a proposal, is in all respects for and in good faith, without collusion or fraud.		
	Name		
	Designation		

	Attachment -1 (P)		
EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,			
Bidding Document No. : 03/EPC/DCRTPP/800 MW			
BIDDER'S NAME	0		
Deleted			

	Attachment -2 (P)		
EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA, Bidding Document No. : 03/EPC/DCRTPP/800 MW			
BIDDER'S NAME	0		
POWER OF ATTORNEY Bidder to Attach the Power of Attorney in accordance with Clause 2.1(b) of Bid Form Part-II (Price Bid) (To Be Submitted in PHYSICAL MODE)			

	Attachment -3 (P)					
"1X800 N	EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,					
	Bidding Document No. : 03/EPC/DCRTPP/800 MW					
	Certificate of Compliance To All Provisions of Bid Document					
BIDDER'S NAME	0					
(To Be Submitted in PHYSICAL MODE)						

Attachment -4 (P)

EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/EPC/DCRTPP/800 MW

Declaration regarding Import Content				
BIDDER'S NAME	0	Bid Currency (Only one bid currency to be specified by Bidder)		
1.0	We confirm the details of CIF value of Import Content included in our bid in are as follows:	respect of Ex-works (India)	price quoted in Schedule-2	
2.0	These details are furnished for the purpose of issuance of Essentiality Certificate by the Owner as per Clause 10.6 Section-II, ITB. We further confirm that we shall be solely responsible for availing such benefits and benefits shall be restricted to the value indicated above			
S.No.	Description of item to be supplied	Quantity	Value	
Name:				
Designation:				
Designation:				
Note				
1.0	Bidder can insert more rows, as required	l		
2.0	Bidders to note that the Plant & Equipment including Mandatory Spares quoted on CIF basis under Schedule-1, which are to be imported by the Owner directly, should not be included in the value of import content indicated in this Attachment. The value of import content to be indicated in this Attachment shall be only in respect of Ex-works (India) price quoted in Schedule-2.			

Attachment -4A (P)

EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/EPC/DCRTPP/800 MW

Declaration regarding Customs Duty Benefits for import of Construction Equipment

Declaration regarding Customs Duty Benefits for import of Construction Equipment				
BIDDER'S NAME	0	Bid Currency (Only one bid currency to be specified by Bidder)		
1.0	We confirm that we are solely responsible for obtaining the Customs Duty Benefits for import of Construction Equipment which we have considered in our bid and in case of failure to receive such benefits, Owner will not compensate us in any manner whatsoever.			
2.0	We further confirm that we will not claim for adjustment in Contract Price on acco of Construction Equipment.	unt of variation in or withdrawal of Cu	stom Duty Benefits for Import	
3.0	We are furnishing below the information required by the Owner for issue of rele Govt. of India:	vant Certificates in terms of the Cust	oms Act & Notification of the	
A	CIF Value in figures (as per bid currency selected above) of Construction Equipment to be imported by the Bidder/including its sub-contractor(s) of the Bidder			
	We further confirm that aforesaid CIF value has not been included in Attachment- 4	(P).		
В	Description and quantities of the Construction Equipment to be imported by the Bidder / sub-contractor(s) for deployment to site under the package.			
S. No.	To be imported by	Description of the item to be imported	Quantity (No.)	
(i)	Bidder			
(ii)	Sub-contractor(s)			
4.0	We confirm that the Construction Equipment being imported as per 'B' above sh subject Package.	all be deployed at the Project Site for	r the purpose of execution of	
Name:				
Designation:				
Note				
Note 1	Bidder can insert more rows, as required			
'	Didder carringer more 10ws, as required			

		Attachment -5 (P)	
EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA, Bidding Document No. : 03/EPC/DCRTPP/800 MW			
BIDDER'S NA	ME	0	
	Deleted		
	Deleteu		

Attach	ment	-6	(P)

Bidding Document No.: 03/EPC/DCRTPP/800 MW

BIDDER'S NAME		0

We declare that the ratings, capacities and performance figures of the equipment furnished by us under the package are guaranteed. We further declare that in the event of any deficiencies in meeting the guaranteed figures indicated below as established after conducting the guarantee tests, you may at your discretion accept the equipment/system after assessing the liquidated damages as specified in Clause No. 3.2 (Category-I) of Chapter 08 ,"FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES", Volume-II of the Bidding Documents, or reject the equipment/system and recover payments already made.

S. No.	Guaranteed Parameters	Guaranteed Figures	Units
a)	Turbine Heat Rate in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 440MW Unit Load (i.e. at 55% TMCR)		kcal/kwhr
b)	Turbine Heat Rate in kcal/kwhr under rated steam conditions at guaranteed optimized condenser pressure with zero make-up at 800 MW Unit Load (i.e. at 100% TMCR)		kcal/kwhr
c)	Efficiency of the Steam Generator at 105% TMCR (840 MW unit load) with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet.		%
d)	Efficiency of the Steam Generator at 100% TMCR (800 MW unit load) with zero make up while firing the design coal at rated steam parameters, rated coal fineness and rated excess air at economizer outlet.		%
e)	Turbine Generator Output of 800 MW (100% rated load) under rated steam conditions, 70 mm Hg (abs) condenser pressure with 0% makeup.		kW
f)	Condenser pressure in mm Hg (abs) measured at 300 mm above top row of condenser tube at 840 MW of unit load, 1% make up, design CW inlet temperature & design CW flow as specified elsewhere.		mm Hg
g)	Steam Generator Capacity at rated steam parameters at Superheater outlet & rated steam temperature at reheater outlet (with any combination of mills working as per Owner's choice) with the coal being fired from within the range specified		T/Hr
h)	ESP Effficiency		%
i)	Unit Auxiliary Power Consumption comprising of all Unit Auxiliaries and Station Auxiliaries required for continuous Unit operation at 800 MW (i.e. 100% rated load of the unit) under rated steam conditions and at guaranteed optimized condenser pressure with 0% make-up		kW
j)	SCR Efficiency for control of NOx emission		%
k)	Catalyst Life		Hours
I)	Ammonia Consumption Rate (in kg/hr, 99.5 wt%) at 100% TMCR load		kg/hr
m)	FGD - SO ₂ Removal Efficiency		%
n)	Limestone Consumption Rate of FGD system at 100% TMCR load		kg/hr
o)	NDCT - Cold water temperature		°C
p)	Transformer Losses (Refer Annexure-II to Attachment-6 (P) for list of transformers)	0	kW
	For every kW increase or part thereof from the Guaranteed value	0	kW
	ii Copper Losses For every kW increase or part thereof from the Guaranteed value	0	kW
	Cooler Losses For every kW increase or part thereof from the Guaranteed value	0	kW
Name:			
signation:			
	Bidder to furnish the breakup of the quoted Auxiliary Power Consumption and Transformer Losse	on on nor Anne 1 1 A	avino II to Attack

Annexure- I to Attachment 6-(P)					
EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA, Bidding Document No. : 03/EPC/DCRTPP/800 MW					
	Break up of Guaranteed Unit Auxiliary Power Consumption (Unit Auxiliaries & Station Auxiliaries) Quoted as per S. No. (i) of Attachment-6 (P) of Bid Form				
BIDDER'S NAME	0				
S. No.	Name of Auxiliaries	Nos. in operation	Power Consumption (in kW)		
Note					
1.0	Bidder can insert more rows, as required				
Name:					
Designation:					

Annexure- II to Attachment 6-(P)

EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No. : 03/EPC/DCRTPP/800 MW

Transformer Losses (as per list below) Quoted as per Sr. No. (p) of Attachment-6 (P) of Bid Form

BIDDER'S NAME	0							
S. No	Transformer	Quantity (No)			Copper Losses (Max) at 75 °C & full load including IS tolerance		Cooler Losses (Max) including IS tolerance	
		(140)	For 1 transformer	For all transformers	For 1 transformer	For all transformers	For 1 transformer	For all transformers
a)	Generator Transformer (GT)	4						
b)	Station Transformer (ST)	2						
c)	Unit Transformer (UT)	2						
d)	Interconnecting Transformer	2						
e)	Excitation Transformer (if applicable)	1						
f)	Auxiliary Power Transformers 11/6.9 KV	2						
i)	UAT	2						
ii)	SAT	2						
iii)	CHPAT	2						
iv)	AHPAT	2						
v)	BKTAT	2						
vi)	FGDAT	2						
vii)	DMPAT	2						
viii)	BWAT	2	_					
g)	Service Transformer	Lot						
	Total Losses (kW)		0.00	0.00	0.00	0.00	0.00	0.00
Name	:							
Designation	:							

Ridding Document No : 03/EPC/DCRTPP/800 MW

Bidding Document No.: 03/EPC/DCRTPP/800 MW							
	SCHEDULE OF RATES AND PRICES						
BIDDER'S NAME		Bid Currency (Only one bid currency to be specified by Bidder)					
SCHEDULE-1	: Plant and Equipments including Type Test and Mandatory Spares to be supplied from Abroad						
Item	Item Description in Bid Currency s		otal Price ncy specified above an port of entry)				
1	2		3				
Α	Main Equipments		0				
1	All Equipments & Material for Steam Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]						
2	All Equipments for Steam Turbine Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]						
3	All Equipments for Balance of Plant (including FGD & Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]						
4	All Equipments for Electrical System and C&I Systems [For ONE(1) no. Power Generating Unit having rated output of 800MW]						
5	Any other Equipment(s) not covered in 1 to 4 above but required for the Scope of Work under the Package						
	Sub Total (A) [(1) + (2) + (3) + (4) +(5)]		0				
В	MANDATORY SPARES [BOQ AS SPECIFIED IN Chapter-9, Vol II] (Bidder is required to fill the prices of all the items serially as specified in Chapter-9, Vol-II)						
С	SUB-TOTAL OF TYPE TEST CHARGES (AS PER FURTHER BREAK-UP OF TYPE TEST CHARGES GIVEN IN SCHEDULE-8A)		0				
	GRAND TOTAL (A+B+C)		0				
NOTE							
1	The details of main equipments under Sr. No. 1 to 5 comprises of the equipments / systems / facilities as detailed in various technical specifications (Refer Vol- II to VII above mentioned equipments which is required to complete the scope of work for one (1) no. power generating unit having rated output of 800MW and for its reliable operations.						
2	Bidders are required to indicate the Break up of Type Test Charges in the respective head of equipment as per Schedule-8A.						
3	Interchangeability and Packings: All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares include all mounted accessories like components, boards, add or items, fitting, connectors etc. and complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules supplied in the original package. All electronic modules shall be pre set and/or preprogrammed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc., shall be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them into service. The spare shall be treated and properly packed for long term storage						
4	Identification: Each spare shall be clearly marked and labeled on the outside of the packing with its description. When more than one spare part is packed in single case, outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.	a general description of th	e contents shall be shown on the				
5	In case the description/ Quantity for any item mentioned in schedule is at variance from what has been stated in technical specifications and its subsequent amendments/its subsequent amendment and clarification shall prevail.	clarifications, the stipulation	ons of technical specifications and				
6	Schedule-1 and/or Schedule-2 & Schedule-4 shall cover all the requirement of supply & erection of factory fabricated steel structure & Site fabricated steel structure recrated output of 800 MW.	uired for the complete 01	no. Power generating Unit having				
7	Only factory fabricated items and not the raw material is quoted in Schedule-1 and/or Schedule-2.						

EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA, Bidding Document No.: 03/EPC/DCRTPP/800 MW SCHEDULE OF RATES AND PRICES BIDDER'S NAME 0 SCHEDULE-2: Plant and Equipments including Type Test and Mandatory Spares to be supplied from within the Owner's Country Total Ex-works (India) Price Description (in INR) 1 2 Main Equipments All Equipments for Steam Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW] All Equipments for Steam Turbine Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW] All Equipments for Balance of Plant (including FGD & Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW] All Equipments for Electrical System and C&I System [For ONE(1) no. Power Generating Unit having rated output of 800MW] Any other Equipments not covered in 1 to 4 above but required for the Scope of Work under the Package Sub Total (A) [(1) + (2) + (3) + (4) +(5)] MANDATORY SPARES [BOQ AS SPECIFIED IN Chapter-9, Vol II] (Bidder is required to fill the prices of all the items serially as specified in Chapter-9, Vol-II) SUB-TOTAL OF TYPE TEST CHARGES (AS PER FURTHER BREAK-UP OF TYPE TEST CHARGES GIVEN IN SCHEDULE-8B) 0 GRAND TOTAL (A+B+C) (In Figures) 0 NOTE The details of main equipments under Sr. No. 1 to 5 comprises of the equipments / systems / facilities as detailed in various technical specifications (Refer Vol- II to VII). Any other system comprising of equipments in addition to above mentioned equipments which is required to complete the scope of work for one (1) no, power generating unit having rated output of 800MW and for its reliable operation shall be deemed to be included in the quoted Bidders are required to indicate the Break up of Type Test Charges in the respective head of equipment as per Schedule-8B. All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares should include all mounted accessories like components, boards, add or items, fitting, connectors etc. and complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules supplied in the original package. All electronic modules shall be pre set and/or preprogrammed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc., shall be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them into service. The spare shall be treated and properly packed for long term storage. Identification: Each spare shall be clearly marked and labeled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases containers and other packages must be suitably marked and numbered for the purpose of identification. In case the description/ Quantity for any item mentioned in schedule is at variance from what has been stated in technical specifications and its subsequent amnedments/ clarifications, the stipulations of technical specifications and its subsequent amendment and clarification shall prevail. Schedule-1 and/or Schedule-2 & Schedule-4 shall cover all the requirement of supply & erection of factory fabricated steel structure & Site fabricated steel structure required for the complete 01 no. Power generating Unit having rated output of 800 MW. Only factory fabricated items and not the raw material is quoted in Schedule-1 and/or Schedule-2.

	EPC Package for "1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA, Bidding Document No. : 03/EPC/DCRTPP/800 MW						
	SCHEDULE OF RATES AND PRICES						
BIDDER'S	IDDER'S NAME						
	e-3: Local Transportation including Port Handling, Port Clearance & Port Charges, Inland Transit Insurance and othery spares at site.	ner local costs incidental to delivery of plant & equipment and					
ITEM	Description	Total Price INR					
1	2	3					
l.	MAIN EQUIPMENTS						
II.	II. MANDATORY SPARES						
	TOTAL (I + II)	0					

EPC Package for

"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No.: 03/EPC/DCRTPP/800 MW

SCHEDULE OF RATES AND PRICES

E	BIDDER'S NAME	0

Schedule-4: Installation Services [Erection, Civil, Steel Structural works (Site fabricated structures permitted as per Specifications), Factory Fabricated Steel Structural Works (Erection) & Allied works] including Insurance (other than transit insurance and other services as specified in the Bidding Documents).

ITEM	Description	Total Price (in INR)				
1	2	3				
Α	Installation/ Erection of Main Equipments					
1	All Equipments for Steam Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]					
2	All Equipments for Steam Turbine Generator and Auxiliaries (including Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]					
3	All Equipments for Balance of Plant (including FGD & Factory Fabricated Steel Structures and excluding Electrical Systems and C&I Systems) [For ONE(1) no. Power Generating Unit having rated output of 800MW]					
4	All Equipments for Electrical System and C&I Systems [For ONE(1) no. Power Generating Unit having rated output of 800MW]					
5	Any other Equipments not covered in 1 to 4 above but required for the Scope of Work under the Package					
	Sub Total (A) [(1) + (2) + (3) + (4) +(5)]	0				
В	Civil, Structural (Other than steel structures) & Architectural works					
С	Site Fabricated Steel Structures Supply, fabrication & erection of site fabricated steel structural works (structural works other than factory fabricated structures) permitted for fabrication at site.					
D	Training Charges (Refer Chapter-5, Vol-II, General Technical Requirements)					
	GRAND TOTAL (A+B+C+D)	0				
NOTE						
1	Only factory fabricated items and not the raw material is quoted in Schedule-1 and/or Schedule-2.					
2	Schedule-1 and/or Schedule-2 & Schedule-4 shall cover all the requirement of supply & erection of factory fabricated steel structure & Site fabricated steel structure required for the complete 01 no. Power generating Unit having rated output of 800 MW.					
3	The works related to Sr. No. A, B, C & D above shall include the equipments / systems / facilities as detailed in various comprising of equipments in addition to above mentioned equipments which is required to complete the scope of work for and for its reliable operation shall be deemed to be included in the quoted prices.					

Bidding Document No.: 03/EPC/DCRTPP/800 MW

BIDDER'S NAME	0

Schedule-5: Grand Summary

S. No.	Description	Currency	Total Price
1	2	3	4
1	SCHEDULE-1 : Plant and Equipments including Type Test and Mandatory Spares to be supplied from Abroad		0
	Bid Currency (as quoted by Bidder)	0	
2	SCHEDULE-2 : Plant and Equipments including Type Test and Mandatory Spares to be supplied from within the Owner's Country	INR	0
3	Schedule-3: Local Transportation including Port Handling, Port Clearance & Port Charges, Inland Transit Insurance and other local costs incidental to delivery of plant & equipment and mandatory spares at site.	INR	0
4	Schedule-4: Installation Services [Erection, Civil, Steel Structural works (Site fabricated structures permitted as per Specifications), Factory Fabricated Steel Structural Works (Erection) & Allied works] including Insurance (other than transit insurance and other services as specified in the Bidding Documents).		0
5	Schedule-7: Goods and Service Tax (GST), applicable on Schedule-2, 3 & 4	INR	0
6	Schedule-7A: Goods and Service Tax (GST), applicable on Schedule-1	INR	0
7	Schedule-12: Schedule of Optional Items/ Works (Including GST)	INR	0

Bidding Document No.: 03/EPC/DCRTPP/800 MW

SCHEDULE OF RATES AND PRICES

BIDDER'S NAME	0	Bid Currency for spares to be supplied from abroad	0
		(Bid currency as per Schedule-1)	,

Schedule-6: Recommended Spare Parts

			Unit	Price	Total	price		
S. No.	ltem Description	Qty.	CIF (Indian port of Entry) (For spares to be supplied from abroad)		CIF (Indian Port of Entry)	Ex-works (India)	GST Amount	Local transportation charges (including inland insurance, port clearance & port charges)
			0	In INR	0	In INR	In INR	In INR
1.	2.	3.	4.	5.	6=3x4	7=3x5	8	9
								_
NOTE								

- Bidder can insert more rows, as required
- Bidder to ensure that Recommended Spares with same specification having same identification number but with different item code shall be quoted by them at the same price. Further all such items of spares shall be 2 clubbed together.
- Domestically manufactured spares shall be quoted on Ex-works (India) basis and the spares to be supplied from abroad shall be quoted on CIF (Indian Port of Entry) basis.

	Bidding Document No. : 03/EPC/DCRTPP/800 MW						
BIDDER'S NA	BIDDER'S NAME 0						
Schedule-7: 0	Goods and Service Tax (GST), applicable on Schedule-2, 3 & 4						
	Goods and Services Tax (as on seven (07) days prior to the last date for submission of bid applicable on the price of goods and which may be payable by the Owner in accordance with the provisions of Bidding Documents are as under:-	s and services quoted in Schedule-2, 3 & 4, not included					
S. No.	Bid Price Component	GST Amount (INR)					
1	2	3					
1	Ex-Works-Main Equipment (Schedule-2)						
2	Ex-Works-Mandatory Spares (Schedule-2)						
3	Type Test Charges (Schedule-2)						
4	F&I-Main Equipment (Schedule-3)						
5	F&I-Mandatory Spares (Schedule-3)						
6	Erection Services of Main Equipment including Factory Fabricated Steel structures (Schedule-4)						
7	Erection services for Civil, Structural (other than steel structures) and architectural Works (Schedule-4)						
8	8 Site fabricated Steel Structural works (Schedule-4)						
9	Training Charges (Schedule-4)						
	Total GST Amount	0					

NOTE

- Bidder shall quote the GST as applicable in the Owner's country as on Seven (7) days prior to the last date of submission of Bid. 1
- The GST shall be paid at actuals against documentary evidence subject to maximum Total GST amount indicated above. 2

EPC Package for

"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,

Bidding Document No.: 03/EPC/DCRTPP/800 MW

BIDDER'S NAME 0

Schedule-7A: Goods and Service Tax (GST), applicable on Schedule-1

The details of Goods and Services Tax as on seven (07) days prior to the last date for submission of bids applicable on the price of goods and services quoted in Schedule-1, not included in the Bid Price and which may be payable by the Owner in accordance with the provisions of Bidding Documents are as under:-

S. No.	Bid Price Component	GST Amount (INR)				
1	2	3				
1	CIF Main Equipment (Schedule-1)					
2	CIF Mandatory Spares (Schedule-1)					
	Total GST Amount	0				
NOTE						
1	Bidder shall quote the GST as applicable in the Owner's country as on Seven (7) days prior to the last date of submission of Bid.					
2	The GST shall be paid at actuals against documentary evidence subject to maximum Total GST amount indicated above.					

Bidding Document No. : 03/EPC/DCRTPP/800 MW

SCHEDULE OF RATES AND PRICES

Description Program Program Description Descript	SCHEDULE OF RATES AND PRICES				
No.	BIDDER'S NAME	0		(Bid currency as per	0
No.	Schedule-8A: Break	I up of Type Test Charges for Equipment Priced in Schedule-1			
UNITO FIVE TESTS ON LICETICAL EQUIPMENTS 1.0 Secretaria with a fundary systems. 1.1 Secretaria of supplementaria and supplementary and s			oneType/	Type/	
1	1	2	3	4	5 = 3 x 4
1		LIST OF TYPE TESTS ON ELECTRICAL EQUIPMENTS			
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14 15 15 15 15 15 15 15	1.4	out of circuit and 10% of tubes plugged is remaining coolers. In case of unsymmetrical cooler configuration, test with all possible variants of one cooler out of service shall be			
15 Separate of the control of th					
20	1.5				
Intervation design and method contribution is in class of an all sent design and promotion. 16 Design	1.5				
16 December control register of sequencies (10 0 0 0 0 0 0 0 0 0					0
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10 The control of	(0)	Converter Assembly (of the excitor field) Temperature rise test at peak rating of excitation system including ceiling			
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Page					
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Both Continued Transformer as per BEC 0000116-11 0 0 0 0 0 0 0 0 0					
1. Lyprogramme processor (1998) 1. Comprehensive control (1998) 1. C	(a)	Excitation Transformer as per IEC-60076-11			0
A. Temperature and Test A. Temperature and Test B. Temperature and T					
Notes work Test Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted and each god any constition. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges for each test (1, 1, 18 kg) shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted. Occurrence Charges of processor shall be reducted on each shall be reducted on					
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(9) discharges (1) Pays and Output withstand capability test (3) The fast transient SWC Treats as per ANSI/EEE C 37:301-2002/EC02055-22-04-2006 (9) Degree of protection test of excitation system panels. (9) Degree of protection test of excitation system panels. (10) Degree of protection test of excitation system panels. (11) The following type test on system spanels. (12) Gas Insulated Switchyard (13) The following type test on system spanels. (14) GS lay mode as per IEC C2271-023. The components forming parts of the GIS which are covered by other standards shall comply with and shall be by be leaded according to those standards. (2) Lightning impulse voltaged by tests. (3) Switching impulse voltage day tests. (3) Switching impulse voltage day tests. (4) Or partial dispharage tests. (5) Power frequency obligate day tests. (8) Power frequency obligate day tests. (9) Partial dispharage tests. (10) Or partial representative rise of any part of the explanent and measurement of the resistance of the main crocust. (10) Fest to prove the temperature rise of any part of the explanent and measurement of the resistance of the main crocust. (10) Fest to prove the ability of the main circuit and earthing circuit to carry the rated peak and the rated short time with sharld current. (10) Fest to prove the strength of enclosures. (10) Or Test for satisfactory operation of the included switching devices. (10) Or Test for particles and the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test for prove the strength of enclosures. (10) Or Test					
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(g) Degree of protection test of excitation system parels. 2.0 Gas Insultand Switchyard (h) The following styles test on typical 400% (As Applicable) (S) Switchyard byte stees on typical 400% (As Applicable) (S) Switching impulse voltage of the Co27 + 20%. The components forming parts of the CIS which are covered by other standards shall comply with and shall be type tested according to those standards. (i) Lightning impulse voltage dry tests. (ii) Switching impulse voltage dry tests. (iii) Switching impulse voltage dry tests. (iii) On Partial discharge tests. (iii) On Partial or or test addition of the included switching devices. (iii) On Partial On Partial Part					
A large less insulated Switchyand A large less insulated Switchyand A large less on highest 400kV (As Applicable) Glis bay module as per IEC 62277-103. The components forming parts of the GIS which are covered by other standards shall comply with and shall be type tested according to those standards. A lightwing imputes voltage dry tests. A line. A lightwing imputes voltage dry tests. A line. A line. A lightwing imputes voltage dry tests. A line. A line. A lightwing imputes voltage dry tests. A line. A lin	(a)				
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(A) Gist bay module as per IEC 62271-203. The components forming parts of the GIS which are covered by other standards shall be type teeds according to those standards. (i) Lightning impulse voltagedry tests. 1No. 0 (ii) Swortching impulse voltagedry tests. 1No. 0 (iii) Power frequency voltage dry tests. 1No. 0 (iv) Partial discharge tests. 1No. 0 (iv) Radio Interference Voltage test 1No. 0 (iv) Test to prove the temperature rise of any part of the equipment and measurement of the resistance of the main circuit. 1No. 0 (iv) Test to prove the temperature rise of any part of the equipment and measurement of the resistance of the main circuit. 1No. 0 (iv) Test to prove the ability of the main circuit and earthing circuit to carry the rated short time with stand current. 1No. 0 (iv) Test to prove the ability of the main circuit and earthing circuit to carry the rated short time with stand current. 1No. 0 (iv) Test to prove the sability of the included switching devices. 1No. 0 (iv) Test to prove the strength of enclosures. 1No. 0 (iv) Test to prove the strength of enclosures. 1No. 0 (iv) Test to prove the strength of enclosures. 1No. 0 (iv) Test to prove the strength of enclosures. 1No. 0 (iv) Test to prove the strength of enclosures. 1No. 0 (iv) Electromagnetic capability test (if applicable) 1No. 0 (iv) Electromagnetic capability test (if applicable) 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operation at limit temperature. 1No. 0 (iv) Test to prove the satisfactory operat		·			
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	ļ	(a) remperature tipe test			

	(b) Lighting Impulse test 1No.		0
	(c) Switching Impulse 1No.		0
	(d) Determination of errors 1No.		0
	(e) Short circuit with stand capability 1No. (f) Chopped lighting impulse test 1No.		0
2.0			0
3.0	Transformers Consister Transformer		
(A)	Generator Transformer Short circuit test as per IEC-60076-5 1No		0
(a) (b)	Short circuit test as per IEC-60076-5 1No. Determination of transient voltage transfer characteristics 1No.		0
(c)	Measurement of harmonics of the no load current 1No.		0
(d)	Measurement of accoustic noise level as per NEMATR-1 1No.		0
(e)	Dielectric type tests. 1No.		0
(f)	Temp. rise test 1No.		0
(g)	LTAC test. 1No.		0
(h)	Tank vacuum test. 1No.		0
(i)	Measurement of power taken by fans & pumps 1No.		0
(B)	Station Transformer/Stand-byTransformer		
	(a) Short circuit test as per IEC-60076-5 1No.		0
	(b) Temperature rise test 1No.		0
	(c) Zero sequence impedence measurement test 1No.		0
	(d) Measurement of the power taken by fans & pumps (if applicable) (e) Measurement of harmonics of the no load current 1No.		0
	(f) Measurement of accoustic noise level as per NEMATR-1 1No.		0
	(g) IPVD test as per IEC-60076-3 1No.		0
	(h) Dielectric type tests.		0
	(i) LTAC test. 1No.		0
	(j) Tank vacuum test. 1No.		0
(C)	Unit Transformer		
	(a) Lighting impulse (Full & chopped wave) test on HV & LV winding (as per IEC-60076-3) 1No.		0
	(b) Lighting impulse test on neutral 1No.		0
	(c) Short circuit test as per IEC-60076-5 1No.		0
	(d) Temperature rise test 1No.		0
	(e) Zero sequence impedence measurement test 1No.		0
	(f) Measurement of the power taken by fans & pumps (if applicable) 1No.		0
	(g) Measurement of harmonics of the no load current 1No.		0
	(h) Measurement of accoustic noise level as per NEMATR-1 1No. (i) Dielectric type tests. 1No		0
	(i) Dielectric type tests. Tho (j) LTAC test. 1No.		0
	(k) Tank Vacuum test. 1No.		0
(D)	Reactor for each type /rating		-
()	(a) Temperature rise test 1No.		0
	(b) Measurement of harmonics 1No.		0
	(c) Measurement of accoustic noise level 1No.		0
	(d) Lighting impulse test on neutral. 1No		0
	(e) Measurement of zero sequence reactance. 1 No.		0
(E)	StartupTransformer		
	(a) Temperature rise test 1No.		0
	(b) Zero sequence impedence measurement test 1No.		0
	(c) Measurement of harmonics of the no load current 1No.		0
(F)	(d) Measurement of accoustic noise level as per NEMATR-1 1No. 11/6.9 KV transformer (For each type and rating):		0
(1)	(a) Chopped wave Lightning impulse test 1No.		0
	(b) Lightning impulse on Neutral 1No.		0
	(c) Short circuit test 1No.		0
	(d) Temperature rise test 1No.		0
	(e) Noise level test 1No.		0
	(f) Tank vacuum test. 1No		0
	(g) DGA test. 1No		0
	(h) Frequency response analysis. 1No		0
	(i) RSO measurement. 1No		0
	(j) DOP test. 1No		0
	(k) Power taken by cooling fans & pumps. 1No		0
	(I) No load harmonics. 1No		0
(0)	(m) Zero sequence impedance. 1No.		0
(G)	Aux/LT transformer (For each type/ rating): (a) Chopped wave Lightning impulse test 1No.		0
	(a) Chopped wave Lightning impulse test invo. (b) Short circuit test 1No.		0
	(c) Temperature rise test 1No.		0
	(d) Noise level test 1No.		0
	(e) Impulse test. 1No.		0
	(f) Heat run test. 1No.		0
1			0
H	(g) Partial discharge test. 1No.		
(H)	Neutral Grounding Reactor (For eachtype/rating):		-
(H)			0
(H)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test		
(H)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No.		0
(H)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No.		0
(H)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No.		0 0 0
	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No.		0 0 0 0
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	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No.		0 0 0 0
	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No.		0 0 0 0 0
(1)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of accoustic sound level. 1No. 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No.		0 0 0 0
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(1)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of accoustic sound level. 1No. 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No.		0 0 0 0 0
(I) 4.0 (A)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. THO ABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable		0 0 0 0 0 0 0 0
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(I) 4.0 (A) 1	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. The Cables The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (g) Resistance test		0 0 0 0 0 0 0 0
(I) 4.0 (A) 1 2 (a)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. The Tables The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires		0 0 0 0 0 0 0 0 0
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4.0 (A) 1 2 (a) (b)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of accoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. HT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires Measurement of Dimensions 01 No. TensileTest 1No.		0 0 0 0 0 0 0 0 0 0
(f) 4.0 (A) 1 2 (a) (b) (c) (d) (d)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of acoustic sound level 1No. HT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires Measurement of Dimensions 01 No. TensileTest 1No. ElongationTest 1No. VrappingTest 1No. WrappingTest 1No.		0 0 0 0 0 0 0 0 0 0 0
(i) 4.0 (A) 1 2 (a) (b) (c) (d) (e)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of acoustic sound level 1No. HT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (f) Resistance test 1No. Elongation Test 1No. WrappingTest 1No. Resistance Test 1No.		0 0 0 0 0 0 0 0 0 0 0
(I) 4.0 (A) 1 2 (a) (b) (c) (d) (e) (f) (g)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 1No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of acoustic sound level 1No. The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (f) Resistance test 1No. TensileTest 1No. Torsion Test 1No. WrappingTest 1No. Mass & uniformity of Zinc Coating tests 1No. Mass & uniformity of Zinc Coating tests 1No.		0 0 0 0 0 0 0 0 0 0 0
4.0 (A) 1 (a) (b) (c) (d) (e) (f) (g)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) 11No. (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 11No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. THT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires Measurement of Dimensions 01 No. Tensile Test 1No. WrappingTest 1No. WrappingTest 1No. Mass & uniformity of Zinc Coating tests 1No. Adhesion test 1No. Adhesion test 1No.		0 0 0 0 0 0 0 0 0 0 0
(I) 4.0 (A) 1 2 (a) (b) (c) (d) (e) (f) (g) (h) 3	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. HT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires Measurement of Dimensions 01 No. TensileTest 1No. BlongationTest 1No. WrappingTest 1No. Mass & uniformity of Zinc Coating tests 1No. For XLPE insulation & PVC Sheath		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(I) 4.0 (A) 1 2 (a) (b) (c) (d) (e) (f) (g) (h) 3 (a)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. HT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires Measurement of Dimensions 01 No. TensileTest 1No. ElongationTest 1No. WrappingTest 1No. WrappingTest 1No. Resistance Test 1No. For XLPE insulation & PVC Sheath Test for thickness 1No.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(i) 4.0 (A) 1 2 (a) (b) (c) (d) (e) (f) (g) (h) 3 (a)	Neutral Grounding Reactor (For eachtype/rating): (a) Lightning Impulse voltage with stand test (as per IEC-76) (b) Temp. rise test 1No. (c) Short time current test & measurement of impedance at Short time current. 1No. (d) Measurement of acoustic sound level. 1No. TieTransformer (a) Short circuit test 1No. (c) Harmonics Measurement 1No. (d) Measurement of the power taken by fans 1No. (e) Determination of transient voltage transfer characteristics 1No. (f) Measurement of accoustic sound level 1No. HT CABLES The following type tests shall be carried out on one size of 11/11KV, Grade Cable Conductor (i) Resistance test For Armour Wires/Formed Wires Measurement of Dimensions 01 No. TensileTest 1No. BlongationTest 1No. WrappingTest 1No. Mass & uniformity of Zinc Coating tests 1No. For XLPE insulation & PVC Sheath		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

	Hot deformation test 1No.		0
	f) Heat shock test 1No.		0
	Shrinkage test 1No.		0
) Thermal stability test 1No. i) Hot set test 1No.		0
	i) Hot set test 1No. i) Water absorption test 1No.		0
	C) Oxygen index test 1No.		0
	I) Smoke density test 1No.		0
	Acid gas generation test 1No.		0
() Flamability test as per IEC-332 Part-3 (Category-B) 1No.		0
(B)	The following type tests shall be carried out on all sizes of 11/11kV cable		
1	Insulation resistance test (Volume Resistivity method)		0
2	High voltage test		0
3	Partial discharge test		0
5	Bending test Dielectric power factor test		0
	(a) As a function of voltage		0
	(b) As a function of temperature		0
6	Heating cycle test		0
7	Impulse withstand test		0
8	Anti termite & Rodent Test		0
9	Temperature Index		0
10	Swedish Chimney Test		0
(C)	The following type tests shall be carried out on one size of 6.6/6.6 kV Cable		
1	Conductor		
2	(i) Resistance test 1No.		0
	For Armour Wires/Formed Wires		0
) Measurement of Dimensions) Tensile Test 1No.		0
) ElongationTest 1No.		0
) Torsion Test 1No.		0
	WrappingTest 1No.		0
	Resistance Test 1No.		0
) Mass & uniformity of Zinc Coating tests 1No.		0
) Adhesion test 1No.		0
3	For XLPE insulation & PVC Sheath		
(Test for thickness 1No.		0
() Tensile strength and elongation test before ageing and after ageing 1No.		0
(Ageing in air oven 1No.		0
	Loss of mass test 1No.		0
	Hot deformation test 1No.		0
	Heat shock test 1No.		0
	Shrinkage test 1No.		0
) Thermal stability test 1No.		0
) Hot set test 1No.		0
	Water absorption test 1No. Oxygen index test 1No.		0
) Smoke density test 1No.		0
) Acid gas generation test 1No.		0
) Flamability test as per IEC-332 Part-3 (Category-B) 1No.		0
(D)	The following type tests shall be carried out on all sizes of 6.6/6.6 kVcable.		
1	Insulation resistance test (Volume Resistivity method)		0
1 2	Insulation resistance test (Volume Resistivity method) High voltage test		0
2	High voltage test		0
2	High voltage test Partial discharge test		0
2 3 4	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage		0 0 0 0
2 3 4 5	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature		0 0 0 0 0
2 3 4 5	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test		0 0 0 0 0
2 3 4 5	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test		0 0 0 0 0 0 0
2 3 4 5	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test		0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index		0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test		0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index		0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E)	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables		0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E)	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor		0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath		0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation		0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Trickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of veltage (c) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only)		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only)) Oxygen Index		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wiref Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Smoke Density Rating		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Smoke Density Rating Aid Gas Generation		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Duter Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only)) Oxygen Index) Temperature Index) Temperature Index		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Duter Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only)) Oxygen Index Temperature Index Smoke Density Rating) Acid Gas Generation) Flammability Test] Smoke Density Rating) Swedish Chimney test BUS DUCT		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Duter Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only)) Oxygen Index) Temperature Index) Smoke Density Rating) Acid Gas Generation) Flammability Test) Swedish Chimney test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Swedish Chimney test BUS DUCT Heat Run Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Fiammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) 0, Oxygen Index Smoke Density Rating 1, Acid Gas Generation Plammability Test Smoke Density Rating 1, Acid Gas Generation Plammability Test Swedish Chimney test BUS DUCT Heat Run Test Generator Bus duct		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Smedish Chimney Test Test on Control Cables Test on Court Sheath Test on Court Sheath Test on Armour Wire/Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Temperature Index Temperatur		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Section Of the Sheath FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Section Of the Sheath Section Of the Sh		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Swedish Chimney test BUS DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) 11 KV Bus duct		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation & sheath Physical test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Swedesh Chimney test Bus Duct Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) 11 KV Bus duct b) 6.6 KV Bus duct		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) (E) 1 2 3 4 5 6 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Trickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index) Smoke Density Rating) Acid Gas Generation) Flammability Test BUS DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct 3) 11 KV Bus duct 5) 6.6 KV Bus duct 5) 6.6 KV Bus duct Short circuit with stand test		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Outer Sheath Ins. Resistance HY Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index) Temperature Index) Smoke Density Rating) Acid Gas Generation) Flammability Test BU SUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) 11 KV Bus duct b) 6.6 KV Bus duct Short circuit with stand test Generator Bus duct Short circuit with stand test Generator Bus duct Short circuit with stand test Generator Bus duct		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HY Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Owggen Index Temperature Index Swedish Chimney test Swedish Chimney test Bus Duct Heat Run Test Generator Bus duct a) Main run Medium Voltage Bus duct a) 11 KV Bus duct b) 6.6 KV Bus duct Short circuit with stand test Generator Bus duct a) Main run		
2 3 4 5 6 7 8 9 10 (E) (E) 1 2 3 4 5 6 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dending test Dending test Dielectric power factor test (a) As a function of voltage (b) As a function of voltage (b) As a function of temperature Healing cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Trickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Smoke Density Rating Acid Gas Generation Flammability Test Bus DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run b) Delta run b) Delta run b) Delta run b) Delta run b) Delta run b) Delta run b) Delta run		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10 10 (I) 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical Test on Outer Sheath Insulation Physical Test on Outer Sheath Insulation Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Smoke Density Rating Aid Gas Generation Flammability Test Bus DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run To Delta run c) Tap off run		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Delectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Outer Sheath Ins. Resistance HY Test at Room Temp Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Smoke Density Rating Add Gas Generation Plammability Test Bus DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct Short circuit with stand test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct Short circuit with stand test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct 3) Main run b) Delta run c) Tap off run Medium Voltage Bus duct 3) Main run b) Delta run c) Tap off run Medium Voltage Bus duct 3) Main run b) Delta run c) Tap off run Medium Voltage Bus duct		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10 10 (I) 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Delectric power factor test (a) As a function of voltage (b) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical test on Insulation HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Smoke Density Rating Acid Gas Generation Plammability Test Swedish Chimney test Bus DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) 11 KV Bus duct		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10 10 (I) 10 10 10 10 10 10 10 10 10 10 10 10 10	High voltage test Partial discharge test Bending test Dielectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Outer Sheath Ins. Resistance HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oyogen Index Temperature Index Oxogen Index Temperature Index Tem		
2 3 4 5 6 7 8 9 10 (E) (E) 1 2 3 4 5 6 6 7 8 9 10 10 (C) (E) 1 2 3 4 5 6 6 7 7 8 9 10 (C) (C) (C) (C) (C) (C) (C) (C) (C) (C)	High voltage test Partial discharge test Bending test Delectric power factor test (a) As a function of voltage (b) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Anti termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical test on Insulation Physical test on Insulation HV Test at Room Temp Test on Armour Wire/ Strip Flammability Test Anti Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Smoke Density Rating Acid Gas Generation Plammability Test Swedish Chimney test Bus DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct a) 11 KV Bus duct		
2 3 4 5 6 7 8 9 10 (E) 1 2 3 4 5 6 7 8 9 10 5 6 7 8 9 10 (i)	High voltage test Partial discharge test Bending test Delectric power factor test (a) As a function of voltage (b) As a function of temperature Heating cycle test Impulse withstand test Aris termite & Rodent Test Temperature Index Swedish Chimney Test The following type tests shall be carried out on LT Cables and Control Cables Test on conductor Thickness of insulation & sheath Physical Test on Outer Sheath Ins. Resistance HY Test at Room Temp Test on Armour Wire/ Strip Flammability Test Aris Termite & Rodent Test FRLSH Properties (For FRLSH PVC Only) Oxygen Index Temperature Index Smoke Density Rating Acid Gas Generation Flammability Test Bus DUCT Heat Run Test Generator Bus duct a) Main run b) Delta run c) Tap off run Medium Voltage Bus duct Short circuit with stand test Generator Bus duct Short Circuit with		

	b) Delta run		0
(ii)	c) Tap off run		0
(11)	Medium Voltage Bus duct a) 11 KV Bus duct		0
	b) 6.6 KV Bus duct		0
5.4	One minute high voltage Power frequency withstand test		
(i)	Generator Bus duct		0
	a) Main run b) Delta run		0
	c) Tap off run		0
(ii)	Medium Voltage Bus duct		-
	a) 11 KV Bus duct		0
	b) 6.6 KV Bus duct		0
5.5	Water TightnessTest		
(i)	Generator Bus duct a) Main run		0
	b) Delta run		0
	c) Tap off run		0
(ii)	Medium Voltage Bus duct		
	a) 11 KV Bus duct		0
5.6	b) 6.6 KV Bus duct		0
(i)	Air LeakageTest Generator Bus duct		0
	a) Main run		0
	b) Delta run		0
	c) Tap off run		0
(ii)	Medium Voltage Bus duct		
	a) 11 KV Bus duct b) 6.6 KV Bus duct		0
6.0	·		0
(A)	MOTORS HT MOTORS		
6.1	No load saturation and loss curves upto approximately 115% of rated voltage		0
6.2	Measurement of noise at no load		0
6.3	Momentary overload test (subject to test bed constraint)		0
6.4	Full load test (Subject to test bed constraint)		0
6.5	Temperature rise test at rated condition		0
6.6	Lightning Impulse withstand test on the sample coil shall be as per IEC-60034, part-15 Surge-withstand test on interturn insulation shall be as per clause no. 5.1.2 of IEC60034, part-15		0
6.8	Degree of protection test for the enclosure followed by IR, HV and no load run test.		0
6.9	Terminal box-fault level withstand test for each type of terminal box		0
(B)	LT MOTORS		
	a) Measurement of resistance of windings of stator and wound rotor.		0
	b) No load test at rated voltage to determine input current power and speed.		0
	c) Open circuit voltage ratio of wound rotor motors (in case of Slip ring motors) d) Full load test to determine efficiency power factor and slip.		0
	e) Temperature rise test. e) Temperature rise test.		0
	f) Momentary excess torque test.		0
	g) High voltage test.		0
	h) Test for vibration severity of motor.		0
	i) Test for noise levels of motor		0
	j) Test for degree of protection k) Over speed test.		0
	I) Type test reports for motors located in fuel oil area having flame proof enclosures as per IS 2148 / IEC 60079-1		0
7.0	LED LIGHTING FIXTURE		
(i)	High bay fixture 1No.		0
(ii)	well glass fixture 1No.		0
(iii)	Street light fixture 1No. Surface mounted indoor type fixture 1No.		0
(v)	Recessed mounted indoor type fixture 1No.		0
(vi)	Rain-proof test for outdoor type luminaries and respective control gearbox as type test.		0
(vii)	Temperature rise test on ballast/choke as type test. Dust proof test as type test.		0
8.0	ESP (Electrical)		
(A)	TR Set		
1	Temperature rise test at rated DC current at 1:1 charge ratio		0
3	Lightning Impulse voltage test Measurement of harmonic current in no load current		0
4	Measurement of harmonic current in no load current PRD operation test		0
	Short circuit test (To be conducted as described below) This short circuit test shall be performed on TR set along		-
5	with the TR panel and controller with a spark gap connected across the output. The gap is adjusted to get the spark at required peak voltage which is the Short circuit condition and the controller will control the voltage to		0
	quench the spark.		
6	Vacuum test on tank		0
7	Vacuum test on tank Pressure test on tank		0
	Vacuum test on tank Pressure test on tank Induced over voltage test		
7 8	Vacuum test on tank Pressure test on tank		0
7 8 9 10	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current		0 0 0
7 8 9 10 11	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level		0 0 0 0 0
7 8 9 10 11 12 13	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test		0 0 0 0 0 0
7 8 9 10 11	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta		0 0 0 0 0
7 8 9 10 11 12 13	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test		0 0 0 0 0 0
7 8 9 10 11 12 13 14	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member		0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 (B) (1)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours		0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator		0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators.		0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch		0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators.		0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test		0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner.		0 0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2) (3) (D) (1)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of Acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner. Heat run (Temperature rise) Test on any one transformer of each type selected by the Owner. Switch Mode Power Supply / TR set controller		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2) (3) (D) (1) (2)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner. Heat run (Temperature rise) Test on any one transformer of each type selected by the Owner. Switch Mode Power Supply / TR set controller Temperature rise Measurement of line current harmonics		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2) (3) (D) (1) (2) (3)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner. Heat run (Temperature rise) Test on any one transformer of each type selected by the Owner. Switch Mode Power Supply / TR set controller Temperature rise Measurement of line current harmonics Degree of protection.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2) (3) (D) (1) (2)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner. Heat run (Temperature rise) Test on any one transformer of each type selected by the Owner. Switch Mode Power Supply / TR set controller Temperature rise Measurement of line current harmonics Degree of protection. Dry heat test as per IEC-68-2-2 or equivalent for electronic modules.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2) (3) (D) (1) (2) (3) (4)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner. Heat run (Temperature rise) Test on any one transformer of each type selected by the Owner. Switch Mode Power Supply / TR set controller Temperature rise Measurement of line current harmonics Degree of protection.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
7 8 9 10 11 12 13 14 15 16 (B) (1) (2) (3) (C) (1) (2) (3) (D) (1) (2) (3) (4) (5)	Vacuum test on tank Pressure test on tank Induced over voltage test Measurement of no load losses and current Measurement of impedance voltage/short circuit impedance and losses Measurement of IR Measurement of acoustic sound level Degree of protection test Measurement of capacitance and tan delta Jacking test on Transformer load bearing member Oil leakage test for 24 hours Insulators Compression test on support insulator Torsion test on shaft insulator Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test on each type of the support insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test on each type of insulators. Disconnecting Switch Lightning impulse test and one minute dry power frequency test Impulse test on any one transformer of each type selected by the Owner. Heat run (Temperature rise) Test on any one transformer of each type selected by the Owner. Switch Mode Power Supply / TR set controller Temperature rise Measurement of line current harmonics Degree of protection. Dry heat test as per IEC-68-2-2 or equivalent for electronic modules.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

	(i) Rated low frequency with stand voltage dry test		0
	(ii) Rated full wave impulse withstand voltage level		0
(b)	Short circuit rating and transient recovery voltage tests		0
	(i) Test for rated symmetrical short circuit current interrupting capability, duty cycle and rated transient recovery		0
	voltage parameters		
	(ii) Test for rated closing, latching and short time current carrying capability		0
	(iii) Test for rated Generator source asymmetrical short circuit interrupting capability		0
(c)	Load current switching test		0
(d)	Out of phase switching current tests		0
(e)	Rated excitation current switching tests		0
(f)	Type tests and oscillographic test records for closing and tripping timings for generator circuit breaker of the rating offered		0
11.0	VFD system for condensate transfer pump motor		
(a)	Reactor (If applicable) Lightning impulse test		0
	Heat run test		0
	Short time current test		0
	Noise Level test		0
(b)	Transformer		
	(i) Short circuit test on transformer		0
	(ii) Noise level		0
	(iii) Measurement of harmonics of no load current		0
	(iv) PRD operation test		0
	(v) Degree of protection test on marshalling box		0
	(vi) Zero sequence Impedance (not applicable for Delta-delta transformer)		0
	(vii) Temperature rise test		0
	(viii) Chopped Wave Lightning impulse teston HV & LV winding as per Cl. 14 of IEC 60076-3		0
	Complete VFD System		
(c)	Overall efficiency determination of VFD system including transformer/ Harmonic filters etc at motor full load		0
(d)	For VFD, following type tests to be carried out:-		
1	Allowable full load current versus speed.		0
2	Overall Efficiency determination of VFD system including transformer/ Harmonic Filters etc at motor full load.		0
3			
4	Temperature rise. EM immunity.		0
5	EM immunity. EM emission.		0
6	Current sharing.		0
7	Voltage division.		0
8	Line side current distortion content		0
9	Power factor		0
10 11	Audible noise Torque pulgation		0
12	Torque pulsation Motor vibration		0
13	Dynamic performance		0
14	Current limit and current loop test		0
15	Speed loop test capability to ride through voltages less than 80%		0
16	Test capability to restart the system and resynchronize converter onto running motor after a voltage interruption.		0
17	Harmonics of No Load Current (Input / Output)		0
12.0	11 kV/6.6kV switchgear, following type tests to be carried out:-		
1	Short circuit duty test on circuit breaker, mounted inside the panel all test duties		0
2	Short time current rating withstand test on circuit breaker mounted inside panel. (50 kA for 1 sec for 11 kV and 40		0
	kA for 1 sec for 6.6 kV)		
3 4	Power frequency voltage withstand test on breaker and panel.		0
	Lightning impulse withstand test on breaker and panel. Temperature rise test on breaker and panel together. Temperature rise test shall be done on a section of		
5	switchgear assembly that involves bus coupler panels and adjacent breaker panels on both the sides.		0
6	Temperature rise measuring points shall include but not limited to the following:-		0
	a) Incoming/outgoing terminal for bus coupler circuit breaker		0
	b) Main bus tap offs for bus coupler circuit breaker.		0
7	Switching over-voltage test on motor substitute circuit as per IEC draft on each rating of breaker used for motor switching duty.		0
8	Measurement of resistance of main circuit.		0
9	Mechanical endurance test of breaker as per IEC.		0
10	Degree of enclosure protection test for IP-42.		0
13.0	SUB STATION AUTOMATION SYSTEM		
			0
(a) (b)	DC Supply Interruption AC Ripple on DC supply		0
(b)	AC Ripple on DC supply AC voltage dips and short Interruptions		0
(d)	AC vottage clips and short interruptions High Frequency Disturbance		0
(e)	Fast Transient Disturbance		0
(f)	Surge Withstand Capability		0
(g)	Electrostatic.		0
(h)	Surge Immunity		0
(i)			0
	Control IEDs and Communication Equipment (Power Input)		
	Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage		0
	a. Awiliary Voltage		0
	a. Auxiliary Voltage b. Current Circuits		0 0 0
(j)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests:		0 0 0 0
(j)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values		0 0 0 0 0
(j)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents		0 0 0 0 0
(j)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages		0 0 0 0 0 0
	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution		0 0 0 0 0 0 0 0
(j) (k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests		0 0 0 0 0 0 0 0
	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests		0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test		0 0 0 0 0 0 0 0 0 0
	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities:		0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents C) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation		0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples		0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dieptoric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) interruption of input voltage Electromagnetic Compatibility Test:		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostato Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 HMZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test g) Emission (Radio interference level) Test.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k) (l) (m)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrostatic Discharge Test c) Radioted Electromagnetic Field Disturbance Test d) Electrostatic Rast transient Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test g) Emission (Radio interference level) Test. h) Conducted Interference Test EMERGENCY DG SET		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(k) (l) (m)	a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test g) Emission (Radio interference level) Test. h) Conducted Interference Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

3	Regulation test			0
4	Measurement of open circuit and short circuit characteristics			0
5	Efficiency test			0
6	Temperature Rise Test			0
7				
	Momentary overload test			0
8	Over speed test			0
9	High Voltage test			0
10	Insulation resistance test (both before and after High Voltage Test)			0
11	Noise level as per IS:12065			0
12	Vibration as per IS: 12075.			0
13	Determination of Deviation of voltage waveform from sinusoidal.			0
14	Degree of protection test on control panel for IP-52			0
15	Battery and battery charger as per relevant standards			0
16	Type test on Engine			0
17	Type test on Alternator			0
15.0	220kV AIS Switchyard			
1	220 kV Circuit Breaker :			
	All type tests as per latest standard performed on an identical breaker			0
	design and rating, with dimensional drawings shall be submitted for approval			Ü
2	245kV Disconnector Switch (Isolator)			
	All type tests as per latest standard shall be performed			0
3	245kV Current Transformer			
	All type tests certificates conforming to latest standard shall be performed			0
				0
4	198kV Surge Arrestors (SAs)			
	All type tests as per latest standard shall be performed			0
16.0	Main Turbine Oil Purification System			
16.1	Particle size impurities test on one oil purification system of main turbine			0
	 			U
17.0	BFP/BP		<u></u>	<u></u>
1	(A) TDBFP			
	(i) Dry Running withstand capability Test on One BFP and Preferably with corresponding BP			0
	(ii) Visual Cavitation Test on One BFP			0
1				
ļ	(iii) Pressure Pulsation Test on One BFP			0
	(iv) Axial Thrust Measurement on One BFP			0
	(v) NPSH (R) Test on One BFP and One BP			0
	(vi) Complete strip down test of BFP which undergone above tests			0
	(vii) Pressure drop test on one strainer for each type and size			0
	(B) MDBFP			
				0
	(i) Dry Running withstand capability Test on One BFP and Preferably with corresponding BP			
	(ii) Visual Cavitation Test on One BFP			0
	(iii) Pressure Pulsation Test on One BFP			0
	(iv) Axial Thrust Measurement on One BFP			0
	(v) NPSH (R) Test on One BFP and One BP			0
	(vi) Complete strip down test of BFP which undergone above tests			0
	(vii) Pressure drop test on one strainer for each type and size			0
				•
18.0	Drive turbine oil Purification system			
18.1	Particle size impurities tests as detailed out in the technical specification, is to be carried out on one oil			0
10.1	purification system of BFP drive turbine			Ū
19.0	Metallic expansion Bellows			
19.0	Metallic expansion Bellows			
19.0 (a)	One number of each type & size			
	·			0
	One number of each type & size			0
	One number of each type & size (i) Life Cycle Test			
	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test			0
(a)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III			0 0 0
(a)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test			0 0 0
(a)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test			0 0 0 0
(a)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test			0 0 0
(a)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test			0 0 0 0
(a)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test			0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump)			0 0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test			0 0 0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump)			0 0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test			0 0 0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test			0 0 0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP			0 0 0 0 0 0
(a) (b) Note: 20.0	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer			0 0 0 0 0 0
(a) (b) Note:	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP			0 0 0 0 0 0
(a) (b) Note: 20.0	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer			0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump			0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works			0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan			0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works			0 0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan			0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan			0 0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan			0 0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.1	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan (d) Seal air fan (e) GR Fan (If applicable)			0 0 0 0 0 0 0 0 0
(a) (b) (b) Note: 20.0 21.0 22.0 22.1 23.0 (l)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan (d) Seal air fan (e) GR Fan (If applicable) (f) Booster Fan (If applicable)			0 0 0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.0 22.1 23.0 (l)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan (d) Seal air fan (e) GR Fan (if applicable) (l) Booster Fan (if applicable) Leak tightness testing of dampers at shop for each type & size of dampers			0 0 0 0 0 0 0 0 0
(a) (b) (b) Note: 20.0 21.0 22.0 22.1 23.0 (l)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan (d) Seal air fan (e) GR Fan (if applicable) (f) Booster Fan (if applicable) Leak tightness testing of dampers at shop for each type & size of dampers Following tests for Steam Generator/ Startup drain recirculation pump at shop			0 0 0 0 0 0 0 0 0 0
(a) (b) Note: 20.0 21.0 22.0 22.1 23.0 (l)	One number of each type & size (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III (i) Life Cycle Test (ii) Meridional yield rupture test (iii) Squirm test Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan (d) Seal air fan (e) GR Fan (if applicable) (l) Booster Fan (if applicable) Leak tightness testing of dampers at shop for each type & size of dampers			0 0 0 0 0 0 0 0 0 0 0 0 0 0
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	"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWE	R PLANT, YAMUNA NA	AGAR" HARYANA,	
	Bidding Document No. : 03/EPC/DCRTPP/800 MW SCHEDULE OF RATES AND PRICES			
BIDDER'S NAME	0			
Schedule-8B: Break	up of Type Test Charges for Equipment Priced in Schedule-2		T	
SI. No.	Description of Test	Charges for oneType/ Rating (in INR)	No.of Type/ Rating	Total Charges (in INR)
1	2	3	4	5 = 3 x 4
	LIST OF TYPE TESTS ON ELECTRICAL EQUIPMENTS			
1.0	Generator and its Auxiliary Systems			
1.1	Instantaneous Sudden Short Circuit Determination of negative sequence and zero sequence impedance			0
1.3	Determination of voltage wave form and Total Hamonic Factor			0
1.4	Short circuit heat run test at 2/3 of rated stator current, at rated pressure and cooling parameters with one cooler out of circuit and 10% of tubes plugged is remaining coolers. In case of unsymmetrical cooler configuration, test with all possible variants of one cooler out of service shall be carried out.			0
	Vibration measurement of stator end winding for the following conditions			0
	(a) Open circuit operation (b) Short circuit operation			0
1.5	(c) Sudden short circuit conditions			0
	(d) Stand still condition with hammer test			0
1.6	(separate charges for each condition (a, b, c & d) shall be indicated) Brushless excitation system (if applicable)			0
(a)	Exciter			0
	Temperature rise test at peak rating of excitation system, including ceiling duty condition			0
(b)	Permanent magnet Generator Temperature rise test at peak rating of excitation system, including ceiling duty condition			0
(a)	Temperature rise test at peak rating or excitation system, including ceiling duty condition Converter Assembly (of the excitor field) Temperature rise test at peak rating of excitation system including ceiling			
(c)	duty condition			0
(d)	Input and output surge withstand capacity test (i) The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002.			0
	(ii) The Fast transient SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002 / IEC 60255-22-04-2008.			0
(e)	Impulse withstand voltage test on terminal Bushings			0
1.7	Static excitation system (if applicable)			0
(a)	Excitation Transformer as per IEC-60076-11			0
	i. Short circuit Test ii. Lighting ImpulseTest			0
	iii. Temperature riseTest			0
	iv. Noise levelTest			0
(b)	(separate charges for each test (i, ii, iii & iv) shall be indicated) Type tests on field breaker as per IEEE/ANSI C-37-18/IEC 60947-2			0
(c)	Temperature rise test of converter panel at MCR rating and demonstration of ceiling duty condition			0
(d)	Excitation Busduct as per IS:8084 / ANSI / IEEE-37:23 / IEC 60439-2,60529 & 62271			0
	i. Temperature rise Test ii. Dynamic and short time current Test			0
	iii. Degree of protectionTest			0
	iv. one minute power frequency high voltage withstand Test			0
	(separate charges for each test (i, ii, iii & iv) shall be indicated) Test for estimating the dis-charging capability of the field discharge resistors in succession for atleast two			
(e)	discharges			0
(f)	Input and Output withstand capability test i. The fast transient SWC Tests as per ANSI/IEEE C 37.90.1-2002/IEC60255-22-04-2008			0
	ii. The Oscillatory SWC tests shall be conducted as per ANSI / IEEE C37.90.1-2002.			0
(g)	Degree of protection test of excitation system panels.			0
2.0	Gas Insulated Switchyard			
(A)	The following type tests on typical 400kV (As Applicable) GIS bay module as per IEC 62271-203. The components forming parts of the GIS which are covered by other standards shall comply with and shall be type tested according to those standards. (i) Lightning impulse voltagedry tests. 1No.			0
	(ii) Switching impulse voltagedry tests. 1No.			0
	(iii) Power frequency voltage dry tests. 1No			0
	(iv) Partial discharge tests. 1No. (v) Radio Interference Voltage test 1No.			0
	(vi) Test to prove the temperature rise of any part of the equipment and measurement of the resistance of the main			0
	circuit. 1No. (vii) Test to prove the ability of the main circuit and earthing circuit to carry the rated peak and the rated short time			
	(vii) rest to prove the ability or the main circuit and earthing circuit to carry the rated peak and the rated short time with stand current. 1No.			0
	(viii) Test to verify the making and breaking capacity of the included switching devices. 1No.			0
	(ix) Test for satisfactory operation of the included switching devices. 1No.			0
	(x) Test to prove the strength of enclosures. 1No. (xi) Gas tightness test 1No.			0
	(xi) Gas tightness test 1No. (xii) Electromagnetic capability test (if applicable) 1No.			0
	(xiii) Test on partitions 1No.			0
	(xiv) Internal arc tests 1No. (xv) Mechanical operation tests. 1No.			0
	(xv) Mechanical operation tests. 1No. (xvi) Test to prove the satisfactory operation at limit temperature. 1No.			0
	(xvii) Verification of degree of protection of auxiliary and control circuits. 1No.			0
	(xviii) Test to prove performance under thermal cycling and gas tightness test on gas barrier insulators 1No.			0
	(xix) Capacitive Current switching test 1No.			0
6	(xx) Shunt reactor current switching test 1No. For surge arrestor and Bus VT following type tests as per relevant IEC.			0
(B)	400kV (As Applicable) Surge Arrestor (As per IEC60099-4)			0
	(a) Insulation withstand test on housing 1No. (b) Residual voltage test 1No.			0
	(c) Long duration current impulse with standtest 1No.			0
-	(d) Operating duty test 1No.			0
	(e) Partial Discharge Test 1No. (f) LeakageTest 1No.			0
(C)	400kV (As Applicable) Bus VT (As per IEC60044-2)			0
	(a) Temperature rise test 1No.			0
<u> </u>	(b) Lighting Impulse test 1No.			0

	(c) Switching Impulse 1No.		0
	(d) Determination of errors 1No.		0
	(e) Short circuit with stand capability 1No.		0
	(f) Chopped lighting impulse test 1No.		0
3.0	Transformers		
(A)	Generator Transformer		
(a)	Short circuit test as per IEC-60076-5 1No.		0
(b)	Determination of transient voltage transfer characteristics 1No.		0
(c)	Measurement of harmonics of the no load current 1No.		0
	Measurement of accoustic noise level as per NEMATR-1 1No.		0
(e)	Dielectric type tests. 1No. Temp. rise test 1No.		0
(f)	Temp. rise test 1No. LTAC test. 1No.		0
(g)	Tank vacuum test. 1No.		0
(h) (i)	Measurement of power taken by fans & pumps 1No.		0
(B)	Station Transformer/Stand-byTransformer		0
(-)	(a) Short circuit test as per IEC-60076-5 1No.		0
	(b) Temperature rise test 1No.		0
	(c) Zero sequence impedence measurement test 1No.		0
	(d) Measurement of the power taken by fans & pumps (if applicable) 1No.		0
	(e) Measurement of harmonics of the no load current 1No.		0
	(f) Measurement of accoustic noise level as per NEMATR-1 1No.		0
	(g) IPVD test as per IEC-60076-3 1No.		0
	(h) Dielectric type tests. 1No.		0
	(i) LTAC test. 1No.		0
	(j) Tank vacuum test. 1No.		0
(C)	Unit Transformer		
1	(a) Lighting impulse (Full & chopped wave) test on HV & LV winding (as per IEC-60076-3) 1No.		0
	(b) Lighting impulse test on neutral 1No.		0
-	(c) Short circuit test as per IEC-60076-5 1No.		0
-	(d) Temperature rise test 1No. (e) Zero sequence impedence measurement test 1No.		0
1	(e) Zero sequence impedence measurement test 1No. (f) Measurement of the power taken by fans & pumps (if applicable) 1No.		0
	(g) Measurement of the power taken by rans & pumps (ir applicable) 1No.		0
	(h) Measurement of narmonics of the no load current 1No. (h) Measurement of accoustic noise level as per NEMATR-1 1No.		0
	(i) Dielectric type tests. 1No		0
	(i) LTAC test. 1No.		0
	(k) Tank Vacuum test. 1No.		0
(D)	Reactor for each type /rating		
	(a) Temperature rise test 1No.		0
	(b) Measurement of harmonics 1No.		0
	(c) Measurement of accoustic noise level 1No.		0
	(d) Lighting impulse test on neutral. 1No		0
	(e) Measurement of zero sequence reactance. 1 No.		0
(E)	StartupTransformer		
	(a) Temperature rise test 1No.		0
	(b) Zero sequence impedence measurement test 1No.		0
	(c) Measurement of harmonics of the no load current 1No.		0
(5)	(d) Measurement of accoustic noise level as per NEMATR-1 1No.		0
(F)	11/6.9 KV transformer (For each type and rating):		0
	(a) Chopped wave Lightning impulse test 1No. (b) Lightning impulse on Neutral 1No.		0
	(b) Lightning impulse on Neutral 1No. (c) Short circuit test 1No.		0
	(d) Temperature rise test 1No.		0
	(e) Noise level test 1No.		0
	(f) Tank vacuum test. 1No		0
	(g) DGA test. 1No		0
	(h) Frequency response analysis. 1No		0
	(i) RSO measurement. 1No		0
	(j) DOP test. 1No		0
	(k) Power taken by cooling fans & pumps. 1No		0
	(I) No load harmonics. 1No		0
	(m) Zero sequence impedance. 1No.		0
(G)	Aux/LT transformer (For each type/ rating):		
	(a) Chopped wave Lightning impulse test 1No.		0
	(b) Short circuit test 1No.		0
1	(c) Temperature rise test 1No.		0
	(d) Noise level test 1No. (e) Impulse test. 1No.		0
	(e) Impulse test. 1No. (f) Heat run test. 1No.		0
	(g) Partial discharge test. 1No.		0
(H)	(g) Partial discharge test. 1No. Neutral Grounding Reactor (For eachtype/rating):		, ,
	(a) Lightning Impulse voltage with stand test		
	(as per IEC-76) 1No.		0
	(b) Temp. rise test 1No.		0
-	(c) Short time current test & measurement of impedance at Short time current. 1No.		0
	(d) Measurement of acoustic sound level. 1No.		0
(1)	TieTransformer (a) Short girouit tool 4No.		0
	(a) Short circuit test 1No. (c) Harmonics Measurement 1No.		0
	(d) Measurement 1No. (d) Measurement of the power taken by fans 1No.		0
	(e) Determination of transient voltage transfer characteristics 1No.		0
	(f) Measurement of accoustic sound level 1No.		0
4.0	HT CABLES		
(A)	The following type tests shall be carried out on one size of 11/11KV, Grade Cable		
1	Conductor		0
	(i) Resistance test		0
2	For Armour Wires/Formed Wires		
(a)	Measurement of Dimensions 01 No.		0
(b)	TensileTest 1No.		0
(c)			0
(-1)	Torsion Test 1No.		0
	WrappingTest 1No.		0
(e)			0
(e) (f)	Resistance Test 1No.		
(e) (f) (g)	Resistance Test 1No. Mass & uniformity of Zinc Coating tests 1No.		0
(e) (f) (g) (h)	Resistance Test 1No. Mass & uniformity of Zinc Coating tests 1No. Adhesion test 1No.		
(e) (f) (g) (h)	Resistance Test 1No. Mass & uniformity of Zinc Coating tests 1No. Adhesion test 1No. For XLPE insulation & PVC Sheath		0
(e) (f) (g) (h) 3	Resistance Test 1No. Mass & uniformity of Zinc Coating tests 1No. Adhesion test 1No. For XLPE insulation & PVC Sheath Test for thickness 1No.		0 0
(e) (f) (g) (h) 3 (a) (b)	Resistance Test 1No. Mass & uniformity of Zinc Coating tests 1No. Adhesion test 1No. For XLPE insulation & PVC Sheath Test for thickness 1No. Tensile strength and elongation test before ageing and after ageing 1No.		0
(e) (f) (g) (h) 3 (a) (b) (d)	Resistance Test 1No. Mass & uniformity of Zinc Coating tests 1No. Adhesion test 1No. For XLPE insulation & PVC Sheath Test for thickness 1No. Tensile strength and elongation test before ageing and after ageing 1No.		0 0 0

	Heat shock test 1No.		0
	Shrinkage test 1No.		0
	Thermal stability test 1No.		0
-	Hot set test 1No.		0
	Water absorption test 1No.		0
	Oxygen index test 1No. Smoke density test 1No.		0
	Acid gas generation test 1No.		0
	Flamability test as per IEC-332 Part-3 (Category-B) 1No.		0
(B)	The following type tests shall be carried out on all sizes of 11/11kV cable		
1	Insulation resistance test (Volume Resistivity method)		0
2	High voltage test		0
3	Partial discharge test		0
4	Bending test		0
5	Dielectric power factor test		0
	(a) As a function of voltage		0
	(b) As a function of temperature		0
6 7	Heating cycle test Impulse withstand test		0
8	Anti termite & Rodent Test		0
9	Temperature Index		0
10	Swedish Chimney Test		0
(C)	The following type tests shall be carried out on one size of 6.6/6.6 kV Cable		
1	Conductor		
	(i) Resistance test 1No.		0
	For Armour Wires/Formed Wires		
	Measurement of Dimensions		0
-	Tensile Test 1No.		0
-	ElongationTest 1No.		0
	Torsion Test 1No. WrappingTest 1No.		0
	WrappingTest 1No. Resistance Test 1No.		0
	Mass & uniformity of Zinc Coating tests 1No.		0
	Adhesion test 1No.		0
3	For XLPE insulation & PVC Sheath		
	Test for thickness 1No.		0
	Tensile strength and elongation test before ageing and after ageing 1No.		0
	Ageing in air oven 1No.		0
(d)	Loss of mass test 1No.		0
(e)	Hot deformation test 1No.		0
(f)	Heat shock test 1No.		0
(g)	Shrinkage test 1No.		0
	Thermal stability test 1No.		0
	Hot set test 1No.		0
	Water absorption test 1No.		0
	Oxygen index test 1No. Smoke density test 1No.		0
	Smoke density test 1No. Acid gas generation test 1No.		0
	Flamability test as per IEC-332 Part-3 (Category-B) 1No.		0
	The following type tests shall be carried out on all sizes of 6.6/6.6 kVcable.		
1	Insulation resistance test (Volume Resistivity method)		0
2	High voltage test		0
3	Partial discharge test		0
4	Bending test		0
5	Dielectric power factor test		0
	(a) As a function of voltage		0
	(b) As a function of temperature		0
6	Heating cycle test		0
7 8	Impulse withstand test		0
9	Anti termite & Rodent Test Temperature Index		0
10	Swedish Chimney Test		0
(E)	The following type tests shall be carried out on LT Cables and Control Cables		
1	Test on conductor		0
2	Thickness of insulation & sheath		0
3	Physical test on Insulation		0
4	Physical Test on Outer Sheath		0
5	Ins. Resistance		0
6	HV Test at Room Temp		0
7	Test on Armour Wire/ Strip		0
8	Flammability Test		0
9	Anti Termite & Rodent Test		0
	FRLSH Properties (For FRLSH PVC Only) Oxygen Index		0
	Oxygen Index Temperature Index		0
	Smoke Density Rating		0
	Acid Gas Generation		0
	Flammabilty Test		0
	Swedish Chimney test		0
5.0	BUS DUCT		
5.1	Heat Run Test		
(i)	Generator Bus duct		0
	a) Main run		0
	b) Delta run		0
	c) Tap off run		0
(ii)	Medium Voltage Bus duct		
	a) 11 KV Bus duct		0
	b) 6.6 KV Bus duct		0
5.2	Short circuit with stand test		
(i)	Generator Bus duct		0
	a) Main run		0
	b) Delta run		0
(ii)	c) Tap off run Medium Voltage Bus duct		0
(11)	Medium Voltage Bus duct		0
	a) 11 KV Bus duct b) 6.6 KV Bus duct		0
5.3	Impulse withstand test followed by HV test		
(i)	Generator Bus duct		0
	a) Main run		0
	b) Delta run		0
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(1) Temperature rise 0 (2) Measurement of line current harmonics 0 (3) Degree of protection. 0 (4) Dry heat test as per IEC-68-2-2 or equivalent for electronic modules. 0 (5) Damp heat test as per IEC-68-2-2 or equivalent for electronic modules. 0 9.0 Deleted 10.0 Generator Circuit Breaker				0
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(5) Damp heat test as per IEC-68-2-2 or equivalent for electronic modules. 9.0 Deleted 10.0 Generator Circuit Breaker	(1)			
9.0 Deleted 10.0 Generator Circuit Breaker	(1) (2) (3)	Degree of protection.		
10.0 Generator Circuit Breaker	(1) (2) (3) (4)	Degree of protection. Dry heat test as per IEC-68-2-2 or equivalent for electronic modules.		0
	(1) (2) (3) (4) (5)	Degree of protection. Dry heat test as per IEC-68-2-2 or equivalent for electronic modules. Damp heat test as per IEC-68-2-2 or equivalent for electronic modules.		0
(a) Rated dielectric strength tests 0	(1) (2) (3) (4) (5) 9.0	Degree of protection. Dry heat test as per IEC-68-2-2 or equivalent for electronic modules. Damp heat test as per IEC-68-2-2 or equivalent for electronic modules. Deleted		0
(i) Rated low frequency with stand voltage dry test	(1) (2) (3) (4) (5) 9.0	Degree of protection. Dry heat test as per IEC-68-2-2 or equivalent for electronic modules. Damp heat test as per IEC-68-2-2 or equivalent for electronic modules. Deleted		0

(b)			
(b)	(ii) Rated full wave impulse withstand voltage level		0
(b)	Short circuit rating and transient recovery voltage tests		0
	(i) Test for rated symmetrical short circuit current interrupting capability, duty cycle and rated transient recovery voltage parameters		0
	(ii) Test for rated closing, latching and short time current carrying capability		0
	(iii) Test for rated Generator source asymmetrical short circuit interrupting capability		0
(c)	Load current switching test		0
(d)	Out of phase switching current tests		0
(e)	Rated excitation current switching tests		0
(f)	Type tests and oscillographic test records for closing and tripping timings for generator circuit breaker of the rating offered		0
11.0	VFD system for condensate transfer pump motor		
(a)	Reactor (If applicable) Lightning impulse test		0
	Heat run test		0
(iii)	Short time current test		0
(iv)	Noise Level test		0
(b)	Transformer		
	(i) Short circuit test on transformer		0
	(ii) Noise level (iii) Measurement of harmonics of no load current		0
	(iv) PRD operation test		0
	(v) Degree of protection test on marshalling box		0
	(vi) Zero sequence Impedance (not applicable for Delta-delta transformer)		0
	(vii) Temperature rise test		0
	(viii) Chopped Wave Lightning impulse teston HV & LV winding as per Cl. 14 of IEC 60076-3		0
(c)	Complete VFD System		0
(-)	Overall efficiency determination of VFD system including transformer/ Harmonic filters etc at motor full load		
(d)	For VFD, following type tests to be carried out:-	 	
1	Allowable full load current versus speed.		0
2	Overall Efficiency determination of VFD system including transformer/ Harmonic Filters etc at motor full load.		0
3	Temperature rise.		0
4 5	EM immunity. EM emission.		0
6	Current sharing.		0
7	Voltage division.		0
8	Line side current distortion content		0
9	Power factor Audible noise		0
11	Torque pulsation		0
12	Motor vibration		0
13 14	Dynamic performance Current limit and current loop test		0
15	Speed loop test capability to ride through voltages less than 80%		0
16	Test capability to restart the system and resynchronize converter onto running motor after a voltage interruption.		0
17	Harmonics of No Load Current (Input / Output)		0
12.0	11 kV/6.6kV switchgear, following type tests to be carried out:-		
1	Short circuit duty test on circuit breaker, mounted inside the panel all test duties		0
2	Short time current rating withstand test on circuit breaker mounted inside panel. (50 kA for 1 sec for 11 kV and 40 kA for 1 sec for 6.6 kV)		0
3	Power frequency voltage withstand test on breaker and panel.		0
4	Lightning impulse withstand test on breaker and panel.		0
5	Temperature rise test on breaker and panel together. Temperature rise test shall be done on a section of switchgear assembly that involves bus coupler panels and adjacent breaker panels on both the sides.		0
6	Temperature rise measuring points shall include but not limited to the following:-		0
	a) Incoming/outgoing terminal for bus coupler circuit breaker		0
	b) Main bus tap offs for bus coupler circuit breaker.		0
7	Switching over-voltage test on motor substitute circuit as per IEC draft on each rating of breaker used for motor switching duty.		0
8	Measurement of resistance of main circuit.		0
9	Mechanical endurance test of breaker as per IEC.		
10	Degree of enclosure protection test for IP-42.		0
			0
13.0	SUB STATION AUTOMATION SYSTEM		
13.0 (a)	SUB STATION AUTOMATION SYSTEM DC Supply Interruption		0
(a) (b)	DC Supply Interruption AC Ripple on DC supply		0 0
(a) (b) (c)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions		0 0 0
(a) (b) (c) (d)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance		0 0
(a) (b) (c)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions		0 0 0 0
(a) (b) (c) (d) (e)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance		0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity		0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input)		0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage		0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits		0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage		0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits		0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications		0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Turnerts c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities:		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dieptictric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible rippies c) Interruption of input voltage		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dilectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test:		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dieptictric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible rippies c) Interruption of input voltage		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible rippies c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible rippies c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i)	DC Supply Interruption AC Rippie on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible rippies c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 Melz. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test g) Emission (Radio interference level) Test.		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i) (i) (ii)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHz. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test e) Conducted Disturbances Tests induced by Radio Frequency Field f) Magnetic Field Test g) Emission (Radio interference level) Test. h) Conducted Interference Test		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i) (k) (m)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test e) Edetroical Fast transient Disturbance Test e) Electroical Fast transient Disturbance Test e) Emission (Radio interference level) Test. h) Conducted Interference Test EMERGENCY DG SET		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (i) (k) (m)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Diermis of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test d) Electrical Fast transient Disturbance Test g) Emission (Radio interference level) Test. h) Conducted Interrence Test EMERGENCY DG SET Measurement of resistance		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(a) (b) (c) (d) (e) (f) (g) (h) (i) (k) (i) (m)	DC Supply Interruption AC Ripple on DC supply AC voltage dips and short Interruptions High Frequency Disturbance Fast Transient Disturbance Fast Transient Disturbance Surge Withstand Capability Electrostatic. Surge Immunity Control IEDs and Communication Equipment (Power Input) a. Auxiliary Voltage b. Current Circuits c. Voltage Circuits d. Indications Accuracy tests: a) Operational Measured Values b) Currents c) Voltages d) Time resolution Insulation Tests a) Dielectric Tests b) Impulse Voltage withstand Test Influencing Quantities: a) Limits of operation b) Permissible ripples c) Interruption of input voltage Electromagnetic Compatibility Test: a) 1 MHZ. Burst disturbance test b) Electrostatic Discharge Test c) Radiated Electromagnetic Field Disturbance Test e) Edetroical Fast transient Disturbance Test e) Electroical Fast transient Disturbance Test e) Emission (Radio interference level) Test. h) Conducted Interference Test EMERGENCY DG SET		0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

4				
-	Measurement of open circuit and short circuit characteristics			0
5	Efficiency test			0
6	Temperature Rise Test			0
7	Momentary overload test			0
8	Over speed test			0
9	High Voltage test			0
10	Insulation resistance test (both before and after High Voltage Test)			0
11	Noise level as per IS:12065			0
12	Vibration as per IS: 12075.			0
13	Determination of Deviation of voltage waveform from sinusoidal.			0
14	Degree of protection test on control panel for IP-52			0
15	Battery and battery charger as per relevant standards			0
16	Type test on Engine			0
17	Type test on Alternator			0
15.0	220kV AIS Switchyard			
1	220 kV Circuit Breaker :			
	All type tests as per latest standard performed on an identical breaker design and rating, with dimensional drawings shall be submitted for approval			0
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2	245kV Disconnector Switch (Isolator)			
	All type tests as per latest standard shall be performed			0
3	245kV Current Transformer			
	All type tests certificates conforming to latest standard shall be performed			0
4	198kV Surge Arrestors (SAs)			
	All type tests as per latest standard shall be performed			0
16.0				
	Main Turbine Oil Purification System			
16.1	Particle size impurities test on one oil purification system of main turbine			0
17.0	BFP/BP			
	(A) TDBFP			
				0
	(i) Dry Running withstand capability Test on One BFP and Preferably with corresponding BP			0
	(ii) Visual Cavitation Test on One BFP			0
	(iii) Pressure Pulsation Test on One BFP			0
	(iv) Axial Thrust Measurement on One BFP			0
	(v) NPSH (R) Test on One BFP and One BP			0
	(vi) Complete strip down test of BFP which undergone above tests			0
	(vii) Pressure drop test on one strainer for each type and size			0
				0
	(B) MDBFP			
	(i) Dry Running withstand capability Test on One BFP and Preferably with corresponding BP			0
	(ii) Visual Cavitation Test on One BFP			0
	(iii) Pressure Pulsation Test on One BFP			0
	(iv) Axial Thrust Measurement on One BFP			0
	(v) NPSH (R) Test on One BFP and One BP			0
	(vi) Complete strip down test of BFP which undergone above tests			0
				0
	(vii) Pressure drop test on one strainer for each type and size			U
18.0	Drive turbine oil Purification system			
	Particle size impurities tests as detailed out in the technical specification, is to be carried out on one oil			
18.1	purification system of BFP drive turbine			0
19.0	Metallic expansion Bellows			
	·			
(a)	One number of each type & size			
	(i) Life Cycle Test			0
	(ii) Meridional yield rupture test			0
	(iii) Squirm test			0
(b)	One number of each type & size as per clause mentioned in Power Cycle Piping, Vol-III			0
	(i) Life Cycle Test			0
	(ii) Meridional yield rupture test			0
	(ii) Moralonal yiola raptaro toot			
	(iii) Squirm toot			0
	(iii) Squirm test			0
Note:	(iii) Squirm test Bidder to indicate price for each type & size separately.			0
Note: 20.0				0
	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump)			
	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test			0
20.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test			
	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test			0
20.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test			0
20.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest			0
21.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer			0 0
21.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged)			0 0 0
21.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer			0 0
21.0	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged)			0 0 0
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20.0 21.0 22.0 22.1	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan			0 0 0 0
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20.0 21.0 22.0 22.1 23.0 (l)	Bidder to indicate price for each type & size separately. Vacuum pump type test (One pump) (i) Wet Air Test (ii) Cavitation Test CEP TypeTest (i) NPSH (R) test on one CEP (ii) Pressure drop test on one CEP (iii) Pressure drop test on one CEP suction strainer Drip Pump Type Test (if envisaged) NPSH (R) test on one drip pump Performance Test on actual fan of the size & type offered at Works (a) ID Fan (b) FD Fan (c) PA Fan (d) Seal air fan (e) GR Fan (if applicable) (f) Booster Fan (if applicable)			0 0 0 0 0
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"1X800 MW SUPER CRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT, YAMUNA NAGAR" HARYANA,		
Bidding Document No. : 03/EPC/DCRTPP/800 MW		
BIDDER'S NAME	0	
Schedule-12: Schedule of Optional Items/ Works		
S. No.	Item Description	Amount (in INR)
1	2	3
1	New Raw Water Reservior as per Chapter -24, Vol-VI	
2	GST for above	
	Total	0
Note		
1	Bidders are requested to refer Clause 10.4 (j) of Section-II, ITB of Vol-I.	