Changeover from constant pressure mode to sliding pressure mode and vice-versa shall also be demonstrated.

1.4.19 Generator Capability

The Generator stator and rotor windings inclusive of main and neutral leads shall be provided with Class-F insulations but rated for class-B temperature rise. The maximum permissible temperature of different parts of the generator for continuous operation shall be as specified in IEC 34-1/34-3 as applicable.

1.4.20 Short Circuit Capability

The Generator shall be capable of withstanding a 3-phase short circuit at the generator terminals when operating at maximum continuous rated MVA and rated power factor, 105% rated voltage and with fixed excitation for 3 seconds as per IEC 34-4.

1.4.21 Excitation System Performance

(a) The excitation system shall be capable of supplying field forcing for Thirty (30) seconds in case of all types of faults, including close in faults of the generator.

(b) The ceiling voltage shall not be less than 150% of the machine excitation voltage.

(c) Nominal excitor response ratio shall not be less than 3.0 per second.

1.4.22 Capacity with Reduced Hydrogen Pressure

Generator shall be capable of operating at reduced capacity at reduced generator hydrogen pressure in accordance with values furnished.

1.4.23 Steam Condensing plant

(a) The value of design condenser pressure to be measured at 300 mm above the top row of condenser tubes shall be guaranteed under VWO condition, 1% make-up, design C.W. inlet temperature and

C.W. flow. The condenser vacuum shall be measured with a vacuum grid utilizing ASME basket tips.

(b) Temperature of condensate, at outlet of condenser, shall not be less than saturation temperature corresponding to the condenser pressure at all loads.

(c) Oxygen content in condensate at hotwell outlet shall not exceed 0.015 cc/litre over 50-100% load range and shall be determined according to calorimetric Indigo-Carmine method.

(d) Air leakage in the condenser under full load condition shall not exceed more than 50% of design value taken for sizing the condenser air evacuation system.

(e) When one half of the condenser is isolated, condenser shall be capable of taking at least 60% T.G. load under TMCR conditions.

(f) The capacity of each vacuum pump in free dry air under standard conditions at a condenser pressure of 25.4 mm Hg (abs) and sub cooled to 4.17°C below the temperature corresponding to absolute suction pressure shall be demonstrated. Correction curves for establishing the capacity at site conditions shall also be furnished.

(g) The air and vapour mixture from air cooling zone of condenser shall be 4.17°C below the saturation temperature corresponding to 25.4 mm Hg (abs) suction pressure. Correction curves for establishing the same at site conditions shall also be furnished.

1.4.24 Condensate Extraction Pumps

(a) Each CEP set shall be capable of delivering flow and total dynamic head corresponding to run out point as specified.

(b) The vibration, noise level and parallel operation of any two of the three pumps shall be demonstrated.

1.4.25 Vacuum Pump

(a) Each pump shall be capable of meeting functional requirements.

(b) The vibration, noise level and parallel operation of the pumps shall be demonstrated.

1.4.26 Boiler Feed Pumps

(a) Each Boiler Feed Pump set shall be capable to deliver flow and total dynamic head corresponding to runout point as specified elsewhere.

(b) The vibration, noise level and parallel operation of the pumps shall be demonstrated as per specification requirements.

(c) Cold startup/hot startup of the unit using TDBFP with motive steam from auxiliary steam header shall be demonstrated.

1.4.27 Drip Pumps (if envisaged)

(a) Each Drip Pump shall be capable of delivering flow and total dynamic head corresponding to design point as specified.

(b) The vibration, noise level shall be demonstrated.

1.4.28 Lube Oil Purification system capacity and purity

(a) Lube Oil Purification system capacity and purity shall be demonstrated (with requisite correction curves for variation in inlet oil purity).

(b) The maximum solid particle size and free moisture in the purified oil shall not exceed the specified values and quality of oil shall confirm to class 15/12 (as per ISO 4406) when centrifuging oil is heated to a temperature of not more than 65°C.

1.4.29 Auxiliary/Equipment Cooling Water system

(a) Vibration, parallel operation and noise level of all pumps at the rated duty point shall be demonstrated at site.

(b) Design heat load of plate type heat exchangers and inlet and outlet temperatures of the plate type heat exchangers on the primary and secondary side to be demonstrated at site. Pressure drop across the plate type heat exchanger on the primary and secondary water circuit to be demonstrated at site.

1.4.30 Condenser Cooling Water Pumps

(a) Each Condenser Cooling Water pump set shall be capable to deliver flow and total dynamic head corresponding to runout point as specified elsewhere.

(b) Vibration, parallel operation and noise level of all pumps shall be demonstrated at site.

1.4.31 HP/LP Bypass capabilities

The HP/LP Bypass system shall satisfy the following functional requirements under automatic interlock action. It shall come into operation automatically under the following conditions:

(a) Generator Circuit breaker opening.

(b) HP/IP stop valves closing due to turbine tripping.

(c) Sudden reduction in demand to house load

Under all these conditions while passing the required steam flows as per the relevant heat balances, the condenser shall be able to swallow the entire steam without increasing the exhaust hood temperature and condenser pressure beyond the maximum permissible value indicated by the BIDDER in his offer and accepted by the OWNER.

1.4.32 Feed Water Heaters and Deaerator

The following parameters shall be demonstrated:

(a) Dissolved O_2 content in feed water at deaerator outlet without chemical dosing at all loads, not to exceed 0.005 cc/litre determined as per ASTM-D-888 – Reference method-A or Indigo Carmine method.

(b) Free carbondioxide in deaerator effluent shall be non-traceable at all loads from zero to VWO with 1% cycle make up.

(c) Continuous and efficient operation and performance of feed heating plant without undue noise and vibrations at all loads and duty conditions.

1.4.33 Automatic on-line Turbine Testing (ATT) system

On-load testing of turbine protective equipments shall be demonstrated without disturbing normal operation and keeping all protective functions operative during the test.

1.4.34 Noise

All the plant, equipment and systems shall perform continuously without exceeding the noise level over the entire range of output and operating frequency specified.

Noise level measurement shall be carried out using applicable and internationally acceptable standards. The measurement shall be carried out with a calibrated integrating sound level meter meeting the requirement of IEC 651 or BS 5969 or IS 9779.

Sound pressure shall be measured all around the equipment at a distance of 1.0 m horizontally from the nearest surface of any equipment/ machine and at a height of 1.5 m above the floor level in elevation. Corrections for background noise shall be considered in line with the applicable standards.

1.4.35 Condensate Polishing Unit

(a) Effluent quality at outlet of each vessel at its rated design flow and design service length between two regenerations (with requisite correction curves for variation in the influent quality).

(b) Pressure drop across the polisher service vessel, as specified, in clean and dirty condition of resin at rated design flow.

1.4.36 Superheater and Reheater Temperature Control Test

This test shall be conducted to guarantee that SH/RH temperatures are maintained within +/- 5°C of rated temperature condition from 40% to 100% TMCR including conditions: HP Heaters out of operations, HP-LP Bypass operation.

1.4.37 Flue Gas Temperature demonstration

The Bidder shall demonstrate that flue gas temperature at the entry and exit of various Boiler heating surfaces and also the variation across the cross section perpendicular to gas flow do not exceed the values considered for the pressure parts design at all loads of boiler.

1.4.38 Control & Instrumentation System Requirements

Performance guarantee tests for closed loop control system shall be carried out at site to verify the integrated performance of the total plant C&I and to verify as to whether all the important parameters remain within stipulated permissible limits under all the operating conditions. In case during this tests or otherwise it is observed that the behavior/response of Contractor's system (drives actuators/valves etc.) is not satisfactory/acts as a limitation/restriction in achieving the permissible limits, the Bidder shall carry out all required modifications, rectification etc. in his system whatsoever so that the permissible limits can be achieved. He shall also depute his experts for associating in the above tests and also for carrying out the necessary modifications, rectification etc.

1.4.39 Balance of Plants:

For Balance of Plants, functional guarantees like capacities and parameters (except power consumption at individual system level) shall be demonstrated as per the specification furnished under respective sections forming part of this specification. Wherever applicable, Owner may, at his sole discretion, consider shop test result as primary indicators of the performance.

1.4.40 Utility Consumption

Bidder shall have to indicate and demonstrate utility (e.g. DM Water, Clarified Water etc) consumptions.

1.5 TEST CODES, CONDITIONS ETC

1.5.1 Steam Generator Efficiency

(a) The steam generator efficiency (by loss method) shall be determined as per the requirements of BS EN 12952- 15, 2003 (by loss method) and other stipulations brought out hereunder.

(i)	Test loads	100% TMCR
(ii)	Test conditions	Boiler operating at rated steam parameter, excess air, coal fineness and firing design coal
(iii)	Ambient conditions	27°C dry bulb temperature and 60% relative humidity. The reference air temperature for the efficiency guarantee/ testing shall be taken as the temperature of air (i.e. 27°C) entering PA and FD fans
(iv)	Number of readings	Two sets of consistent readings for each of test loads. Average of the test efficiencies based on above two readings for each load shall be considered for guaranteed efficiency

(v)	APH leakages to be considered	Guaranteed or actual whichever is higher
(vi)	Test Duration	Four hours. No soot blowing shall be allowed during the test period or during stabilization period of four hours prior to commencement of the test.
(vii)	Heat Credits	No heat credits allowed. The guaranteed steam generator efficiency shall be without any heat credit.

(b) The guaranteed efficiency shall comply with following limiting parameters with design coal firing:

(i)	Excess air at economizer outlet at 100% TMCR load	20% (minimum)
(ii)	Corrected flue gas temperature (at 100% TMCR load)	135°C or as predicted by the bidder at air preheater outlet

1.5.2 Auxiliary Power Consumption

The unit auxiliary power consumption shall be calculated using the following relationship.

Pa = Pu + Pbbfp

Pa = Guaranteed Auxiliary Power Consumption

Pu = Power consumed by the auxiliaries under test.

Pbbfp = Power consumed by motor drive of turbine driven boiler feed booster pump (in case booster pump is driven by independent motor)

Note: Pbbfp will be zero if the turbine drive is used to drive both main pump and booster pump).

While guaranteeing the auxiliary power consumption, all continuously operating unit auxiliaries as specified shall be included. (Please refer Volume – I, Section 3)

1.5.3 Performance/Acceptance Test for Steam generator

The performance tests shall be conducted in accordance with the latest version of ANSI PTC 4.0 except for the specific requirements brought out herein below. This test shall be done simultaneously with P-G test of Turbine Generator set. During this test, Boiler unit shall be fully on automatic control under steady load condition.

The efficiency tests shall be carried out with the steam generator operating at the guaranteed point condition i.e. corresponding to 100%, 75%, 60% TMCR, or at the agreed loads as near these as possible, with the boiler operating at the rated excess air, rated SH/RH attemperation flows, flue gas temperature, coal fineness, etc. corresponding to the loads on boiler. At control load, the stable and efficient operation of the unit with the rated excess air, rated mill outlet coal fineness, while achieving the rated S/H, R/H steam parameters shall be demonstrated by the Contractor to the satisfaction of the Owner.

For finding out the performance values, corresponding code requirements to be fulfilled.

The measurement and computation of heat losses shall be carried out as per the stipulations of ASME PTC 4.0 and shall include but not be limited to the following items:

(a) Dry gas loss.

(b) Loss due to hydrogen in fuel.

(c) Loss due to moisture in fuel.

(d) Loss due to moisture in air.

(e) Loss due to unburnt carbon in ash.

Ash samples shall be collected from the furnace bottom hopper, air heater hoppers, duct hoppers and ESP hoppers. The ash collection rates for computation of losses shall be assumed as 20%, 5% and 3% in the furnace bottom hopper, duct hopper and air heater hopper respectively.

(f) Radiation loss.

(g) Loss due to Carbon Monoxide (CO) in flue gas.

(h) Any other unaccountable loss through sensible heat in ash and due to radiation to furnace bottom hopper.

(i) Manufacturer's margin.

1.5.4 Corrections shall be applied to the tested efficiency, to correct it to the design conditions, for variations in the following parameters only:

(i) Feed water temperature at economiser inlet.

(ii) Ambient air temperature

(iii) Relative humidity of ambient air.

(iv) Hydrogen in coal.

(v) Moisture in coal.

(vi) Gross calorific value of coal.

The Bidder shall furnish correction curves, for Owner's approval, covering the expected ranges of variations for all these parameters for the range of coals specified.

In all other aspects, not spelt out above, or in specifications, where ANSI code stipulates agreement between the parties concerned before the test, Bidder shall get these approved by the Owner.

No negative tolerance on account of instrument in-accuracies or otherwise shall be allowed on the guaranteed values.

Performance tests shall also be conducted to prove the steam generating capacity of the steam generator at rated parameters at stipulated loads.

Necessary write ups, schemes, instrument schedules, detailed procedures clearly indicating periods of tests, frequency of observations, etc. shall be prepared and submitted for all the tests for Owner's review and shall be got specifically approved from the Owner within one year of L.O.A. issue.

1.5.5 Performance / Acceptance Test for Electrostatic precipitator :

The performance test on electrostatic precipitator will commence after a minimum period of three thousand (3000) hours of continuous operation after completion of trial operation. During the interval between the commencement of trial operation and the commencement of performance test only routine maintenance shall be carried out. No physical or chemical cleaning of ESP shall be permitted during this period or immediately before the conductance of the performing tests.

The test efficiency shall be based on the overall performance of the electrostatic precipitator over a mutually agreed period of operation under the conditions given in this specification and following the normal operation of the unit including rapping and normal soot blowing and/or warm-up guns. Outlet dust concentration of ESP with one field out in each stream while firing worst coal shall be 50 mg/NM^3 (max) subjected to applicable modification adopted by Environmental Department, Government of India, at the time of project execution.

The performance tests shall be carried out in accordance with Method-17 of EPA (Environmental Protection Agency of USA) code. The details of the tests shall, however be mutually agreed upon between the OWNER and the CONTRACTOR.

All calibration procedures and standards shall be subjected to the approval of the Owner. The protecting tubes, pressure connections and other test connections required for conducting guarantee test and maintenance testing shall conform to the relevant codes. The Bidder shall fully elaborate, in his

proposal, the provisions made to this effect. Method of measurement for all air leakage test and power consumption test proposed by the Bidder shall be clearly indicated in his offer, and shall be subject to Owner's approval.

1.5.6 Performance/Acceptance Test for Steam turbine generator

(a) Performance test for the turbine generator set will be conducted in accordance with the latest edition of ASME PTC-6.

(b) Power consumed by the auxiliaries mentioned which is to be deducted from electrical power generated, shall be measured during the performance/ Acceptance Test. Wherever the measurement is not possible, design values of power consumption by an auxiliary shall be considered.

(c) Corrections to the test results for steam turbine shall be applied as per the correction curves provided. When the system is properly isolated for a performance test, the unaccounted leakages should not be more than 0.1% of the design throttle flow at that load. However, during the test, if it is found that the unaccounted for leakage is more than 0.1% of design throttle flow at that load, then heat rate will be increased by an amount equal to half the difference between actual unaccounted for leakage expressed as percentage of design throttle flow at that load and 0.1% (allowed by the code).

(d) The tests shall be arranged in a manner that the normal unit operation is not disrupted. Duplicate test runs shall be performed at 100% TMCR and 80 % TMCR loads. The results of corrected heat rate shall agree within 0.25%. If they differ by more than 0.25%, third test shall be run at the same point. The corrected result of any one of the three test runs, which deviates from the corrected averaged result of all the runs by more than 0.25%, shall be eliminated; otherwise the results of all the three tests runs shall be accepted.

1.5.7 Performance test for the condensers

Performance test for the condensers shall be conducted in accordance with the latest edition of ASME PTC-12.2 with the exception at (a) mentioned below:

(a) Condenser pressure shall be measured at 300 mm above the top row of tubes under VWO conditions, 1% make-up and design C.W. flow & design temperature. The condenser pressure shall be measured with a vacuum grid utilizing ASME basket tips. The grid is fitted at 300 mm above top row of condenser tubes.

(b) Combined pressure drop in condenser tube, water box and inlet and outlet piping shall be measured in between intake and discharge point of the C.W. system with cleanliness factor of 0.9 and COLTCS in service.

1.5.8 Performance test for Feed Water Heaters and Drain Cooler

Performance test for feed water heaters shall be conducted in accordance with the latest edition of ASME PTC-12.1.

1.5.9 Performance test for Deaerator

Performance test for deaerator shall be conducted in accordance with the latest edition of ASME PTC-12.3.

1.5.10 For Balance of plant

For the Balance of plant equipment, performance test shall be conducted as per the relevant codes. The results of the shop test shall be used wherever applicable as the base for conducting the test.

1.6 TEST INTERRUPTIONS

In the event of a test interruption resulting from an Event of Force Majeure or Employer-Caused-Delay, contractor shall be entitled to relief as provided in the contract, provided that (except for certain interruptions of a Availability Test as specified below), the interrupted Performance test must be started again and test data that were collected during the interrupted test must be ignored.
In the event of test interruptions as a result of Force Majeure or Employer-Caused-Delay during Availability test the test shall not be deemed a successful Performance Test where

(a) The total cumulative interrupted time during the test is more than twenty-four (24) hours

(b) The total number of interruptions during the test is more than four (4)

Except as provided above, the test resulting from Force Majeure or Employer-Caused-Delay shall be extended by an amount equal to the length of the interruptions, including time to return to steady-state operation. The test data for the period of interruptions shall be excluded from analysis and the test data that were collected both before and after the interruptions shall be included in the analysis.

1.7 TEST REPORTS

The contractor shall prepare test reports for the Availability Test, Efficiency Test, Capacity Test and the Emissions Test in which the methods followed, instrument readings, graphs, observations, final results obtained etc shall be recorded.

Amount of Liquidated Damages (LD) applicable for Category-I guarantees shall be as stipulated in Volume I.

The contractor shall also prepare Heat Balance Diagrams and Correction curves for all tests.

The contractor shall also furnish detail information about:

(a) Start up trials of the equipments

(b) Initial trial of total system

(c) Trial operation

(d) Procedure for performance guarantee/ acceptance tests.

FUNCTIONAL/PERFORMANCE / DEMONSTRATION GUARANTEE (AS APPLICABLE)

TRIAL OPERATION, COMMISSIONING, PERFOMANCE/ DEMONSTRATION GUARANTEE TESTS:

Demonstration / Functional guarantee tests of elevator shall be carried out at site as follows:

The parameters/ capability is to be demonstrated of various equipments/system as listed below.

i. Overload test.
ii. Travel speed and hoist speed checks.
iii. Drop test.
iv. Checks for interlocks & safety systems.
v. Checks for operation from inside the cage.
vi. Rated capacity of the elevator.
vii. Accurate positioning of the elevator.

ANNEXURE-III
QUALITY ASSURANCE PLAN

	MANUFACTURING QUALITY PLAN FOR=M/S vendor	PROJECT: PACKAGE: ITEM: ELEVATOR BHEL REF. NO.:	Q.P/FQP. NO & REV: DATE:1 PAGE: 1of 4 JOB NO:

1	2	3	4	5	6	7	8	9	10				11
Sr. No.	COMPONENT& OPERATION	CHARATERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMATE OF RECORD		AGENCY			REMARKS
									D	VE	M	B	
A. Boughtout Items :													
1	Raw materials, Round Hexagon & Structurals. Type : EN-8/EN-8D to EN-9,B and En-24	A: Chemical Composition	Major	Analysis	Sample	IS/BS : 970	IS/BS : 970	O.S.L/ T.C		V	V	V	
		B: Mechanical Properties	Major	Hardness	Sample	IS/BS : 970	IS/BS : 970	QA REG.		V	V	V	
		C: Dimensional Checks	Major	Measurement	100%	DRG.	DRG.	D.I.R/Q.C.R		V	w	V	
2	Raw material Rounds, En-8, EN-9, EN-24	Crack Detection	Major	Ultrasonic testing	100%	ASTM-388	ASTM -388	QA/FMT/03		V	W	V	
3	Casting : a. C.I. Graded Castings	A: Chemical Composition	Major	Analysis	Sample	IS-vendor DRG	AS PER DRG.	S.T.C	√	V	V	V	
		B: Mechanical Properties	Major	Hardness on traction sheave	Sample	vendor-DRG IS : 210	vendor-DRG IS : 210	S.T.C	√	V	V	V	
		C: Dimensional Checks	Major	Measurement	Sample	vendor-DRG	vendor-DRG	QA/FMT/02		-	W	-	
		D: Blow Holes	Major	Visual	100%	—	-	QA/REG		-	W	-	
4	Suppliers Item :												
	a. Manufactured Items	Dimensional Check	Major	Measurement	100%	vendor/DRG.	vendor/DRG.	D.I.R		-	W	-	
	b. Moldings Rubber Items (ABSORBER)	A: Dimensional Checks	Major	Measurement	100%	vendor-DRG.	vendor/DRG.	QA/FMT/02		-	W	-	
		B: Hardness	Major	Compression Test	Sample	vendor-DRG.	vendor-DRG.	QA/FMT/02		-	W	-	
	c. Springs (Buffer)	A: Dimensional Check	Major	Measurement	100%	vendor-DRG.	vendor-DRG.	QA/FMT/02		-	W	-	
		B: Spring Constant compression.	Major	Compression	Sample	vendor-DRG.	vendor-DRG.	S.T.C	√	V	V	V	
	d. Guide Rail.	A.Chemical Test.	Major	Analysis	Sample	vendor- DRG	vendor -DRG	S. T.C	√	V	V	V	
		B. Dimension check.	Major	Measurement	Sample	vendor-DRG.	vendor-DRG.	QA/FMT/02		V	W	V	
	e. Wire rope	A: Dimensional Check	Major	Measurement of O.D/ Const.	Sample	IS/2365 &	IS/2365 &	QA/FMT/02		-	W	-	
		B: Mechanical Properties.	Major	Measurement	Correlate S.T.C	IS : 2266	IS : 2266	S.T.C	√	V	V	V	

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***W=Witness , *VE= Manufacturer/ sub contractor Vendor.**
***S.T.C= Supplier Test Certificate, *B =BHEL/Nominated inspection agency.**
***O.S.L = Out Side Lab, *D.I.R=Daily inspection register.**
***R.Q.C = Rvendoript Quality Control (vendor) . *P =Perform.**
***Q.C.R = Qua;ity Control Register (vendor) . *T.C. = Test Certificate,**
***D.I.R = Daily inspection register. * D = Documents.**
***U.E.R. =Ultra Sonic Examinitation Record .**

MANUFACTURER SEAL AND SIGN

CONTRACTOR SIGN AND SEAL .

NAME & SIGN OF APPROVING AUTHORITY & SEAL

1	2	3	4	5	6	7	8	9	10				11
Sr. No.	COMPONENT& OPERATION	CHARATERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMATE OF RECORD		AGENCY			RMARKS
									D	VE	M	B	
	f. Power & control (PVC)cable	a- FRLS ,	Major	Electrical	Sampling	IS - 694	IS - 694	S.T.C	√	V	V	V	
		b- Insulation resistance.	do	do	do	do	do	do	√	V	V	V	
5	Raw material for motor. (1) Enameled wire.	a) Dimension Check	Major	Measurement	Sample	vendor -STD	vendor -STD	D.I.R		V	W	V	
		b) High voltage test	Major	Elect.	One Sample each roll	IS:4800	IS:4800	D.I.R		V	W	V	
	(2) Copper base (Flat)	Chemical check	Major	Analysis	Sample	Cu=min 99.5%	Cu=min 99.5%	O.S.L / T.C		V	V	V	
6	Finished Manufactured Components	Plating thickness control	Major	Measurement	Sample	vendor-STD.	vendor-STD.	vendor-STD		V	W	V	
B. Inspection During mfg.													
1	Machine Shop :	A: Dimensional Check	Major	Measurement	100%	vendor-DRG.	vendor-DRG.	QA/FMT/01		-	W	-	
		B: Crack detection Motor bodies	Major	D.P. Test	100%	vendor-STD.	vendor-STD.	-		-	W	-	
		C: Surface check	Major	Visual	100%	vendor-STD.	vendor-STD.	-		-	W	-	
2	Fabrication Shop :	Dimensional Checks of critical items	Major	Measurement	100%	vendor-DRG.	vendor-DRG.	Q.C.R		-	W	-	
		Welding	minor	Visual	Sampling	do	do	.		.	W	.	Welding by approved welder
C. Assembly Inspection.		A- Back lash of gears& Maching	Major	Measurement	100%	vendor	vendor	QA/FMT/11		V	W	-	
1	Winding gear.	contact.				INSP NORMS	INSP NORMS						
		B- Vibration .	Major	Measurement	100%	vendor	vendor	do		V	W	-	
						INSP NORMS	INSP NORMS						
		C- Noise level.	Major	Measurement	100%	vendor	vendor	do		V	W	-	
						INSP NORMS	INSP NORMS						
		D- Visual .	Oil leckage	Visual	100%	vendor	vendor	do		V	W	-	
						INSP NORMS	INSP NORMS						

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CONTRACTOR SIGN AND SEAL .

NAME & SIGN OF APPROVING AUTHORITY & SEAL /HPGCIL

1	2	3	4	5	6	7	8	9	10				11
Sr. No.	COMPONENT& OPERATION	CHARATERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMATE OF RECORD		AGENCY			REMARKS
									D	VE	M	B	
2	Motor Assembly :	A-Winding Insulation test.	Major	High Volt. Test	100%	I S :325-96 1.5 KV for 5 SEC	I S :325-96 1.5 KV for 5 SEC.	D.I.R QA/FMT/13		V	W	V	
		B-Insulation Resistance	Major	Measurement	100%	> 10 mega ohms	> 10 mega ohms	Test report		V	W	V	
		C-Motor testing for elect. Pmt.	Major	Elect.	100%	IS : 325	IS : 325	Test report		V	W	V	
		D-Vibration measurement & noise lev	Major	Measurement	100%	vendor - Norms	vendor -Norms	Test report		V	W	.	
3	Speed Governor Assembly :	Tripping speed Easy Run test	Major	Function Check	100%	I S : 9878 LCH -112	I S : 9878 LCH - 112	T.C IN Pant.		V	W	V	
4	Controller Assembly / VVVF Unit.	1. Visual Inspection	Major	Visual	100%	vendor Norms	vendor Norms	T.C		V	W	V	
		2. Electrical Checks (Routine Test).	do	Electrical	100%	do	do	do		V	W	V	
		3. Functional Checks	do	Function	100%	do	do	do		V	W	V	
		4. Pretreatment in seven tank for sheet & paint thickness.	Major	Measurement + Visual	Sampling	do	do	vendor - FMT.		V	W	V	

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CONTRACTOR SIGN AND SEAL.

NAME & SIGN OF APPROVING AUTHIRITY & SEAL.

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Sr. No.	COMPONENT& OPERATION	CHARATERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMATE OF RECORD		AGENCY			REMARKS
									D	VE	M	B	
5	Mechanical assembly :	Cage assembly .	Major	Measurement	100%	Appd. L/o DRG. vendor-INSP. Norms	Appd. L/o DRG. vendor-INSP. Norms	QA/FMT/15		V	W	V	
6	Painting	Parts & Components	Major Major	Cross Hatch Test Powder Coating Thickness Test	Sampling Sampling	vendor-INSP. Norms vendor-INSP. Norms	vendor-INSP. Norms vendor-INSP. Norms	QA / REG. QA / REG.		V V	W W	V V	
6	Electrical Assembly	1- Break assembly .	Minor	Function check	Sampling	vendor- NORMS	vendor - NORMS	TC		V	W	V	

***V= Verification as appropriat. *M= Manufacturer/Sub contractor.**
***W=Witness , *VE= Manufacturer/ sub contractor Vendor.**
***S.T.C= Supplier Test Certificate, *B =BHEL/Nominated inspection agency.**
***O.S.L = Out Side Lab, *D.I.R=Daily inspection register.**
***R.Q.C = Rvendoript Quality Control (vendor) . *P =Perform.**
***Q.C.R = Qua;ity Control Register (vendor) . *T.C. = Test Certificate,**
***D.I.R = Daily inspection register. *D = Documents.**
***U.E.R. =Ultra Sonic Examinitation Record .**

MANUFACTURER SEAL AND SIGN

CONTRACTOR SIGN AND SEAL.

NAME & SIGN OF APPROVING AUTHORITY & SEAL

ANNEXURES

ANNEXURE-I
LIST OF MAKES

SR. NO.	ITEM	SUPPLIERS	PLACE	REMARKS
1.	WIRE ROPES	USHA MARTIN	RANCHI	
		BHARAT WIRE ROPE	MUMBAI.	
2.	TRAILING CABLE	GEBAUR & GRILLER- AUSTRIA		
		DAETWYLER (THELMA) CABLES-SWITZERLAND	SWITZERLAND	
		LAPP	GERMANY	
		UNIVERSAL	-	
		INCABSTEP	-	
3.	BUFFER SPRINGS	INDUSTRIAL STEEL SPRING	-	
		ALL INDIA STEEL SPRING MANUFACTURING COMPANY	-	
		KOLKATA SHAW COMPANY	KOLKATA	
		SUPER INDIA SPRINGS	KOLKATA	
		MESCO SPRING.	MUMBAI.	
4.	GEAR INTERNALS	PREMIUM ENERGY TRANSMISSION LTD,	PUNE	
		SICOR S.P.A-	ITLY	
		OEM		
5.	DRIVER MOTOR	Seimens-	MUMBAI	
		ABB	FARIDABAD	
		BHARAT BIJILI	-	
		CGL	-	
		KIRLOSKER	-	
		OEM	-	
6.	STAINLESS STEEL	SAIL,	-	
		MINOX METAL,	-	
		JINDAL	-	
7.	CR SHEET	ESSAR STEELS,	-	
		BHUSHAN STEELS	-	
8.	CABLES	DELTON,	-	
		NICCO	-	
		UNIVERASL,	-	
		FINOLEX,	-	
		CCI	-	
		MACROTHREM,	-	
		VARSHA CABLES	-	
		KEI.	-	
		PARAMOUNT	-	
		POLYCAB.	-	
9.	RELAYS	SIEMENS	-	

SR. NO.	ITEM	SUPPLIERS	PLACE	REMARKS
		SCHNEIDER TELEMECHANIQUE	-	
		SALZER,	-	
		SCHNIDER ELECTRIC.	-	
		OEN	-	
10.	CONTACTORS	SIEMENS	-	
		L&T	-	
		GE	-	
		SCHNEIDER TELEMECHANIQUE.	-	
11.	TRANSFORMERS	SHARP ELECTRONICS	-	
		MELCON CONTROLS	CHENNAI	
		LOGITECH	-	
		GUNHAWA ELECTRIC CO LTD.	-	
12.	INVERTOR (V3F)	YASKAWA-	GERMANY	
		TOSHIBA	JAPAN.	
13.	T GUIDES	SAVERA	CHINA	
		D.D HITECH	-	
		MARAZZI	-	
14.	CAR DOOR OPERATOR	Wittur GMBH	AUSTRIA	
		FERMATOR	-	
		OEM	-	
15.	INFRA-RED DOOR CURTAIN	MEMCO	UK	
		WECO	-	
		TLJONES	-	
16.	BATTERY (LEAD ACID)	EXIDE.		
		HBL POWER SYSTEM-	HYDERABAD	
		AMAR RAJA	TIRUPATI	
		AMCO SAFT INDIA LTD	BANGALORE.	

NOTE:

1. THE SUB VENDOR LIST ABOVE IS INDICATIVE ONLY AND IS SUBJECT TO BHEL AND CUSTOMER APPROVAL DURING DETAILED ENGINEERING STAGE WITHOUT ANY COMMERCIAL & DELIVERY IMPLICATION TO BHEL.

   BIDDER TO PROPOSE SUB VENDOR WITHIN 4 WEEKS OF PLACEMENT OF LOI. THEREAFTER NO REQUEST FOR ADDITIONAL SUB-VENDOR SHALL BE ENTERTAINED.

2. IN CASE OF ASSEMBLED IMPORTED ELEVATOR, MAKES OF BOI SHALL BE SUBJECT TO BHEL/ CUSTOMER APPROVAL DURING DETAIL ENGINEERING STAGE WITHOUT ANY COMMERCIAL IMPLICATION AT CONTRACT STAGE.

3. DEALERS ARE NOT ACCEPTABLE FOR ANY ITEM OF THE PACKAGE. BIDDER SHALL PROCURE ALL ITEMS INCLUDING PLATES, STRUCTURAL ETC. FROM APPROVED SUB VENDOR ONLY.

ANNEXURE-II
List of Mandatory Spares for Elevators

Mandatory spares shall be provided as follows:

1. One (01) set of Mandatory Spares for TG Building Elevators.
2. One (01) set of Mandatory Spares for Service Building Elevator.
3. One (01) set of Mandatory Spares for ESP Control Room Building Elevators.

i.e. total Three (03) sets of Mandatory Spares shall be provided.

Sl. No.	Description	Quantity (Units)
1.1	Friction block	Two (2) Nos.
1.2	Guide roller of each type	20% of total population or Three (3) Nos. whichever is higher
1.3	Contactors of each type	Two (2) Nos.
1.4	Control transformer	One (1) Nos. of each type
1.5	Time device	Two (2) Nos. of each type
1.6	Rectifiers	Two (2) Nos. of each type
1.7	Over current relay	Two (2) Nos. of each type
1.8	Auxiliary relay	Three (3) Nos. of each type
1.9	Resistor	Three (3) Nos. of each type
1.10	Fuses of each rating	20% of the total population
1.11	Limit switches of each type	Three (3) Nos.
1.12	Push button	Three (3) Nos. of each type
1.13	Contact device (if applicable)	Three (3) Nos. of each type
1.14	Brake motor	Two (2) Nos. of each type
1.15	Transmitters	Two (2) Nos. of each type
1.16	Switches of each type	Three (3) Nos.
1.17	Receiver	Two (2) Nos. of each type
1.18	Bearings of each type and size	Two (2) Nos.
1.19	Roller of each type	Three (3) Nos.
1.20	Spares for worm gear	
1.20.1	'0' rings	Three (3) sets
1.20.2	Sealing ring of each type	Three (3) sets
1.21	Spares for brake	
1.21.1	Fan	Two (2) Nos. of each type
1.21.2	Magnetic coil	Three (3) Nos. of each type
1.21.3	Brake disc	Two (2) sets
1.21.4	Brake pad	Two (2) sets
1.22	Bushing (for door front)	Two (2) sets
1.23	Pinion	Two (2) Nos. of each type

Note:

a) Unless stated otherwise, a 'set' means item or sub-items required for each type/ size, range of assembly/ sub- assembly required for complete replacement in one equipment system; it

is further intended that the assembly/ sub-assembly which have different orientation (like left hand or right hand, top or bottom), different direction of rotation or mirror image positioning or any other reasons which result in marinating two different sets of spares to be used for subject assembly/ sub assembly, these shall be considered as different type of assembly/ sub assembly.

b) Wherever quantity has been specified as percentage (%), the quantity of mandatory spares to be provided by the vendor shall be the specified percentage (%) of total population required to meet the specification requirements. In case the quantity of mandatory spares so calculated happens to be in fraction, the same shall be rounded off to next higher whole number.

c) Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc, these shall cover all the items supplied and installed and the breakup of these shall be furnished by the vendor during detail engineering.

d) In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to the offered design with quantities generally in line with the approach followed in the above list.

e) Wherever bidder has indicated an item as not applicable, the same will have to be supplied free of cost, in case it is found applicable during detail engineering.

f) Any change or variation in equipment or systems during detailed engineering stage which would cause changes / variations in the essential spares, shall be supplied by Bidder without any commercial implications.

g) Mandatory spares shall not be dispatched before dispatch of corresponding main equipment.

h) Wherever quantity is specified both as a percentage and a value, the Bidder has to supply the higher quantity until & unless specified otherwise.

i) The spares shall be treated and packed for a long storage under the climatic condition prevailing at site.

j) Each spare part shall be clearly marked and labelled on the outside of the packing with its description. When more than one spare part is packed in a single case, a general description of the content 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.

k) The Bidder shall note that if there in any change/ variation in equipment/ system during detail engineering which causes any change/ variation in the essential spares quantity, the same shall be supplied without any commercial implications. The price indicated for the mandatory spares shall be considered for the purpose of evaluation.

ANNEXURE-III
List of Tools & tackles for Elevators

Sl. No.	DESCRIPTION	Qty.	Remarks
1	Spanner of all sizes required for maintenance	2 Sets	
2	Adjustable Spanner	1 No.	
3	Allen Key set all sizes required for maintenance	1 No.	
4	Screw driver set	1 Set	
5	Cutting plier	1 No.	
6	Grease gun	1 No.	
7	Nose plier	1 No.	
8	Grip plier	1 No.	
9	Hook spanner	1 No.	
10	Box spanner	1 No.	
11	Oil can	1 No.	
12	Measurement Taps	1 No.	
13	Paint brush 1/4,1/2,3/4 inch	1 No.	
14	Line tester	1 No.	
15	Multimeter	1 No.	
16	Soldering iron	1 No.	
17	Torch Light	1 No.	
18	Knife cutter	1 No.	
19	Steel rule	1 No.	
20	Wire Striper	1 No.	
21	Tube Spanner Combination	1 No.	
22	Hammer 1/2 Kg	1 No.	
23	Dial rench	1 No.	
24	Multi-purpose meter	2 Nos.	
25	Other tools if any (Please specify)		

ANNEXURE-IV

Drawing document submission schedule

S.N0.	Description	Schedule
1	First submission of dwg/ docs as per MDL	Within two (2) weeks from placement of LOI.
2	Every repeat submission	Within one (1) week.
3	Response time by BHEL	Within three (3) weeks after receiving of drawing.

Note:

1.0 The above are the minimum quantity of drawings/documents required. The exact requirement shall be informed to the successful bidder during detail engineering stage for which no commercial implication shall be entertained by BHEL.

2.0 Bidder to note that BHEL reserves the right for drawing/document submission through web based Document Management System. Bidder would be provided access to the DMS for drawing/document approval and adequate training for the same. Detailed methodology would be finalized during the kick-off meeting. Bidder to ensure following at their end.

- Internet explorer version – Minimum Internet Explorer 7.
- Internet speed – 2 mbps (Minimum preferred).
- Pop ups from our external DMS IP (124.124.36.198) should not be blocked.
- Vendor's internal proxy setting should not block DMS application's link (http://124.124.36.198/wrenchwebaccess/login.aspx).

ANNEXURE-V

MDL FOR ELEVATOR

SL. NO.	BHEL DOC NO.	TITLE	APP. CAT
1	PE-V0-415-502-A007	GAD OF TG BUILDING ELEVATOR	A
2	PE-V0-415-502-A008	GAD OF SERVICE BUILDING ELEVATOR	A
3	PE-V0-415-502-A010	GAD OF ESP CONTROL BUILDING ELEVATOR	A
4	PE-V0-415-502-A001	DATA SHEET FOR TG BUILDING ELEVATOR	A
5	PE-V0-415-502-A021	DATA SHEET FOR SERVICE BUILDING ELEVATOR	A
6	PE-V0-415-502-A023	DATA SHEET FOR ESP CONTROBUILDING ELEVATOR	A
7	PE-V0-415-502-A013	COMMON MQP OF ELEVATOR	A
8	PE-V0-415-502-A014	O & M MANUAL FOR ELEVATOR	I
9	PE-V0-415-502-A025	WIRING DIAGRAM & POWER DISTRIBUTION SCHEMATIC	I

A= APPROVAL
I= INFORMATION

24.2 The contractor shall proceed with the works in accordance with the decisions, instructions and orders given by the Engineer in accordance with these conditions.

24.3 If in the opinion of the Contractor, a decision made by the Engineer is not in accordance with the meaning and intent of the contract, the Contractor may file with the Engineer within 30 (Thirty) days after receipt of the decision, a written objection to the decision giving his reasons for so doing. Failure to file an objection within the allotted time shall be considered as acceptance of the Engineer's decision and the decision shall become final and binding.

24.4 The Engineer's decision and filing of the written objection thereto shall be a condition precedent to the right to request for arbitration.

24.5 Either party to the contract shall be at liberty to refer the matter to arbitration as provided in the contract but such intimation from the Contractor for referring any decision of Engineer to arbitration shall not relieve the contractor of his obligation to proceed with the works in accordance with the said decision, instruction or order in respect of which intimation has been given. It is the intent of this contract that there shall be no delay in execution of the works and the decision of the Engineer as rendered shall be promptly abided by.

25.0 Submission & Approval of Design Documents:

25.1 The contractor shall submit all the General Arrangement drawings, Mechanical, Electrical and Civil Design Basis/Criteria, Drawings, Data Sheets, Documents, Equipment and their Capacity Selection, Test Procedure etc. and other engineering documents stipulated elsewhere in the contract (hereinafter referred to and called as 'design document') for approval of the engineer along with the design calculations and general write up wherever involved. All electrical and mechanical drawings shall be properly coordinated.

25.2 The Design document so submitted shall be approved/commented upon generally within 10 working days from the date of its submission at the office of the respective engineer. Both the parties shall put their efforts together to complete the activity of design document approval in good faith in order to complete the same within stipulated period as above. However, the contractor acknowledges that the duration of approval/ commenting largely depends upon quality of the submission and also bunching of submission and hence agrees with the owner that neither any

specific period for approval can be ascertained nor the delay if any in the same (unless the delay is due to sheer negligence on the part of the engineer/his authorised personnel/owner's consultant) can be considered as the reason for extension of work completion period.

25.3 In the event of any discrepancy observed in the design document submitted during its scrutiny, the same shall be communicated to the contractor promptly. The contractor shall either arrange to correct the design document or shall justify the correctness of his submission.

25.4 On approval of the design document by the engineer, the contractor shall furnish six copies and soft copy on CD in AUTOCAD form (*.dwg) of these approved drawings to the recipients as per the distribution to be intimated by the engineer during the first co-ordination meeting (kick-off meeting). As the drawings shall be approved based on the basic information furnished by the contractor, approval by the Engineer shall not absolve the contractor of his responsibilities towards correctness of design & performance of the equipment.

25.5 If the Owner/Engineer is of opinion that any design document submitted and the approval thereof were erroneous, the Owner/Engineer reserves right to ask the contractor to revise/ modify approved design document and submit the same for approval of the Engineer without any financial liability to the owner.

25.6 During the currency of the contract, if any approved design document are required to be modified, such details of the modifications required to be carried out shall be separately maintained.

25.7 On completion of all the works, the contractor shall incorporate all the changes necessitated in the drawings and submit 6(six) sets of all the "As built" drawing for the records of the Owner/engineer.

26.0 Flow Model Test:

26.1 The Contractor shall carry out flow model tests of various packages/equipment as applicable, on the models prepared by him and furnish the model test reports to the Owner for his review. The Contractor shall give advance notice to the Owner to enable Owner to depute his representative to witness the flow model test. Such flow model tests shall be carried out as applicable for the various packages. The expenditure for deputing the Owner's engineer to witness the flow model test shall be borne by the owner.

VOLUME II

SECTION – 9

REQUIREMENT OF SPARES, TOOLS & TACKLE, LUBRICANTS/OIL/CONSUMABLES/LABORATORY EQUIPMENTS

CONSULTANT : PROCON ENGINEERS

CONTENT

1.0 TOOLS & TACKLE

The Contractor shall supply with the equipment one complete set of special tools and tackles required for the erection, assembly, dis-assembly & maintenance of the equipment. These special tools shall also include special material handing equipment, jigs & fixtures for maintenance and calibration/ re-adjustment, checking & measurement aids etc. A list of such tools & tackles shall be submitted by the Bidder along with the offer. Detailed description of each tool/tackles, its function along with the equipment / part for which it is meant for and the price of each tool / tackles shall also be indicated in the offer. These tools & tackles shall be separately packed and sent to site before commissioning. The Bidder shall also ensure that these tools are not used for erection purpose.

2.0 SPARES

2.1 GENERAL

The Bidder shall indicate and include in his scope of supply all the necessary start-up, commissioning and recommended spares in addition to mandatory spares as specified elsewhere in the specification. The Owner reserves the right to buy any or all mandatory and recommended spares. The Contractor shall also state for each item of spares, both mandatory and recommended, the normal expected service life.

2.1.1 All spares supplied under this contract shall be strictly interchangeable with the parts which they are intended to replace. The spares shall be treated and packed for long storage under the climatic conditions prevailing at the site, e.g. small items shall be packed in sealed transparent plastic bags with dessicator packs, as necessary.

2.1.2 Each spare part shall be clearly marked or labelled on the outside of the packing with the description. When more than one spare part is packed in a single case, a general description of the contents shall be shown on the outside and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.

2.1.3 All cases, containers or other packages are liable to be opened for examination as may be considered necessary by the Engineer.

2.1.4 All mandatory spares shall be delivered to site within one to three months prior to the scheduled date of the trial operation of the plant. However, they shall not be despatched before the despatch of the associated main equipment.

2.1.5 The Bidder shall also guarantee supply of spare parts, which will be made, based on manufacturer's drawings on special order from the Owner for 30 years after commissioning of the plant.

2.1.6 Warranty period for all kinds of spares shall be six thousand (6000) hours of operation, except normal wear or eighteen (18) months from the date of receipt at site, whichever is later. In case of failure or non-conformance to specifications, the Contractor shall replace them free of cost.

2.1.7 Design & Engineering details of all spares (make, model, rating, drawing, data sheet etc.) shall be submitted to the Owner prior to dispatch from manufacturers' works.

2.2 RECOMMENDED SPARES

2.2.1 The Contractor shall provide a list of recommended spares giving unit prices and total prices for Three (3) years of normal operation of the plant. This list shall take into consideration the mandatory spares specified elsewhere in the specification and shall be a separate list.

2.2.2 The price of recommended spares will not be used for the evaluation of bids. The price of these spares shall remain valid for a period as specified elsewhere in the specification from the date of Award of the Contract. Where the recommended spares are the same as mandatory spares, the prices shall be the same. The prices of any recommended spares, which are not common with mandatory spares, shall be subject to review by the Owner and shall be finalised after mutual discussion.

2.3 START-UP COMMISSIONING SPARES

2.3.1 Start-up commissioning spares are those spares which may be required during the start-up and commissioning of the equipment/system. All spares used until the plant is handed over to the Owner shall come under this category. Said spares, properly marked, shall be supplied together with the

main equipment and shall be used by the Contractor, if needed, during erection & commissioning stage. All such spares which remain unused till issuance of Taking Over Certificate by the Owner, along with an equipment-wise quantitative consumption report shall be returned to the Owner during time of handover. The list of commissioning spares to be brought by the Contractor to ensure smooth commissioning of the plant shall be subject to the Engineer's approval.

2.3.2 The Contractor shall submit a complete list of all such start-up spares. Costs of the above spares, which are consumed before the handing-over of the plant, shall be deemed to have been included in the lump sum proposal price of the package, and the Contractor shall have no claim on this account to the Owner.

2.4 MANDATORY SPARE PARTS

2.4.1 The Owner considers some of the spares as essential for running the equipment irrespective of whether they are included in the list of recommended spares by the Bidder as mentioned above.

2.4.2 Since the components involved can not be foreseen at the bidding stage, only broad requirements of the Owner in this respect are outlined hereinafter. The Bidder shall include in his proposal, an item-wise list of all components and the quantity, unit prices & total price thereof, offered as mandatory spares for each and every equipment. This list shall be separate from the list of recommended spares and shall be used for bid evaluation purposes. Any clarification in this respect may be obtained by the Bidder at the pre-bidding stage. During finalization of detailed engineering if some component, equipment, system, sub-system found to undergo change, then the Owner/Consultant shall revise the list for compliance by the contractor without any cost implication.

2.4.3 The mandatory spares should be supplied to the Owner at least one month before the trial run of the Unit. The despatch programme is subject to approval of the Owner/ Consultant after award of contract.

2.4.4 Criteria for selection of Quantity of Mandatory Spares:

2.4.4.1 The list of mandatory spares considered essential by the Owner is enclosed in Annexures of this specification. The Bidder shall indicate the prices for each and every item (except for items not applicable to the Bidders design) whether or not he considers it necessary for the Owner to have such spares. If the bidder fails to comply with the above or fails to quote the price of any spare item, the cost of such spares shall be deemed to be included in the contract price. The Bidder shall furnish the population of each item. Whenever the quantity is mentioned in "sets", the Bidder has to give the item details and prices of each item.

2.4.4.2 Whenever the quantity is indicated as a percentage, it shall mean percentage of total population of that item in the station (project) unless specified otherwise, and the fraction will be rounded off to the next higher whole number. Wherever the requirement has been specified a 'set', it will include the total requirement of the item for a unit, module or the station or as specified. Where it is not specified, a 'set' would mean the requirement for the single equipment/system as the case may be. Also, the 'set' would include all components required to replace the item; for example, a set of bearings shall include all hardware normally required while replacing the bearings.

2.4.4.3 The prices of mandatory spares indicated by the Bidder in the Bid Proposal shall be used for bid evaluation purposes.

2.4.4.4 Wherever quantity is specified both as a percentage and a value, the bidder has to supply the higher quantity until and unless specified otherwise.

2.4.4.5 For Mandatory Spares, refer Annexures of Mechanical, Electrical and C&I packages.

2.4.5 Owner will have the option to procure any or all of the mandatory spares at his discretion.

3.0 ELECTRICAL LABORATORY AND TESTING EQUIPMENTS

The bidder shall furnish Electrical Laboratory & Testing Equipment as specified in Annexure D of this section & include any other equipment considered necessary for the satisfactory operation of the unit and associated 400 kV switchyard and other systems in the power plant.

CIVIL INPUT DETAILS

Refer attached civil input assignment drawings. (for TG building, Service building & ESP Control building elevators)