COMPLIANCE DRAWING

A) WATER ANALYSIS (ANNEXURE-1)

B) DETAILS OF CT OUTLET (ANNEXURE-2)

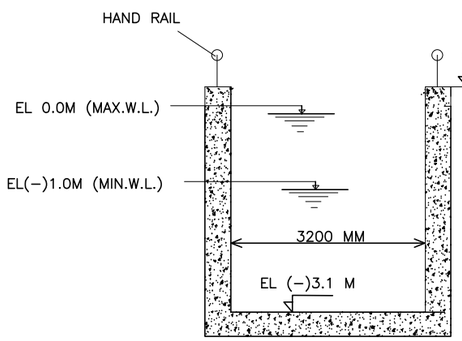
C) COORDINATES AND BATTERY LIMIT OF IDCT (ANNEXURE-3)

ANNEXURE-1

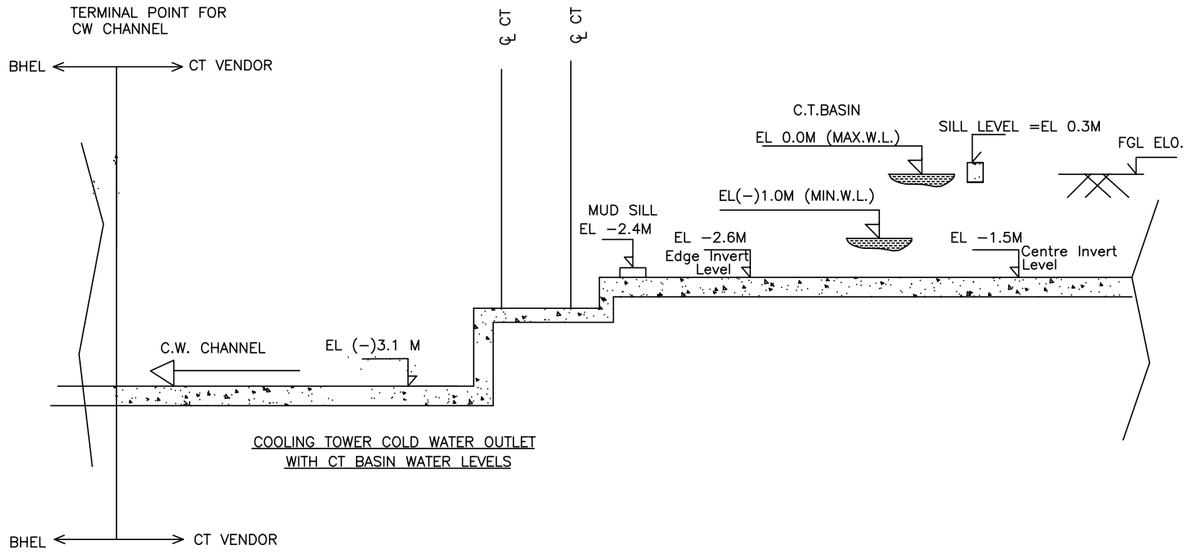
Circulating water analysis (with COC 5)

			Circulating Cooling Water
1	pH		8.5@25DegC
2	Turbidity	NTU	5
3	P-Alkalinity	mg/l as $CaCO_3$	70
4	M-Alkalinity	mg/l as $CaCO_3$	480
5	Calcium	mg/l as $CaCO_3$	410
6	Magnesium	mg/l as $CaCO_3$	190
7	Chloride	mg/l as Cl	300
8	Reactive Silica	mg/l as SiO_2	70
9	Chemical Oxygen Demand(COD)	mg/l	90
10	Biological Oxygen Demand(BOD)	mg/l	25
11	Equivalent Mineral Acid(EMA)	mg/l	320
12	Total Suspended Solids(TSS)	mg/l	15
13	Total Iron	mg/lasFe	2
14	$KmnO_4$No	mg/l	19.5
15	Dissolved Oxygen(DO)	mg/l	35
16	TDS	mg/l	1140
~~17~~	~~Temperature~~	~~Deg C~~	~~35~~
18	Total hardness		600
19	Conductivity		1710

ANNEXURE-2



COOLING TOWER CHANNEL



COOLING TOWER COLD WATER OUTLET
WITH CT BASIN WATER LEVELS

IDCT KEY PLAN AND TERMINAL POINT DETAILS

ANNEXURE-3

E-100.0M
E-200.0M
E-300.0M
E-400.0M
E-500.0M
E-600.0M
N-1000.0M
N-900.0M
N-800.0M
KANDSA VILLAGE
TP-3
TP-2
CHP MCC-3 (CHP/LHP MCC)
AIR RECIEVER
DM P/H
CS TANK
CONV.5A/B
637.232E 1018.44N
CLARIFIED WATER TANK
CLARIFIED P/H
DMCW P/H & PHE
BFP BUILDING
515.8E 1024.77N
563.9E 1027.57N
SURGE VESSELS (14Mx35M)
FUTURE SPACE FOR EXPANSION
304.232E 1012.245N
411.018E 1017.108N
PSF (32M X 17.4M)
WIND DIRECTION
281.94E 940.51N
CLO2 (34MX22.5M)
CWTP (13.5MX11.5M)
BHEL
15000
8000
IDCT VENDOR
CW PH
MAINTENANCE BAY
RL(+)218.0M EL:0.0M
PLANT NORTH
236.94E 780.51N
COOLING TOWER FOR GASIFICATION
IDCT
65163
35457
44000
AIR SEPARATION UNIT
637.232E 888.95N
RL(+)218.0M EL:0.0M
N.830.787 E.681.755
106200
95000
80840
28395
15000
55000
7800
14430
21000
4000
8000
47570
24500
26000
PLANT BATTERY LIMIT
24965
88165
D-602A
D-602B
⑦WNA STORAGE TANK
NA AN PLANT
SUBSTATION (82mx26m)
4-MS-01
30M WIDE ROAD
A
B
C
D
E
F

PERFORMANCE GUARANTEES TO BE DEMOSTRATED AT SITE

1	**PERFORMANCE GUARANTEES:**
1.1	Each equipment shall be guaranteed to meet the performance requirement as specified.
1.2	The cold-water temperature of 33 Deg C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower attached herewith.
1.3	Performance test of Cooling Tower (IDCT) as per the test procedure elaborated elsewhere in the specification for demonstration of guaranteed Cold CW Water Temperature at design conditions shall be carried out at site. The cold CW water temperature as specified shall be guaranteed by the bidder for the design condition of CW flow, range, ambient wet bulb temperature relative humidity and guaranteed power consumption.
1.4	All costs associated with the tests including cost associated with the supply, calibration shall be included in the bid price.
1.5	Instruments required for conducting the PG Test shall be as per 'CT PG Test Procedure' attached in the specification.
1.6	The Performance / Acceptance test shall be carried out as per the standard procedure included in the specification.
1.7	The performance test of the Cooling Tower shall be carried out by the Contractor in presence of BCGCL/BHEL. The testing agency proposed by the Contractor shall be approved by BCGCL/BHEL.
1.8	The data logged in the data logger shall be given to BCGCL in soft form for reference immediately after the test, which should be readable in BCGCL computer. In case, any software is required, the same shall be supplied to BCGCL without any extra cost to BCGCL/BHEL. The testing agency shall simultaneously submit their final report to both Contractor as well as BCGCL/BHEL.
1.9	To ascertain the fulfillment of Guarantees of the Cooling Towers, the test results of the tower tested through approved testing agency shall be considered for PG test evaluation and based on the test result, the liquidated damage if applicable shall be levied for all the Cooling Towers.
1.10	PG test of Cooling Tower (IDCT) shall be carried out by the contractor within one year of successful completion of trial operation of the cooling tower and at a time when the atmospheric conditions are within limits of deviation from the design conditions as specified, preferably in the period from May to September. If Unit trial operation falls in these months then PG test of IDCT can be clubbed with Unit trial operation.

1.11	In case during performance guarantee tests it is found that the equipment/system has failed to meet the guarantees, the Contractor shall carry out all necessary modifications and/or replacements to make the equipment/system comply with the guaranteed requirements at no extra cost to the BHEL / BCGCL and re-conduct the performance guarantee test(s) with BHEL /BCGCL's consent.
1.12	However, if the specified performance guarantee(s) are still not met even after the above modifications/ replacements within ninety (90) days or a reasonable period allowed by the customer, after the tests have been completed, BHEL/ BCGCL will have the right to accept the equipment / system after assessing the deficiency in respect of the various ratings, performance parameters and capabilities and recover from the contract price an amount equivalent to the damages as determined by BHEL/ BCGCL. Such damages shall, however be limited to the cost of replacement of the equipment(s) / system(s) replacement of which shall remove the deficiency so as to achieve the guarantee performance.
1.13	It is bidder’s responsibility to design the cooling tower and its components to meet the performance requirements at given design conditions while complying to all the technical constraints specified in technical specification.
2	**Fan Power Consumption (KW) and CW Pumping Head:**
2.1	Apart from above performance guarantees, bidder shall guarantee the total Power consumption per Cooling Tower, for the cooling tower fans.
2.2	The total fan Power Consumption (KW) and the IDCT Pumping head (MWC) within bidder’s terminal points shall not exceed the respective maximum limits specified in Technical Data Part-A.
2.3	Bidder shall submit the total fan Power Consumption (KW) and IDCT pumping head calculation along with his technical offer for reference.
2.4	The IDCT pumping head specified limit is inclusive of static head plus frictional losses including 10% margin on frictional losses.
2.5	Bids with total fan power consumption (KW) and the IDCT pumping head (MWC) more than the specified maximum limits shall not be accepted.
2.6	No advantage shall be given to any bidder for total fan power consumption (KW) and IDCT pumping head (MWC) offered less than specified maximum limits.
2.7	The bidder’s Cooling Tower thermal design shall take care of above aspects including maximum and minimum permissible plan dimensions indicated in Technical Data Part-A.
2.8	The bidder shall substantiate the IDCT pumping head with calculations in the event of order and same shall be subjected to approval. IDCT pumping shall be calculated as follows:
2.9	The static head for calculating IDCT pumping head shall be considered up to top elevation of top most hot water distribution header.
2.10	Frictional losses for pipes shall be as per William & Hazen formula with C = 100. Frictional losses for various valves & fittings e.g. Miter bends, valves, tees, reducers etc. shall be as per crane handbook. Ft Value for fitting friction drop calculation to be considered as 0.01 for all sizes greater than 600NB.The frictional losses shall be computed considering 10% margin on same. William & Hazen formula: V = 0.85 X C X (i)^0.54 X (d/4)^0.63.

2.11	**AMOUNT OF LIQUIDATED DAMAGES FOR SHORTFALL IN GAURANTEED PARAMETERS:**	
2.11.1	If the performance guarantee(s) are not met by the Contractor during PG Test, it will be concluded that, the equipment has failed to meet the guarantee(s) and action shall be taken as per the Contract Requirement.	
2.11.2	If the performance guarantee(s) specified above are not met by the Contractor even after the modifications and/or replacements mentioned, BHEL / BCGCL will accept the equipment / system only after levying liquidated damages against the Contractor and such liquidated damages shall be deducted from the Contract Price.	
2.11.3	The liquidated damages (LD) shall be prorated for the fractional parts of the deficiencies.	
	Guarantee	**Rate of LD**
	Per Cooling Tower - For every KW of aux power consumption	Rs 1400000.0 /-
3	The purchaser is, however, not bound to accept the equipment and reserves the right to reject it if the actual values exceed beyond the plant design limits.	

CLAUSE NO.	TECHNICAL REQUIREMENTS

CT PG Test Procedure

INTRODUCTION

1.1 Scope

This document, hereinafter referred to as the "Test Procedure", describes the procedures for conducting the Cooling Tower Thermal Performance Test at Station, hereinafter referred to as the "Plant". This Test Procedure contains guidelines for conducting the test, the test set-up, list of test instrumentation, data to be acquired, and equations to be used for the calculation of results.

1.2 Test Goal

The goal of the Test is to accurately determine the thermal performance of the cooling tower for contractual acceptance.

1.3 Tower Description

The cooling tower, located at the ------ (Name of the Plant) is --- (no.) cell mechanically induced draft cooling tower with ……..type fill. The cooling tower operates with …. No of cells in service and ------ cell in standby mode. Each cell has one (1) fan. The cooling tower guaranteed power consumption at motor inlet is …….. KW. Hot circulating water is supplied to the tower through a ….. (dia of header) return header and distributed to both sides of each cell through risers. Cold water drains from each cell into a common basin beneath the tower, and exits the tower through a common channel.

1.4 Commercial Items

Testing shall be in accordance with CTI ATC-105 (2000), and in accordance with the Contract. Any inconsistencies between any of the provisions in this Test Procedure, and/or any of the Appendices herein, shall be resolved by giving precedence in the following order:

I. The Contract
II. This Test Procedure and any Authorized Modifications
II. Governing Performance Test Code(s) and Standards

1.5 Parties to the Test

The three (3) parties to the performance test are as follows:
Owner:
Contractor / Manufacturer:
Testing Subcontractor

The Testing Subcontractor shall appoint a Test Director to be in charge of all testing activities. Representatives for each party identified above shall be designated to observe the test, confirm that it was conducted in accordance with this Test Procedure, and if necessary, shall have the authority to approve any agreed upon test exceptions in writing. A joint protocol should be signed by all the parties before the test declaring that cooling tower is fit for the test in all respect.

2.0 References and Definitions

2.1 Test Codes and Standards

The following list of Codes and Standards shall be used in part in the testing of the Cooling Tower as deemed applicable by the Contractor:

- *CTI ATC-105 (2000) Acceptance Test Code for Water Cooling Towers*

2.2 Constants and Unit Conversions

Code-specific conversion factors required for use in the determination of test results shall be in accordance with CTI Bulletin STD-145(95).

2.3 Property Data

The psychometric calculations are based on ASHRAE formulations, if required.

2.4 Defined Terms and Abbreviations

Any capitalized terms that are not separately defined in this Test Procedure shall have the meaning for that term as defined by the Contract.

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME American Society of Mechanical Engineers
Guarantee Performance parameter guaranteed by the Contract
DAS Data Acquisition System
RTD Resistive Temperature Device
Test Director Responsible for the coordination and direction of the performance tests in accordance with this Test Procedure
Test Procedure This document
Test Run Period of time in which testing parameters are collected.

3.0 Test Overview

3.1 Test Description

The goal of the Test is to accurately determine the thermal performance of the cooling tower. The Test will be performed under the general guidelines of the CTI ATC-105 (2000). The Test will consist of measurements of circulating water flow rate, fan motor power consumption, air and water temperatures, wind speed and direction, and barometric pressure.

“These measured test parameters will be evaluated with the manufacturer supplied thermal performance curves to determine the thermal performance of the tower by comparing predicted cold water temperature with test cold water temperature.”

3.2 Responsibilities

The responsibilities for each of the involved parties to the test are as follows:

Owner Responsibilities

- Operate the tower such that the manufacturer specified limits are not exceeded.
- Provide a stable heat load to the tower sufficient for testing.
- Provide a stable electrical power source for all temporary test instrumentation and equipment required to perform the Test. The Test equipment will require a standard 110 volt single phase AC power source for the data acquisition system and the psychrometers.
- Allow full access for the Testing Subcontractor to setup temporary instrumentation, and to record measurements manually if applicable.

Contractor / Manufacturer Responsibilities

- Overall Test coordination of all on-site logistical activities in support of the Performance Test.
- Designate the necessary personnel to witness the execution of the Performance Test, including a witness who shall have the authority to agree to any revisions/deviations to the Test Procedure.
- Provide an electrician to obtain fan power measurements at the direction of the Testing Subcontractor.
- Correct any defects that may occur that prevent the safe and reliable operation of the Tower.
- Coordinate with control room operations prior to and during the test.
- Provide access via ladders, man lifts, or scaffolding as needed including access to pitot taps.

Testing Subcontractor Responsibilities

- Provide temporary test instrument data acquisition system and NIST-traceable, calibrated, temporary test instrumentation.
- Calibrate temporary test instrumentation prior to the Test.
- Install temporary test instrumentation with Contractor assistance as needed.
- Prepare this Test Procedure and make changes, as needed.
- Analyse the test results and prepare a Test Report following the completion of the Test.
- Provide a Test Director who shall direct, coordinate and oversee the Test activities, and ensure that the Test is executed per this Test Procedure.

Test Director Responsibilities

- The Test Director, or acting designee, shall be present during the entire testing period.
- Keep a test log to note any Plant Upsets which may cause the test data to violate the stability criteria listed in this Test Procedure.

- Ensure that the Test is conducted in accordance with this Test Procedure, or record any deviations with agreement by the parties to the Tests, where necessary / applicable.
- Coordinate and direct the Test.
- Train and organize test data collectors, as needed.
- Effect proper safety compliance for onsite Testing Subcontractor personnel.
- Communicate with the Contractor and Owner
- Distribute copies of all raw Test data to all parties following the Test

3.3 Condition of Equipment

At the time of testing, the tower shall be clean and in good operating condition. Specific items that shall be checked prior to the start of testing are listed in Table 3-1.

Table 3-1: Required Conditions of the Tower

#	Condition
1.	The water distribution system shall be essentially free of foreign materials that may impede the normal flow of water.
2.	All mechanical equipment shall be in good operating condition. Fans shall be rotating in the correct direction, and pitched properly.
3.	The fill and drift eliminators shall be essentially free of algae and other foreign materials that may impede normal air flow.
4.	The water in the cold water basin shall be at normal operating elevation.

3.4 Pre-Test Preparation

The following pre-test preparations shall be executed under the direction of the Test Director:

Contractor / Manufacturer

1. Verify the condition of the equipment meets the requirements of Section 3.3.
2. Verify the tower is well balanced prior to flow measurements. If required, appropriate rectification action to be taken to make it ready for the test

Testing Subcontractor

1. Verify the primary measurements against the secondary measurements and station indications if applicable.
2. Verify all data acquisition systems are running and recording data per Section 4.0.
3. Manual data sheets, shown in Appendix B and data collector requirements shall be determined and made available prior to testing.

4. Any deviations to this Test Procedure identified prior to testing shall be identified and agreed upon in writing by the parties to the test.
5. Test equipment will be checked to insure proper operation prior to testing including temperature comparisons.

Design Operating Conditions

The Design Operating Conditions of the cooling tower are given in Table 3-2 below.

Table 3-2: Design Operating Conditions

Parameter Units Value

- Circulating Water Flow Rate (m3/hr)
- Hot Water Temperature (°C)
- Cold Water Temperature (°C)
- Inlet Air Wet-Bulb Temperature (°C)
- Ambient Wet-Bulb Temperature (°C)
- Guaranteed Power consumption at motor inlet /cell (KW)
- Guaranteed Power consumption at motor inlet /tower (KW)
- Barometric Pressure (in Hg)

Every effort shall be made to conduct the Test as close to the design operating conditions as possible. The maximum permissible variations from the design operating conditions are given in Table 3-3 below.

Table 3-3: Maximum Permissible Variation from Design Operating Conditions

Parameter Limit

- Circulating Water Flow Rate ± 10 %
- Range ± 20 %
- Ambient Air Wet-Bulb Temperature (As per manufacturer's performance curve) not exceeding +_8.5 deg C
- Fan Motor Power Per Cell ± 10 %
- Barometric Pressure 1 in Hg
- Wind Speed
    - < 4.5 m/s for the 60 Minute Average,
    - < 7.0 m/s for the 1 Minute Moving
    - Average Throughout the 60 Minutes

The Test conditions shall meet the constancy requirements of ATC-105 given in Table 3-4 below.

Table 3-4: Required Constancy of Test Conditions During the Test

Parameter	**Constancy of Test Conditions**

Circulating Water Flow Rate	± 2 %
Heat Load & Range	± 5 %
Ambient/Inlet Air Wet-Bulb Temperature*	± 1 °C / hour
Ambient/Inlet Air Wet-Bulb Temperature maximum deviation of a reading from the test	± 1.5 °C

* Limit on the liner least squares trend

3.6 Test Methodology

3.6.1 The Test shall be conducted in general accordance with CTI ATC-105.

3.6.2 The Test shall be performed on the entire tower as a whole. The circulating water flow rate and fan power of all operating cells shall be within ± 10% of the average of the tower. Fan blades shall be adjusted within allowable range of operation so that test power consumption shall be as close as possible to guaranteed power consumption.

3.6.3 The heat load on the tower should be steady for a minimum of thirty (30) minutes prior to the start of testing.

3.6.4 Test parameters should be measured for as long as Test conditions permit. The Test director will review the data and select one (1) Test Run that is one (1) hour in duration based on stability criteria. The most stable hour of data will be utilized to calculate the tower performance. Data stability will be determined by the Test Agency engineer and DAS software. The averaged data from the most stable Test run shall be evaluated with the manufacturer's performance curves given in Appendix A to determine the tower performance.

3.6.5 Test parameters will be measured from a combination of temporary test instruments supplied by the Performance Testing Agency and permanent plant instrumentation, see Appendix C. The calibrated accuracy of all instruments shall meet the requirements of ATC-105. Instrument readings will be recorded by the plant control systems, temporary data acquisition system, and manually by test personnel.

3.6.6 Prior to testing, all thermal probe outputs will be compared in a water bath to verify that the probes were not damaged in shipment. Only probes which read less than ±0.1°C from the water bath average will be used.

3.6.7 Manufacturer's recommended operating guidelines shall be followed throughout all testing. No equipment shall be operated outside of its design limits. To the extent practical, systems will be in automatic control during the tests. Any deviation from standard operation should be noted and approved by all parties to the Test.

3.6.8 Should any adjustment to the tower circulating water flow rate be necessary, throttling should be attempted at the pump discharge and condenser valves in order

to maintain clean full flow profiles in the risers for the water flow measurements. After Testing, any flow control will be at the discretion of plant operations.

3.6.9 All flows to and from the tower shall remain steady during each Test Run. If possible, the blow down shall be isolated and the makeup flow shall remain steady during each Test Run.

3.6.10 A test log should be kept by the Test Director to note any Plant Upsets which may cause the test data to violate the stability criteria or operational limits listed in the Test Procedure and cause test interruption.

3.6.11 Data recorded during a Plant Upset (Plant Upsets may include circulating pump trip, fan power trip or unexpected weather changes) shall be omitted from the test average and not included in the calculation of the test results. Unless otherwise specified, the Performance Test shall resume at a minimum of thirty (30) minutes following the re covery of stability. The Test Runs shall be extended for a period of time equal to the duration of the test interruption.

3.7 Proposed Test Schedule

The proposed test schedule is provided in Table 3-5 below. The schedule is subject to change.

Table 3-5: Proposed Schedule for Test Agency Personnel

Activities	Estimated Hours
Install Equipment	10
Measure water flow at the header, Conduct Test	8
Pack equipment, Calculate Preliminary Results	8

4.0 Test Measurements

4.1 Measurement Methodology

4.1.1 Test measurements shall be recorded with a combination of temporary installed and permanent plant instrumentation. A complete list of measurements can be found in Appendix C.

4.1.2 Primary measurements are defined as those used to calculate test results.

4.1.3 Secondary measurements are defined as those that do not enter into the calculation of the results. These measurements shall be used as a quality indicator of the test.

4.1.4 All instrumentation for the recording of primary measurements shall be calibrated prior to the performance test in accordance with ATC-105 (2000). Calibration

records prior to for all test instrumentation will be provided when equipment arrives on site testing.

4.1.5 A temporary installed data acquisition system (DAS) shall be utilized to acquire the majority of the test data. Data recorded digitally shall be collected every thirty (30) seconds.

4.1.6 Manually recorded data shall be recorded once per test run unless specified other wise.

5.0 Calculation Methodology

5.1 Calculation Overview

This section outlines the steps for determining the Cooling Tower Thermal Performance.

The following test parameters are evaluated as part of the Test:

1. Water Flow Rate
2. Hot Water Temperature
3. Cold Water Temperature
4. Ambient Air Wet-Bulb Temperature
5. Ambient Air Dry-Bulb Temperature
6. Barometric Pressure
7. Fan Motor Power
8. Wind Speed

The calculation of Tower Performance will be estimate as described in the Section 5.2 and 5.3 below.

5.2 Determination of predicted Cold Water Temperature for Cooling Tower

The data for each parameter is displayed and averaged for a sliding one hour window throughout the entire data set. Limits from the ATC-105 code are applied to the parameter averages.

The cold water temperature shall be read from the performance curves for 90%, 100% and 110% of rated flows at test wet bulb temperature andrange. The three points thus obtained from performance curves are plotted to obtain a cross plot, which is a relation between water flow and cold water temperature.

The test water flow is corrected for difference in fan power consumption from design values as follows:

Corrected test water flow

= (Test Water Flow) x (Design Power Consumption/ Test Power Consumption)$^{1/3}$

From the cross plot obtained above the predicted cold water temperature shall be read at corrected test water flow.

5.3 Test Acceptance Criteria

The acceptance criteria of the test is defined as: "For the cooling tower, if the test cold water temperature is less than or equal to the predicted cold water temperature as calculated based on methodology given in Section 5.2,the tower is deemed to have met the guarantee."

A maximum tolerance of 0.3 deg C in cold water temperature shall be allowed to take care of design and instrument inaccuracies.

6.0 Reporting Requirements

6.1 Data Delivery

A copy of all data sheets and logged data will be furnished to all parties at the completion of the test prior to demobilization.

6.2 Test Report Delivery

The Performance Test Report shall be completed within thirty (30) days of the completion of the Test. The final thermal performance report for the cooling tower detailing shortfall in test cold water temperature from predicted cold water temperature to be issued. The reports to be electronically submitted in an Acrobat PDF format to the test purchaser and owner of the tower,

6.3 Final Test Report Requirements

The Performance Test Report shall include:

- A copy of all data sheets and raw data required by this procedure.
- A copy of the manufacturer's data including the performance curves.
- A description of the cooling tower with its orientation.
- A sketch of the installation showing the measurement location of circulating water flows, temperatures, wind speed, barometric pressure, etc.
- Date and time of test runs start and finish.
- Description of conditions under which the test runs were conducted.
- Summary and discussion of the Test results.
- Notes on any unusual observations, data, or conclusions.
- Signed pre-test agreements.
- Any mutually-agreed upon deviations to the Test Procedure (if applicable).
- Instrument calibration data including instrument calibration forms will be supplied for any temporary test instrumentation used to obtain data for the test.

CLAUSE NO.	TECHNICAL REQUIREMENTS

Appendices

Appendix Title

A. Manufacturers Performance Curves
B. Manual Data Sheets
C. Primary and Secondary Measurements

APPENDIX A
Manufacturers Performance Curves

APPENDIX B
Manual Data Sheets

APPENDIX C
Primary and Secondary Measurements

PRIMARY TEST MEASUREMENTS

Primary measurements are defined as those used to calculate test results. They will be recorded if an electronic interface to the data can be established. A temporary test Data Acquisition System (DAS) shall be used to monitor the majority of the precision test pressures and temperatures. The test DAS will include at least one (1) data logger connected to a laptop computer. Automatically monitored parameters will be scanned a minimum of once every 30 seconds using the test DAS. If the data acquisition system is not available for testing, primary measurements will be manually recorded every five (5) minutes. Location of instruments shall be as per specification.

Primary measurements will be based on the following:

1. Circulating water flow rate will be determined by Pitot tube traverses provided at site. An air-over-water manometer will be used to measure the differential pressure between the impact and the static ports of the pitot. The circulating water flow rate is anticipated to remain steady throughout the mobilization. The water flow to the tower will be measured once, and then checked before each test run by monitoring the manometer differential pressure at the midpoint of the header. The discharge pressure of the circulating pumps, the power consumption of the pumps, and other plant data shall be monitored if available to insure the circulating water flow rate to the tower is steady throughout the test.
2. Hot water temperature shall be measured with two (2) RTDs installed in a flowing well in at least one (1) of the taps at the supply header upstream of first riser. Hot water temperature may be measured in multiple taps if necessary.
3. Cold water temperature shall be measured in cooling tower outlet channel with a grid of at least nine (9) RTD’s installed in the channel at the discharge of the cold water basin.
4. Ambient air wet-bulb temperature will be measured in front of the air inlets using RTDs installed in sixteen (16) CTI - compliant mechanically aspirated psychrometers located at eight (8) equal area points suspended from ropes on each side of the tower.
5. Ambient air dry-bulb temperature will be measured in front of the air inlets using RTDs installed in two (2) of the psychrometers used to measure ambient air wet-bulb temperature. To measure Ambient WBT & DBT, RTDs are to be installed preferably

at location approximately 1.5 m above basin curb elevation, not less than 15 m or more than 100 m to windward of the cooling tower or at a suitable location after mutual agreement.

6. Fan motor power readings for the tower will be made at the motor control switchgear with a test agency calibrated wattmeter. Voltage and amperage measurements will be taken for plant reference and line loss calculations as required.

7. Barometric pressure will be measured with a calibrated barometer near the temporary DAS.

8. Make up water flow and temperature shall be measured with permanent plant instrumentation. If permanent plant instrumentation is not available, makeup water flow shall be approximated from the tower evaporation rate, and makeup water temperature shall be measured with a temporary installed RTD.

SECONDARY MEASUREMENTS

Secondary variables are measured variables that do not enter into the calculation of the results. Secondary measurements are recorded as a quality indicator of the test. Information Only variables may be recorded for the Test Director's information.

Secondary measurements shall include the following:

The ambient wind speed will be measured with a calibrated RM Young meteorological station placed upwind of the tower in an open and unobstructed location beyond the influence of the inlet air

SUB VENDOR LIST

INDICATIVE SUB-VENDOR LIST

All sub vendors / makes of equipment shall be subject to BHEL/ Customer approval in the event of order without any implication

Sl No	Item	Supplier	Place	Remark
1	PIPES-MS- (BLACK/ GI) AS PER IS IS:3589 >1000NB			
		STEEL AUTHORITY OF INDIA LIMITED	ROURKELA	
		WELSPUN	ANJAR	SAW UPTO 2600 NB
		WELSPUN	BHARUCH	SAW UPTO 1300 NB
		MAN INDUSTRIES	INDORE	SAW UPTO 1400 NB
		SAMSHI	VADODARA	SAW 450 TO 2540 NB
		MUKAT TANKS & VESSELS	TARAPUR	SAW 200 TO 1200 NB
		MUKAT PIPES	RAJPURA	SAW UPTO 1800 NB
		LALIT PIPES AND PIPES LTD	THANE	SAW 350 TO 1400 NB
		RATNAMANI	CHATRAL	SAW 600 TO 2600 NB
		RATNAMANI	KUTCH	SAW 400 TO 3600 NB
		PSL HOLDINGS LIMITED	DAMAN	SAW 450 TO 1600 NB
		PSL INTERNATIONAL LTD.	CHENNAI	SAW 450 TO 1600 NB
		PSL LIMITED	KUTCH	SAW 450 TO 1600 NB
		PSL LIMITED	VISAKHAPATNAM	SAW 450 TO 1600 NB
		JCO PIPES	CHHINDWARA	SAW UPTO 1600 NB
		SURYA GLOBAL STEEL TUBE LTD	ANJAR	SAW UP TO 2032 OD
		CAPACITE STRUCURES PVT LTD	THANE	406.4 MM TO 3874 MM
2	PUMP -SUBMERSIBLE>= 30KW			
		KSB	NASHIK	130 KW
		KIRLOSKAR BROTHERS LTD	KIRLOSKARWADI	
		AQUA MACHINERY	AHMEDABAD	UP TO 235 KW
		WPIL	GHAZIABAD	
3	FAN ASSEMBLY-COOLING TOWER			
		PAHARPUR COOLING TOWERS LTD	SAHIBABAD	WITH SOLID FAN BLADES 288" AND 336 " DIA, WITH FOAM CORED FAN BLADES WITH 10 METERS AND 10.97
		PAHARPUR COOLING TOWERS LTD	BHASA	60" TO 288" FAN DIA
		PAHARPUR COOLING TOWERS LTD	KOLKATA	60" TO 288" FAN DIA
		M/s MAYA FANS AIR ENGG PVT LTD	DEWAS	UP TO 11 METER FAN
		AMALGAMATED INDUSTRIAL COMPOSITES PVT LTD	NASHIK	UP TO 11 METER FAN DIA
4	GEAR BOX -COOLING TOWER			
		PAHARPUR COOLING TOWERS LTD	SAHIBABAD	
		PAHARPUR COOLING TOWERS LTD	KOLKATA	
		NEW ALLENBERRY WORKS	KOLKATA	
		ELECON ENGINEERING	VALLABH VIDYANAGAR	
		PREMIUM ENERGY TRANSMISSION	FALTA	
5	DRIVE SHAFT-CARBON FIBRE -COOLING TOWER			

		M/S EUROFLEX TRANSMISSION (INDIA) PVT LTD		
		PAHARPUR COOLING TOWERS LTD	SAHIBABAD	
		AMALGAMATED INDUSTRIAL COMPOSITES PVT LTD	NASHIK	
		NORTH STREET COOLING TOWERS	GHAZIABAD	
6	DRIVE SHAFT SS-COOLING TOWER			
		PAHARPUR COOLING TOWERS LTD	SAHIBABAD	
		PAHARPUR COOLING TOWERS LTD	KOLKATA	
		NORTH STREET COOLING TOWERS	GHAZIABAD	

2000 TPD BCGCL COAL TO AMMONIUM NITRATE - LSTK-1

INDICATIVE SUB-VENDOR LIST

110803 : HOT & COLD INSULATION OF EQUIPMENT & PIPING

CODE	NAME
MAHATASHTRA	
1 . P1178	INSULREF TECHNOLOGIES PRIVATE LIMITED
INDIA	
2 . P1162	ALP AEROFLEX INDIA PVT. LTD. (- 50 Deg C to 120 Deg C)
3 . P1150	AMOL DICALITE LIMITED (For Supply & Application of Perlite Block & Pipe Section)
4 . P1161	ARMACELL INDIA PVT. LTD. (ARMACELL ENGINEERED SYSTEMS) (Upto Rs. 3.0 Crore (For supply & application of Insulation & Acoustic Works).)
5 . P3203	ASIAN THERMAL INSULATION (I) PVT LTD
6 . P3214	ASSOCIATED INSULATION CO.
7 . P1186	ASSOCIATED INSULATION COMPANY
8 . P3210	CAPE INDUSTRIAL SERVICES (PVT) LTD
9 . P3212	CAPEX INSULATION & ENGINEERS (upto Rs 1.0 Crore)
10 . P3208	CONTINENTAL INSULATIONS PVT LTD (upto Rs 1.0 Crore)
11 . P1175	G+H INSULATION INDIA PVT.LTD.
12 . P1155	HI-TEC ROCK FIBRE PVT. LTD. (Upto Rs. 2 Crore (For the supply of Thermal Insulation materiasl only).)
13 . P3206	HYDERABAD INDUSTRIES LTD (For calcium silicate only)
14 . P3211	JD INSULATION (upto Rs 1.0 Crore)
15 . P3209	KAEFER PUNJ LLOYD LIMITED
16 . P3204	KHANDELWAL INSULATIONS PVT LTD

110803 : HOT & COLD INSULATION OF EQUIPMENT & PIPING

CODE	NAME
17 . P3201	LLOYDS INSULATION(i) LIMITED
18 . P3202	LLOYDS PROJECTS PVT LTD
19 .	LLOYDS PROJECTS PVT LTD (APPLICATION ONLY)
20 . P1119	MINWOOL ROCK FIBRES LIMITED (Upto 5 Crores)
21 . P3205	NEWKEM ENGINEERS PVT LTD
22 . P1201	PERMA-PIPE INDIA PRIVATE LIMITED
23 . P3213	POINEER INSULATION
24 . P1174	POLYBOND INSULATION PVT.LTD.
25 . P3207	SHARAD INSULATIONS & INTERIORS PVT LTD (upto Rs 1.0 Crore)
26 . P1217	STAIVE EINGINEERING AND TECHNICAL SERVICES PVT. LTD.
27 . P1191	TECHNO ELECTRIC & ENGINEERING CO. LIMITED
1INDIA	
28 . P1193	SUAVAL LORVEN INDIA PVT.LTD.

110807 : PAINTING OF STRUCTURAL , EQUIPMENT & PIPING

CODE	NAME
MAHATASHTRA	
1 . P1178	INSULREF TECHNOLOGIES PRIVATE LIMITED
INDIA	
2 . P1032	ARCOY INDUSTRIES
3 . P6063	ARIEN NEW DELHI PRIVATE LIMITED
4 . P6061	ASHISH DECORATORS
5 . P6068	BHARAT CHEMICALS & PAINTS (UPTO Rs. 1.0 Cr.)
6 . P6064	CP SYSTEMS PVT. LTD.
7 . P1145	GRAUER & WEIL (INDIA) LTD.
8 . P6062	HEERU PAINTS AND CONTRACTS PVT. LTD.
9 . P1171	JOTUN INDIA PRIVATE LIMITED
10 . P6059	M.PALLONJI & CO. PRIVATE LIMITED
11 . P6058	NATRAJ AND SIDDHARTH METACARE PVT. LTD.
12 . P6042	NEO STRUCTO CONSTRUCTION LIMITED
13 . P6067	POLY COATS (UPTO Rs. 1.0 Cr.)
14 . P6069	QUANTUM ENGINEERS (UPTO Rs. 1.0 Cr.)
15 . P1146	RAMDEV RESINS PVT. LTD
16 . P6066	RESMET INDIA (UPTO Rs. 1.0 Cr.)

110807 : PAINTING OF STRUCTURAL , EQUIPMENT & PIPING

CODE	NAME
17 . P6065	SETWELL COATING INDIA PVT. LTD. (UPTO Rs. 1.0 Cr.)
18 . P1191	TECHNO ELECTRIC & ENGINEERING CO. LIMITED
19 . P6060	WASPRABHA
20 . P1170	MOHAN PAINTS

110811 : ONLY UNDERGROUND PIPING WORKS

CODE	NAME
INDIA	
1 . P6041	ABAN CONSTRUCTION
2 . P6040	ARIO BROTHERS
3 . P6005	BRIDGE AND ROOF CO.(INDIA) LTD.
4 . P6006	GAMMON INDIA LTD.
5 . P6003	GANNON DUNKERLEY & CO. LIMITED
6 . P1176	GOLDEN EDGE ENGINEERING PVT.LTD.
7 . P6001	LARSEN & TOUBRO LTD(ECC Division)
8 . P6042	NEO STRUCTO CONSTRUCTION LIMITED
9 . P6044	NEWTON ENGG. COST. CO. LTD.
10 . P6039	PUNJ LLOYD LTD.
11 . P6043	SPIC JEL ENGG. CONSTRUCTION LTD.
12 . P1191	TECHNO ELECTRIC & ENGINEERING CO. LIMITED
13 . P6038	U.B.ENGINEERING LIMITED

120101 : CS PIPES IS-1239 (BLACK & GI)

CODE	NAME
INDIA	
1 . P0039	AMBICA TUBES CO.
2 . P2055	ANIL METAL CORPORATION
3 . P2253	BHARAT ENTERPRISES (All sizes from PDIL enlisted pipe mills/manufacturer)
4 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
5 . P2216	CHETAN STEELS (Upto 6")
6 . P2196	DADU PIPES (P) LIMITED (½" to 6")
7 . P2075	GOOD LUCK STEEL TUBES LTD. (15 mm to 150 mm dia)
8 . P0326	GUJRAT STEEL TUBES LTD.
9 . P2166	HI-TECH PIPES LTD. (ERW MS / GI Pipes:½" NB to 6" NB, (Thickness 2.2 mm to 6.0 mm))
10 . P0814	INDIAN TUBE CO. (TATA DIV. OF TUBES & PIPES) (For >200M)
11 . P0387	INDUS TUBES LIMITED (½" to 6")
12 . P2121	JAY LAKSHMI STEEL & ENGINEERING CO.
13 . P0427	JINDAL PIPES LTD. (1/2" to 4")
14 . P2193	JOTINDRA STEEL & TUBES LTD. (½" to 6")
15 . P2111	KALPESH TUBE(INDIA), (TRADER) (upto a max order value Rs.25.0 lakh)
16 . P2264	KWALITY TUBES (All sizes and grades from PDIL enlisted pipes mill/manufacturer)
17 . P2276	MOKSHI INDUSTRIES PVT. LTD. (All sizes and grades from PDIL enlisted pipes mills/manufacturer)

120101 : CS PIPES IS-1239 (BLACK & GI)

CODE	NAME
18 . P0548	MUKAT PIPES LTD
19 . P2178	NAVRATAN PIPE AND PROFILE LTD. (Upto 6")
20 . P2040	P.K.FORGE & FITTING INDUSTRIES
21 . P2116	SAGAR STEEL CORPORATION (TRADER)
22 . P2110	SANGHVI METALS (TRADER)
23 . P2250	SHRIPAL METAL LIMITED (CS Pipes IS-1239 (Black & GI) All sizes from PDIL enlisted pipe mills/manufacturer)
24 . P0775	SURINDRA ENGINEERING CO. PVT. LTD.
25 . P0776	SURYA ROSHNI LTD. (15mm to 150mm)
26 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)
27 . P2152	WELSPUN GUJARAT STAHL ROHREN LIMITED (ANJAR) (Upto 6")
28 . P0894	ZENITH LIMITED
29 . P2252	` (UP TO 6" (BLACK), UPTO 4" (GI))

120102 : CS WELDED PIPES IS-3589

CODE	NAME
INDIA	
1 . P2055	ANIL METAL CORPORATION
2 . P2253	BHARAT ENTERPRISES (All sizes from PDIL enlisted pipe mills/manufacturer)
3 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
4 . P2196	DADU PIPES (P) LIMITED (6" to 12" (Thickness up to 9.5 mm))
5 . P2069	EVERGREEN HARDWARE STORES
6 . P2075	GOOD LUCK STEEL TUBES LTD. (Upto 150mm dia , 8 mm thick.)
7 . P0326	GUJRAT STEEL TUBES LTD.
8 . P2077	HEAVY METAL & TUBES LIMITED
9 . P2166	HI-TECH PIPES LTD. (ERW MS / GI Pipes: 6" NB OD to 12", (Thickness 2.6 mm to 8.0 mm))
10 . P0387	INDUS TUBES LIMITED (6" to 12")
11 . P2121	JAY LAKSHMI STEEL & ENGINEERING CO.
12 . P0427	JINDAL PIPES LTD. (8" to 14")
13 . P2193	JOTINDRA STEEL & TUBES LTD. (6" to 14")
14 . P2111	KALPESH TUBE(INDIA), (TRADER)
15 . P2264	KWALITY TUBES (All sizes and grades from PDIL enlisted pipes mill/manufacturer)
16 . P2124	LALIT PIPES & PIPES LIMITED (16" to 64", thickness upto 20mm)
17 . P2276	MOKSHI INDUSTRIES PVT. LTD. (All sizes and grades from PDIL enlisted pipes mills/manufacturer)

120102 : CS WELDED PIPES IS-3589

CODE	NAME
18 . P0548	MUKAT PIPES LTD
19 . P2178	NAVRATAN PIPE AND PROFILE LTD. (Upto 10")
20 . P2040	P.K.FORGE & FITTING INDUSTRIES
21 . P2174	PRATIBHA INDUSTRIES LTD., (16" NB to 24" NB, Wall Thickness: 6 mm to 20 mm)
22 . P0661	RATNAMANI METALS & TUBES LIMITED
23 . P2116	SAGAR STEEL CORPORATION (TRADER)
24 . P2110	SANGHVI METALS (TRADER)
25 . P2095	SAW PIPES
26 . P2105	SHRI RAM METALS
27 . P2250	SHRIPAL METAL LIMITED (CS Welded Pipes IS-3589 All sizes from PDIL enlisted pipe mills/manufacturer)
28 . P0754	STEEL AUTHORITY OF INDIA LTD.
29 . P0775	SURINDRA ENGINEERING CO. PVT. LTD.
30 . P0776	SURYA ROSHNI LTD. (6" to 16" ,(150mm to 400mm))
31 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)
32 . P2153	WELSPUN GUJARAT STAHL ROHREN LIMITED (DAHEJ) (Upto 72" (50 mm thk.))
33 . P2152	WELSPUN GUJARAT STAHL ROHREN LIMITED (ANJAR) (Upto 100" (30 mm thk.))

120103 : CS WELDED PIPES TO API 5L SPIRAL/LONG. WELDED (SAW/EFSW)

CODE	NAME
INDIA	
1 . P2253	BHARAT ENTERPRISES (All sizes from PDIL enlisted pipe mills/manufacturer)
2 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
3 . P2198	HEAVY METAL PIPE CENTRE (Upto 24" (Upto SCHXXS) (PDIL approved Manufacturer's Make only))
4 . P0427	JINDAL PIPES LTD. (2" TO 14")
5 . P2193	JOTINDRA STEEL & TUBES LTD. (½" to 14")
6 . P2111	KALPESH TUBE(INDIA), (TRADER)
7 . P2264	KWALITY TUBES (All sizes and grades from PDIL enlisted pipes mill/manufacturer)
8 . P2124	LALIT PIPES & PIPES LIMITED (16" to 64", thickness upto 20mm)
9 . P2276	MOKSHI INDUSTRIES PVT. LTD. (All sizes and grades from PDIL enlisted pipes mills/manufacturer)
10 . P0548	MUKAT PIPES LTD
11 . P2040	P.K.FORGE & FITTING INDUSTRIES
12 . P2174	PRATIBHA INDUSTRIES LTD., (16" NB to 24" NB, Wall Thickness: 6 mm to 14.27)
13 . P0661	RATNAMANI METALS & TUBES LIMITED
14 . P2116	SAGAR STEEL CORPORATION (TRADER)
15 . P0754	STEEL AUTHORITY OF INDIA LTD.
16 . P0775	SURINDRA ENGINEERING CO. PVT. LTD.
17 . P0776	SURYA ROSHNI LTD. (Gr. A, 3" to 4", Gr. B, 6" to 14")

120103 : CS WELDED PIPES TO API 5L SPIRAL/LONG. WELDED (SAW/EFSW)

CODE	NAME
18 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)
19 . P2153	WELSPUN GUJARAT STAHL ROHREN LIMITED (DAHEJ) (Upto 72" (50 mm thk.))
20 . P2152	WELSPUN GUJARAT STAHL ROHREN LIMITED (ANJAR) (Upto 100" (30 mm thk.))
FRANCE	
21 . P0834	ETS TROUVAY & CAUVIN
22 . P0629	PHOCEENNE
GERMANY	
23 . P0509	MANNESMANN HANDEL AG
24 . P0813	THYSSEN-KRUPP STAHLUNION GmbH
ITALY	
25 . P0191	DALMINE SPA
26 . P2092	RACCORTUBI SRL
JAPAN	
27 . P0464	KOSEI SANGYO LTD
28 . P0517	MARUBENI ITOCHU STEEL
29 . P0539	MITSUBISHI CORPORATION
30 . P0583	NIPPON KOKAN
31 . P0585	NIPPON STEEL CORPORATION
32 . P0587	NISHITANI & CO. LTD.

120103 : CS WELDED PIPES TO API 5L SPIRAL/LONG. WELDED (SAW/EFSW)

CODE	NAME
33 . P0588	NISSHO IWAI CORPORATION
34 . P0601	OKURA & CO. LTD.
35 . P0575	SOJITZ CORPORATION
36 . P0770	SUMITOMO METAL INDUSTRIES LTD.
KOREA	
37 . P0370	HYUNDAI CORPORATION
U.K.	
38 . P2064	BRITISH STEEL CORPORATION
39 . P0129	CORUS TUBES LIMITED
U.S.A.	
40 . P0703	SAW PIPES USA,INC.

120104 : CS / AS / LTCS SEAMLESS PIPES

CODE	NAME
INDIA	
1 . P2224	ANAND SEAMLESS TUBES PVT. LTD. (CS Seamless Pipes Upto 2")
2 . P2253	BHARAT ENTERPRISES (All sizes from PDIL enlisted pipe mills/manufacturer)
3 . P0115	BHEL (VALVES DIVISION)
4 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
5 . P2216	CHETAN STEELS (Upto 12" SCH 80)
6 . P2077	HEAVY METAL & TUBES LIMITED (Upto 8" (thickness upto 18.26 mm))
7 . P2198	HEAVY METAL PIPE CENTRE (Upto 24" (Upto SCHXXS) (PDIL approved Manufacturer's Make only))
8 . P0814	INDIAN TUBE CO. (TATA DIV. OF TUBES & PIPES)
9 . P0800	ISMT LIMITED
10 . P2121	JAY LAKSHMI STEEL & ENGINEERING CO.
11 . P2133	JINDAL SAW LIMITED
12 . P2264	KWALITY TUBES (All sizes and grades from PDIL enlisted pipes mill/manufacturer)
13 . P0503	MAHARASHTRA SEAMLESS LTD.
14 . P2276	MOKSHI INDUSTRIES PVT. LTD. (All sizes and grades from PDIL enlisted pipes mills/manufacturer)
15 . P2040	P.K.FORGE & FITTING INDUSTRIES
16 . P2138	RATNADEEP METAL & TUBES PVT. LTD. (<=168.3mm OD)
17 . P2170	SAINEST TUBES PVT. LTD. (½" NB to 3" Upto Sch 160 (ASTM A106 Gr. B, A333 Gr.1 & 6 & A335 Gr. P11))

120104 : CS / AS / LTCS SEAMLESS PIPES

CODE	NAME
18 . P2250	SHRIPAL METAL LIMITED (CS/AS/LTCS Seamless Pipes All sizes from PDIL enlisted pipe mills/manufacturer)
FRANCE	
19 . P0834	ETS TROUVAY & CAUVIN
20 . P0629	PHOCEENNE
GERMANY	
21 . P0477	HORST KURVERS GmbH
22 . P0509	MANNESMANN HANDEL AG
ITALY	
23 . P0191	DALMINE SPA
24 . P2119	GAM RACCORDI S.P.A
25 . P0175	IBF SEAMLESS PIPES Spa
26 . P2092	RACCORTUBI SRL
JAPAN	
27 . P0517	MARUBENI ITOCHU STEEL
28 . P0539	MITSUBISHI CORPORATION
29 . P0585	NIPPON STEEL CORPORATION
30 . P0587	NISHITANI & CO. LTD.
31 . P0588	NISSHO IWAI CORPORATION
32 . P0601	OKURA & CO. LTD.

120104 : CS / AS / LTCS SEAMLESS PIPES

CODE	NAME
33 . P0575	SOJITZ CORPORATION
34 . P0770	SUMITOMO METAL INDUSTRIES LTD.
KOREA	
35 . P0370	HYUNDAI CORPORATION
SWEDEN	
36 . P0004	AB SANDVIK STEEL
U.K.	
37 . P2064	BRITISH STEEL CORPORATION
38 . P0129	CORUS TUBES LIMITED
39 . P0870	VOMAL INTERNATIONAL LIMITED

120105 : SS SEAMLESS/WELDED PIPES

CODE	NAME
GERMANY	
1 . P2189	H. BUTTING GmbH & CO. (Seamless : Upto 30" (upto 16mm thk) & Welded: Upto 72" (upto 64mm thk.))
INDIA	
2 . P2183	APEX TUBES PVT. LIMITED (Seamless: Upto 8" (Sch80S) & Welded: Upto 48" (Sch160))
3 . P2258	ASR MET TECH PRIVATE LIMITED (Item-SS(Seamless), Size- Up to 12", Thk/Sch -Up to12.7mm/SCH80, Specification/Grade - A312 Gr. 304/304L/316/316L)
4 . P2181	BHANDARI FOILS & TUBES LIMITED (Seamless Upto 4" (Sch. 80) & Welded Upto 20" (Thk. <= 8 mm))
5 . P2253	BHARAT ENTERPRISES (All sizes from PDIL enlisted pipe mills/manufacturer)
6 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
7 . P2216	CHETAN STEELS (Upto 6" SCH 40)
8 . P0158	CHOKSI TUBE COMPANY LTD.
9 . P2242	DIVINE TUBES PVT.LTD. (UPTO 8")
10 . P2077	HEAVY METAL & TUBES LIMITED (Upto 8" (thickness upto 18.26 mm))
11 . P2198	HEAVY METAL PIPE CENTRE (Upto 8" (Upto SCH80S) (PDIL approved Manufacturer's Make only))
12 . P2121	JAY LAKSHMI STEEL & ENGINEERING CO.
13 . P2133	JINDAL SAW LIMITED
14 . P2167	KRYSTAL STEEL MANUFACTURING PVT. LTD. (Upto 2" (Material upto Grade SS 321))
15 . P2264	KWALITY TUBES (All sizes and grades from PDIL enlisted pipes mill/manufacturer)
16 . P2084	MARDALE PIPES PLUS LTD

120105 : SS SEAMLESS/WELDED PIPES

CODE	NAME
17 . P2168	MODERN TUBE INDUSTRIES LIMITED (Upto 2" (Upto SS Grade 321))
18 . P2276	MOKSHI INDUSTRIES PVT. LTD. (All sizes and grades from PDIL enlisted pipes mills/manufacturer)
19 . P0593	NUCLEAR FUEL COMPLEX
20 . P2040	P.K.FORGE & FITTING INDUSTRIES
21 . P2089	PRAKASH STEELAGE LIMITED (Seamless : Upto 12" & Welded: Upto 24")
22 . P2182	QUALITY STAINLESS PVT. LTD. (Seamless: Upto 6" (SCH40S), Welded: Upto 20" (SCH40S) (Upto SS Grade 316L))
23 . P2138	RATNADEEP METAL & TUBES PVT. LTD. (Seamless <=168.3mm.OD. Welded <=50.8mm OD)
24 . P0661	RATNAMANI METALS & TUBES LIMITED
25 . P0659	REMI EDELSTAHL TUBULARS LTD.(RAJENDRA MECHANICAL INDUSTRIES (Welded Upto 48" Seamless upto 8" (Thk. Upto 12.7 mm))
26 . P2268	S PLUS TUBE TECH (Upto 5" Seamless, SCH40S, A312 TP304L/316L, Upto 6" Welded, SCH40S, A312 TP304L/316L)
27 . P2206	SANDVIK ASIA PVT. LTD. (¾" to 2" (Thk: upto 8.74 mm))
28 . P2110	SANGHVI METALS (TRADER)
29 . P2169	SCORODITE STAINLESS (INDIA) PVT. LTD. (Seamless upto 16" NB, Welding upto 36")
30 . P2246	SHALCO INDUSTRIES PRIVATE LIMITED (SS Seamless Pipes - Up to 8", SS Welded Pipe - Up to 4")
31 . P2250	SHRIPAL METAL LIMITED (SS Seamless/Welded Pipes All sizes from PDIL enlisted pipe mills/manufacturer)
32 . P2157	SHUBHLAXMI METALS & TUBES PVT. LTD. (SS Seamless ¾" NB to 2" NB; Thk: 1.2 mm to 8 mm, L upto 14 mtr; SS Welded ¾" NB to 8" NB; Thk: 1.2 mm to 8 mm Lupto 14 mtr (Material: SS 304, SS 304L, SS316, SS 316L, SS 321, SS 347, SS 347H))
33 . P2275	SHUBHLAXMI METALS AND TUBES PRIVATE LIMITED (1. PIPE-SS(SEAMLESS), UPTO 12", SCH40S, A312 GR. 304/304L/316/316L 2. PIPE-SS(SEAMLESS), UPTO 16", SCH40S, A312/A358 TP304/304L//316/316L)

120105 : SS SEAMLESS/WELDED PIPES

CODE	NAME
34 . P2270	SUNCITY SHEETS PVT. LTD. (Upto 12" Welded, SCH 40S, A312 TP304L/316L)
35 . P2154	SURAJ LIMITED (SURAJ STAINLESS LIMITED)
36 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)
37 . P1205	Venus Pipes & Tubes Private Limited (Up to 16")
38 . P2244	WELSPUN SPECIALITY SOLUTIONS LIMITED (Upto 4" (only for Seamless Pipes))
THE NETHERLANDS	
39 . P2202	SOSTA BV (Upto 72" (thickness upto 25.4 mm))
CHINA	
40 . P2131	ZHEJIANG JIULI STAINLESS STEEL PIPE CO. LTD.
FRANCE	
41 . P0834	ETS TROUVAY & CAUVIN
42 . P0629	PHOCEENNE
GERMANY	
43 . P0477	HORST KURVERS GmbH
44 . P0509	MANNESMANN HANDEL AG
45 . P0813	THYSSEN-KRUPP STAHLUNION GmbH
ITALY	
46 . P0191	DALMINE SPA
47 . P2119	GAM RACCORDI S.P.A (thickness 2" to 24")
48 . P0175	IBF SEAMLESS PIPES Spa

120105 : SS SEAMLESS/WELDED PIPES

CODE	NAME
49 . P2092	RACCORTUBI SRL
JAPAN	
50 . P0517	MARUBENI ITOCHU STEEL
51 . P0539	MITSUBISHI CORPORATION
52 . P0585	NIPPON STEEL CORPORATION
53 . P0587	NISHITANI & CO. LTD.
54 . P0588	NISSHO IWAI CORPORATION
55 . P0601	OKURA & CO. LTD.
56 . P0575	SOJITZ CORPORATION
57 . P0770	SUMITOMO METAL INDUSTRIES LTD.
KOREA	
58 . P0370	HYUNDAI CORPORATION
SPAIN	
59 . P2151	T.T.I. - TUBACEX TUBOS INOXIDABLES, S.A. (Upto 10")
SWEDEN	
60 . P0004	AB SANDVIK STEEL
U.K.	
61 . P2064	BRITISH STEEL CORPORATION
62 . P0129	CORUS TUBES LIMITED
63 . P0870	VOMAL INTERNATIONAL LIMITED

120106 : SS SEAMLESS TUBES

CODE	NAME
INDIA	
1 . P2055	ANIL METAL CORPORATION
2 . P2183	APEX TUBES PVT. LIMITED (Upto 50.8 mm OD (Thickness Upto 4.00 mm))
3 . P2258	ASR MET TECH PRIVATE LIMITED (Item-SS(Seamless), Size101.60 mm Thk/Sch -Up to 4 mm, Specification/Grade - A213 Gr. 304/304L/316/316L/316TI/321)
4 . P2181	BHANDARI FOILS & TUBES LIMITED (Upto 50 mm OD)
5 . P2253	BHARAT ENTERPRISES (All sizes from PDIL enlisted pipe mills/manufacturer)
6 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
7 . P2242	DIVINE TUBES PVT.LTD. (UPTO 3")
8 . P2077	HEAVY METAL & TUBES LIMITED (Upto 8" (thickness upto 18.26 mm))
9 . P2167	KRYSTAL STEEL MANUFACTURING PVT. LTD. (Upto 50.8 OD (Material upto Grade SS 321))
10 . P2264	KWALITY TUBES (All sizes and grades from PDIL enlisted pipes mill/manufacturer)
11 . P2168	MODERN TUBE INDUSTRIES LIMITED (Upto 50.80 OD (Upto SS Grade 321))
12 . P2089	PRAKASH STEELAGE LIMITED (114.3 mm OD Thickness upto 6 mm)
13 . P0661	RATNAMANI METALS & TUBES LIMITED
14 . P2268	S PLUS TUBE TECH (Upto 50.8mm OD x 2.11 mm THK SA213 TP304L/316L/321, Upto 76.02 mm OD x 3.18 mm THK SA269 TP304L/316L)
15 . P2206	SANDVIK ASIA PVT. LTD. (OD upto 60.33 (Thk: upto 8.74 mm))
16 . P2169	SCORODITE STAINLESS (INDIA) PVT. LTD. (19.05 mm OD to 50.80 mm OD, Thickness upto 3 mm)
17 . P2246	SHALCO INDUSTRIES PRIVATE LIMITED (Upto 76.2 mm OD)

120106 : SS SEAMLESS TUBES

CODE	NAME
18 . P2250	SHRIPAL METAL LIMITED (SS Seamless Tubes All sizes from PDIL enlisted pipe mills/manufacturer)
19 . P2275	SHUBHLAXMI METALS AND TUBES PRIVATE LIMITED (1. TUBE-SS(SEAMLESS), 42.04MM, UPTO 1.6MM, A213 GR. 304/304L/316/316L 2. TUBE-SS(SEAMLESS), 25.4MM, UPTO 2MM, A213 GR. 304/304L/316/316L)
20 . P2154	SURAJ LIMITED (SURAJ STAINLESS LIMITED)
21 . P1205	Venus Pipes & Tubes Private Limited (Up to 50.8 mm OD)
22 . P2244	WELSPUN SPECIALITY SOLUTIONS LIMITED (Upto 114.3 MM OD)
SPAIN	
23 . P2151	T.T.I. - TUBACEX TUBOS INOXIDABLES, S.A. (Upto 250.0 mm OD)

120107 : SS PIPES UREA GRADE

CODE	NAME
INDIA	
1 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
2 . P2239	KEY-TECH ENGINEERING COMPNAY (Upto 8")
AUSTRIA	
3 . P0120	BHDT GMBH
4 . P0708	SCHOELLER-BLECKMANN NITEC GMBH
FRANCE	
5 . P0834	ETS TROUVAY & CAUVIN
6 . P0629	PHOCEENNE
GERMANY	
7 . P0477	HORST KURVERS GmbH
8 . P0509	MANNESMANN HANDEL AG
9 . P0813	THYSSEN-KRUPP STAHLUNION GmbH
ITALY	
10 . P0191	DALMINE SPA
11 . P0175	IBF SEAMLESS PIPES Spa
JAPAN	
12 . P0517	MARUBENI ITOCHU STEEL
13 . P0539	MITSUBISHI CORPORATION
14 . P0585	NIPPON STEEL CORPORATION

120107 : SS PIPES UREA GRADE

CODE	NAME
15 . P0587	NISHITANI & CO. LTD.
16 . P0588	NISSHO IWAI CORPORATION
17 . P0601	OKURA & CO. LTD.
18 . P0575	SOJITZ CORPORATION
19 . P0770	SUMITOMO METAL INDUSTRIES LTD.
KOREA	
20 . P0370	HYUNDAI CORPORATION
SPAIN	
21 . P2151	T.T.I. - TUBACEX TUBOS INOXIDABLES, S.A. (Upto 10")
SWEDEN	
22 . P0004	AB SANDVIK STEEL
U.K.	
23 . P2064	BRITISH STEEL CORPORATION
24 . P0129	CORUS TUBES LIMITED
25 . P0870	VOMAL INTERNATIONAL LIMITED

120110 : HDPE/ MDPE PIPES & PIPE FITTINGS

CODE	NAME
INDIA	
1 . P2057	ASTRAL
2 . P2059	AUQUAGUARD PLASTICS & POLYMERS
3 . P2066	CLIMAX SYNTHETICS
4 . P2071	FIBRO PLASTICHEM (I) PVT. LTD.
5 . P2085	NATIONAL ORG CHEMICAL INDIA LTD.
6 . P2207	PARTH POLY VALVES PVT. LTD. (¾" to 8" (150#))
7 . P2001	PENNWALT AGRU PLASTICS LTD. (upto 250mm Dia)
8 . P2094	RELIANCE INDUSTRIES 'RELPIPE'
9 . P1203	SANGIR PLASTICS PRIVATE LIMITED (UPTO 1200 MM OD)
10 . P1039	SONAL ENGG. PLASTIC FABRICATOR

120111 : SS WELDED TUBES

CODE	NAME
INDIA	
1 . P2183	APEX TUBES PVT. LIMITED (Upto 102 mm OD (Thickness Upto 4.00 mm))
2 . P2274	BMS INTERNATIONAL (BOMBAY) LLP (All Sizes & grades from PDIL enlisted pipe mills/manufacturer)
3 . P2242	DIVINE TUBES PVT.LTD. (UPTO 4")
4 . P2167	KRYSTAL STEEL MANUFACTURING PVT. LTD. (Upto 50.8 OD (Material upto Grade SS 321))
5 . P3418	MAXIM TUBES COMPANY PVT. LTD. (6 mm to 114.3 mm (0.5 mm to 4.5 mm thk.))
6 . P2168	MODERN TUBE INDUSTRIES LIMITED (Upto 50.80 OD (Upto SS Grade 321))
7 . P2089	PRAKASH STEELAGE LIMITED (114.3 mm OD thickness upto 6 mm)
8 . P2182	QUALITY STAINLESS PVT. LTD. (Upto 4"OD (Upto 4.0 mm Thick) (Upto SS Grade 316L))
9 . P0659	REMI EDELSTAHL TUBULARS LTD.(RAJENDRA MECHANICAL INDUSTRIES (50.8 mm OD)
10 . P2268	S PLUS TUBE TECH (Upto 19.05 mm OD x 0.711 mm THK SA249 TP304)
11 . P2235	SCODA TUBES LTD. (9.52 mm OD to 50.8 mm OD)
12 . P2169	SCORODITE STAINLESS (INDIA) PVT. LTD. (19.05 mm OD to 50.80 mm OD, Thickness upto 3 mm)
13 . P2275	SHUBHLAXMI METALS AND TUBES PRIVATE LIMITED (1. TUBE-SS(WELDED), UPTO 19.05MM, UPTO 1.2MM, SA249 TP 304/304L/316/316L & 2. TUBE-SS(WELDED), UPTO 38.01MM, UPTO 1.6MM, SA270 TP 304/304L/316/316L)
14 . P2240	STEAMLINE INDUSTRIES LTD. (6.00 mm OD to 50.8 mm OD)
15 . P2270	SUNCITY SHEETS PVT. LTD. (12.7mm to 127mm OD x 0.7mm to 4mmTHK SA249 TP 304/316L)
16 . P2230	SUNRISE STAINLESS PVT.LTD. (Upto 4" OD, thickness upto 6 mm.)
17 . P2154	SURAJ LIMITED (SURAJ STAINLESS LIMITED)

120111 : SS WELDED TUBES

CODE	NAME
18 . P1205	Venus Pipes & Tubes Private Limited (Up to 73.1 mm OD)
19 . P2244	WELSPUN SPECIALITY SOLUTIONS LIMITED (Upto 50.8 MM OD)

120113 : FITTINGS: CS/AS/SS SEAMLESS & FORGED

CODE	NAME
INDIA	
1 . P2120	AMFORGE INDUSTRIES (Upto 24")
2 . P2055	ANIL METAL CORPORATION
3 . P2216	CHETAN STEELS (Upto 6" SCH 80)
4 . P0166	COMMERCIAL SUPPLYING AGENCY
5 . P2195	CSA FITTINGS (Forged: ½" to 2" (Upto 9000#) & Seamless: 2" to 8" (Upto SCH XXS))
6 . P0221	EBY FASTNERS
7 . P0222	EBY INDUSTRIES
8 . P2150	FIT-TECH INDUSTRIES (Upto 24")
9 . P2159	FLASH FORGE(P) LTD. (Forged: Upto 4" (Upto 9000#) & Seamless: Upto 42")
10 . P2002	GUJARAT INFRAPIPES PVT. LTD.
11 . P2121	JAY LAKSHMI STEEL & ENGINEERING CO.
12 . P2111	KALPESH TUBE(INDIA), (TRADER) (upto a max order value Rs.25.0 lakh)
13 . P2266	KISAAN STEELS PRIVATE LIMITED (1. UPTO 6" CS SMLS FITTINGS, 2. UPTO 2" CS/AS/SS FORGED FITTINGS)
14 . P0553	M.S.FITTINGS MANUFACTURING CO.PVT.LTD.
15 . P2084	MARDALE PIPES PLUS LTD
16 . P2269	N J ENGINEERS (½" TO 24"-SCH 40/80/100/160 SEAMLESS FITTINGS & ½" TO 4" 3000#, 6000#, 9000# ELBOW, TEE, CAP, COUPLING, CROSS, WELDOLET, SOCKOLET)
17 . P2162	NAVKAR FORGINGS & FITTINGS PVT. LTD. (Forged: 3" (Upto 6000#) & Seamless: Upto 16" (Sch XXS))

120113 : FITTINGS: CS/AS/SS SEAMLESS & FORGED

CODE	NAME
18 . P2251	NEOSEAL ENGINNEERING PRIVATE LIMITED (1. I. Fittings(Forged), CS, Up To 1.5", ANSI Class -Up To 3000#, 2. Fittings(SMLS), CS, Up To 10", SCH -Up To 40, 3. Fittings(SMLS), AS, Up To 6", SCH -Up To 40, 4. Fittings(SMLS), SS, Up To 8", SCH -Up To
19 . P2003	NL HAZRA (up to SCH 80)
20 . P2215	P K TUBES & FITTINGS PVT. LTD. (Forged upto 1 ½" & Seamless upto 24" (SCH 160))
21 . P2040	P.K.FORGE & FITTING INDUSTRIES
22 . P2199	PARAS FITTINGS PVT. LTD. (Forged CS: ½" to 2" & CS Seamless: 2" to 8" (Upto Sch XXS))
23 . P2156	PARMAR TECHNO FORGE (Elbow-1/2" to 12", Tees-1/2" to 8", Reducer (conc. & eccn.)-1/2" to 12", CAPS-1/2" to 18" (CS&SS))
24 . P2088	PERFECT MARKETING (P) LTD,
25 . P2187	PETROCHEM INDUSTRIES (Seamless: upto 16" (all Fittings) & upto 36" (Only Caps) Sch : XXS / 80S, Forged : Upto 3" 6000#)
26 . P2210	RAJENDRA FORGE INDUSTRIES (CS: Upto 12" Sch 40 & SS: 6" Sch 40S)
27 . P0733	S & G ENGINEERS (P) LTD.
28 . P2116	SAGAR STEEL CORPORATION (TRADER)
29 . P2110	SANGHVI METALS (TRADER)
30 . P2280	SARDA PIPES & FITTINGS PVT. LTD. (1. Upto 18"/12"/4" for CS/AS/SS Seamless Fittings 2. Upto 2" 3000# for CS Forged Fittings)
31 . P2004	SAWAN ENGINEERS PVT. LIMITED (Upto 36" (SCH 160))
32 . P0728	SHIVANANDA PIPE FITTINGS LTD.,
33 . P2272	SKY FORGE PRIVATE LIMITED (1/2" to 24" SMLS & 1/2" to 3" Forged)
34 . P0758	STEWARTS AND LLOYDS OF INDIA LIMITED

120113 : FITTINGS: CS/AS/SS SEAMLESS & FORGED

CODE	NAME
35 . P0793	TEEKAY TUBES PRIVATE LIMITED
36 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)
37 . P2165	TOPAZ PIPING INDUSTRIES (2" to 36" (Sch 10 to Sch 160))
38 . P2006	TUBE BEND (CALCUTTA) PVT LTD (CS FITTINGS ONLY)
39 . P0835	TUBE PRODUCTS INCORPORATE
40 . P2261	UNITED FORGE INDUSTRIES (1. Upto 24" SCH 40 for CS SMLS Fittings, 2. Upto 10" SCH 10S for SS SMLS Fittings & 3. Upto 1.5" 3000# CS/SS Forged Flanges)
41 . P2135	ZOLOTO INDUSTRIES (15mm to 150mm (only CS-Galv.))
ITALY	
42 . P2188	PETROL RACCORD S.P.A. (Seamless: 1" - 42" (Elbows) & 1" - 56" (Tees/ Reducers/Caps))
FRANCE	
43 . P0834	ETS TROUVAY & CAUVIN
44 . P0629	PHOCEENNE
45 . P0853	VALLOUREC
GERMANY	
46 . P0477	HORST KURVERS GmbH
47 . P0509	MANNESMANN HANDEL AG
48 . P0712	SEIKMANN ANLAGEN-TECHNIK GMPH.
49 . P0822	TPS-TECHNITUBE ROHRENWERKE GMBH
ITALY	

120113 : FITTINGS: CS/AS/SS SEAMLESS & FORGED

CODE	NAME
50 . P0191	DALMINE SPA
51 . P2119	GAM RACCORDI S.P.A
52 . P0175	IBF SEAMLESS PIPES Spa
53 . P0377	IND MECCANICA BASSI LUIGI & C. SPA
54 . P2083	MANTOVANI SpA
55 . P2092	RACCORTUBI SRL
56 . P0789	TECHNO FORGE SPA
JAPAN	
57 . P0517	MARUBENI ITOCHU STEEL
58 . P0583	NIPPON KOKAN
59 . P0587	NISHITANI & CO. LTD.
60 . P0588	NISSHO IWAI CORPORATION
61 . P0601	OKURA & CO. LTD.
62 . P0575	SOJITZ CORPORATION
63 . P0770	SUMITOMO METAL INDUSTRIES LTD.
TAIWAN	
64 . P2007	HAITIMA CORPORATION
U.K.	
65 . P2064	BRITISH STEEL CORPORATION

120113 : FITTINGS: CS/AS/SS SEAMLESS & FORGED

CODE	NAME
66 . P0129	CORUS TUBES LIMITED
67 . P0245	EUROTUBE LIMITED
68 . P0870	VOMAL INTERNATIONAL LIMITED
U.S.A.	
69 . P2063	BONNEY FORGE

120115 : FRP/PVC PIPE AND PIPE FITTINGS

CODE	NAME
INDIA	
1 . P2278	ASHIRVAD PIPES PRIVATE LIMITED (Up to 8" SCH 80)
2 . P2058	ASTRAL POLYTECHNIK PVT. LTD. (1/2" TO 12" SIZE)
3 . P0290	GANDHI AND ASSOCIATES
4 . P2255	SATYAM COMPOSITES PVT. LTD. (Uo to 1800mm OD)
5 . P1039	SONAL ENGG. PLASTIC FABRICATOR

120116 : CAST IRON FITTINGS & PIPES

CODE	NAME
INDIA	
1 . P0182	CRAWLEY & RAY (F&E) PVT. LTD.
2 . P0374	IISCO LTD.
3 . P0445	KESORAM SPUN PIPES & FOUNDRIES
4 . P0704	SAYAJI IRON & ENGG.CO(P)LIMITED
5 . P0719	SHAKTI CAST (P)LIMITED
6 . P0720	SHALIMAR WORKS LTD
7 . P0727	SHIVA ENGINEERING WORKS
8 . P0866	VISVESARAYA IRON & STEEL LTD.

120117 : FORGED FLANGES

CODE	NAME
INDIA	
1 . P2053	AJAY FORGINGS PVT. LTD.
2 . P2120	AMFORGE INDUSTRIES (Upto 24" for upto 1500#; Upto 12" for 2500#)
3 . P0048	ANANDMAYEE FORGINGS PVT. LTD.
4 . P0141	C D ENGINEERING
5 . P2233	CHANDAN STEEL LIMITED (Only SS Flanges: Upto 36" - 150#, upto 24" - 300#, upto 20" - 600#, upto 16" - 900#, upto 12" - 1500#, upto 8" - 2500#)
6 . P2216	CHETAN STEELS (Upto 6" (150#))
7 . P0152	CHW FORGE PRIVATE LIMITED (FORMERLY CHAUDHARY HAMMER WORKS
8 . P0223	ECHJAY INDUSTRIES LIMITED
9 . P0255	FERROUS ALLOYS FORGINING PVT.LTD.,
10 . P0314	GOLDEN IRON & STEEL WORKS
11 . P2194	GOODLUCK ENGINEERING CO. (½"-12" (Upto 2500#), 14"-16" (Upto 900#), 18"-32" (Upto 600#), 34"-48" (Upto 300#))
12 . P0417	J K FORGINGS (1/2" to 60",ANSI B16.5,Class 150 to 2500)
13 . P2266	KISAAN STEELS PRIVATE LIMITED (1. UPTO 64" 150# CS, 2. UPTO 54" 300# CS, 3. UPTO 38" 600# CS, 4. UPTO 42" 300# AS/SS, 5. UPTO 20" 600# AS/SS & 6. UPTO 12" 2500# CS/AS/SS)
14 . P2160	KUNJ FORGINGS PVT. LTD. (Upto 60"(upto 300#) & Upto 12"(upto 2500#))
15 . P2175	MAHESH INDUSTRIES (½" to 8" NB, Rating: 150#- SWRF, SORF & BLRF Material: ASTM A105 only; 2" NB to 4" NB, Rating: 150#- Weld Neck RF Flange Material: ASTM A105 only)
16 . P2223	METAL FORGINGS PVT. LTD. (Upto 86" (150#); 60" (300# to 600#); 48" (900#); 24" (1500#); 12" (2500#))
17 . P2269	N J ENGINEERS (½" TO 24" -150#, 300#, 600#, 900#, 1500# & ABOVE 24" TO 56"-150#,3OO#)

120117 : FORGED FLANGES

CODE	NAME
18 . P2251	NEOSEAL ENGINNEERING PRIVATE LIMITED (1. Flange (Blind/WN), CS, Up To 36", ANSI Class -Up To 150#, 2. Flange (Blind/WN), CS, Up To 24", ANSI Class -Up To 2500#, 3.Flange (Blind/WN), AS, Up To 24", ANSI Class -Up To 1500#, 4. Flange (Blind/WN), SS,
19 . P2215	P K TUBES & FITTINGS PVT. LTD. (Upto 24" (upto 1500#) & upto 12" (upto 2500#) (Spectacle Blinds and Spacer & Blind only).)
20 . P2214	PARAMOUNT FORGE (CS, AS & SS: ½" to 42" (Upto 600#), ½" to 24" (Upto 900#), ½" to 16" (Upto 1500#), ½" to 12" (Upto 2500#))
21 . P2088	PERFECT MARKETING (P) LTD,
22 . P2008	PUNJAB STEEL
23 . P2155	R.D. FORGE (A UNIT OF R D CHEMICALS PVT LTD) (½" to 54" - 150#, ½" to 40" - 300#, ½" to 42" - 600#,½" to 20" - 900#, ½" to 20" - 1500#, ½ to 12" - 2500# (CS, AS & SS))
24 . P2210	RAJENDRA FORGE INDUSTRIES (CS & SS : Upto 12", 300#)
25 . P0733	S & G ENGINEERS (P) LTD.
26 . P2005	SANGHVI FORGINGS & ENGINEERING LTD. (Upto 42" (upto 300#), 36"(600#), 24"(upto1500#) & 12"(2500#))
27 . P2110	SANGHVI METALS (TRADER)
28 . P2280	SARDA PIPES & FITTINGS PVT. LTD. (1. Upto 16"/14" for CS/AS 300 # for Forged Flanges)
29 . P2004	SAWAN ENGINEERS PVT. LIMITED
30 . P2272	SKY FORGE PRIVATE LIMITED (1/2" to 20")
31 . P2185	TECHNO FORGE LTD. (Upto 42" (upto 300#), upto 24" (600#), upto 20" (900#), upto 16" (1500#), upto 12" (2500#))
32 . P2006	TUBE BEND (CALCUTTA) PVT LTD
33 . P2261	UNITED FORGE INDUSTRIES (Upto 30" 600# CS Forged Flanges)
FRANCE	
34 . P0834	ETS TROUVAY & CAUVIN

120117 : FORGED FLANGES

CODE	NAME
35 . P0629	PHOCEENNE
GERMANY	
36 . P0477	HORST KURVERS GmbH
ITALY	
37 . P0414	I.S. INTERNATIONAL
38 . P2083	MANTOVANI SpA
39 . P0599	OFFICINE NICOLA GALPERTI & FIGLIO S.P.A
40 . P2092	RACCORTUBI SRL
JAPAN	
41 . P0576	NICHINAN SANGYO CO. LTD.,
42 . P0587	NISHITANI & CO. LTD.
43 . P0575	SOJITZ CORPORATION
U.K.	
44 . P0870	VOMAL INTERNATIONAL LIMITED

120118 : PLATE RING FLANGES

CODE	NAME
INDIA	
1 . P2070	FABWELL ENGINEERS
2 . P2175	MAHESH INDUSTRIES (½" to 16" NB, Rating: 150# & 300#- SWRF, SORF & BLRF, Material: MS Plate Flanges of IS 2062 Grade)
3 . P1012	MOD FABRICATORS
4 . P2269	N J ENGINEERS (Upto 42")
5 . P2215	P K TUBES & FITTINGS PVT. LTD. (Upto 48" (Spectacle Blinds and Spacer & Blind only).)
6 . P2214	PARAMOUNT FORGE (CS & SS : ½" to 84")
7 . P2088	PERFECT MARKETING (P) LTD,
8 . P2011	R SQUARE ENGINEERS
9 . P2110	SANGHVI METALS (TRADER)
10 . P2272	SKY FORGE PRIVATE LIMITED (Upto 1385 MM)
11 . P2261	UNITED FORGE INDUSTRIES (Upto 36" 150# CS Plate Ring Flanges)

120119 : FITTINGS: CS/AS/SS WELDED

CODE	NAME
KOREA	
1 . P2238	TK CORPORATION
INDIA	
2 . P2227	PARAS ENGINEERING WORKS (8" to 36" NB, Sch 5 to Sch XXS (CS & SS))
3 . P2216	CHETAN STEELS (Upto 10" SCH 80)
4 . P2150	FIT-TECH INDUSTRIES (Upto 48")
5 . P2159	FLASH FORGE(P) LTD. (Upto 42")
6 . P2269	N J ENGINEERS (½" to 42" Welded)
7 . P2162	NAVKAR FORGINGS & FITTINGS PVT. LTD. (Upto 24" (Sch XXS, Material: CS only))
8 . P2251	NEOSEAL ENGINNEERING PRIVATE LIMITED (1. Fittings(Welded), CS, Up To 14", SCH -Up To 40, 2. Fittings(Welded), SS, Up To 14", SCH -Up To 10S)
9 . P2215	P K TUBES & FITTINGS PVT. LTD. (Upto 48" (SCH 160))
10 . P2187	PETROCHEM INDUSTRIES (6" to 36" (all Fittings) & 6" to 56" (Only Conc. / Ecc. Reducers) Sch : XXS/ 80S)
11 . P2210	RAJENDRA FORGE INDUSTRIES (CS & SS : Upto 12", Sch 40)
12 . P2280	SARDA PIPES & FITTINGS PVT. LTD. (1. Upto 14"/4"/4" for CS/AS/SS Welded Fittings)
13 . P2004	SAWAN ENGINEERS PVT. LIMITED (Upto 52" (SCH 160))
14 . P2165	TOPAZ PIPING INDUSTRIES (8" to 48" (Sch 10 to Sch 160))
15 . P2261	UNITED FORGE INDUSTRIES (Upto 36" SCH 40 for CS Welded Fittings)
ITALY	
16 . P2188	PETROL RACCORD S.P.A. (4" - 56" (Tees/ Reducers/ Elbows))

120120 : PIPE COATINGS

CODE	NAME
INDIA	
1 . P2174	PRATIBHA INDUSTRIES LTD., (External Coating: 4" to 24" Pipe OD)
2 . P2153	WELSPUN GUJARAT STAHL ROHREN LIMITED (DAHEJ) (4" to 64" for external coating & 16" to 64" for internal coating.)

120121 : CPVC PIPE AND PIPE FITTINGS

CODE	NAME
INDIA	
1 . P2278	ASHIRVAD PIPES PRIVATE LIMITED (Up to 10" SCH 80)

120205: SPRAY NOZZLE ASSEMBLY

CODE	NAME
INDIA	
1. P2229	CHEMTROLS SAMIL (INDIA) PVT. LTD.

120301 : GATE/GLOBE/CHECK VALVES CS/SS/AS < 900 Lbs

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Cast: Up to 42" (150#), 28" (300#), 24" (600#) & Forge:Upto 2" (800#))
2 . P2052	ADVANCE VALVES (2"- 80" (Upto 600#) (Dual Plate Check Valves only).)
3 . P0072	ASSOCIATED TOOLINGS (I) PVT. LTD. (½" to 2" (Rating upto : 800 #))
4 . P0077	AUDCO INDIA LIMITED(L&T VALVES DIVN.)
5 . P2136	AUTOCAP INDUSTRIES (1/2" to 2", 800 # (only CS & SS))
6 . P2060	BELL-O-SEAL VALVES PVT. LTD. (for zero leakage, hazardous fliuds.)
7 . P0115	BHEL (VALVES DIVISION)
8 . P2146	BRIGHTECH VALVES AND CONTROLS PVT. LTD. (Upto 8" x 300# for CS, AS & SS Material)
9 . P2117	CHEMTECH INDUSTRIAL VALVES PVT. LTD
10 . P2229	CHEMTROLS SAMIL (INDIA) PVT. LTD. (Upto 12" - 150-# (Dual Plate Check Valves only))
11 . P2137	CRAWLEY & RAY (FOUNDERS & ENGINEERS) PVT. LTD (<=300 # (only CS))
12 . P0194	DATRE CORPORATION LTD. (Upto 300#, 2-8 "(Gate),2-6"(Globe&Check))
13 . P0202	DEWRANCE MACNEILL & CO. LTD.
14 . P0224	ECONO VALVES PVT.LTD.
15 . P2118	EXPERT ENGINEERING ENTERPRISES (Forged: upto 2"- 800#; Gate & Globe Valve: upto12"- 150# & 300#; Check Valve: upto 32"- 150# & 300#)
16 . P0273	FLOCON SYSTEMS PVT. LTD. (CS upto 6" 150#)
17 . P2248	FLOTEK INDUSTRIES (1. Gate [CAST] -CS, Upto 30", ANSI Class -Upto 300 # 2. Gate [CAST]-AS/SS, Upto 16", ANSI Class -Upto 600 # 3. Globe [CAST] -CS,Upto 14", ANSI Class-Upto 600 # 4.Check [SWING] -CS/AS, Upto 12", Upto 600# 5.Check [DUAL

120301 : GATE/GLOBE/CHECK VALVES CS/SS/AS < 900 Lbs

CODE	NAME
18 . P2172	FLOVEL VALVES PVT. LTD. (Single Disc, Dual Plate & Nozzle Check Valves only: Upto 48" (150#) & 24" (upto 600#))
19 . P2277	FLOWJET VALVES PVT. LTD. (Gate [CAST], CS, Up to 36"- 300#, Gate/Globe/Check [CAST] ,CS/SS/AS, Up to 18"- 600# & Check [SWING], CS, Up to 30"- 150#, Gate/Globe/Check Valve, CS/SS/AS, Up to 2"- 800#)
20 . P2219	FLUIDTECH EQUIPMENT PVT. LTD. (Cast# (CS and SS): 2" to 12" 150# & 2" to 8" 300# and Forged (CS and SS) ½" to 2" (800#))
21 . P2114	FORWARD ALLOYS & CASTINGS (upto 14")
22 . P2254	G M VALVE PVT. LTD. (Item - FORGED, Material- CS/SS/AS, Size-2", ANSI Class - Upto 800 #)
23 . P2145	GURU INDUSTRIAL VALVES PVT. LTD. (Cast CS only: Upto 24"(150#), 20"(300#), 10"(600# & Forged: Upto 2" (800#))
24 . P2218	HAWA ENGINEERS LTD. (Gate Valve:Upto 40" (150#),Upto 26"(300#),Upto 24"(600#),Upto 2" (800#); Globe Valve:Upto 20"(150#),Upto 16" (300#),Upto 12"(600#),Upto 2"(800#); Check Valve:Upto 36" (150#),Upto 24"(300#),Upto 16"(600#),Upto 2" (800#) (Dual Plate:36" (150#
25 . P2013	HAWA VALVES INDIA PVT. LTD. (CS upto 6",150#)
26 . P0897	HI-TECH VALVES PVT. LTD. (CS,<=800# size 1/2"-2", <=300# for size 2"-6)
27 . P0404	INTERVALVE POONAWALLA LIMITED (Cast upto 24" (Upto 300#) & Upto 12" (600#), Forged: Upto 2" (800#))
28 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Cast: Upto 48" (150#), 24" (upto 600#) & Forged: Upto 2" (800#))
29 . P0451	KIRLOSKAR BROTHERS LIMITED (CS upto 12" size, 300#)
30 . P0473	KSB PUMPS LIMITED (VALVES DIVN)
31 . P1101	LARSEN & TOUBRO LIMITED (1/2" to 24")
32 . P0487	LEADER VALVES LIMITED (Casting<=20"- upto 600# & 30"-150#, Forging<=2"- upto 800#)
33 . P2082	M.H. VALVES PVT. LTD. (1/2" to 1 1/2" - 800#, 2"to 6"- 600#)
34 . P2147	MICON ENGINEERS (HUBLI) PVT. LTD. (Cast : Upto 12" (150# & 300#), 6" (600#) & Forged: Upto 2" (800#))

120301 : GATE/GLOBE/CHECK VALVES CS/SS/AS < 900 Lbs

CODE	NAME
35 . P0094	MICROFINISH VALVES PVT. LTD.
36 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 24" rating upto 600#)
37 . P0590	NITON VALVE INDUSTRIES PVT. LTD. (Forging upto 800#, <= 1.5" size)
38 . P2279	NOVEL VALVES INDIA PVT. LTD. (1. Gate/Globe - CS/AS/SS, Up to 30" 300 # 2. Gate/Globe/Check - CS/AS/SS, Up to 6" 600 # & 3. check [dual plate] - CS/AS/SS , Up to 12" 300 #)
39 . P2164	NSSL LIMITED (Cast: Upto 80"(150#), 56"(Upto 600#) & Forged: Upto 2" (800#))
40 . P1207	NUTECH CONTROLS (Gate/Check Valve (CS) Up to 12", ANSI Class up to 300#, Globe valve (CS) Up to 10", ANSI Class up to 300#, Gate/Globe/Check Valve (SS/AS) Up to 8", ANSI Class up to 300# & Gate/Globe/check valve (CS/SS/AS) Up to 2", ANSI Class up to
41 . P2041	OSWAL INDUSTRIES LTD. (Upto 48" (150#), 32" (300#) & 24" (600#))
42 . P2096	S & M INDUSTRIAL VALVES LIMITED (CS Gate & Globe valves 2"- 24" <=300#)
43 . P2249	SAKHI ENGINEERS PVT. LTD. (1. CS/AS/SS, upto 16" , ANSI Class upto 150# 2.CS/AS/SS, upto 12", ANSI Class upto 300)
44 . P1204	SAP Industries Limited (Up to 14")
45 . P2204	SHALIMAR VALVES PVT. LTD. (Cast: Upto 24"(Upto 600#), Forged: ½" to 1½" (800#))
46 . P0731	SHREERAJ INDUSTIRES (CS upto 150#)
47 . P2097	STEEL STRONG VALVES (I) PVT. LTD (Upto 42")
48 . P1206	VALVE TECH INDUSTRIES (<900 LBS (UPTO 24" 600# FOR CS, UPTO 12" 300# FOR SS/AS))
49 . P2014	VENUS PUMP & ENGINEERING WORKS
50 . P2144	VIBA FLUID CONTROL ((1) Gate/Globe/Check Valves (Cast), CS/AS/SS, Size- Up to 14", and Up to 12", 600# (2) Gate/Globe/Check Valves (Forged), CS/SS, Size- Up to 1.5", 800#)
51 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Cast: Upto 36" (150#), 24" (300#), 12" (600#) & Forged: Upto 2"(800#))

120301 : GATE/GLOBE/CHECK VALVES CS/SS/AS < 900 Lbs

CODE	NAME
52 . P2149	ZED VALVES CO. PVT. LTD. (Upto 14" (600#))
53 . P2135	ZOLOTO INDUSTRIES (40mm to 200mm (Only CS & SS))
CANADA	
54 . P0857	VELAN INC. (Size upto 48" (Rating upto 600#))
CHINA	
55 . P2173	BOTELI VALVE GROUP CO. LTD. (Cast: Upto 56" (150#), 36" (300#), 24" (600#) & Forged: Upto 2" (800#))
56 . P2080	Zhejiang Jiehua Valve Co.,Ltd .
GERMANY	
57 . P2016	PEMTO VALVE
INDIA	
58 . P2263	INTEGRAL PROCESS CONTROLS INDIA PVT. LTD. (1.Gate(cast),CS, Upto24", Upto150#, 2.Gate(cast), CS, Upto16", Upto600#, 3.Globe(cast), CS, Upto10", Upto300#, 4.Gate/Globe/Check Valve(cast), CS/SS, Upto8", Upto300#, 5.Check (Swing), CS, Upto18",
ITALY	
59 . P0150	CESARE BONETTI SPA (Cast: Upto 42" (Upto 300#), 24" (600#) & Forged: Upto 1 ½" (800#))
60 . P0253	FASANI S.P.A.
61 . P2179	FRIULCO SPA (Upto 48" (150#), 32" (Upto 600#))
62 . P0476	GTC ITALIA, S.R.L.
63 . P2083	MANTOVANI SpA
64 . P0603	OMB S.P.A.
65 . P0628	PETROL VALVES S.R.L
JAPAN	

120301 : GATE/GLOBE/CHECK VALVES CS/SS/AS < 900 Lbs

CODE	NAME
66 . P0520	MATSURA H. P MACHINE WORKS CO.LTD.,
67 . P0587	NISHITANI & CO. LTD.
68 . P0575	SOJITZ CORPORATION
NETHERLAND	
69 . P2093	REDPOINT ALLOYS BV
SPAIN	
70 . P0083	BABCOCK BORSIG ESPANA, S.A.
71 . P2201	POYAM VALVES, (AMPO S. COOP.) (Size upto 60"(Rating upto 800#))
72 . P2015	WALTHAN & WEIR
U.A.E.	
73 . P0764	SUFA LIMITED
U.K.	
74 . P0097	BEL VALVES
UAE	
75 . P2273	NEWAY VALVE (SUZHOU) CO., LTD. (Cast: upto 88" (150#), Upto 48" (300#), Upto 40" (600#), Forge: Upto 2" (800#))

120302 : GATE/GLOBE/CHECK VALVES CS/SS/AS >=900 Lbs

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Cast: Upto 24" (900# & 1500#), 8" (2500#) & Forge: Upto 2" (Upto 2500#))
2 . P2052	ADVANCE VALVES (2"- 36" (900#), 2" - 24" (1500#), 2" -12" (2500#) Dual Plate Check Valves only.)
3 . P0072	ASSOCIATED TOOLINGS (I) PVT. LTD. (½" to 2" (Rating: 900# & 1500#))
4 . P0077	AUDCO INDIA LIMITED(L&T VALVES DIVN.)
5 . P0115	BHEL (VALVES DIVISION)
6 . P2248	FLOTEK INDUSTRIES (1. Gate [CAST]-CS/AS, Upto 6", ANSI Class -Upto 2500 # 2.Globe [CAST]-CS/AS, Upto 4", ANSI Class -Upto 1500 # 3.Check [Swing]-CS/AS, Upto 10", ANSI Class -Upto 2500 # 4.GATE/GLOBE/CHECK VALVES [Forged]-CS/AS/SS, Upto 0.75", ANSI
7 . P2172	FLOVEL VALVES PVT. LTD. (Dual Plate Check Valves only: Upto 24" (900#))
8 . P2277	FLOWJET VALVES PVT. LTD. (Gate [CAST], CS/SS/AS, Up to 8"- 1500#, Gate/Globe/Check Valve , CS/SS/AS, Up to 2"- 2500# [FORGED])
9 . P2254	G M VALVE PVT. LTD. (Item -FORGED- CS/SS/AS, Size- Upto 2", ANSI Class- Upto 2500 #)
10 . P2218	HAWA ENGINEERS LTD. (Gate Valves: Upto 20" (900#), Upto 10" (1500# & 2500#); Globe Valves: Upto 8" (900# & 1500#), Upto 1" (2500#); Check Valves: Upto 10" (900#), Upto 6" (1500#), Upto 1" (2500#))
11 . P0404	INTERVALVE POONAWALLA LIMITED (Forged: Upto 2" (1500#))
12 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Cast: Upto 12" (upto 1500#), 10" (2500#) & Forged: Upto 2" (2500#))
13 . P0473	KSB PUMPS LIMITED (VALVES DIVN)
14 . P1101	LARSEN & TOUBRO LIMITED (1/2" to 2")
15 . P0487	LEADER VALVES LIMITED (Casting <= 12" - upto 2500#, Forging <= 2" - upto 2500#)
16 . P0533	METROPOLITAN INDUSTRIES (size=200mm, ratings=2500 lb)
17 . P2147	MICON ENGINEERS (HUBLI) PVT. LTD. (Forged: Upto 2" (1500#))

120302 : GATE/GLOBE/CHECK VALVES CS/SS/AS >=900 Lbs

CODE	NAME
18 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 24", rating upto 2500#)
19 . P2279	NOVEL VALVES INDIA PVT. LTD. (1. Gate/Globe - CS , Up to10", 900 # 2. Gate/Globe - CS, Up to3", 1500 # & 3. Check [SWING]- CS, Upto 8", 900 #)
20 . P2164	NSSL LIMITED (Cast: Upto 36" (900#), 24"(upto 2500#) & Forged: Upto 2"(upto 2500#))
21 . P1207	NUTECH CONTROLS (Gate/Globe/Check valve (CS/AS) Up to 2", ANSI Class up to 2500#)
22 . P2041	OSWAL INDUSTRIES LTD. (Upto 12" (900# &1500#))
23 . P2249	SAKHI ENGINEERS PVT. LTD. (CS/AS/SS, upto 4" ANSI Class upto 1500#)
24 . P2204	SHALIMAR VALVES PVT. LTD. (Cast: Upto 20"(900#), Forged: ½" to 1 ½" (1500#))
25 . P1206	VALVE TECH INDUSTRIES (>=900 LBS (UPTO 8" 2500# FOR CS, UPTO 8" 1500# FOR SS/AS))
26 . P2285	VALVE TECH INDUSTRIES ((i) UP TO 24", 2500#, CS/AS/SS GATE/GLOBE (CAST) VALVE (ii) UP TO 28", 2500#, CS/AS/SS CHECK (CAST) VALVE (iii) UP TO 2", 2500#, SS GATE/GLOBE (FORGED) VALVE)
27 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Cast: Upto 12" (Upto 2500#) & Forged: Upto 2"(1500#), 1"(2500#))
CANADA	
28 . P0857	VELAN INC. (Size upto 24" (Rating upto 2500#))
CHINA	
29 . P2173	BOTELI VALVE GROUP CO. LTD. (Cast: Upto 16" (upto 1500#) & 12" (2500#) & Forged: Upto 2" (1500# & 2500#))
30 . P2080	Zhejiang Jiehua Valve Co.,Ltd .
INDIA	
31 . P2263	INTEGRAL PROCESS CONTROLS INDIA PVT. LTD. (1. Gate(Cast), CS, Upto 16", Upto 900#, 2.Gate/Globe/Check Valve (Cast), CS/SS, Upto 4", Upto 1500#, 3.Gate/Globe/Check Valve (Cast), CS/SS, Upto 2", 800# to 2500#)
ITALY	
32 . P0103	BFE BONNEY FORGE VALVE LICENSEE

120302 : GATE/GLOBE/CHECK VALVES CS/SS/AS >=900 Lbs

CODE	NAME
33 . P0150	CESARE BONETTI SPA (Upto 24", (upto 2500#))
34 . P0253	FASANI S.P.A.
35 . P2179	FRIULCO SPA (Upto 32" (900#); 24" (1500#); 14" (2500#))
36 . P0476	GTC ITALIA, S.R.L.
37 . P0603	OMB S.P.A.
38 . P0628	PETROL VALVES S.R.L
39 . P2100	VALVITALIA SpA
JAPAN	
40 . P0520	MATSURA H. P MACHINE WORKS CO.LTD.,
41 . P0587	NISHITANI & CO. LTD.
SPAIN	
42 . P0083	BABCOCK BORSIG ESPANA, S.A.
43 . P2201	POYAM VALVES, (AMPO S. COOP.) (Size upto 30" (Rating upto 2500#))
U.A.E.	
44 . P0764	SUFA LIMITED
U.K.	
45 . P0097	BEL VALVES
UAE	
46 . P2273	NEWAY VALVE (SUZHOU) CO., LTD. (Cast: upto 24" (900# & 1500#), Upto 16" (2500#) & Forged Upto 2" (2500#))

120303 : BALL VALVES (SOFT SEATED)

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Up to 12" (Upto 600#))
2 . P2176	AIRA EURO AUTOMATION PVT. LTD. (Upto 6", Rating: 150# & 300#)
3 . P2056	AQUA VALVES PVT.LTD
4 . P2146	BRIGHTECH VALVES AND CONTROLS PVT. LTD. (4" x 150# for CS, AS & SS Material)
5 . P2117	CHEMTECH INDUSTRIAL VALVES PVT. LTD
6 . P2137	CRAWLEY & RAY (FOUNDERS & ENGINEERS) PVT. LTD (DN 25)
7 . P2163	DELVAL FLOW CONTROLS PRIVATE LIMITED (Upto12" (Upto 900#))
8 . P0273	FLOCON SYSTEMS PVT. LTD. (CS upto 6" 150#)
9 . P2017	FLOW CONTROL
10 . P2073	FLOWCHEM INDUSTRIES (upto 300# and upto 10")
11 . P2277	FLOWJET VALVES PVT. LTD. (Ball Valve(Cast), CS/SS, Up To 18"-150# & Ball Valve(Forged), CS, Up To 2" -800#)
12 . P2219	FLUIDTECH EQUIPMENT PVT. LTD. (Up to 4" (300#))
13 . P2114	FORWARD ALLOYS & CASTINGS (upto 900#)
14 . P2254	G M VALVE PVT. LTD. (1. Item- FORGED-CS, Size- Upto 2", ANSI Class- Upto 800 #, 2. Item - FORGED-- AS/SS, Size- Upto 1.25", ANSI Class- Upto 800 #)
15 . P2145	GURU INDUSTRIAL VALVES PVT. LTD. (Cast CS only: Upto 12"(Upto300#), 4" (Upto 900#) & Forged: Upto 2" (800#))
16 . P2218	HAWA ENGINEERS LTD. (Upto 16" (150# & 300#), Upto12" (600# & 900#))
17 . P0404	INTERVALVE POONAWALLA LIMITED (Forged: Upto 2" 800#, Cast: Upto 12" (Upto 300#))

120303 : BALL VALVES (SOFT SEATED)

CODE	NAME
18 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Upto 28" (upto 600#), 12" (900#, 1500#), 10" (2500#))
19 . P0473	KSB PUMPS LIMITED (VALVES DIVN) (CS upto 100DN,20 bar)
20 . P0487	LEADER VALVES LIMITED (Casting <= 6" - upto 600#, Forging <= 2" - upto 800#)
21 . P2228	MEVADA ENGINEERING WORKS PVT. LTD., MUMBAI (Upto 2" (800#), (Forged), Material: CS/AS/SS; Upto 14" (300#), Material: CS/AS/SS)
22 . P2147	MICON ENGINEERS (HUBLI) PVT. LTD. (Cast : Upto 6" (150# & 300#) & Forged: Upto 2" (800#))
23 . P0094	MICROFINISH VALVES PVT. LTD.
24 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 12", rating upto 600# and Upto 8", rating upto 2500#)
25 . P2279	NOVEL VALVES INDIA PVT. LTD. (1. Ball Valve -CS, Up To 14"-900# 2. Ball Valve -CS, Up To 10"-900# & 3. Ball Valve (Forged) -SS Up To 2" -2500#)
26 . P2164	NSSL LIMITED (Upto 12" (150# & 300#))
27 . P1207	NUTECH CONTROLS (Ball valve(CS) Up to 10", ANSI Class up to 150#, Up to 2", ANSI Class up to 900#)
28 . P2041	OSWAL INDUSTRIES LTD. (Upto 24" (150#, 300# & 600#))
29 . P2249	SAKHI ENGINEERS PVT. LTD. (1. [Soft Seated] CS, upto 10", ANSI Class upto 300# 2.[Soft Seated] SS, upto 3" ,ANSI Class upto 150#)
30 . P1204	SAP Industries Limited (Up to 16", rating 600#)
31 . P2204	SHALIMAR VALVES PVT. LTD. (Upto 18" (600#) Material: CS/AS/SS)
32 . P1206	VALVE TECH INDUSTRIES (UPTO 24" 600#)
33 . P2144	VIBA FLUID CONTROL ((1) Ball Valves CS/SS, Size- Up to 18", 150# (2) Ball Valves CS, Size- Up to 6", 300#)
34 . P0865	VIRGO ENGINEERS LTD. (Upto16" (Upto 600#))

120303 : BALL VALVES (SOFT SEATED)

CODE	NAME
35 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Cast: Upto 30" (150# & 300#); 20" NB (600#), 16" (900#), 12" (1500#) & Forged: Upto 2"(800#))
36 . P0264	XOMOX SANMAR LIMITED (FISHER XOMOX)
AUSTRIA	
37 . P0120	BHDT GMBH
CANADA	
38 . P0857	VELAN INC. (Size upto 16" (Rating upto 600#))
CHINA	
39 . P2173	BOTELI VALVE GROUP CO. LTD. (Upto 32" (150# & 300#), 30" (600#), 24" (900#))
40 . P2080	Zhejiang Jiehua Valve Co.,Ltd .
FRANCE	
41 . P0834	ETS TROUVAY & CAUVIN
GERMANY	
42 . P2186	PERRIN GmbH (Size upto 24" (Rating upto 2500#))
ITALY	
43 . P0150	CESARE BONETTI SPA (Cast: Upto 4" (150#) & Forged: Upto 1" (800#) Floating only)
44 . P2179	FRIULCO SPA (Upto 48" (150# & 300 #); 20" (Upto 1500#); 12" (2500#))
45 . P0476	GTC ITALIA, S.R.L.
46 . P2083	MANTOVANI SpA
47 . P0628	PETROL VALVES S.R.L
48 . P0631	PIBIVIESSE SRL (Upto 48", 600#)
SINGAPORE	

120303 : BALL VALVES (SOFT SEATED)

CODE	NAME
49 . P0568	METSO AUTOMATION
SPAIN	
50 . P2201	POYAM VALVES, (AMPO S. COOP.) (Size upto 42" (Rating Upto 2500#))
TAIWAN	
51 . P2007	HAITIMA CORPORATION
UAE	
52 . P2273	NEWAY VALVE (SUZHOU) CO., LTD. (Upto 2" (1500#), Upto 12" (900#), Upto 48" (600#))

120304 : BALL VALVES (METAL SEATED)

CODE	NAME
INDIA	
1 . P2176	AIRA EURO AUTOMATION PVT. LTD. (Upto 6", Rating: 150# & 300#)
2 . P2146	BRIGHTECH VALVES AND CONTROLS PVT. LTD. (4" x 150# for CS, AS & SS Material)
3 . P2163	DELVAL FLOW CONTROLS PRIVATE LIMITED (Upto12" (Upto 900#))
4 . P2277	FLOWJET VALVES PVT. LTD. (Ball Valve(Cast), CS/SS, Up To 8" -300#)
5 . P2145	GURU INDUSTRIAL VALVES PVT. LTD. (Cast CS only: Upto 12"(Upto300#), 4" (Upto 900#) & Forged: Upto 2" (800#))
6 . P2218	HAWA ENGINEERS LTD. (Upto 16" (150# & 300#), Upto12" (600# & 900#))
7 . P0404	INTERVALVE POONAWALLA LIMITED (Upto 12" (150#))
8 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Upto 28" (upto 600#), 12" (upto 1500#), 10" (2500#))
9 . P2147	MICON ENGINEERS (HUBLI) PVT. LTD. (Cast : Upto 6" (150# & 300#) & Forged: Upto 2" (800#))
10 . P0094	MICROFINISH VALVES PVT. LTD.
11 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 12", rating upto 600#)
12 . P2279	NOVEL VALVES INDIA PVT. LTD. (Ball Valve - 1. CS , Up To 10", 900# 2. CS, Up to 6", 1500#)
13 . P2164	NSSL LIMITED (Upto 12" (150# & 300#))
14 . P2041	OSWAL INDUSTRIES LTD. (Upto 24" (150#, 300#, & 600#))
15 . P1206	VALVE TECH INDUSTRIES (UPTO 16" 300#)
16 . P2285	VALVE TECH INDUSTRIES (UP TO 24", 300# CS BALL VALVE)
17 . P0865	VIRGO ENGINEERS LTD. (Upto16" (Upto 600#))

120304 : BALL VALVES (METAL SEATED)

CODE	NAME
18 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Cast: Upto 30" (150# & 300#); 20" NB (600#), 16" (900#), 12" (1500#) & Forged: Upto 2"(800#))
CANADA	
19 . P0857	VELAN INC. (Size upto 16" (Rating upto 600#))
CHINA	
20 . P2173	BOTELI VALVE GROUP CO. LTD. (Upto 32" (150# & 300#), 30" (600#), 24" (900#))
GERMANY	
21 . P2186	PERRIN GmbH (Size upto 24" (Rating upto 2500#))
ITALY	
22 . P2054	ALFA VALVOLE SrL
23 . P0150	CESARE BONETTI SPA (Upto 24" (150#) & 4" (Upto 1500#) Trunnion Mounted only)
24 . P2179	FRIULCO SPA (Upto 48" (150# & 300#); 20" (Upto 1500#); 12" (2500#))
25 . P0594	GE POWER (NUOVO PIGNONE SPA)
26 . P0476	GTC ITALIA, S.R.L.
27 . P0628	PETROL VALVES S.R.L
28 . P0631	PIBIVIESSE SRL (Upto 48", 600#)
29 . P2100	VALVITALIA SpA
NETHERLAND	
30 . P2093	REDPOINT ALLOYS BV
SINGAPORE	
31 . P0568	METSO AUTOMATION

120304 : BALL VALVES (METAL SEATED)

CODE	NAME
32 . P0606	ORBIT VALVES PLC
SPAIN	
33 . P2201	POYAM VALVES, (AMPO S. COOP.) (Size upto 42" (Rating Upto 2500#))
UAE	
34 . P2273	NEWAY VALVE (SUZHOU) CO., LTD. (Upto 2" (1500#), Upto 12" (900#), Upto 48" (600#))

120305 : BUTTERFLY VALVES

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Upto 48" (150#))
2 . P2052	ADVANCE VALVES (2" - 120" (Upto 150#), 2" - 80" (Upto 900#))
3 . P2176	AIRA EURO AUTOMATION PVT. LTD. (Upto 48", Rating: Upto 300#)
4 . P0077	AUDCO INDIA LIMITED(L&T VALVES DIVN.)
5 . P2018	BDK PROCESS CONTROLS PVT. LTD. (upto 1600mm)
6 . P2117	CHEMTECH INDUSTRIAL VALVES PVT. LTD
7 . P2137	CRAWLEY & RAY (FOUNDERS & ENGINEERS) PVT. LTD (40mm - 1000mm)
8 . P2163	DELVAL FLOW CONTROLS PRIVATE LIMITED (Upto 24" (Upto 300#))
9 . P0273	FLOCON SYSTEMS PVT. LTD. (CS upto 12" 150#)
10 . P2248	FLOTEK INDUSTRIES (1. Triple Offset, Material - CS/AS, Upto 18", ANSI Class -Upto 300 # 2. Double Offset & Concentric-CS, Upto 36", ANSI Class -Upto 150 #)
11 . P2277	FLOWJET VALVES PVT. LTD. (Butterfly Valves, CS, Up to 42"-150#)
12 . P2219	FLUIDTECH EQUIPMENT PVT. LTD. (Up to 12" (300#))
13 . P0281	FOURESS ENGINEERING (I) LTD.
14 . P2218	HAWA ENGINEERS LTD. (2" to 48" (PN10/PN16/150#/300#))
15 . P2013	HAWA VALVES INDIA PVT. LTD. (CS upto 6", 150#)
16 . P2134	HI-TECH BUTTERFLY VALVES INDIA PVT. LTD. (<300#,<30"(Teflon/Rubber) ,<72"(Metal))
17 . P0400	INSTRUMENTATION LTD. (PALAKKAD)

120305 : BUTTERFLY VALVES

CODE	NAME
18 . P0404	INTERVALVE POONAWALLA LIMITED (Upto 72" (150#) & Upto 16" (300#))
19 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Upto 20" (150#) & 10" (300#))
20 . P1101	LARSEN & TOUBRO LIMITED (1/2" to 24")
21 . P0487	LEADER VALVES LIMITED (size <=16" - 150#)
22 . P0519	MATHER & PLATT (INDIA) LTD. (A Subsidiary of WILO SE German (upto DN 1600,PN10 Double flange type)
23 . P0533	METROPOLITAN INDUSTRIES (size=2000mm)
24 . P2147	MICON ENGINEERS (HUBLI) PVT. LTD. (Upto 24" (PN10 & PN16))
25 . P2279	NOVEL VALVES INDIA PVT. LTD. (1. CS, Up to 48"150# & 2. AS, Up to 8" 150#)
26 . P2284	OMVAL CONTROLS PRIVATE LIMITED (CS, UP TO 24" UP TO 150#)
27 . P2249	SAKHI ENGINEERS PVT. LTD. (1. upto 6", ANSI Class upto 150#)
28 . P1204	SAP Industries Limited (Up to 32", rating PN10, Up to 18", rating 150#)
29 . P1206	VALVE TECH INDUSTRIES (UPTO 48" 300# & UPTO 24" 600#)
30 . P2014	VENUS PUMP & ENGINEERING WORKS (upto 600NB,150#)
31 . P0865	VIRGO ENGINEERS LTD. ((Triple Offset only): 3" to 24", Upto 600# (CS/SS))
32 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Upto 56" (Upto 250#); 24" (300#))
33 . P0264	XOMOX SANMAR LIMITED (FISHER XOMOX)
JAPAN	
34 . P2200	TOMOE VALVE CO. LTD. (Upto 48" (150# & 300#), Upto 24" (600#, 900# & 1500#))

120305 : BUTTERFLY VALVES

CODE	NAME
AUSTRIA	
35 . P0120	BHDT GMBH
CANADA	
36 . P0857	VELAN INC. (Size upto 48" (Rating upto 600#))
CHINA	
37 . P2173	BOTELI VALVE GROUP CO. LTD. (36" (150# & 300#))
38 . P2080	Zhejiang Jiehua Valve Co.,Ltd .
FRANCE	
39 . P2076	GRISS SAPAG INDUSTRAIL VALVES
GERMANY	
40 . P2051	ADAMS ARMATUREN
ITALY	
41 . P0476	GTC ITALIA, S.R.L.
TAIWAN	
42 . P2007	HAITIMA CORPORATION
U.K.	
43 . P0489	LEEDS VALVE LTD
U.K	
44 . P2101	WEIR VALVES & CONTROLS DIVISION.
U.S.A.	
45 . P2068	CURTIS WRIGHT FLOW CONTROL CORPOARATION
46 . P0679	EMERSON PROCESS MGT

120305 : BUTTERFLY VALVES

CODE	NAME
47 . P0488	LEAR SIEGLER MEAS. CTRLS. CORP.
48 . P0174	SPX VALVES & CONTROLS (COPES-VULCAN LTD)
49 . P0889	TYCO INTERNATIONAL INC.,U.S.A.
50 . P2102	XOMOS(CRANE CO)
UAE	
51 . P2273	NEWAY VALVE (SUZHOU) CO., LTD. (Upto 56" (600#))

120307 : SAMPLING VALVES/ NEEDLE VALVES

CODE	NAME
INDIA	
1 . P0072	ASSOCIATED TOOLINGS (I) PVT. LTD. (½" to 1-1/2" (Rating: 800#))
2 . P2117	CHEMTECH INDUSTRIAL VALVES PVT. LTD
3 . P0248	EXCELSIOR ENGG WORKS
4 . P2118	EXPERT ENGINEERING ENTERPRISES (Upto 12" - 150# & 300#)
5 . P2248	FLOTEK INDUSTRIES (Needle Valve- SS, Upto 0.5-0.75", ANSI Class -Upto 800-2500 #)
6 . P0487	LEADER VALVES LIMITED (size <= 1 1/2" - 800#)
7 . P0792	TECNOMATIC (INDIA) PVT. LTD.
8 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Upto 50 mm size (Upto 2500#))
UAE	
9 . P2273	NEWAY VALVE (SUZHOU) CO., LTD. (Upto 1" (2500#))

120308 : PLUG VALVES (NON LUBRICATED)

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Upto 20" (150#) (CS & SS))
2 . P0077	AUDCO INDIA LIMITED(L&T VALVES DIVN.)
3 . P2177	AZ ARMATUREN GMBH (½" NB to 20" NB, 150#, 300#, 600# (Matl. CS, SS & AS))
4 . P2018	BDK PROCESS CONTROLS PVT. LTD.
5 . P2117	CHEMTECH INDUSTRIAL VALVES PVT. LTD
6 . P2229	CHEMTROLS SAMIL (INDIA) PVT. LTD. (Upto 12" - 150# & 300#)
7 . P2137	CRAWLEY & RAY (FOUNDERS & ENGINEERS) PVT. LTD (DN 200)
8 . P2219	FLUIDTECH EQUIPMENT PVT. LTD. (Up to 4" (300#))
9 . P2145	GURU INDUSTRIAL VALVES PVT. LTD. (Cast CS only: Upto 12"(Upto300#), 4" (Upto 900#) & Forged: Upto 2" (800#))
10 . P2218	HAWA ENGINEERS LTD. (½" to 8" (150#))
11 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Upto 12" (upto 300#))
12 . P1101	LARSEN & TOUBRO LIMITED (1/2" to 24")
13 . P0487	LEADER VALVES LIMITED (size <= 6" - upto 300#)
14 . P1204	SAP Industries Limited (Up to 12", rating 150#)
15 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Upto 16"(150#), 12" (300#), 3" (600#))
16 . P0264	XOMOX SANMAR LIMITED (FISHER XOMOX)
CHINA	

120308 : PLUG VALVES (NON LUBRICATED)

CODE	NAME
17 . P2080	Zhejiang Jiehua Valve Co.,Ltd .
ITALY	
18 . P0612	O.M.S. SALERI DI SALERI P & FIGLI S.M.C.
SPAIN	
19 . P2201	POYAM VALVES, (AMPO S. COOP.) (Upto 30" (Upto 900#) for Lift Plug valves only.)

120309 : PLUG VALVES (LUBRICATED)

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Upto 20" (150#) (CS & SS))
2 . P0077	AUDCO INDIA LIMITED(L&T VALVES DIVN.)
3 . P2018	BDK PROCESS CONTROLS PVT. LTD.
4 . P2139	ECONO VALVES PVT. LTD. (<=8"(150-300#), <=1-1/2" (<=800#))
5 . P2219	FLUIDTECH EQUIPMENT PVT. LTD. (Up to 4" (300#))
6 . P2145	GURU INDUSTRIAL VALVES PVT. LTD. (Cast CS only: Upto 12"(Upto300#), 4" (Upto 900#) & Forged: Upto 2" (800#))
7 . P2218	HAWA ENGINEERS LTD. (½" to 8" (150#))
8 . P2161	JC VALVES & CONTROLS INDIA PVT. LTD. (Upto 12" (upto 300#))
9 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Upto 8" (125#))
CHINA	
10 . P2080	Zhejiang Jiehua Valve Co.,Ltd .
ITALY	
11 . P2108	DELTA VALVES EUROPE
12 . P0612	O.M.S. SALERI DI SALERI P & FIGLI S.M.C.
SPAIN	
13 . P0083	BABCOCK BORSIG ESPANA, S.A.

120311 : DIAPHRAGM VALVES / RUBBER LINED CHECK VALVES

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Upto 12" (125#))
2 . P0029	AKAY INDUSTRIES PVT LTD
3 . P2018	BDK PROCESS CONTROLS PVT. LTD. (upto 150#, 6 mm to 350mm)
4 . P2117	CHEMTECH INDUSTRIAL VALVES PVT. LTD
5 . P2137	CRAWLEY & RAY (FOUNDERS & ENGINEERS) PVT. LTD (25 NB to 200 NB)
6 . P2218	HAWA ENGINEERS LTD. (½" to 8" (PN10))
7 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Upto 14" (PN16))

120312 : CAST IRON VALVES

CODE	NAME
INDIA	
1 . P0003	A V VALVES LIMITED (Upto 48" (125#))
2 . P0182	CRAWLEY & RAY (F&E) PVT. LTD. (Buttterfly)
3 . P2219	FLUIDTECH EQUIPMENT PVT. LTD. (Up to 24" (PN 1.0 & PN 1.6))
4 . P2074	GEETA ENGINEERING WORKS
5 . P0451	KIRLOSKAR BROTHERS LIMITED (sluice,gate,butterfly valves PN1 & PN1.6)
6 . P0487	LEADER VALVES LIMITED (size <= 24" upto PN16 rating)
7 . P2096	S & M INDUSTRIAL VALVES LIMITED (ONLY GATE & GLOBE VALVES,50mm -600mm,125#)
8 . P1204	SAP Industries Limited (Up to 12", rating 150#)
9 . P2014	VENUS PUMP & ENGINEERING WORKS (sluice<900mm,Diphragm,<300mm,stop<500mm)
10 . P0093	WEIR BDK VALVES (A UNIT OF WEIR INDIA PVT. LTD.) (Upto 12" (PN6))

120313 : PVC/CPVC VALVES

CODE	NAME
INDIA	
1 . P2058	ASTRAL POLYTECHNIK PVT. LTD. (SIZE 1/2"-6",BUTTERFLY VALVE UPTO 24")
2 . P2096	S & M INDUSTRIAL VALVES LIMITED (32mm - 80mm Size)

120401 : ASBESTOS/RUBBER GASKETS

CODE	NAME
INDIA	
1 . P0256	FERROLITE JOINTINGS (P) LTD. (Asbestos,CAF only)
2 . P0294	GASKETS (INDIA) PVT. LTD. (Asbestos,CAF only)
3 . P2112	GOODRICH GASKET PVT. LTD. (upto 24")
4 . P0350	HINDUSTAN ASBESTOS & ALLIED PRODUCTS
5 . P0354	HINDUSTAN COMPOSITES LIMITED
6 . P2079	HINDUSTAN FERREDO LTD.
7 . P0373	IGP ENGINEERS LIMITED
8 . P0501	MADRAS INDUSTRIAL PRODUCTS (upto 48")
9 . P0525	MECHANICAL PACKING INDUSTRIES LTD.,
10 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 80", rating 150# (Only Rubber Gaskets))
11 . P0614	PACKINGS & JOINTINGS (P) LTD.
12 . P2088	PERFECT MARKETING (P) LTD,
13 . P2090	PRASHANT ENGG STORES
14 . P0663	REINZ TALBROS PRIVATE LIMITED
15 . P0745	SPIRASEAL GASKETS PVT. LTD. (CAF & Teflon)
16 . P2115	STARFLEX SEALING INDIA PVT. LTD.
17 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)

120401: ASBESTOS/RUBBER GASKETS

	CODE	NAME
18.	P2184	UNIQUE INDUSTRIAL PACKINGS PVT. LTD.

120402 : SPIRALLY WOUND GASKETS

CODE	NAME
INDIA	
1 . P0294	GASKETS (INDIA) PVT. LTD.
2 . P2112	GOODRICH GASKET PVT. LTD. (up to 24")
3 . P0373	IGP ENGINEERS LIMITED (10 to 3550mm size, 150#-2500# for exch gskt)
4 . P0501	MADRAS INDUSTRIAL PRODUCTS (upto 52")
5 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 84", rating upto 150# and upto 30" rating upto 600#)
6 . P0614	PACKINGS & JOINTINGS (P) LTD.
7 . P2088	PERFECT MARKETING (P) LTD,
8 . P2090	PRASHANT ENGG STORES
9 . P0745	SPIRASEAL GASKETS PVT. LTD. (SS upto 12" & 150#)
10 . P2115	STARFLEX SEALING INDIA PVT. LTD.
11 . P2123	THE BENGAL MILL STORES SUPPLY CO.(TRADER)
12 . P2184	UNIQUE INDUSTRIAL PACKINGS PVT. LTD. (Upto 42"(600#) & Upto 24" (2500#))
CHINA	
13 . P2080	Zhejiang Jiehua Valve Co.,Ltd .

120403 : LENS GASKETS & RING JOINT (METALLIC)

CODE	NAME
INDIA	
1 . P0294	GASKETS (INDIA) PVT. LTD.
2 . P2112	GOODRICH GASKET PVT. LTD. (0.5" to 24")
3 . P0373	IGP ENGINEERS LIMITED (150# - 2500#)
4 . P0501	MADRAS INDUSTRIAL PRODUCTS
5 . P0533	METROPOLITAN INDUSTRIES (3mm thickness , ratings=300 lb)
6 . P2243	NEOSEAL ENGINNEERING PRIVATE LIMITED (Upto 30", rating upto 900# and Upto 20" rating upto 2500#)
7 . P0614	PACKINGS & JOINTINGS (P) LTD.
8 . P2090	PRASHANT ENGG STORES
9 . P0745	SPIRASEAL GASKETS PVT. LTD.
10 . P2115	STARFLEX SEALING INDIA PVT. LTD.
11 . P2184	UNIQUE INDUSTRIAL PACKINGS PVT. LTD. (Ring Joint Gaskets only, Upto 16" (1500#))
AUSTRIA	
12 . P0120	BHDT GMBH
ITALY	
13 . P2083	MANTOVANI SpA

120405 : EXPANSION JOINTS & BELLOWS

CODE	NAME
INDIA	
1 . P0177	CORI ENGINEERS PVT. LTD. (For Rubbber)
2 . P0217	D.WREN & CO. (For Rubber & Fabric)
3 . P0269	FLEXATHERM EXPANLLOW PVT. LTD. (Circular: Upto 240", Rectangular: No bar for size, (Up to 600#))
4 . P0270	FLEXICAN BELLOWS & HOSES PVT. LTD.
5 . P0274	FLUIDYNE ENGINEERS (I) PVT. LTD. (Metallic Bellows upto 800 mm dia)
6 . P0443	KELD ELLENTOFT INDIA PVT. LTD. (For Fabric)
7 . P0498	LONESTAR INDUSTRIES
8 . P0530	MB METALLIC BELLOWS PVT. LTD.
9 . P2090	PRASHANT ENGG STORES
10 . P2259	RATNAFLEX ENGINEERING PRIVATE LIMITED (EXPANSION JOINTS / BELLOWS METALLIC - PIPING)
11 . P0752	STANDARD PRECISION BELLOWS
GERMANY	
12 . P2019	TUBOFLEX
ITALY	
13 . P0271	FLEXIDER S.P.A.

120406 : FASTENERS

CODE	NAME
INDIA	
1 . P0017	AEP COMPANY
2 . P0146	CAPITAL INDUSTRIES
3 . P2020	CONSOL ENGG. & FASTNERS INDUSTRIES
4 . P0221	EBY FASTNERS
5 . P0265	FIT TIGHT NUTS & BOLTS LTD.
6 . P0266	FIX FIT FASTENERS MFG. PVT. LTD.
7 . P2245	HEM INDUSTRIES (Upto 4")
8 . P2180	INDUSTRIAL ENGINEERING CORPORATION (Size upto 4" (M100))
9 . P2212	MEGA ENGINEERING PRIVATE LIMITED (½" to 3" Material: CS/AS/SS)
10 . P0532	METRO MECHANICAL PVT.LTD.
11 . P0559	NAGBHUSHANAM INDUSTRIES
12 . P0586	NIREKA ENGG. CO. PVT. LTD.
13 . P2021	PACIFIC FORGING & FASTENERS PVT. LTD. (M 10 to M125)
14 . P2088	PERFECT MARKETING (P) LTD,
15 . P2022	PIONEER NUTS & BOLTS PVT. LTD. (Up to 3.5")
16 . P0641	PRECISION AUTO ENGINEERS
17 . P0642	PRECISION ENGINEERING INDUSTRIES

120406 : FASTENERS

CODE	NAME
18 . P2257	PROCYON TECHNOLOGY (Upto 3.5")
19 . P0650	PTD FASTNERS PVT. LTD.
20 . P2110	SANGHVI METALS (TRADER)
21 . P0772	SUNDARAM FASTENERS LIMITED
22 . P2099	UDHERA FASTENERS

130208 : SUMP PUMPS

CODE	NAME
INDIA	
1 . P0029	AKAY INDUSTRIES PVT LTD
2 . P0095	BEACON WEIR LTD.
3 . P3002	FLOWSERVE INDIA CONTROLS PVT. LTD.
4 . P0455	KISHORE PUMPS PVT.LTD.
5 . P1302	RUHRPUMPEN INDIA PRIVATE LIMITED
6 . P1144	SAM TURBO INDUSTRY PRIVATE LTD. (Capacity - 550 m3/hr. Head - 35 mtr)

150404 : ELECTRIC HOISTS

CODE	NAME
INDIA	
1 . P3017	ELECON ENGG. CO. LTD.
2 . P0320	GREAVES LTD.
3 . P0344	HERCULES HOISTS LTD.
4 . P0361	HOIST-O-MECH.LTD.
5 . P0365	HOPES METAL INDUSTRIES(I) LTD.
6 . P2241	SAFEX ENERGY PVT. LTD.
7 . P3066	SAMCO ENGINEERING PVT. LTD (upto 20 tonnes capacity)
8 . P0704	SAYAJI IRON & ENGG.CO(P)LIMITED
9 . P0855	VAUGHAN BURN CRANE CO.LIMITED
10 . P0885	W.H. BRADY & CO. LIMITED

150405 : CHAIN PULLEY BLOCKS/CHAIN HOISTS

CODE	NAME
INDIA	
1 . P0091	BATLIBOI & CO. LTD.
2 . P0344	HERCULES HOISTS LTD.
3 . P3332	LIFTING EQPT.& ACCESSORIES LTD.
4 . P3333	LIGHT LIFT INDUSTRIES.
5 . P3335	MANGLA HOIST & HYDRAULICS LTD.
6 . P3355	REVA ENGG. INDUSTRIES LIMITED
7 . P2241	SAFEX ENERGY PVT. LTD.
8 . P3364	TRACTEL TIRFOR INDIA PVT.LIMITED
9 . P3373	W.H.BRADY & CO LTD.

Annexure-IX

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
AC CONTACTORS	1	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AC CONTACTORS	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AC CONTACTORS	3	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	TAKEN OVER BY SCHNEIDER
AC CONTACTORS	4	L01	LK (Formerly L&T)	Lauritz Knudsen Electrical & Automation A/600, SHIL – Mahape Road, TTC Industrial Area, MIDC Thane, Mumbai, Maharashtra 400710	Pranjal Tyagi, Pranjal.Tyagi@lk-ea.com, Mobile - 8976907537, Telephone: +91 22 69327800	
AC CONTACTORS	5	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000	
AC LOAD BREAK SWITCH	1	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AC LOAD BREAK SWITCH	2	L01	LK (Formerly L&T)	Lauritz Knudsen Electrical & Automation A/600, SHIL – Mahape Road, TTC Industrial Area, MIDC Thane, Mumbai, Maharashtra 400710	Pranjal Tyagi, Pranjal.Tyagi@lk-ea.com, Mobile - 8976907537, Telephone: +91 22 69327800	
AC LOAD BREAK SWITCH	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AC LOAD BREAK SWITCH	4	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687	
AC LOAD BREAK SWITCH	5	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
AC MCCB	1	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
AC MCCB	2	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
AC MCCB	3	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
AC MCCB	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
AC MCCB	5	L01	LK (Formerly L&T)	Lauritz Knudsen Electrical & Automation A/600, SHIL – Mahape Road, TTC Industrial Area, MIDC Thane, Mumbai, Maharashtra 400710	Pranjal Tyagi, Pranjal.Tyagi@lk-ea.com, Mobile - 8976907537, Telephone: +91 22 69327800	
AC MCCB	6	C02	CROMPTON GREAVES	RAIL TRANSPORTATION SYSTEMS,VANDANA BUILDING, 11, TOLSTOY MARG, TOLSTOY MARG, NEW DELHI, DL 110001	011 3041 6300	
AUXILIARY RELAYS	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
AUXILIARY RELAYS	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
AUXILIARY RELAYS	3	E1075	JYOTI LTD.	JYOTI LIMITED, E&CS DIVISION,3/15, BIDC, GORWA,VADODARA - 390 016, E-MAIL ID: ECS@JYOTI.COM	Ph. No.:+91-265-2281214 , Fax No.:+91-265-2281214	
AUXILIARY RELAYS	4	E1099	OEN INDIA LTD	29/1479, VYTILLA, COCHIN - 682 019 KERALA, INDIA	Phone : +91 484 2301132, 2303709 Fax : +91 484 2302287, 2302221 sales@oenindia.com	
AUXILIARY RELAYS	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
CABLE GLANDS	1	E1201	ALLIED TRADERS & EXPORTERS	C-124 A, SECTOR-2, NOIDA -201 301, UTTAR PRADESH, INDIA	Mr. Vijay Mohan Sood +(91)-(120)-2525694 +(91)-(120)-3052594 +(91)-(11)-23287156 vijay_mohansood@yahoo.com	
CABLE GLANDS	2	E1017	ARUP ENGG & FOUNDARY WORKS	391/119,PRINCE ANWAR SHAH ROAD, CALCUTTA-700068	033 2473 0850	
CABLE GLANDS	3	E1206	BALIGA LIGHTING EQPT.PVT.LTD.	63A,CP RAMASWAMY ROAD, ALWARPET,P.B.No 6910, CHENNAI-600018	44-24995505,22680990-4	
CABLE GLANDS	4	E1036	COMMET BRASS PRODUCTS	NUTAN CHEMICAL COMPOUND, WALBHAT ROAD, GOREGAON, MUMBAI-400063	91-022-26852961/62/63 comet@vsnl.net	
CABLE GLANDS	5	DW08	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD, GOREGOAN (EAST). MUMBAI 400 063.	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/ 022-29270878.	
CABLE GLANDS	6	E1044	ELECTROMAC INDUSTRIES	27/28AF NEW EMPIRE IND.ESTT., R.KRISHNA MANDIR RD.JB NGR ,ANDHERI(E),MUMBAI-400059	91-22-28324829 / 66919034 devang@electromacglands.com	
CABLE GLANDS	7	I01	INCAB	HARE STREET,KOLKATA,WEST BENGAL-700001	91-33-2480161/62/63/64 Fax : 91-33-2485766	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
CABLE LUGS	1	E1040	DOWELLS	M/S. DOWELLS ELECTRICALS 47/47A, SATGURU INDUSTRIAL ESTATE. OFF AAREY ROAD. GOREGOAN (EAST).	CEO : Mr. Jayantibhai S. Patel TEL: 022-32504770./022-29270876/	
CABLE LUGS	2	E1149	UNIVERSAL MACHINES LTD.	4,B.B.D.BAG (EAST) 90,STEPHEN HOUSE,5TH FLR CALCUTTA-700001	033 2282 2540	
GI CONDUITS	BIS APPROVED MAKE					
GI CONDUIT (EPOXY PAINTED)	BIS APPROVED MAKE					
FLEXIBLE CONDUIT (PVC COATED)	REPUTED MAKE					
CONTROL SWITCHES/ SELECTOR SWITCH	1	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687	
CONTROL SWITCHES/ SELECTOR SWITCH	2	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
CONTROL SWITCHES/ SELECTOR SWITCH	3	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479000	
CONTROL SWITCHES/ SELECTOR SWITCH	4	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
CONTROL SWITCHES/ SELECTOR SWITCH	5	SRC01	M/s Shrenik & Co.	39A/3, PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ-BAVLA ROAD, CHANGODAR,		
CONTROL SWITCHES/ SELECTOR SWITCH	6	RE05	RECOM PVT. LTD.	M/S RECOM PVT. LTD.,16A , 2ND FLOOR A, WING RAJ INDUSTRIAL COMPLEX, MILITARY	Mr. Chandrashekar Kamath (MD) : 09820249503	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	2	E1066	INDCOIL	PLOT NO. A- 150/ 151, 23RD U ROAD, WAGLE ESTATE, THANE WEST, CST RD, FRIENDS COLONY, HALLOW PUL, KURLA WEST, MUMBAI, MAHARASHTRA 400070	Phone:022 2583 8305	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	3	K18	KAPPA ELECTRICALS	KAPPA ELECTRICALS, KAPPA CONSOLIDATED PVT. LTD., 14, CART TRACK ROAD, MADUVANKARAI, CHENNAI - 600 042, INDIA.	PHONE: +91 - 44 - 22454709, 22454516, 22450794, 22450795 FAX: +91 - 44 - 22351662, 22451693 E-MAIL: mira@kappaelectricals.com sales@kappaelectricals.com	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	4	E1082	LOGICSTAT	B-160, INDUSTRIAL AREA, C BLOCK RD, OKHLA I, OKHLA INDUSTRIAL AREA, NEW DELHI, DL 110020	011 2681 0032	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	5	E1106	PRECISE ELECTRICALS	47A-49A,CHAKALA ROAD ANDHERI(E),MUMBAI-99 MUMBAI, MAHARASHTRA, INDIA PIN-400 099	022-8323402 / 022-8216433	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	6	E1128	UNILEC ENGINEERS PVT. LTD.	PLOT NO: R-247, T.T.C. INDUSTRIAL AREA, M.I.D.C , RABALE, NAVI MUMBAI- 400 701 INDIA	+91-22- 27607787 / 27607927 +91-22- 27607997	
CONTROL TRANSFORMER/ WINDING HEATING TRANSFORMER	7	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	FOR CONTROL TRANSFORMER ONLY
HRC FUSES	1	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
HRC FUSES	2	G01	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
HRC FUSES	3	L01	LK (Formerly L&T)	Lauritz Knudsen Electrical & Automation A/600, SHIL – Mahape Road, TTC Industrial Area, MIDC Thane, Mumbai, Maharashtra 400710	Pranjal Tyagi, Pranjal.Tyagi@lk-ea.com, Mobile - 8976907537, Telephone: +91 22 69327800	
HRC FUSES	4	C01	C&S ELECTRIC LTD.	222, OKHLA IND. ESTATE, PH-III, NEW DELHI-110020	011-3088 7520-29	
HRC FUSES	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 ;amit.bhadauria@siemens.com	
HRC FUSES	6	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
HRC FUSES	7	S02	SPACEAGE SWITCHGEARS LTD.	68 & 13-A INDUSTRIAL DEVELOPMENT COLONY, MEHRAULI ROAD GURGAON, HARYANA-122001	0124-2302711, 4085091	
HRC FUSES	8	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
HRC FUSES	9	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
HRC FUSES	10	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
GI WIRE & FLAT	1	I039	INDUSTRIAL PERFORATION (I) PVT.LTD.	MR. A. K. SAHA 327, R.N.GUHA ROAD, DUM DUM KOLKATA-West Bengal-India Phone-9830241788 Pincode : 700028 Email : ipipl@cal2.vsnl.net.in	011 2737 3579	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
GI WIRE & FLAT	2	I070	INDIA ELECTRICALS SYNDICATE	Mr. Suresh Kumar Agarwal 55, Ezra Street, Kolkata-West Bengal-India Phone- 033-22354047 Pincode : 700001 Email : cabletray@vsnl.com	022-28511704	
GI WIRE & FLAT	3	I072	INDMARK FORMTECH PVT. LTD.	Mr. Narendra R. Meher J Block, Plot No.-375, MIDC BHOSARI PUNE-MAHARASHTRA-INDIA Phone- 020-27130546 Pincode : 411026 Email : indmarkformtech@vsnl.net		
GI WIRE & FLAT	4	P039	PREMIER POWER PRODUCTS (CAL) PVT. LTD.	Chatterjee International Centre, 33A, Jawaharlal Nehru Road, 6th Floor, Suit No. - 11A, Kolkata,-West Bengal-India Phone- 9331008739 Pincode : 700071 Email : hemantdaga@dagaventures.com		
GI WIRE & FLAT	5	P050	PATNY SYSTEMS (P) LTD	PATNY PLAZA 160 , SARDAR PATEL ROAD SEUNDRABAD SECUNDRABAD-TELANGANA-INDIA Phone- 040-27902451 Pincode : 500003 Email : mr.mkt@patnysystems.com		
GI WIRE & FLAT	6	P079	PASSIVE INFRA PROJECTS PVT. LTD.	MR. VARUN AGRAWAL 182, VAISHALI, PITAMPURA Delhi-DELHI-INDIA Phone-9871183059 Pincode : 110088 Email : ATANU.SAHA@PASSIVEINFRA.COM		
GI WIRE & FLAT	7	R036	RUKMANI ELECTRICAL & COMPONENTS PVT LTD	11A , MAHARISHI DEBENDRA ROAD 1ST FL , ROOM NO.4 KOLKATA-WEST BENGAL-INDIA Phone- Pincode : 700007 Email : maruthikabra@gmail.com		
GI WIRE & FLAT	8	R037	RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	MR. G.D. SINGHEE/MR. MAHESH SINGHEE 26, P.K. TAGORE STREET, MAIN BUILDING KOLKATA-WEST BENGAL-INDIA Phone-9830177331 Pincode : 700006 Email : mahesh@ratans.com		
GI WIRE & FLAT	9	R041	RABI ENGINEERING WORKS PVT. LTD.	MR. TAPAN KUMAR SEN/MR. SIDDHARTHA 327, R.N. GUHA ROAD, DUM DUM, KOLKATA-WEST BENGAL-INDIA Phone- 9748753002 Pincode : 700028 Email : rabiengineering@gmail.com		
GI WIRE & FLAT	10	R200	RAJASTHAN METAL SMELTING CO.	Mr. R. K. Tibrewala D-80, Road No. 7, V.K.I.A., Jaipur-Rajasthan-India Phone- 0141-2332269 Pincode : 302013 Email : info@rmscoindia.com		
GI WIRE & FLAT	11	S210	SARAL INDUSTRIES	Mr. Y.K. Gupta L-1, L-2, Industrial Area-1 Sultanpur Road Rae Bareli-Uttar Pradesh-India Phone- 0535-2702474 Pincode : 229010 Email : saralindustries@gmail.com		
GI WIRE & FLAT	12		PARCO Engineers Pvt. Ltd.	401, skyline Epitom Building ,Near to Jolly Gym Khana, Kirol Road , Vidhyavihar, MH 400086 India		
GI WIRE & FLAT	13	U019	UNITECH FABRICATORS and ENGINEERS PVT LTD	INDRAPRASHTHA APARTMENT 24 , M.B.RAOD , BIRATI KALABAGAN KOLKATA KOLKATA-WEST BENGAL-INDIA Phone- Pincode : 700051 Email : ufepl@vsnl.net; ufepl@rediffmail.com	022 - 26230814	
JUNCTION BOXES (NON FLAME PROOF)	1	J01	JASPER ENGNIREES PVT. LTD.	A-23, SECTOR - 8, NOIDA-201301	0120-4033520/533	
JUNCTION BOXES (NON FLAME PROOF)	2	EC05	Electro Controls & Devices	M/S ELECTRO CONTROLS & DEVICES, F-41, SITE-C, SURAJPUR INDUSTRIAL AREA GREATER NOIDA, UTTAR PRADESH :201308	Mr. Sanjay Sharma (Chief Promoter) 0120-2569487, 2560100,2560300	
JUNCTION BOXES (NON FLAME PROOF)	3	SRC01	M/s Shrenik & Co.	39A/3, PANCHRATNA INDUSTRIAL ESTATE, SARKHEJ-BAVLA ROAD, CHANGODAR, AHMEDABAD – 382 213	020-026708100	
JUNCTION BOXES (NON FLAME PROOF)	4	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126	
JUNCTION BOXES (NON FLAME PROOF)	5	ACE01	Adroit Control Engineers Pvt.Ltd.	M/S ADROIT CONTROL ENGINEERS PVT.LTD. PLOT-3, KRISHNA INDL. AREA, SECTOR-25 FARIDABAD – 121004	011-47600700, 0129-4251400	
JUNCTION BOXES (NON FLAME PROOF)	6	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E-mail:d.gupta@pmipl-online.com ;admin@pmipl-online.com	
JUNCTION BOXES (NON FLAME PROOF)	7	MK01	MIKA ENGINEERS	BRANCH OFFICE : 'D'-101, DHEERAJ HERITAGE RESIDENCY II, SHASTRI NAGAR, SANTACRUZ (W), MUMBAI 400 054.	Director : Mr. Asgar Karimi Email: asgar@mikaengineers.com E-mail : mika@mtnl.net.inTelfax : 022-26610081/82/83/84Tel : 02527-249066/70 Cell : 099230 74373	TYPE-S ONLY

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
JUNCTION BOXES (NON FLAME PROOF)	8	PME-01	M/s PHOENIX MECANO LTD.,	388 BHARE, TALUKA MULSHI, POST GHOTAWADE, PIRANGOOT, INDUSTRIAL AREA, PUNE-412115	TEL.- +912066745000 Awasthi(09971119006) Tel: ++91 20 6674 5103, Mobile: +91 90499 95985, Fax: ++91 20 6674 5126 contact person : Vishwa bandhu E-mail:d.gupta@pmipl-online.com ;admin@pmipl-online.com	
JUNCTION BOXES (NON FLAME PROOF)	9	B05	BAJAJ ELECTRICALS	BAJAJ ELECTRICALS LTD. ENGINEERING & PROJECTS BU (NORTH) 3rd FLOOR, GULMOHARHOUSE, COMMUNITY CENTRE 161/B-4, GAUTAM NAGAR, YUSUF SARAI NEW DELHI – 110049	CONTACT PERSON : Mr. S. SREEMANY. SR. MANAGER (PROJECTS) CONTACT DETAILS : (+91) 9871025705. MAIL ID : srabans@bajajelectricals.com;	
JUNCTION BOXES (NON FLAME PROOF)	10	A03	AJMERA INDUSTRIES & ENGG. WORKS	AJMERA INDL. AND ENGG. WORKS. AJMERA HOUSE, A-61 / KHAIRANE MIDC. , TTC INDL. AREA, NAVI MUMBAI – 400705.	Tel : 022 27620299 / 97 / 96 'mail@ajmera.net	
JUNCTION BOXES (NON FLAME PROOF)	11	SB02	S.B. ELECTRICAL ENGINEERING CORPORATION	03, SARDAR GRIHA BUILDING, LOHAR CHAWAL, MUMBAI-400002	022- 22069831; 022-66637259	
JUNCTION BOXES (NON FLAME PROOF)	12	RT13	RITTAL INDIA PVT. LTD.	Espire Building ,Level -1 A-41, Mohan Co-Operative Industrial Estate ,Mathura Road, New Delhi -110044	Amit Bansal Phone: 011-42004000, D: 011-42004033 · Mobile: +91 9717772245 · mailto:amit.b@rittal-india.com www.rittal-india.com	
JUNCTION BOXES (NON FLAME PROOF)	13	HP08	HPL ELECTRIC AND POWER LTD.	Works Address: Village Shavella, PO:Jabli, Teh-Kasauli, Dist-Solan, Himachal Pradesh-173209	Mr. Ashwani Kumar mailto:'ashwani@hplindia.com' M:9971127370	
JUNCTION BOXES (FLAME PROOF)	1	SS01	SUDHIR SWITCHGEAR	305/6, APEEJAY HOUSE, 130, BOMBAY SAMACHAR MARG, MUMBAI - 400 023. INDIA	Telephone Nos. : 40460000 (100 lines) Fax Nos. : ++-91-22-22049381 Email : md@sudhirswitchgears.com ; works@sudhirswitchgears.com ;scud@vsnl.com	
LIGHTING FIXTURES (LED)	1	NE01	Neev Luminaries	B-6/3 Okhla Industrial Area | Phase-2| New Delhi | 110020	Phone: 011 40604830-31, M:8826995888 Fax: +91 11 4060 4831 info@neevenergy.in, Jitendra Sahu <jsahu@neevenergy.com>	
LIGHTING FIXTURES (LED)	2	HI01	HAVELLS INDIA LIMITED	QRG TOWERS , 2D SECTOR-126, NOIDA- 201301	GIRISH KUMAR SHRIVASTAVA +91-9810528922, girish.srivastava@havells.com\	
LIGHTING FIXTURES (LED)	3	B05	BAJAJ ELECTRICALS	BAJAJ ELECTRICALS LTD. ENGINEERING & PROJECTS BU (NORTH) 3rd FLOOR, GULMOHARHOUSE, COMMUNITY CENTRE 161/B-4, GAUTAM NAGAR, YUSUF SARAI NEW DELHI – 110049	CONTACT PERSON : Mr. S. SREEMANY. SR. MANAGER (PROJECTS) CONTACT DETAILS : (+91) 9871025705. MAIL ID : srabans@bajajelectricals.com;	
LIGHTING FIXTURES (LED)	4	SR01	SURYA ROSHNI LIMITED	1	011-25810093 ; 9810071832 (Akhilesh Agrawal) aagrawal@sroshni.com	
LIGHTING FIXTURES (LED)	5	P01	PHILIPS	9TH FLOOR,DLF 9B, DLF CYBER CITY, DLF PHASE-III,GURGAON-122002	01244606001, Sharad (+919871150447), Mr. Guruseelan M 8939693949, Mr Ashish Sethi 9007077089	
LIGHTING FIXTURES (LED)	6	HP01	M/S HPL ELECTRIC & POWER PVT. LTD	M/S HPL ELECTRIC & POWER PVT. LTD. PLOT NO. 76-B,PHASE-IV, SEC-57, HSIIDC, INDL. AREA , KUNDLI, DIST.- SONEPAT (HARYANA) - 131028	mohitsharma@hplindia.com, Mr. Nitesh Verma 8851036938, Mr Ajay lakra 9560045423	
LIGHTING FIXTURES (LED)	7	INS1	INSTA POWER	PLOT NO. - 457 PHASE - V, UDYOG VIHAR, GURGAON - 122016	124-4124000, Mr amit Bhardwar: 8800508090	
LIGHTING FIXTURES (LED)	8	PT13	Pyrotech Electronics Pvt. Ltd.	M/s Pyrotech Electronics Pvt. Ltd(Unit -1) Led Light, Sensor Division F-16A, Road No.3 Mewar Industrial Area, Madri Udaipur -313003, Rajasthan,	Concern Person – Mr. Praveen sisodiya : 9314310042(psisodia@pyrotechlighting.com) Ms Ritika 9509245814	
LIGHTING FIXTURES (LED)	9	HN13	M/s Halonix Technologies Limited	M/s Halonix Technologies Limited B-31 , Phase –II, Noida Distt. Gautam Budh Nagar (U.P.) Pin- 201305	Mr. Mohit Gautam ' 'Tel: +919568152111 'mohit.gautam@halonix.co.in'; M: 9891868793'rahul.singh@halonix.co.in'	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
LIGHTING FIXTURES (LED)	10	JA13	M/s JAQUAR & COMPANY PVT. LTD.	M/s JAQUAR & COMPANY PVT. LTD. Plot No.3 , Sector M-11, IMT Manesar. Gurgaon- 122050 Haryana	Mr. Dhruv Kumar ' 'Tel: +919350043727 dhruv.kumar@jaquar.com ; gaurav.bhalla@jaquar.com : 9582950282	
LIGHTING FIXTURES (LED)	11	CR13	M/s CROMPTON GREAVES CONSUMER ELECTRICALS LTD.	M/s CROMPTON GREAVES CONSUMER ELECTRICALS LTD.Tower-3, 1st Floor, East Wing Equinox Business Park LBS Marg, Kurla (West), Mumbai-400070	Mr S L Sivakumar 'Sivakumar L' <sivakumar.sl@crompton.co.in> M: 9176609363	
LIGHTING FIXTURES (LED)	12	WI13	M/s WIPRO ENTERPRISES PRIVATE LTD.	M/s WIPRO ENTERPRISES PRIVATE LTD. L-8, MIDC Waluj, Aurangabad-431136, Maharashtra, India	Mr Akhilesh Chouhan 'akhilesh.chouhan@wipro.com' M 9425072138	
LIGHTING FIXTURES (LED)	13	NI13	M/s Nessa Illumination Technologies Pvt. Ltd.	M/s Nessa Illumination Technologies Pvt. Ltd.36/A Devraj Industrial Park, Opp. Sameep Fabrics, Pipalaj Pirana Road, Piplaj, Ahmedabad	Mr. Dhaval Shah <dhaval@nessa.in> M 9825650354, Mr. Akshat Khare <akshat@nessa.in> M: 9016111723	
LIGHTING FIXTURES (LED)	14	FE13	M/s. Forus Electric Pvt. Ltd.	M/s. Forus Electric Pvt. Ltd. B-313, Okhla Industrial Area, Phase-1, New delhi-110020	Mr. Amit Bharadwaj <amit.bharadwaj@foruselectric.com> M 8800508090, Mr. Uttam Goyal <uttam@foruselectric.com> M: 8527652687	
LIGHTING FIXTURES (LED)	15	OE13	M/s. ORIENT ELECTRIC LIMITED.	C- 130, Sector-63, Noida-201301, Uttar Pradesh, D-209, Sector-63, Noida-201301, Uttar Pradesh	Birjendra Kumar Yadav <birjendra.yadav@orientelectric.com> P. +91-120-4894900 , +91-9599848491	
LIGHTING FIXTURES (LED)	16	ME13	M/s Mika Engineers	Survey no. 47, shed no. 2, AGHAI, Shahpur-wada road, AGHAI Thane, Maharashtra-421601	''deepak'' <deepak@mikaengineers.com>MOB: 8976737543	
LIGHTING FIXTURES (LED)	17	KI13	M/s Kalingia Illuminaton Pvt Ltd.	15/3/2 SITE-IV SAHIBABAD INDUSTRIAL AREA GHAZIABAD UP 201010	Suresh Shiromani' <suresh.shiromani@kalingialights.com>, 'info@kalingialights.com', 'kalingialights@gmail.com'	
LIGHTING FIXTURES (LED)	18	LL13	Ledure Lightings Limited	Registered Office Address: 115, First Floor, Devika Tower Nehru Place, New Delhi - 110091 Works Address: A-40, Sector-58, Noida, Gautam Buddha Nagar, Uttar Pradesh -201301	Mr. Umang Aggarwal Email ID: tenders@ledure.com; Ph. No.: 9313370712	
LIGHTING FIXTURES (LED)	19	LL13	M/S SHAKTI INDUSTRIES	Works Address: PLOT NO. 94-I, SECTOR-6A,IIE,SIDCUL,HARIDWAR,UTTARAKHAND, 249403	Bidyut Mandal' <bidyut.mandal@shaktiindustries.in> (M: 9555367941 / 9315029882)	
LIGHTING FIXTURES (LED)	19	LL13	M/S CENTURY LED	Srijan Industrial Logistic Park, Part B, Block A, NH-06, Bombay High way, Near Saraswati Bridge, PO Andul-Mouri, P.S.- Domjur, Dist- Howrah. Pin-711302, West Bengal.	Mr Subhadeep Majumdar <subhadeep.majumdar@centuryled.in> (M: 8900735536 / 9315029882) Mr Qutub Ansari (qutub.ansari@centuryled.in) (M: 9830808374), info@centuryled.in	
LIGHTING FIXTURES (FLAME PROOF)	1	HI01	HAVELLS INDIA LIMITED	QRG TOWERS , 2D SECTOR-126, NOIDA- 201301	GIRISH KUMAR SHRIVASTAVA +91-9810528922	
LIGHTING FIXTURES (FLAME PROOF)	2	B05	BAJAJ ELECTRICALS	BAJAJ ELECTRICALS LTD. ENGINEERING & PROJECTS BU (NORTH) 3rd FLOOR, GULMOHARHOUSE, COMMUNITY CENTRE 161/B-4, GAUTAM NAGAR, YUSUF SARAI NEW DELHI – 110049	CONTACT PERSON : Mr. S. SREEMANY. SR. MANAGER (PROJECTS) CONTACT DETAILS : (+91) 9871025705. MAIL ID : srabans@bajajelectricals.com;	
LIGHTING FIXTURES (FLAME PROOF)	3	E1206	BALIGA ELECTRICALS	63A,CP RAMASWAMY ROAD, PB NO 6910, CHENNAI-600018	44-24995505,22680990-4, Mr. Vipin kumar (8939880502, baligadel@baliga.com)	
LIGHTING SWITCH , SOCKET & S/F UNIT	1	F04	ELEXPRO ELECTRICALS PVT/ LTD.	C 1/27 & 37 GIDC KABILPORE NAVSARI-396424	02637-265140, Mr. Jssk kumar	
LIGHTING SWITCH , SOCKET & S/F UNIT	2	E1012	ANCHOR	STEEL HOUSE, B WING, PLOT NO. 24, MAHAL INDUSTRIAL ESTATE, MAHAKALI CAVES ROAD, NEAR PAPER BOX, ANDHERI (E), MUMBAI, MAHARASHTRA.- 400093	022-30418888.	
LIGHTING SWITCH , SOCKET & S/F UNIT	3	E1076	KAYCEE	KAYCEE INDUSTRIES LTD., C/O-CMS COMPUTERS LTD., 35A, REAR BLDG., KILOKARI, NEW DELH1-110014	Rajiv Sharma-9312004687	
LIGHTING SWITCH , SOCKET & S/F UNIT	4	L01	LK (Formerly L&T)	Lauritz Knudsen Electrical & Automation A/600, SHIL – Mahape Road, TTC Industrial Area, MIDC Thane, Mumbai, Maharashtra 400710	Pranjal Tyagi, Pranjal.Tyagi@lk-ea.com, Mobile - 8976907537, Telephone: +91 22 69327800	
LIGHTING SWITCH , SOCKET & S/F UNIT	5	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
LIGHTING SWITCH , SOCKET & S/F UNIT	6	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
LIGHTING PANEL (NON FLAME PROOF)	1	E1091	MIKA ENGINEERS	D'-101, DHEERAJ HERITAGE RESIDENCY II, SHASTRI NAGAR, SANTACRUZ (W), MUMBAI 400 054.	Director : Mr. Asgar Karimi E-mail : mika@mtnl.net.inTelfax : 022-26610081/82/83/84Tel : 02527-249066/70 Cell : 099230	
LIGHTING PANEL (NON FLAME PROOF)	2	F04	ELEXPRO ELECTRICALS PVT/ LTD.	C 1/27 & 37 GIDC KABILPORE NAVSARI-396424	02637-265140, Mr. Jssk kumar	
LIGHTING PANEL (NON FLAME PROOF)	3	VC01	Vidhyut Controls (India) Pvt. Ltd.	M/S VIDHYUT CONTROL (I) PVT.LTD. D-12 & 13, SECTOR-17,KAVI NAGAR INDL.AREA,GHAZIABAD – 201002 (DELHI NCR) U.P. INDIA	0120-4186400, 0120-4186423, 8527005590(DK GUPTA)	
LIGHTING PANEL (NON FLAME PROOF)	4	KM1	KMG ATOZ SYSTEMS	"ATOZ HOUSE" C-49, SECTOR-81, GAUTAM BUDDH NAGAR, NOIDA – 201 305 U. P. (INDIA)	Tel : +91-120-4207920 Fax : +91-120-4207921, 4327958 Phone:098 10 802710	
LIGHTING PANEL (NON FLAME PROOF)	5	E05	UNILEC ENGINEERS PVT. LTD.	BEHRAMPUR INDUSTRIAL AREA, BEGAMPUR KHATOLA ROAD, GURGAON-122001	0124-4030247,248, 4559700, 9911087173	
LIGHTING PANEL (NON FLAME PROOF)	6	AVA01	AVAIODS TECHNOVATORS LTD.	PLOT NO.25 ,SECTOR-3,IMT-MANESAR, GURGEON-122050 (HARYANA)	KRISHNA KALRA- 09958096168	
LIGHTING PANEL (NON FLAME PROOF)	7	ACE01	Adroit Control Engineers Pvt.Ltd.	M/S ADROIT CONTROL ENGINEERS PVT.LTD. PLOT-3, KRISHNA INDL. AREA, SECTOR-25 FARIDABAD – 121004	011-47600700, 0129-4251400	
LIGHTING PANEL (NON FLAME PROOF)	8	JC01	JACKSON ENGINNEERS	A-43, HOSEIRY COMPLEX, OPPOSITE NSEZ, NOIDA-201305	0120-4302600, 2568923,27	
LIGHTING PANEL (NON FLAME PROOF)	9	MIL01	MILESTONE SWITCHGEARS PVT. LTD.	MILESTONE SWITCHGEARS PVT. LTD. 97, UDYOG VIHAR, PHASE-1, GURGEON HARYANA - 122016	Phone Nos.: 0124-4994900 (30 Lines) Fax: 0124-4002973 Email: jaideep.ahuja@milestonesindia .com URL: www.milestonesindia.com	
LIGHTING PANEL (NON FLAME PROOF)	10	PCS01	Positronics Pvt. Ltd.	POSITRONICS HOUSE ,882/ 2, G.I.D.C. MAKARPURA,VADODARA 390010 GUJARAT	+91 265 2642496 Fax: +91 265 264 7033 / 234 0944 E- mail : info@positronicsindia.com Website:www.positronicsindia. com	
LIGHTING PANEL (NON FLAME PROOF)	11	PYRE01	Pyrotech Electronics Pvt. Ltd.	M/s Pyrotech Electronics Pvt. Ltd(Unit -1) Led Light, Sensor Division F-16A, Road No.3 Mewar Industrial Area, Madri Udaipur -313003, Rajasthan,	Concern Person – Mr. Praveen sisodiya (psisodia@pyrotechlighting.com) Ankit Kumar Sr. Engineer(North Region -Sales & Marketing) # +91- 7340061769, 8287897309	
MCB	1	E1088	MDS SWITCHGEAR LTD	314-317SHAH NAHAR ESTATE	011 - 25793021	
MCB	2	E1068	INDO ASIAN	B-24, PHASE - II , NOIDA - 201305, U.P.	120-3042222	
MCB	3	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
MCB	4	E1120	S&S POWER SWITCHGEAR LTD,	NEW NO. 67, OLD NO. 19, DR. RANGA ROAD, MYLAPORE, CHENNAI - 600004	044 - 24988056, 044 - 24988057, 044 - 24988058	
LV MOTORS (NON FLAME PROOF)	1	A24	ABB	14, MATHURA ROAD, FARIDABAD, HARYANA-121003	0129-2567580, 09871799449	
LV MOTORS (NON FLAME PROOF)	2	E1027	BHARAT BIJLEE LTD.	BHARAT BIJLEE LIMITED, 1ST FLOOR, 7-B, RAJINDRA PARK, PUSA ROAD, NEW DELHI - 110 060.	Tel.: + 91 (11) 25816931-33, 35 & 36| DT: +91 25724318 Fax: + 91 (11) 25819640| M:+ 91	
LV MOTORS (NON FLAME PROOF)	3	C02	CROMPTON GREAVES	3RD FLOOR, EXPRESS BUILDING,9-10, BAHADUR SHAH ZAFAR MARG, NEAR ITO CROSSING,NEW DELHI-110002, INDIA	91 11 23460700 - 999 Sunil.Das@cgglobal.com	
LV MOTORS (NON FLAME PROOF)	4	A35	GE-POWER	KAMAK TOWER, 3RD FLOOR, PLOT NO. 12-A, TVK INDUSTRIAL ESTATE, EKKADUTHANGAL, GUINDY, CHENNAI-600032	044-49681447	
LV MOTORS (NON FLAME PROOF)	5	K01	KIRLOSKAR ELECTRIC CO LTD.	P.O. BOX 5555 , MALLESWARAM WEST ,BANGALORE 560055	Tel: +91-80-23374865 Fax: +91-80-23377706	
LV MOTORS (NON FLAME PROOF)	6	L04	LAXMI HYDRAULICS PVT. LTD	129/130, INDUSTRIAL ESTATE PATIL NAGAR, HOTGI ROAD SOLAPUR-413003, MAHARASHTRA	0217- 2357001-005	APPROVED UPTO 200KW
LV MOTORS (NON FLAME PROOF)	7	M01	MARATHON	MARATHON ELECTRIC INDIA PRIVATE LTD.SECTOR - 11, MODEL TOWN, FARIDABAD - 121006	Ph: +91-129-2286421, 2265340, 4006601 to 4006610	
LV MOTORS (NON FLAME PROOF)	8	A35	NGEF	POCKET NO.10, FLAT NO. 37 & 38, EXPANDABLE DDA FLATS, NASIRPUR DWARKA, PHASE-I NEW DELHI-110 045	Ph: (011) 2539 7763	
LV MOTORS (NON FLAME PROOF)	9	E1115	RAJINDRA ELECT INDUSTRIES	14 SHAH IND.ESTATE VEERA DESAI RD,ANDHERI(W) MUMBAI-400053	91-22-26730823, 26730789; 91)-(22)-26730154	
LV MOTORS (NON FLAME PROOF)	10	S01	SIEMENS	RC-IN I S NR DEL AREA, JIL BUILDING, TOWER-B, PLOT NO. 78, SECTOR 18, GURGAON-122015, INDIA	0124-2842000, 9873424331 amit.bhadauria@siemens.com	
LV MOTORS (NON FLAME PROOF)	11	HM06	HAVELLS INDIA LIMITED	Plot No. SP 181-189, Industrial Area Phase-II, Neemrana, Dist. Alwar, Rajasthan-301705, India	M: 9644355595 Mr. Kapil Jain (L): +91120-4772317 (Kapil Jain <Kapil.Jain@havells.com>)	APPROVED UPTO 200KW
LV MOTORS (FLAME PROOF)	1	E1115	RAJINDRA ELECT INDUSTRIES	14 SHAH IND.ESTATE VEERA DESAI RD,ANDHERI(W) MUMBAI-400053	91-22-26730823, 26730789; 91)-(22)-26730154	

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
SWITCH BOX	1	E1012	ANCHOR	STEEL HOUSE, B WING, PLOT NO. 24, MAHAL INDUSTRIAL ESTATE, MAHAKALI CAVES ROAD, NEAR PAPER BOX, ANDHERI (E), MUMBAI, MAHARASHTRA.- 400093	022-30418888.	
SWITCH BOX	2	F04	ELEXPRO ELECTRICALS PVT/ LTD.	C 1/27 & 37 GIDC KABILPORE NAVSARI-396424	02637-265140, Mr. Jssk kumar	
SWITCH BOX	3	B05	BAJAJ ELECTRICALS	BAJAJ ELECTRICALS LTD. ENGINEERING & PROJECTS BU (NORTH) 3rd FLOOR, GULMOHARHOUSE, COMMUNITY CENTRE 161/B-4, GAUTAM NAGAR, YUSUF SARAI NEW DELHI – 110049	CONTACT PERSON : Mr. S. SREEMANY. SR. MANAGER (PROJECTS) CONTACT DETAILS : (+91) 9871025705. MAIL ID : srabans@bajajelectricals.com;	
SWITCH BOX	4	A03	AJMERA INDUSTRIES & ENGG. WORKS	AJMERA INDL. AND ENGG. WORKS. AJMERA HOUSE, A-61 / KHAIRANE MIDC. , TTC INDL. AREA, NAVI MUMBAI – 400705.	Tel : 022 27620299 / 97 / 96 'mail@ajmera.net	
SWITCH BOX	5	SB02	S.B. ELECTRICAL ENGINEERING CORPORATION	03, SARDAR GRIHA BUILDING, LOHAR CHAWAL, MUMBAI-400002	022- 22069831; 022-66637259	
TIMERS - PNEUMATIC	1	B04	BCH	20/4, MATHURA ROAD, FARIDABAD, HARYANA-121006	0129-4293000	
TIMERS - PNEUMATIC	2	G01	ALSTOM LTD	A-7, SEC-65, NOIDA	0120-479 0000	
TIMERS - PNEUMATIC	3	L01	LK (Formerly L&T)	Lauritz Knudsen Electrical & Automation A/600, SHIL – Mahape Road, TTC Industrial Area, MIDC Thane, Mumbai, Maharashtra 400710	Pranjal Tyagi, Pranjal.Tyagi@lk-ea.com, Mobile - 8976907537, Telephone: +91 22 69327800	
TIMERS - PNEUMATIC	4	E1144	TELEMECHANIQUE/ SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	TAKEN OVER BY SCHNEIDER
TIMERS - PNEUMATIC	5	S03	SCHNEIDER ELECTRIC INDIA PVT. LTD.	9TH FLOOR, BLDG. NO. 10, TOWER-C, DLF CYBER CITY, PH-II, GURGAON-122002	0124-3940400	
TIMERS - PNEUMATIC	6	E01	ELECTRONIC AUTOMATION PVT. LTD.	20, KHB INDUSTRIAL AREA YELAHANKA BANGLORE-560064	080 -28567561 / 080 -28567562 / 080 -42802345	
TIMERS - ELECTRONIC	1	E1050	ESSEN DEINKI	FLAT NO. 502, SKYLINE HOUSE 85, NEHRU PLACE NEW DELHI	011-26217060	
RECEPTACLE (FLAME PROOF)	1	E1206	BALIGA ELECTRICALS	63A,CP RAMASWAMY ROAD, PB NO 6910, CHENNAI-600018	44-24995505,22680990-4	
RECEPTACLE (FLAME PROOF)	2	SS01	SUDHIR SWITCHGEAR	305/6, APEEJAY HOUSE, 130, BOMBAY SAMACHAR MARG, MUMBAI - 400 023. INDIA	Telephone Nos. : 40460000 (100 lines) Fax Nos. : ++-91-22-22049381 Email : md@sudhirswitchgears.com ; works@sudhirswitchgears.com ; scud@vsnl.com	
RECEPTACLE (FLAME PROOF)	3	FFP01	FCG FLAME PROOF CONTROL GEAR	A1/53, SHAH & NAHAR INDUSTRIAL ESTATE, SITARAM JADHAV ROAD, LOWER PAREL (W), MUMBAI-400 013	Mr. N. G. Patel CMD Office No: +91-22-43443200 Fax No: +91-22-24960313	
RECEPTACLE (NON FLAME PROOF)	1	A03	AJMERA INDUSTRIES & ENGG. WORKS	AJMERA INDL. AND ENGG. WORKS. AJMERA HOUSE, A-61 / KHAIRANE MIDC. , TTC INDL. AREA, NAVI MUMBAI – 400705.	Tel : 022 27620299 / 97 / 96 'mail@ajmera.net	
RECEPTACLE (NON FLAME PROOF)	2	C02	CROMPTON GREAVES	3RD FLOOR, EXPRESS BUILDING,9-10, BAHADUR SHAH ZAFAR MARG, NEAR ITO CROSSING,NEW DELHI-110002, INDIA	91 11 23460700 - 999 'Sunil.Das@cgglobal.com	
RECEPTACLE (NON FLAME PROOF)	3	E1207	CYCLO ELECTRIC DEVICE & SERV.CO.	: A-3, NEAR ANTHEM BIOSCIENCE, KSSIDC INDUSTRIAL AREA, BOMMASANDRA, BOMMASANDRA INDUSTRIAL AREA, BANGALORE, KARNATAKA 560099	Mr. H.Jaishanker +919845039081, 080 - 27833102 , 080 - 27833103 : +91 80 41460985 'cycloelectric@gmail.com	
RECEPTACLE (NON FLAME PROOF)	4	B04	BCH	20/4, MATHURA ROAD, FARIDABAD - 121006, HARYANA, INDIA	0(129)-4063000, 9015800189(Ramesh Giri) 'ramesh.giri@bchindia.com	
RECEPTACLE (NON FLAME PROOF)	5	B02	BEST & CROMPTON	BEST & CROMPTON ENGINEERING LTD 28C, AMBATTUR INDUSTRIAL ESTATE (NORTH) AMBATTUR, CHENNAI - 600 098	Ph : +91 44 4551 4724 , MRKT DGM Mr. VI Raj:- 9840593411 'bestcromptonviraj@gmail.com	
AMMETER	1	E1009	AUTOMATIC ELECTRIC LTD.	96 AB LONAVLA INDUSTRIAL ESTATE NANGARGAON, LONAVLA-410401	Phone : +91 2114323665 Fax : +91 2114273482	
AMMETER	2	R01	RISHABH INST.PVT LTD	RISHABH INSTRUMENTS PVT. LTD. F-31, MIDC, SATPUR NASHIK - 422007 MAHARASHTRA INDIA	marketing@rishabh.co.in 91-253 2202202/203 Fax: 91 253 2351064	
AMMETER	3	NK09	M/s Newtek Electricals	M-90, M.I.D.C, Waluj, Aurangabad 431136, Maharashtra, India	Tel/Fax: +91 240 2551555 E-mail: mkt.north@newtekelectricals.com, sales@newtekelectricals.com Mr Sanjeev Aggarwal (9958897890)	
PVC WIRES	BIS APPROVED MAKE					
CABLE TRAYS & ACC.			ADVANCE POWER PRODUCTS LLP	Mr. Manmohan Damani 24A, Rabindra Sarani, Kolkata Phone- 033-22252463 Pincode : 700073 Email : sales@advancepowerproducts.in		

ITEM/SERVICE DESCRIPTION	SL NO.	VENDOR CODE	VENDOR NAME	ADDRESS	PHONE	REMARKS
CABLE TRAYS & ACC.			EROS METAL WORKS (P) LTD.	Mr. Amit N. Pande G-5, MIDC Industrial area Hingna Road Nagpur Phone- 9371490163 Pincode : 440028 Email : eemwpl@erosgroup.co.in;sohumpande@erosgroup.co.in		
CABLE TRAYS & ACC.			INDUSTRIAL PERFORATION (I) PVT.LTD.	MR. A. K. SAHA 327, R.N.GUHA ROAD, DUM DUM KOLKATA Phone- 9830241788 Pincode : 700028 Email : mail@ipipl.co.in		
CABLE TRAYS & ACC.			NAMDHARI INDUSTRIAL TRADERS PVT. LTD	Mr. Gurdeep Singh 515/5, Industrial Area-B, Overlock Road, Ludhiana Phone- 0161-2531398 Pincode : 141003 Email : namdhari_ind_traders@yahoo.com		
CABLE TRAYS & ACC.			PARMAR METALS PVT.LTD.	MR. KIRIT PARMAR 28-A, BHAKTINAGAR INDL ESTATE RAJKOT Phone- 9925019998 Pincode : 360 002 Email : info@parmarmetal.com		
CABLE TRAYS & ACC.			PATNY SYSTEMS (P) LTD	PATNY PLAZA 160 , SARDAR PATEL ROAD SEUNDRABAD SECUNDRABAD Phone- 040-27902451 Pincode : 500003 Email : mr.mkt@patnysystems.com		
CABLE TRAYS & ACC.			PENTAX FERRO INCORPORATE	Mr. Rajeev Kandhari 801, 8th Floor, Palm Springs, Link road, Malad (W) Mumbai Phone- 09820088400 Pincode : 400064 Email : rajeev@jencogalva.com		
CABLE TRAYS & ACC.			Pinax Steel Industries Pvt. Ltd.	Village - Deokuli, PO - Musepur, Bihta, Patna Phone- 9264477062 Pincode : 801103 Email : p.singh@pinaxgroup.in, kumar@pinaxgroup.in		
CABLE TRAYS & ACC.			PREMIER POWER PRODUCTS (CAL) PVT. LTD.	Chatterjee International Centre, 33A, Jawaharlal Nehru Road, 6th Floor, Suit No. - 11A, Kolkata, Phone- 9331008739 Pincode : 700071 Email : pppdaga4@gmail.com;info@thepremierpower.com		
CABLE TRAYS & ACC.			R.K. Engineering Works	W/87,Addl Ambernath Anandnagar,MIDC,Ambernath-East Thane Phone- 9923009696 Pincode : 421506 Email : salespune@rkenggwork		
CABLE TRAYS & ACC.			RABI ENGINEERING WORKS PVT. LTD.	MR. TAPAN KUMAR SEN/MR. SIDDHARTHA 327, R.N. GUHA ROAD, DUM DUM, KOLKATA Phone- 9748753002 Pincode : 700028 Email : rabiengineering@gmail.com		
CABLE TRAYS & ACC.			RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	MR. G.D. SINGHEE/MR. MAHESH SINGHEE 26, P.K. TAGORE STREET, MAIN BUILDING KOLKATA Phone- 9830177331 Pincode : 700006 Email : mahesh@ratans.com		
CABLE TRAYS & ACC.			RUKMANI ELECTRICAL & COMPONENTS PVT LTD	11A , MAHARISHI DEBENDRA ROAD 1ST FL , ROOM NO.4 KOLKATA Phone- Pincode : 700007 Email : maruthikabra@gmail.com		
CABLE TRAYS & ACC.			Saral Industries	Mr. Y.K. Gupta L-1, L-2, Industrial Area-1 Sultanpur Road Rae Bareli Phone- 0535-2702474 Pincode : 229010 Email : saralindustries@gmail.com		
CABLE TRAYS & ACC.			UNITECH FABRICATORS and ENGINEERS PVT LTD	INDRAPRASHTHA APARTMENT 24 , M.B.RAOD , BIRATI KALABAGAN KOLKATA KOLKATA Phone- Pincode : 700051 Email : ufepl@rediffmail.com;ufepl@vsnl.net;		
CABLE TRAY SUPPORT SYSTEM - BOLTABLE			AM-TECH ENGG.SERVICES	Chinmay Patwardhan 305 ,UNIQUE CHAMBERS 925 B/1,FC ROAD PUNE Phone- 9822499078 Pincode : 410004 Email : amtech.aditya@amail.com		
CABLE TRAY SUPPORT SYSTEM - BOLTABLE			INDUSTRIAL PERFORATION (I) PVT.LTD.	MR. A. K. SAHA 327, R.N.GUHA ROAD, DUM DUM KOLKATA Phone- 9830241788 Pincode : 700028 Email : mail@ipipl.co.in		
CABLE TRAY SUPPORT SYSTEM - BOLTABLE			Maheshwari Electrical Mfrs. Pvt. Ltd.,	Mr. Abhishek Garg, 9999902481 A-59, Sector-5, Noida, Phone- 9811027324, Pincode : 201301, Email : memindia@gmail.com,		
CABLE TRAY SUPPORT SYSTEM - BOLTABLE			PREMIER POWER PRODUCTS (CAL) PVT. LTD.	Chatterjee International Centre, 33A, Jawaharlal Nehru Road, 6th Floor, Suit No. - 11A, Kolkata, Phone- 9331008739 Pincode : 700071 Email : pppdaga4@gmail.com;info@thepremierpower.com		
CABLE TRAY SUPPORT SYSTEM - BOLTABLE			RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	MR. G.D. SINGHEE/MR. MAHESH SINGHEE 26, P.K. TAGORE STREET, MAIN BUILDING KOLKATA Phone- 9830177331 Pincode : 700006 Email : mahesh@ratans.com		

310301 : PRESSURE GAUGES

CODE	NAME
1 . P3185	(standard normal type)
INDIA	
2 . P3477	NESSTECH INSTRUMENTS PRIVATE LIMITED
3 . P3483	WIKA INSTRUMENTS INDIA PVT.LTD
4 . P0081	A N INSTRUMENTS PVT. LTD.
5 . P3103	BAUMER TECHNOLOGIES INDIA PVT. LTD.(FORMERLY WAAREE INSTRUM
6 . P3496	FORBES MARSHALL (HYD) PRIVATE LIMITED (Up to 0.6 to 600Kg/cm2)
7 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
8 . P0304	GENERAL INSTRUMENTS CONSORTIUM,
9 . P0371	H.GURU INDUSTRIES
10 . P3470	ITEC MEASURES PRIVATE LIMITED
11 . P0512	MANOMETER (INDIA) PVT. LTD.
12 . P3469	MICRO PROCESS CONTROLS
13 . P3517	MILLENNIUM INSTRUMENTS LIMITED
14 . P0622	PEEJEE ENGG. WORKS
15 . P3456	PRECISION MASS PRODUCTS PVT. LTD.
16 . P0646	PREMIUM INST. & CONTROLS LTD.

310301 : PRESSURE GAUGES

CODE	NAME
17 . P3454	THERMAL INSTRUMENT INDIA PVT.LTD.
18 . P0874	WALCHANDNAGAR INDUSTRIES LTD.
GERMANY	
19 . P0212	DRESSER EUROPE S.A.
20 . P0880	WIKA ALEXENDER WIEGAND GMBH & CO.
ITALY	
21 . P0746	SPRIANO SPA
JAPAN	
22 . P0558	NAGANO KEIKI SEISAKUSHO
SWITZERLAND	
23 . P0690	RUEGER SA
U.K.	
24 . P0136	BUDENBERG GAUGE CO. LTD.

310303 : LOCAL D/P INDICATORS

CODE	NAME
INDIA	
1 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
2 . P3469	MICRO PROCESS CONTROLS
3 . P3517	MILLENNIUM INSTRUMENTS LIMITED
4 . P3456	PRECISION MASS PRODUCTS PVT. LTD.
5 . P0781	SWITZER INSTRUMENT CO.,
U.K.	
6 . P0090	BARTON INSTRUMENT SYSTEMS LIMITED
7 . P0198	DELTA CONTROLS LTD.

310304 : PRESSURE & D/P TRANSMITTERS

CODE	NAME
GERMANY	
1 . P3430	VEGA GRIESHABER KG
INDIA	
2 . P0151	ABB INDIA LIMITED
3 . P0263	EMERSON PROCESS MANAGEMENT (I) PVT. LTD.
4 . P3427	ENDRESS+HAUSER (INDIA) PVT. LTD.
5 . P0787	HONEYWELL AUTOMATION INDIA LIMITED
6 . P3417	SIEMENS LTD.
7 . P0891	YOKOGAWA INDIA LIMITED
GERMANY	
8 . P0735	SIEMENS AG, GERMANY
JAPAN	
9 . P0888	AZBIL CORPORATION (Formerly YAMATAKE CORPORATION)
10 . P0892	YOKOGAWA ELECTRIC CORPORATION
SINGAPORE	
11 . P0262	EMERSON PROCESS MGT SINGAPORE LTD
12 . P0740	SMAR SINGAPORE PTE. LTD.
U.S.A.	
13 . P0363	HONEYWELL INC.,
14 . P0544	MOORE PRODUCTS COMPANY

310310 : PRESSURE & D/P SWITCHES INCLUDING VOL. SEAL

CODE	NAME
INDIA	
1 . P3427	ENDRESS+HAUSER (INDIA) PVT. LTD.
2 . P0379	INDFOS INDUSTRIES LTD. (except vol.seal)
3 . P3405	KAUSTUBHA UDYOG
4 . P3469	MICRO PROCESS CONTROLS
5 . P3456	PRECISION MASS PRODUCTS PVT. LTD.
6 . P0781	SWITZER INSTRUMENT CO., (except vol.seal)
JAPAN	
7 . P0888	AZBIL CORPORATION (Formerly YAMATAKE CORPORATION)
8 . P0558	NAGANO KEIKI SEISAKUSHO
U.K.	
9 . P0198	DELTA CONTROLS LTD.
U.S.A.	
10 . P0743	SOR INC.
11 . P0899	UNITED ELECTRIC CONTROLS CO.

310401 : TRANSPARENT/ REFLEX / BICOLOR MAG.LEVEL GAUGES

CODE	NAME
INDIA	
1 . P0151	ABB INDIA LIMITED
2 . P3414	BLISS ANAND PRIVATE LIMITED
3 . P3181	CHEMTROLS SAMIL (INDIA) PVT LTD.
4 . P3433	FLOWTECH INSTRUMENTS SERVICES
5 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
6 . P3400	NISAN SCIENTIFIC PROCESS EQUIPMENTS PVT. LTD. (Transparent/ Reflex type Level Gauge : Upto 600#; Tubular Type Level Gauges : Upto 150#)
7 . P3186	PUNE TECHTROL PVT.LTD. (<=300# rating only)
8 . P0792	TECNOMATIC (INDIA) PVT. LTD.
9 . P3491	V.AUTOMAT & INSTRUMENTS (P) LTD
10 . P0871	V.AUTOMAT & INSTRUMENTS (P) LTD. (upto 300#)
AUSTRIA	
11 . P0672	RICHARD KLINGER AG
ITALY	
12 . P0150	CESARE BONETTI SPA
13 . P0791	TECHNOMATIC SPA
JAPAN	
14 . P0577	NIHON KLINGAGE CO. LTD.
U.S.A.	
15 . P0161	CLARK-RELIANCE CORP.

310401 : TRANSPARENT/ REFLEX / BICOLOR MAG.LEVEL GAUGES

CODE	NAME
16 . P0425	JERGUSON GAUGE & VALVE CO.
17 . P0889	TYCO INTERNATIONAL INC.,U.S.A.

310402 : LEVEL SWITCHES (FLOAT & DISPLACER TYPE)

CODE	NAME
GERMANY	
1 . P3430	VEGA GRIESHABER KG ((Tuning fork, Capacitance, Radar))
INDIA	
2 . P0151	ABB INDIA LIMITED
3 . P3414	BLISS ANAND PRIVATE LIMITED
4 . P3181	CHEMTROLS SAMIL (INDIA) PVT LTD.
5 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
6 . P3186	PUNE TECHTROL PVT.LTD.
7 . P3459	SBEM PVT. LTD.
8 . P3417	SIEMENS LTD. ((Ultrasonic, Vibrating Fork, Capacitance, Paddle))
9 . P3491	V.AUTOMAT & INSTRUMENTS (P) LTD
10 . P0871	V.AUTOMAT & INSTRUMENTS (P) LTD. (upto 300# , Non-critical service)
BELGIUM	
11 . P0502	MAGNETROL INTERNATIONAL N.V.
U.K.	
12 . P0408	ISA CONTROLS LIMITED
13 . P0441	KDG MOBREY LTD.
U.S.A.	
14 . P0743	SOR INC.

310403 : DISPLACER TYPE LEVEL TRANSMITTERS

CODE	NAME
INDIA	
1 . P0153	CHEMTROLS INDUSTRIES LTD.
2 . P3183	DRESSER VALVE INDIA PVT LTD (Rating <= 600#)
3 . P3491	V.AUTOMAT & INSTRUMENTS (P) LTD
BELGIUM	
4 . P0502	MAGNETROL INTERNATIONAL N.V. (LVDT)
FRANCE	
5 . P0518	DRESSER MASONEILAN
GERMANY	
6 . P0282	FOXBORO ECKARDT GmbH
ITALY	
7 . P0618	PARCOL SPA (Pneumatic Transmission only)

310404 : NUCLEONIC LEVEL TRANSMITTER

CODE	NAME
GERMANY	
1 . P3430	VEGA GRIESHABER KG
INDIA	
2 . P3465	EIP ENVIRO LEVEL CONTROLS PRIVATE LIMITED
GERMANY	
3 . P0101	BERTHOLD TECHNOLOGIES GMBH & CO.KG
4 . P0238	ENDRESS + HAUSER GMBH & CO.,
U.S.A.	
5 . P0439	KAY RAY

310405 : CAPACITANCE TYPE LEVEL TRANSMITTER

CODE	NAME
GERMANY	
1 . P3430	VEGA GRIESHABER KG
INDIA	
2 . P3427	ENDRESS+HAUSER (INDIA) PVT. LTD.
3 . P3417	SIEMENS LTD.
BELGIUM	
4 . P0502	MAGNETROL INTERNATIONAL N.V.
GERMANY	
5 . P0238	ENDRESS + HAUSER GMBH & CO.,
6 . P0467	KROHNE
U.K.	
7 . P0441	KDG MOBREY LTD.

310406 : TANK LEVEL INSTRUMENTS

CODE	NAME
INDIA	
1 . P0151	ABB INDIA LIMITED
2 . P3465	EIP ENVIRO LEVEL CONTROLS PRIVATE LIMITED
3 . P0263	EMERSON PROCESS MANAGEMENT (I) PVT. LTD.
4 . P3186	PUNE TECHTROL PVT.LTD.
5 . P3459	SBEM PVT. LTD.
6 . P3417	SIEMENS LTD. ((Radar Level Transmitter, Guded Wave Radar))
GERMANY	
7 . P0238	ENDRESS + HAUSER GMBH & CO., (Non-contact & servo)
8 . P0467	KROHNE (Non-contact type)
JAPAN	
9 . P0816	TOKYO KEISO CO. LTD.
SINGAPORE	
10 . P0240	ENRAF SINGAPORE PTE. LTD.
U.S.A.	
11 . P0480	L & J TECHNOLOGIES

310408 : RESITIVE ELECTRODE TYPE LEVEL INSTRUMENT

CODE	NAME
U.S.A.	
1 . P0161	CLARK-RELIANCE CORP.
2 . P0706	SCHLUMBERGER RESOURCE MANAGEMENT LTD.

310409 : SPECIAL LEVEL SWITCHES (VIBRATION FORK/RF ADMITTANCE)

CODE	NAME
INDIA	
1 . P0151	ABB INDIA LIMITED
2 . P3465	EIP ENVIRO LEVEL CONTROLS PRIVATE LIMITED
3 . P3404	PROTOCONTROL INSTRUMENTS (I) PVT. LTD. (For Non Critical application)
GERMANY	
4 . P0238	ENDRESS + HAUSER GMBH & CO.,
U.S.A.	
5 . P0743	SOR INC.

310410 : ULTRASONIC LEVEL TRANSMITTER

CODE	NAME
GERMANY	
1 . P3430	VEGA GRIESHABER KG
INDIA	
2 . P3465	EIP ENVIRO LEVEL CONTROLS PRIVATE LIMITED
3 . P3417	SIEMENS LTD.

310412 : GUIDED WAVE RADAR

CODE	NAME
GERMANY	
1 . P3430	VEGA GRIESHABER KG
INDIA	
2 . P3427	ENDRESS+HAUSER (INDIA) PVT. LTD.

310501 : TEMPERATURE ELEMENTS (THERMOCOUPLE, RTD)

CODE	NAME
INDIA	
1 . P3477	NESSTECH INSTRUMENTS PRIVATE LIMITED
2 . P3483	WIKA INSTRUMENTS INDIA PVT.LTD
3 . P0151	ABB INDIA LIMITED
4 . P3184	ALTOP INDUSTRIES LTD. (only normal type (MI))
5 . P0201	DETRIV INSTRUMENTATION & ELECTRONICS LTD (Only Normal Type)
6 . P0227	ELECTRICAL & ELECTRONICS CORPORATION,
7 . P0232	ELEIND ENGINEERING PVT. LTD. (Only Normal Type)
8 . P3427	ENDRESS+HAUSER (INDIA) PVT. LTD.
9 . P3439	EXOTHERM INSTRUMENTS
10 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
11 . P0304	GENERAL INSTRUMENTS CONSORTIUM,
12 . P3436	GOA INSTRUMENTS INDUSTRIES PVT. LTD.
13 . P0390	INDUSTRIAL INSTRUMENTATION, (Only Normal Type)
14 . P3470	ITEC MEASURES PRIVATE LIMITED
15 . P3469	MICRO PROCESS CONTROLS
16 . P3517	MILLENNIUM INSTRUMENTS LIMITED
17 . P3456	PRECISION MASS PRODUCTS PVT. LTD.

310501 : TEMPERATURE ELEMENTS (THERMOCOUPLE, RTD)

CODE	NAME
18 . P3402	PYRO ELECTRIC INSTRUMENTS GOA PVT. LTD. (A.Thermocouple Assemblies with / without Thermowelss; B. RTD Assemblies with / without Thermowells.)
19 . P3507	TECHNO INSTRUMENTS
20 . P3420	TEMPSENS INSTRUMENTS (I) PVT. LTD.
21 . P3454	THERMAL INSTRUMENT INDIA PVT.LTD. (All Ranges)
22 . P3416	UNICONTROLS INSTRUMENTS PVT. LTD.
GERMANY	
23 . P0716	SENSYCON (M/S DEGUSSA AG)
24 . P0884	W.C. HERAEUS GMBH
HOLLAND	
25 . P0807	THERMO ELECTRIC CO. LTD.
JAPAN	
26 . P0888	AZBIL CORPORATION (Formerly YAMATAKE CORPORATION)
27 . P0600	OKAZAKI MANUFACTURING CO.

310502 : BIMETALLIC THERMOMETER

CODE	NAME
1 . P3185	
INDIA	
2 . P3477	NESSTECH INSTRUMENTS PRIVATE LIMITED
3 . P0081	A N INSTRUMENTS PVT. LTD.
4 . P3103	BAUMER TECHNOLOGIES INDIA PVT. LTD.(FORMERLY WAAREE INSTRUM
5 . P3496	FORBES MARSHALL (HYD) PRIVATE LIMITED ((-50 'C to -400'C))
6 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
7 . P0304	GENERAL INSTRUMENTS CONSORTIUM,
8 . P3436	GOA INSTRUMENTS INDUSTRIES PVT. LTD.
9 . P0371	H.GURU INDUSTRIES
10 . P3470	ITEC MEASURES PRIVATE LIMITED
11 . P0468	KROHNE MARSHALL PVT. LTD.
12 . P3517	MILLENNIUM INSTRUMENTS LIMITED
13 . P3456	PRECISION MASS PRODUCTS PVT. LTD.
14 . P3454	THERMAL INSTRUMENT INDIA PVT.LTD.
ITALY	
15 . P0791	TECHNOMATIC SPA
JAPAN	

310502 : BIMETALLIC THERMOMETER

CODE	NAME
16 . P0558	NAGANO KEIKI SEISAKUSHO
SWITZERLAND	
17 . P0690	RUEGER SA
U.S.A.	
18 . P0827	TREND INSTRUMENT INC.

310503 : DIAL THERMOMETER (Hg in Steel/Glass)

CODE	NAME
1 . P3185	
INDIA	
2 . P3477	NESSTECH INSTRUMENTS PRIVATE LIMITED
3 . P3483	WIKA INSTRUMENTS INDIA PVT.LTD
4 . P0081	A N INSTRUMENTS PVT. LTD.
5 . P3103	BAUMER TECHNOLOGIES INDIA PVT. LTD.(FORMERLY WAAREE INSTRUM
6 . P3496	FORBES MARSHALL (HYD) PRIVATE LIMITED (HG in Steel / Glass); (-50 'C to 600'C))
7 . P3466	GAUGES BOURDON INDIA PVT. LTD (Mfg. unit of GIC)
8 . P0304	GENERAL INSTRUMENTS CONSORTIUM,
9 . P3436	GOA INSTRUMENTS INDUSTRIES PVT. LTD. (Liquid filled, Gas filled, Mercury in steel)
10 . P0371	H.GURU INDUSTRIES
11 . P3470	ITEC MEASURES PRIVATE LIMITED
12 . P3469	MICRO PROCESS CONTROLS
13 . P3517	MILLENNIUM INSTRUMENTS LIMITED
14 . P0622	PEEJEE ENGG. WORKS
15 . P3456	PRECISION MASS PRODUCTS PVT. LTD.
16 . P3454	THERMAL INSTRUMENT INDIA PVT.LTD.

310503: DIAL THERMOMETER (Hg in Steel/Glass)

	CODE	NAME
17.	P0874	WALCHANDNAGAR INDUSTRIES LTD.

310504 : RADIATION PYROMETER

CODE	NAME
INDIA	
1 . P3420	TEMPSENS INSTRUMENTS (I) PVT. LTD.
GERMANY	
2 . P0735	SIEMENS AG, GERMANY
ITALY	
3 . P0189	C.C.R. TECHNICO
JAPAN	
4 . P0155	CHINO CORPN.
U.K.	
5 . P0482	LAND INFRARED
U.S.A.	
6 . P0873	WAHL INSTRUMENTS

310505 : TEMPERATURE TRANSMITTER

CODE	NAME
INDIA	
1 . P0151	ABB INDIA LIMITED
2 . P3427	ENDRESS+HAUSER (INDIA) PVT. LTD.
3 . P3417	SIEMENS LTD.
4 . P0891	YOKOGAWA INDIA LIMITED
JAPAN	
5 . P3415	M. SYSTEM CO., LTD., (Model No. B6U-B; Model No. 27HU-B)

310506: TEMPERATURE SWITCHES

CODE	NAME
INDIA	
1 . P3436	GOA INSTRUMENTS INDUSTRIES PVT. LTD.

310507: SPECIAL TEMPERATURE ELEMENTS

CODE	NAME
INDIA	
1. P3513	THERMAL INSTRUMENT INDIA PVT. LTD.

310614 : LIMIT/PROXIMITY SWITCHES

CODE	NAME
INDIA	
1 . P3445	CAIR EUROMATIC AUTOMATION PVT.LTD. (Non-critical)
2 . P3505	CAIR EUROMATIC AUTOMATION PVT. LTD.
3 . P3195	EL-O-MATIC INDIA PRIVATE LIMITED
4 . P0608	OSNA ELECTRONICS PVT. LTD. (Intrinsically Safe Proximity Switches)
5 . P3109	PEPPERL + FUCH
6 . P3404	PROTOCONTROL INSTRUMENTS (I) PVT. LTD. (For Non Critical application)
7 . P3196	ROTEX MANUFACTURERS & ENGINEERS PRIVATE LIMITED
GERMANY	
8 . P3108	PEPPERL + FUCH
SINGAPORE	
9 . P0625	PEPPERL + FUCHS PTE LTD.
U.S.A.	
10 . P0363	HONEYWELL INC.,

310801 : CONTROL PANEL

CODE	NAME
INDIA	
1 . P0230	ELECTRONICS CORPORATION OF INDIA LTD
2 . P3458	EX- PROTECTA
3 . P3442	HULASI METALS PVT. LTD. (For safe area.)
4 . P0389	INDUSTRIAL CONTROL APPLIANCES (P) LTD.,
5 . P3485	IRIS AUTOMATION PVT.LTD.
6 . P0421	JAISUN & HUTCHISUN CONTROLS LTD.,
7 . P3407	PRIMA AUTOMATION (INDIA) PVT. LTD. (For package equipments)
8 . P0653	PYROTECH ELECTRONICS PVT.LTD.
9 . P3499	RITTAL INDIA PVT.LTD.
10 . P3432	TAN SWA TECHNOLOGIES INC
11 . P0841	UNITED ELECTRIC CO. (DELHI) PVT. LTD. (Upto 10 Mtrs.)
12 . P0891	YOKOGAWA INDIA LIMITED
HOLLAND	
13 . P0397	INSTROMET INTERNATIONAL N.V
14	Bharat Heavy Electrical Ltd. Electronics Division Bangalore

310802 : PANEL ACCESS. (Relay,Switch,Lamp,Terminal,Push Button)

CODE	NAME
INDIA	
1 . P3487	CONNECTWELL INDUSTRIES PVT.LTD. (Terminal Block)
2 . P3411	ECONIX HI-TECH COMPONENTS PVT. LTD. (For Terminal Blocks & Accessories only)
3 . P3410	ELMEX CONTROLS PVT. LTD. (For Terminal Blocks & Accessories only)
4 . P3458	EX- PROTECTA
5 . P0430	JYOTI LIMITED (Relay)
6 . P0484	LARSEN & TOUBRO LTD.(CONTROL& AUTOMATION (Lamp, Push Button)
7 . P3421	PHOENIX CONTACT (INDIA) PVT. LTD. (For Terminal Blocks only)
8 . P3435	POWERCAM ELECTRICALS PVT. LTD. (For Pilot Lamp, Push Button only.)
9 . P0033	ROCKWELL AUTOMATION INDIA PVT. LTD. (Relays)
GERMANY	
10 . P0206	DIGITABLE THIELEN GMBH & CO
11 . P0630	PHOENIX CONTACT GMBH & CO.
12 . P0735	SIEMENS AG, GERMANY (Lamp,PushButton,Contactors)
13 . P0750	STAHL-UND APPARATEBAU HANS LEFFER GMBH (Lamp,PushButton)
14 . P0872	WAGO KONTAKLTECHNIK GMBH
15 . P0875	WEIDMULLER LTD. (Terminal)
JAPAN	
16 . P0605	OMRON CORPORATION (Relay)

310802: PANEL ACCESS. (Relay,Switch,Lamp,Terminai,Push Button)

CODE	NAME
SINGAPORE	
17. P0625	PEPPERL +FUCHS PTE LTD. (Switch)

311608 : JUNCTION BOX & CABLE GLAND

CODE	NAME
INDIA	
1 . P0089	BALIGA LIGHTING EQUIPMENTS LIMITED
2 . P3458	EX- PROTECTA
3 . P0147	FCG FLAMEPROOF CONTROL GEARS PVT. LTD. (FORMERLY CEAG FLAME
4 . P0268	FLAMEPROOF EQUIPMENTS PVT. LTD.
5 . P3412	FLEXPRO ELECTRICALS PVT. LTD.
6 . P3475	PHOENIX MECANO (INDIA) PVT.LTD.
7 . P3499	RITTAL INDIA PVT.LTD.
8 . P3432	TAN SWA TECHNOLOGIES INC (JUNCTION BOX)
9 . P3422	TRINITY TOUCH PVT. LTD. (Only Cable Glands upto Size 25M)
GERMANY	
10 . P0750	STAHL-UND APPARATEBAU HANS LEFFER GMBH

311618 : PIPE FITTINGS

CODE	NAME
U.K.	
16 . P0203	DEWRANCE & CO. LTD.
17 . P0366	HOPKINSONS LIMITED
18 . P0811	THOMPSON VALVES LTD.
19 . P0856	VELAN ENGINEERING CO. LIMITED
U.S.A.	
20 . P0049	ANDERSON GREENWOOD & CO.
21 . P0181	CRANE COMPANY INTL. SALES

311624 : VALVE MANIFOLDS

CODE	NAME
INDIA	
1 . P3497	ASTEC VALVES & FITTINGS PRIVATE LIMITED
2 . P3476	COMFIT & VALVES PVT.LTD.
3 . P3519	GLOBAL VALVES AND FITTING (INDIA) PVT. LTD. (FOR NON IBR APPLICATION)
4 . P3494	HAVI ENGINEERING INDIA PVT.LTD
5 . P3518	VENTIL FLOWSERVE PVT. LTD.
6 . P3413	WESMEC ENGINEERING PVT. LTD.

311627 : ENCLOSURES

CODE	NAME
INDIA	
1 . P3458	EX- PROTECTA
2 . P3499	RITTAL INDIA PVT.LTD.
3 . P3422	TRINITY TOUCH PVT. LTD. (Weatherproof size 80 X 80 mm)
4.	Bharat Heavy Electrical Ltd. Electronics Division Bangalore

311631 : INSTRUMENTATION VALVES (NEEDLE VALVE & CHECK VALVES

CODE	NAME
INDIA	
1 . P3497	ASTEC VALVES & FITTINGS PRIVATE LIMITED
2 . P3476	COMFIT & VALVES PVT.LTD.

311701 : INSTRUMENT CONTRACTOR FOR INST. CONSTRUCTION/ERECTION WORKS

CODE	NAME
INDIA	
1 . P3178	ANI INSTRUMENT (upto 0.5 Crores)
2 . P3429	GODREJ & BOYCE MFG. CO. LTD.
3 . P3177	INSTROCON ENGINEERS AND CONTROLS (I) PVT. LTD (upto 0.5 Crores)
4 . P3172	JASUBHAI ENGINEERING PVT. LTD.
5 . P3180	L&T (CONSTRUCTION CONTRACTS DIVN.)
6 . P3179	MIRAJ INSTRUMENTATION SERVICE (upto 0.5 Crores)
7 . P3187	NARAYAN ENGINEERING (< RS. 5 LACS (SMALL PROJECT))
8 . P3175	PACE PROCESS CONTROL PVT. LTD.
9 . P3173	PETRON ENGG. CONSTRUCTION LTD.
10 . P3176	PROTECH CONTROL PVT. LTD. (upto 0.5 Crores)
11 . P3511	SPARK AUTOMATION
12 . P3171	TECHNIMONT ICB LTD.

QUALITY PLAN

General points related to Quality Assurance:	
1	The inspection & testing of the cooling towers & its various components shall be as per quality plans approved by the purchaser/ Customer. Bidder shall submit the quality plans based on the guidelines given in specification & quality plans enclosed herein. The customer hold points of BHEL/ Customer/Customer nominated agency shall be marked in the QP at the contract stage, in the event of order & inspection/ testing shall be carried out as per same apart from various test certificates/ inspection records etc.
2	Equipments for which quality plan is not covered in the specification, bidder shall submit QP's for same on the basis of similar guidelines & submit for approval in the event of order.
3	Purchaser / Customer or their authorized representatives shall have the right to inspect at any stage of manufacture & construction, all materials, components & workmanship & testing of material. The bidder shall provide all facilities for inspection & testing without any extra cost to the purchaser/ Consultant.
4	The contractor/ manufacturer shall conduct the following minimum specific tests to ensure that the equipment shall conform to the requirements of specification and in full compliance with the requirements spelt out in applicable codes and standards
4.1	Material identification and testing of gear reducers, regulating valve assemblies, screen assemblies, fan blades and hubs, all supporting structural assemblies, fill supports, all nuts and bolts, sluice valves, fan shafts, fills packs, gear sets, nozzles and all other applicable components constituting each cooling tower.
4.2	Oil leakage and oil temperature rise, backlash, noise level & amperage at full load torque with reduced speed shall be checked for each gear reducer assembly.
4.3	Dynamic balancing of drive shaft assembly and all other rotating components.
4.4	Measurement of proof strength and contour for each fan blade.
4.5	Static balancing test, checking of fan blade moment weight and blade track variation of fan blades, with checking of pitching and blade tip variation at site.
4.6	Complete assembly of drive shaft, Fan hub and Fan blades shall be statically balanced at Site
4.7	Visual, dimensional checking of all components of each cooling tower.
4.8	Material testing of all components, hydrostatic testing of all pressure parts at a pressure and duration in compliance with this specification, static and dynamic balancing tests of all rotating components such as pump shaft, line shaft, impeller etc. and complete performance testing as minimum for each sludge pump in each cooling tower.
4.9	Tests for hoists, chain pulley blocks and all other lifting tackle shall be carried out as per relevant Indian/ equivalent international standards.
5	Any other tests deemed necessary for safe, reliable and satisfactory operation of the equipment.

COOLING TOWERS(IDCT)

SN	TESTS/CHECK / ITEMS / COMPONENTS	Material Test	WPS/PQR/Welder Qualification	Ultrasonic test	DPT/MPI	Balancing	Assembly Fit up	Dimension	RT	Hydraulic / Water Fill	Test as per relevant Std/ Approved Data Sheets	Other Tests
1	**GEAR BOX**						Y[1]	Y				Y[2]
1.1	Shaft and gear blanks	Y[a]		Y	Y[b]							
1.2	Gear Box Casing	Y[a]								Y		
2	**FAN ASSEMBLY**					Y	Y	Y				Y[3]
2.1	Fan hub	Y[a]	Y		Y[b]				Y[4]			Y[3]
2,2	Fan blades	Y[a]						Y				Y[3]
3A	**DRIVE SHAFT (SS) FOR FAN**	Y[a]	Y	Y	Y[b]	Y		Y				
3B	**CARBON FIBER DRIVE SHAFT**	SEE NOTE - 15										
4	**PVC FILL & DRIFT ELIMINATOR**	Y[5]					Y	Y			Y	Y[6]
5	**GATE/ GLOBE/ CHECK VALVES**	Y[a]			Y[b]		Y			Y	Y	Y[8]
6	**BUTTERFLY VALVES**				Y		Y	Y		Y	Y	Y[9]
6.1	Body (Cast) , Disc (Cast)	Y[a]			Y[b]			Y				
6.2	Body & Disc both fabricated	Y[a]	Y	Y	Y[b]			Y	Y[10]			
6.3	Shaft	Y[a]		Y[c]	Y[b]			Y				
7	**ROLLED & WELDED PIPES.**	Y[a]	**REFER NOTE – 11 FOR ALL CHECKS**									
8	**WRAPPING & COATING OF PIPES**	Y[12]						Y			Y	Y
9	**HOISTS & CHAIN PULLEY BLOCKS**	Y[a]	Y		Y		Y	Y			Y	Y[13]
10	**VENTILATION FANS**	Y[a]	Y	Y[c]	Y[b]	Y	Y	Y			Y	Y[14]
11	**FRP STRUCTURE**											
11.1	**Fibre Glass- Pultruded Structural Products**	See Note- 16 & 18										
11.2	**Fiber Glass- Reinforced Plastic Panels**	See Note 17 & 18										
11.3	**Fiber Glass- Reinforced Pipes**	The FRP pipes shall conform to CTI-154										

	Legend/ Notes:	
a.	One per Heat/Heat Treatment batch/Lot	
b.	On machined surfaces only of castings and forgings. Also 100% after root run/ back gauging for butt welds and 10% after final butt welds and fillet welds.	
c.	UT shall be done for shafts with Diameter 50 mm or above & Plates of Thickness 25 mm or above.	
1.	Blue Matching and Backlash of the gears shall be checked.	
2.	No load run test for 4 hours to check noise, vibration, oil leakage and temperature rise.	
3.	Proof load test, moment weight test on blades, blade track variation & tip clearances shall be checked. Galvanizing tests as per relevant IS.	
4.	10% RT on Butt welds of Fan Hub only (in case fabricated).	
5.	PVC material shall meet the requirements of CTI Bulletin STD-136. However impact test may be done as per ASTM-D-256 and Flammability test may be done as per ASTM-D-635 with extinguishing type PVC. Density & VICAT softening temperature tests shall also be conducted.	
6.	UV exposure shall be carried out on samples, at reputed third party laboratories as per ASTM -G26 method- C/standard specified in engineering portion of the specification for cooling tower. Impact test before and after UV exposure shall be conducted as per ASTM D-256.	
7.	--NA---.	
8.	Blue matching, Wear travel for Gate valves & reduced pressure test for Check valves shall be conducted as per relevant standards.	
9.	For POD of Butterfly Valves refer respective engineering section of the technical specification.	
10.	In case of fabricated construction of Butterfly Valves and companion flanges, UT on Plates of Thickness 20 mm or above for body and disc, and RT on 100% Butt welds shall also be carried out. Welders and WPS shall be qualified as per ASME section -IX. Stress reliving after complete welding shall be carried out as per ASME Section - IX	
11.	Tests	Quantum of Check
	WPS, PQR, Welder Qualification Test	100%
	DPT on root run	100% on pipes up to 1200 mm diameter
	DPT after back gauging	100% on pipes above 1200 mm diameter
	RT/ UT by TOFD Technique/PAUT	5% (covering 100% of `T'-joints)
	DPT on finished welds	10%
	Hydraulic Test	100%, Test pressure = 1.5 times the design pressure or 2 times the working pressure whichever is higher.
	Note:- After erection, the complete piping system shall be tested at 1.5 times, the design pressure or two times the maximum working pressure whichever greater. No leakage/seepage is acceptable. Butt weld joints which would not be hydro-tested shall be subjected to 100% RT test/ 100% UT by TOFD /PAUT Technique.	
12.	Spark test, adhesion test and material tests for primer & enamel and coal tar tapes as per AWWA-C-203.	

13.	Ropes shall meet relevant Code requirements. All motions & safety features shall be tested at Works. Full load & 25% overload test shall also be conducted at works. At site, Full load test shall be conducted with all motions and safety features.
14.	One Fan of each type & size will be performance tested as per corresponding Code, for Air Flow, Static pressure, Total pressure, Speed, Efficiency, Power Consumption, Noise, and Vibration & Temperature rise. Also, all fans shall be subjected to run test of 4 hours during which Noise, Vibration, Temperature rise & current drawn shall be measured.
15.	In case of Carbon Fiber Shaft, following checks are applicable a. Manufacturer Test Certificate for Carbon Fiber and Resin b. Dimensional Check, Run out Test and Dynamic Balancing Test on Finished Shaft c. Torsional Test on Drive Shaft Assembly along with flange as a type test to verify the factor of safety. d. Type test for bonding strength at joint between shaft & shaft flange. In case of proven design, test reports of the previous test conducted shall be reviewed. e. UV test for demonstrating the compliance with respect to requirement of UV ray stabilization. Acceptance criteria of the above tests shall be mutually discussed during pre-award discussions based on proven practices of the manufacturer or relevant standards as available
16.	The physical and mechanical properties of FRP pultruded sections as specified in CTI- Standard 137 shall be tested. Fire retardant property as specified shall be tested.
17.	The physical properties of FRP Panels as specified in CTI- Standard 131 shall be tested.
18.	The UV test on identified samples of FRP Pultruded Sections, FRP Panels and FRP Pipes shall be carried out.

LOW PRESSURE PIPING

PIPES, FITTINGS, BENDS, VALVES, COATING-WRAPPING, STRAINERS EXPANSION, JOINTS, TANKS, FASTENERS, LINING ETC.

	Tests/Check / Items / Components	Material Test	DPT/MPI / RT	Ultrasonic Test	WPS/ WQS/PQR	Hydraulic / Water Fill Test	Pneumatic Test	Assembly Fit up	Dimensions	Functional/operational Test	Other Tests	All Tests as per relevant Std	REMARKS
1	Pipes & Pipe Fittings	Y[a]	Y[b]			Y1			Y			Y	
2	Diaphragm Valves	Y[a]				Y[5]			Y		Y[6]		
3A	Cast Butterfly Valves (Low Pressure)					Y		Y	Y	Y	Y[7]		
	Body	Y[a]	Y[b]										
	Disc	Y[a]	Y[b]										
	Shaft	Y[a]	Y	Y[c]									
3B	Fabricated Butterfly Valves	**REFER NOTE 14**											
4	Gate/ Globe/Swing Check / Ball Valves	Y[a]	Y[b]	Y[c]		Y[5]	Y	Y	Y	Y	Y[8]		
5	Dual Plate Check Valves	Y[a]	Y[b]	Y[c]		Y	Y	Y	Y	Y	Y[4]		
6	Rolled & Welded Pipes and Mitre Bends	Y[a]	Y[3]		Y	Y[3]			Y		Y[3&15]	Y	
7	Coating & Wrapping of Pipes	Y[2]									Y[2]		
8	Tanks & Vessels	Y[a]	Y[b]		Y	Y			Y		Y[16]		
9	Strainers	Y[a]	Y[b]		Y #	Y					Y[11]		#For Fabricated Strainer
10	Rubber Expansion Joints	Y[a]				Y[12]		Y	Y		Y[13]		
11	Internal Lining of Pipes	Y[a]							Y		Y[9]		
12	Site Welding		Y[10]		Y	Y							

NOTES (MEANING OF SUPERSCRIPTS)

a	One per heat/heat treatment batch/lot.
b	On machined surfaces only for castings and on butt welds.
c	For shaft/spindles > or = 40 mm
1	100% Hydraulic test shall be carried out. Weld joints not subjected to hydraulic test due to some unavoidable reasons, shall be subjected to 100% RT/PAUT.
2	Spark Test, Adhesion Test and Material Test for primer and enameled & Coal Tar Tapes as per AWWA-C-203-91/ IS-10221 & IS 15337 as applicable.
3	Followings are the testing requirements for fabrication of pipes at site

TESTS	**QUANTUM OF CHECKS**
WPS, PQR, Welder Qualification Test	100% Welders and WPS shall be qualified as per ASME- section IX
DPT on root run	100% for pipes up to 1200 mm diameter
DPT after back gauging	100% for pipes above 1200 mm diameter
RT / UT by (TOFD/PAUT) Technique	5% (100% of T Joints)

	DPT on finished butt weld joints	10%
	Hydraulic Test	100%, 1.5 times the design pressure or 2 times the working-pressure whichever is higher.
4	Dry Cycle Test on Dual Plate Check valve spring for one lakh Cycles shall be carried out as a type test. If Dry Cycle test carried out earlier for same material & diameter, Test report shall be reviewed.	
5	Seat Leakage Test for Actuator Operated Valves, shall be done with by closing the valves with actuator.	
6	Tests on rubber parts shall be conducted per batch of rubber mix for tensile, Elongation, hardness, adhesion, spark test, bleed resistance test. In addition, type test for 50,000 cycles of each type of diaphragm shall also be conducted.	
7	Hydraulic Test of Body, Seat and disc-strength shall be carried out in accordance with governing design standard in presence of owner / owner's representatives. Actuator operated valves shall be checked for Seat Leakage by closing the valves with actuator. For Proof of Design Test refer respective chapters of engineering portion in the technical specification.	
8	Blue matching, wear travel for gates, valves, pneumatic seat leakage, and reduced pressure test for check valves shall be done as per relevant standard. Maximum allowable vacuum loss is 0.5 mm of Hg abs. for valves to be tested for vacuum operation for internal pressure 25 mm of Hg abs. for a period of 15 minutes. Fire safe test for ball valve shall be done wherever specified. In case of already carried out, the test report shall be submitted for review and acceptance by owner / owner's representatives. Valves shall be offered for hydro test in unpainted condition.	
9	Tensile, Elongation, Hardness, Specific Gravity, Lining Thickness, Humidity Check, Pipe temperature check, Adhesion Test and Holiday Detection Test etc as per applicable standard shall be done for all lining material and application.	
10	10% of welds (Root and finished welds) shall be subjected to DPT. (100% DPT for compressed air line and boiler & deaerator fill line.).	
11	Pressure drop across the strainer for each type and size as a special test shall be carried out. In case of already carried out, the test report shall be submitted for review and acceptance by owner / owner's representatives.	
12	During hydraulic and vacuum tests at 25mm Hg abs in 3 positions, the change in the circumference of arch should not be more than 1.5%. 24 hrs after the test permanent set in dimension should not exceed 0.5%.	
13	Tests on rubber for tensile, elongation, hardness, hydraulic stability check as per ASTM D 471, ozone resistance test as per ASTM D 1149/IS 3400 Part 20 aging test and adhesion strength of rubber to fabric, rubber to metal adhesion shall be carried out.	
14	In addition of all tests as indicated for Cast Butterfly valve being applicable for fabricated butterfly valves, following test shall be done for Fabricated Butterfly Valve: a. UT as per ASTM A-435/IS 11630 & IS 4225 on plate material for body and disc shall be carried out for plate thickness 25mm and above. b. 100% RT and DPT as per ASTM, Section-VIII, Division-I, on butt joins of body and disc. 10% DPT on other welds shall be done. c. Post weld heat treatment as per ASME, Section-VIII, Division-I on butt joints of body and disc. d. Welders and WPS shall be qualified as per ASME- section IX	
15	Maximum number of segments in segmental flanges shall be four (04) only. All butt weld joints in the segmental flanges shall be examined by RT/UT. Segmental flanges exceeding 37.5 mm thickness shall be stress relieved as per norms of ASME Section VIII after welding.	
16	For pressure vessel welds RT shall be done as per design code requirements.	

All Valves shall be offered for inspection in unpainted condition.

No repair welding is permitted on Cast Iron / Alloy Cast Iron Castings.

ITEM (MATERIAL, CLASS, GRADE, RATING, RANGE, SIZE ETC) **DRIFT ELIMINATOR AND FILLS (PVC/PP)**	**STANDARD QUALITY PLAN**	**QP NO:**	**0000-999-QOM-S-115**	**PREPARED BY:** / **APPROVED BY:**
		REV NO.:	**00**	
		DATE	**06.04.2026**	
	CONFORMING TO CODE: **CTI STD-136**	**PAGE**	1 OF 1	

SL NO	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N					M	C	N	
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	** 10			11
1.0	**RAW MATERIAL INSPECTION**													
1.1	PHYSICAL PROPERTIES	TENSILE STRENGTH AT YIELD	MAJOR	PHYSICAL & MECHANICAL	01 SAMPLE PER DAY		APPD. DRG. /DATA SHEET / CTI STD-136 (LATEST)		TC	√	P	V	V	SAMPLES SHALL BE TAKEN IN PRESENCE OF CUSTOMER ONLY. TESTS SHALL BE CONDUCTED IN-HOUSE / IN LABS WITH ISO 17025 ACCREDATION NTPC SHALL WITNESS TESTS AT RANDOM ATLEAST ONCE IN MANUFACTURING CYCLE FOR EVERY PROJECT ON SURVEILLANCE BASIS MAIN CONTRACTOR/ MANUFACTURER SHALL INFORM MANUFACTURING PROGRAM TO CUSTOMER ATLEAST 15 DAY PRIOR TO PRODUCTION.
1.2		ELONGATION							TC	√	P	V	V	
1.3		DENSITY							TC	√	P	V	V	
1.4		FLEXURAL STRENGTH (ONLY FOR PVC)							TC	√	P	V	V	
1.5		FLEXURAL MODULUS							TC	√	P	V	V	
1.6		IMPACT RESISTANCE (NOTCHED IZOD / GARDNER)							TC	√	P	V	V	
1.7		HEAT DEFLECTION TEMPRATURE AT 66 PSI (0.46 MPa) & 264 PSI (1.82 MPa)							TC	√	P	V	V	
1.8		FLAMMABILITY TEST							TC	√	P	V	V	
1.9		VICAT SOFTENING TEMPRATURE							TC	√	P	V	V	
1.10		LIMITING OXYGEN INDEX							TC	√	P	V	V	
1.11		UV RESISTENT TEST (500 HRS UV EXPOSURE) IMPACT RESISTANCE TEST IS TO BE CARRIED OUT BEFORE AND AFTER UV EXPOSURE							*	√	P	V	V	TYPE TEST IF APPLIACBLE AS PER ENGG. SPECIFICATION *TYPE TEST REPORT SHALL BE VERIFIED BY CUSTOMER
2.0	**FINAL INSPECTION**													
2.1	FINISHED PRODUCT	APPEARANCE, FINISH & COLOUR	MAJOR	VISUAL	100%	*	APPD. DRG. /DATA SHEET		IR	√	P	W	W	*C & N SHALL WITNESS RANDOM 10 SAMPLES / OFFERED LOT. MANUFACTURER SHOULD MAINTAIN HOURLY LOG.
2.2		DIMENSIONS INCLUDING LENGTH, WIDTH & THICKNESS	MAJOR	MEASURE	RANDOM				IR	√	P	W	W	

LEGEND: * RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. . / * "टिक" (..) के साथ प्रमाणित रिकॉर्ड, क्यूए दस्तावेजीकरण में आपूर्तिकर्ता द्वारा अनिवार्य रूप से शामिल किया जाएगा।** **M:** MANUFACTURER / SUB-SUPPLIER /निर्माता / उप-आपूर्तिकर्ता **C:** MAIN CONTRACTOR / मुख्य संविदाकार, **N:** CUSTOMER **P:** PERFORM/ निष्पादन **W**: WITNESS/ गवाह AND **V:** VERIFICATION. AS APPROPRIATE/ सत्यापन (जैसा उपयुक्त हो), **CHP/** सीएचपी: CUSTOMER SHALL IDENTIFY IN COLUM "N" AS 'W'.: CUSTOMER ^ खंड "N" में **"W'** के रूप में करेगा ।

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.: PE-QP-999-Q-006, REV-02	DATE: 17.04.2020
	PROJECT:		PO NO.:	DATE:
	ITEM: AC ELECT. MOTORS UPTO 55KW (LV (415V))	SYSTEM:	SECTION: II	SHEET 1 of 2

S. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY **			REMARKS
1	2	3	4	5	6		7	8	9	D	M	C	N	
					M	C/ N								
1.0	ASSEMBLY	1.WORKMANSHIP	MA	VISUAL	100%	-	MFG. SPEC.	MFG. SPEC.	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	VISUAL	100%	-	MFG. DRG./ MFG. SPEC.	MFG. DRG./ MFG. SPEC.	LOG BOOK		P	-	-	
		3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	-	MFG.SPEC./	MFG.SPEC.	LOG BOOK		P	-	-	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	-	MFG. SPEC/ APPROVED DATASHEET	MFG. SPEC/ APPROVED DATASHEET	LOG BOOK	✓	P	V	-	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST	MA	VISUAL	100%	-	IS-325 / IS-12615/ APPROVED DATA SHEET	IS-325 / IS-12615/ APPROVED DATA SHEET	TEST/ INSPN. REPORT	✓	P	V *	-	* NOTE -1
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	-	APPROVED DRG/ DATA SHEET	APPROVED DRG/ DATA SHEET	TEST/ INSPN. REPORT	✓	P	V *	-	* NOTE -1 & NOTE-2

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	RITESH KUMAR JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-Q-006, REV-02	DATE: 17.04.2020
		PROJECT:		PO NO.:	DATE:
		ITEM: AC ELECT. MOTORS UPTO 55 KW (415V)	SYSTEM:	SECTION: II	SHEET 2 of 2

		3.NAMEPLATE DETAILS	MA	VISUAL	100%	-	IS-325 / IS-12615 / APPROVED DATA SHEET	SAME AS COL. 7	TEST/ INSPN. REPORT	✓	P	V	-	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MFG. STANDARD / (#)	AS PER MFG. STANDARD / (#).	INSPC. REPORT	✓	P	W	-	(#) REFER NOTE-8

NOTES:
1. Routine tests on 100% motors shall be done by the vendor. However, BHEL/ Customer shall witness routine tests on random samples. The sampling plan shall be mutually agreed upon.
2. For exhaust/ventilation fan motors of rating up to 1.5 KW, only routine test certificates shall be furnished for scrutiny.
3. In case test certificates for these tests on similar type, size and design of motor from independent laboratory are available, the same is valid for 5 years or as per TDS.
4. BHEL reserves the right to perform repeat test, if required.
5. After packing and prior to issue MDCC, photographs of items to be despatched shall be sent to BHEL for review.
6. In case of any changes in QP commented by customer at contract stage, same shall be carried out by bidder without any implication to BHEL/ Customer.
7. Project specific QP to be developed based on customer requirement.
8. For export job, BHEL technical specification for seaworthy packing to be followed.
9. Packing shall be suitable for storage at site in tropical climate conditions.
10. Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) indicated in QP shall be referred.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, B: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, **C**: CUSTOMER,
P: PERFORM, **W**: WITNESS, **V:** VERIFICATION, AS APPROPRIATE
MA: MAJOR, **MI**: MINOR**, CR:** CRITICAL
D: DOCUMENTATION

BHEL					
ENGINEERING			QUALITY		
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BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

बीएचईएल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN	SPEC. NO :	DATE:17.04.2020
		CUSTOMER :	QP NO.: PE-QP-999-Q-007, REV-04	
		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 1 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.0	RAW MATERIAL & BOUGHT OUT CONTROL													
1.1	SHEET STEEL, PLATES, SECTION, EYEBOLTS	1.SURFACE CONDITION	MA	VISUAL	100%	-	-	FREE FROM BLINKS, CRACKS, WAVINESS ETC	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	LOG BOOK		P	-	-	
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	SAMPLE	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	TEST REPORT		P/V	-		
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%	-		FREE FROM CRACKS, UN-EVENNESS ETC.	TEST REPORT		P	-	-	
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	TC		P/V	-	-	PROPERTY CLASS MARKING SHALL BE CHECKED BY THE VENDOR
1.3	CASTING	1.SURFACE CONDITION	MA	VISUAL	100%	-	MANUFACTURER'S DRG./SPEC	FREE FROM CRACKS, BLOW HOLES ETC.	LOG BOOK		P/V	-		
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	TC		P/V	-		HEAT NO. SHALL BE VERIFIED
		3.DIMENSIONS	MA	MEASUREMENT	100%	-	MANUFACTURER'S DRG.	MANUFACTURER'S DRG.	LOG BOOK		P/V	-		
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	-	MANUFACTURER'S DRG./SPEC	MANUFACTURER'S DRG./SPEC	LOG BOOK		P/V	-		

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
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Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 2 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.5	SHAFT (FORGED OR ROLLED)	1. SURFACE COND.	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		P	-	-	VENDOR'S APPROVAL IDENTIFICATION SHALL BE MAINTAINED
		2. CHEM. & PHYSICAL PROPERTIES	MA	CHEM. & PHYSICAL TESTS	1/HEAT NO. OR HEAT TREATMENT BATCH NO	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S DRG./ STD.	TC		P/V	-		
		3. DIMENSIONS	MA	MEASUREMENT	100%	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S DRG.	LOG BOOK		P/V	-		
		4.INTERNAL FLAWS	CR	ULTRASONIC TEST	100%	-	ASTM-A388	MANUFACTURER'S STD.	INSPECTION REPORT	✔	P/W	V	-	FOR DIA OF 55 MM & ABOVE
1.6	SPACE HEATERS, CONNEC-TORS, TERMINAL BLOCKS, CABLES, CABLE LUGS, CARBON BRUSH TEMP. DETECTORS, RTD, BTD'S	1. MAKE & RATING	MA	VISUAL	100%	-	MANUFACTURER'S DRG./STD.	MANUFACTURER'S DRG./STD.	INSPECTION REPORT		P/V	-	-	
		2. PHYSICAL COND.	MA	VISUAL	100%	-	MANUFACTURER'S DRG./STD.	NO PHYS. DAMAGE, NO ELECTRICAL DISCONTINUITY	INSPECTION REPORT		P/V	-	-	
		3.DIMENSIONS (WHEREVER APPLICABLE)	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG./ STD	MANUFACTURER'S DRG. / STD.	INSPECTION REPORT		P/V	-	-	
		4.PERFORMANCE/ CALIBRATION	MA	TEST	100%	-	MANUFACTURER'S DRG./ STD	MANUFACTURER'S DRG. / STD.	TEST REPORT		P/V	-	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
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BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Approved by:			

बी एच ई एल BHEL	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN	SPEC. NO :	DATE:17.04.2020
		CUSTOMER :	QP NO.: PE-QP-999-Q-007, REV-04	
		PROJECT:	PO NO.:	
		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V)) SYSTEM:	SECTION: II	SHEET 3 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC.	MA	VISUAL	100%	-	-	NO VISUAL DEFECTS	TEST REPORT		P/V	-	-	
		2.DIMENSION(BORE DIA, WALL THICKNESS, BDV AS RECEIVED, BDV AFTER FOLDING AT 180°	MA	TEST	SAMPLE	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK AND OR SUPPLIER'S TC		P/V	-	-	
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND.	MA	VISUAL	100%	-	-	NO VISUAL DEFECTS (FREE FROM BURS)	LOG BOOK		P	-	-	
		2.DIMENSIONS INCLUDING BURS HEIGHT	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG. .	MANUFACTURER'S DRG.	LOG BOOK		P/V	-	-	
		3. ACCEPTANCE TESTS	MA	ELECT. & MECH TESTS	SAMPLE	-	MANUFACTURER'S DRG./ STD.	MANUFACTURER'S DRG./ STD.	TC		P/V	-	-	
1.9	CONDUCTORS	1. SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		*P/V	-	-	* MOTOR MANUFACTURER TO CONDUCT VISUAL CHECK FOR SURFACE FINISH ON RANDOM BASIS (10% SAMPLE) AT HIS WORKS AND MAINTAIN RECORD FOR VERIFICATION BY
		2.ELECT. PROP, & MECH. PROP	MA	ELECT. & MECH.TEST	SAMPLES	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S / SPEC.	TC & VENDOR'S TEST REPORTS		P/V	-	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
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Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
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Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	DATE:17.04.2020
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 4 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLES	-	MANUFACTURER'S DRG./ SPEC.	MANUFACTURER'S / SPEC.	LOG BOOK		P/V	-	-	
1.10	BEARINGS	1.MAKE & TYPE	MA	VISUAL	100%	-	MANUFACTURER'S DRG./ APPROVED DATASHEET	MANUFACTURER'S DRG./ APPROVED DATASHEET	LOG BOOK		P/V	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	APPROVED DATASHEET	APPROVED DATASHEET/ BEARING MANUF'S CATALOGUES	LOG BOOK		P/V	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		P/V	-	-	
1.11	SLIP RING (WHEREVER APPLICABLE)	1.SURFACE COND.	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	LOG BOOK		P	-	-	
		3.TEMP.WITH-STAND CAPACITY	MA	ELECT.TEST	SAMPLE	-	MANUFACTURER'S STD./ APPROVED DATASHEET	MANUFACTURER'S STD./ APPROVED DATASHEET	LOG BOOK		P/V	-	-	
		4.HV/IR	MA	-DO-	100%	-	MANUFACTURER'S STD./ APPROVED DATASHEET	MANUFACTURER'S STD./ APPROVED DATASHEET	LOG BOOK		P/V	-	-	
1.12	OIL SEALS & GASKETS	1.MATERIAL OF GASKET	MA	VISUAL	100%	-	MANUFACTURER'S DRG/SPECS	MANUFACTURER'S DRG./ SPECS.	LOG BOOK		P	-	-	
		2.SURFACE COND.	MA	VISUAL	100%	-	-	FREE FROM VISUAL DEFECTS	LOG BOOK		P	-	-	
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	LOG BOOK		P	-	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 5 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
2.0	IN PROCESS													
2.1	STATOR FRAME WELDING (IN CASE OF FABRICATED STATOR)	1.WORKMANSHIP & CLEANNESS	MA	VISUAL	100%	-	MANUFACTURER'S DRG	GOOD FINISH	LOG BOOK		P/W	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	100%	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	LOG BOOK		P	-	-	
2.2	MACHINING	1.FINISH	MA	VISUAL	100%	-	-DO-	GOOD FINISH	LOG BOOK		P	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	100%	-	MANUFACTURER'S DRG	MANUFACTURER'S DRG	LOG BOOK		P	-	-	
		3.SHAFT SURFACE FLOWS	MA	PT	100%	-	MANUFACTURER'S STD./ ASTM-E165	MANUFACTURER'S STD./ APPROVED DATASHEET.	LOG BOOK	✔	P	V	-	
2.3	PAINTING	1.SURFACE PREPARATION	MA	VISUAL	100%	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	
		2.PAINT THICKNESS (BOTH PRIMER & FINISH COAT)	MA	MEASUREMENT BY ELCOMETER	SAMPLE	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	
		3.SHADE	MA	VISUAL	SAMPLE	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	
		4.ADHESION	MA	CROSS CUTTING & TAPE TEST	SAMPLE	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
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Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 6 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK		P	-	-	
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-	MANUFACTURER'S STD.	MANUFACTURER'S STD.	LOG BOOK		P	-	-	
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	
		2.CLEANLINESS	CR	VISUAL	100%	-	MANUFACTURER'S STD./APPROVED DATASHEET	MANUFACTURER'S STD./APPROVED DATASHEET	LOG BOOK		P	-	-	
		3.IR+HV-IR	CR	ELECT. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325//IS-12615/IEC-60034 PART-1	TEST/INSPC. REPORT	✔	P	V	-	
		4.RESISTANCE	CR	ELECT. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325//IS-12615/IEC-60034 PART-1	TEST/INSPC. REPORT	✔	P	V	-	
		5.INTERTURN INSULATION	CR	ELECT. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325//IS-12615/IEC-60034 PART-1	TEST/INSPC. REPORT		P	-	-	
2.6	IMPREGNATION	1.VISCOSCITY	MA	PHY. TEST	AT STARTING	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		3.NO. OF DIPS	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK	✔	P	V	-	THREE DIPS TO BE GIVEN

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	DATE:17.04.2020
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 7 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
		4.DURATION	MA	PROCESS CHECK	CONTINUOUS	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK	✔	P	V	-	
2.7	COMPLETE STATOR ASSEMBLY	1.COMPACTNESS & CLEANLINESS	MA	VISUAL	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
2.8	BRAZING/COMPRESSION JOINT	1.COMPLETENESS	CR	VISUAL	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	LOG BOOK		P	-	-	
		2.SOUNDNESS	CR	MALLET TEST & UT	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	TEST/INSPC. REPORT	✔	P	V	-	
		3.HV	MA	ELECT. TEST	100%	-	MANUFACTURER'S STANDARD	MANUFACTURER'S STANDARD	TEST/INSPC. REPORT	✔	P	V	-	
2.9	COMPLETE ROTOR ASSEMBLY	1.RESIDUAL UNBALANCE	CR	DYN. BALANCE	100%	-	MANUFACTURER'S SPEC./ ISO 1940	MANUFACTURER'S DWG.	LOG BOOK		P	-	-	
		2.SOUNDNESS OF DIE CASTING	CR	ELECT. (GROWLER TEST)	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	TEST/INSPC. REPORT	✔	P	V	-	
2.10	ASSEMBLY	1.ALIGNMENT	MA	MEAS.	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		2.WORKMANSHIP	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		3.AXIAL PLAY	MA	MEAS.	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK	✔	P	V	-	
		4.DIMENSIONS	MA	MEAS.	100%	-	MANUFACTURER'S DRG./ MANUFACTURER'S SPEC.	MANUFACTURER'S DRG./ MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK		P	-	-	
		6. RTD, BTD & SPACE HEATER MOUNTING.	MA	VISUAL	100%	-	MANUFACTURER'S SPEC.	MANUFACTURER'S SPEC.	LOG BOOK	✔	P	V	-	

BHEL					
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Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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Doc No:			
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Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 8 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
3.0	TESTS	1.TYPE TESTS INCLUDING SPECIAL TESTS	MA	ELECT.TEST	1/TYPE/SIZE	1/TYPE/SIZE	IS-325/IS-12615/APPROVED DATASHEET	IS-325/IS-12615/APPROVED DATASHEET	TEST REPORT	✔	P	W*	-	* NOTE - 1
		2.ROUTINE TESTS INCLUDING SPECIAL TEST	MA	ELECT.TEST	100%	-	IS-325/IS-12615/APPROVED DATASHEET	IS-325/IS-12615/APPROVED DATASHEET	TEST REPORT	✔	P	V$	-	$ NOTE - 2
		3.VIBRATION & NOISE LEVEL	MA	ELECT.TEST	100%	-	IS: 12075 / IEC 60034-14 & IS-12065	IS: 12075 / IEC 60034-14 & IS-12065	TEST REPORT	✔	P	V$	-	$ NOTE - 2
		4.OVERALL DIMENSIONS AND ORIENTATION	MA	MEASUREMENT & VISUAL	100%	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET &	TEST/INSPC. REPORT	✔	P	W	-	
		5.DEGREE OF PROTECTION	MA	ELECT. & MECH. TEST	1/TYPE/ SIZE	-	IEC 60034-5/IS-12615	APPROVED DATASHEET	TC	✔	P	V	-	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		6. MEASUREMENT OF RESISTANCE OF RTD & BTD	MA	ELECT. & MECH. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1/IS: 12802	IS-325/IS-12615/IEC-60034 PART-1/IS: 12802	TC	✔	P	V$	-	$ NOTE - 2
		7. MEASUREMENT OF RESISTANCE, IR OF SPACE HEATER	MA	ELECT. & MECH. TEST	100%	-	IS-325/IS-12615/IEC-60034 PART-1	IS-325/IS-12615/IEC-60034 PART-1	TC	✔	P	V$	-	$ NOTE - 2
		8. NAME PLATE DETAILS	MA	VISUAL	100%	-	IS-325/IS-12615& DATA SHEET	IS-325//IS-12615 & DATA SHEET	TEST/INSPC. REPORT	✔	P	V$	-	$ NOTE - 2
		9.EXPLOSION FLAME PROOF NESS (IF SPECIFIED)	MA	EXPLOSION FLAME PROOF TEST	1/TYPE	-	IS 2148 / IEC 60079-1	IS 2148 / IEC 60079-1	TC	✔	P	V	-	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		10. PAINT SHADE, THICKNESS & FINISH	MA	VISUAL & MEASUREMENT BY ELKOMETER	SAMPLE	SAMPLE	APPROVED DATASHEET	APPROVED DATASHEET	TC	✔	P	W$	-	SAMPLING PLAN TO BE DECIDED BY INSPECTION AGENCY $ NOTE - 2

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
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Reviewed by:			
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MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:17.04.2020
	CUSTOMER :		QP NO.: PE-QP-999-Q-007, REV-04	
	PROJECT:		PO NO.:	
	ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV (415V))	SYSTEM:	SECTION: II	SHEET 9 OF 9

Sl No.	Component & Operations	Characteristics	Class	Type of Check	Quantum Of check		Reference Document	Acceptance NORMS	FORMAT OF RECORD		AGENCY			
1	2	3	4	5	6		7	8	9	*	**			
					M	C/N				D	M	C	N	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MANUFACT. STANDARD / (#)	AS PER MANUFACT. STANDARD / (#)	INSPC. REPORT	✔	P	W	-	(#): REFER NOTE-8

NOTES:

1 DEPENDING UPON THE SIZE AND CRITICALLY, WITNESSING BY BHEL SHALL BE DECIDED.

2 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL/CUSTOMER SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON.

3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THE SAME IS VALID FOR 5 YEARS.

4 BHEL RESERVES THE RIGHT TO PERFORM REPEAT TEST, IF REQUIRED.

5 AFTER PACKING AND PRIOR TO ISSUE MDCC, PHOTOGRAPHS OF ITEMS TO BE DESPATCHED SHALL BE SENT TO BHEL PURCHASE GROUP FOR REVIEW.

6 IN CASE , ANY CHANGES IN QP COMMENTED BY CUSTOMER AT CONTRACT STAGE SHALL BE CARRIED OUT BY BIDDER WITHOUT ANY IMPLICATION TO BHEL/ CUSTOMER.

7 PROJECT SPECIFIC QP TO BE DEVELOPED BASED ON CUSTOMER REQUIREMENT.

8 FOR EXPORT JOB, BHEL TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING TO BE FOLLOWED.

9 PACKING SHALL BE SUITABLE FOR STORAGE AT SITE IN TROPICAL CLIMATE CONDITIONS.

10 LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ ASME/ IEC ETC.) INDICATED IN QP SHALL BE REFERRED.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,

** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, B: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, **C**: CUSTOMER,

P: PERFORM. **W**: WITNESS. **V**: VERIFICATION. AS APPROPRIATE

MA: MAJOR, **MI**: MINOR, **CR**: CRITICAL

D: DOCUMENT

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	HEMA KUSHWAHA	HEMA KHUSHWAHA	Checked by:		KUNAL GANDHI
Reviewed by:	PRAVEEN DUTTA	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL	R K JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
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Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO:	DATE:
	CUSTOMER:		QP NO.: PE-QP-999-509-E001, R3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: ABOVE GROUND EARTHING MATERIALS	SYSTEM: EARTHING		SHEET 1 OF 2

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					6					*	**			
1	2	3	4	5	M	B	7	8	9	D	M	B	C	
1.0	**RAW MATERIAL:**													
1.1	MILD STEEL (FLATS & RODS) AS PER SPECIFICATION	1.CHEMICAL & PHYSICAL PROPERTIES	MA	VERIFICATION OF TC'S	100%	-	IS 2062	IS 2062	MILL TC	✓	P	V	-	REFER REMARKS AT SL. NO. 3.1
		2. DIMENSIONS	MA	MEASUREMENT	100%	-	IS 1730	IS 1730	QC RECORD	✓	P		-	
		3.SURFACE FINISH	MA	VISUAL	100%	-	IS 1079	IS 1079	QC RECORD	✓	P		-	
1.2	ZINC	1.CHEMICAL COMP.	MA	CHEM. TEST	SAMPLE	-	IS 209	IS 209	QC RECORD	✓	P	V	-	
2.0	**IN PROCESS:**													
2.1	CUTTING, DRILLING	1.DIMENSIONS	MA	MEASUREMENT	100%	-	IS 1730	IS 1730	QC RECORD	✓	P	V	-	
2.2	SURFACE PREPARATION	1. CLEANING, PICKLING, RINSING & FLUXING	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
2.3	GALVANISING	1.TEMPERATURE OF BATH	MA	MEASUREMENT	CONTINUOUS	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	GALVANIZATION IS TO BE DONE AT GALVANIZATION PLANT LISTED IN ANNEXURE-1 TO QUALITY PLAN.
		2. DROSS	MA	VISUAL	PERIODIC	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
		3.RATE OF IMMERSION	MA	VISUAL/ MEASUREMENT	100%	-	IS 2629	IS 2629	QC RECORD	✓	P	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN	QC RECORD	✓	P	-	-	
3.0	**FINISHED ITEMS:**													
3.1	MS FLATS	1. CHEMICAL COMP.	MA	CHEM. TEST	1 No./LOT/SIZE	-	IS 2026	IS 2026	LAB TC	✓	P	V	-	NOTE: SAMPLE FOR CHEMICAL TEST SHALL BE SELECTED BY BHEL& TESTING SHALL BE DONE AT NABL/ GOVT. APPD. LAB
		2. DIMENSIONS	MA	MEASUREMENT	IS 2500 (PART 1) LEVEL S-4	IS 2500 (PART 1) LEVEL S-4	IS 1730	IS 1730	INSPECTION REPORT	✓	P	W		

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:		MANOJ MEENA	Checked by:		Suman
Reviewed by:		Sandeep Gadhi	Reviewed by:	22-2-24	Hari

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO:	DATE:
	CUSTOMER:		QP NO.: PE-QP-999-509-E001, R3	DATE:
	PROJECT:		PO NO.:	DATE:
	ITEM: ABOVE GROUND EARTHING MATERIALS	SYSTEM: EARTHING		SHEET 2 OF 2

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
					M	B				D	M	B	C	
1	2	3	4	5	6		7	8	9		**			
		3. SURFACE FINISH	MA	VISUAL	IS 2500 (PART 1) LEVEL S-4	IS 2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORD	✓	P	W		
		4.MASS OF ZINC COATING	MA	CHEM. TEST	IS 4759	IS 4759	IS-6745	FLATS 5 MM THICK AND OVER 610 GM/SQ.M. FLATS UNDER 5 MM, BUT NOT LESS 2 MM 460 GM/SQ.M.	INSP. REPORT	✓	P	W	-	
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP. REPORT	✓	P	W	-	
		6. THICKNESS OF ZINC COATING	MA	MEASUREMENT	IS-4759	IS-4759	IS-4759	FLATS 5 MM THICK AND OVER=AVG 86 MICRON AND MINIMUM 75 MICRON. FLATS UNDER 5 MM THICK, BUT NOT LESS 2 MM =AVG 65 MICRON	INSP. REPORT	✓	P	W	-	
		7. ADHESION	MA	MECH. TEST	IS-4759	IS-4759	IS 2629	IS 2629	INSP. REPORT	✓	P	W	-	
	NOTE: ITEMS LIKE PIPES/ FLEXIBLE COPPER BRAID/ GI WIRE/ GS ROD/ SHIELDING MAST/ TEST LINK WILL BE CLEARED BASED ON COC (CERTIFICATE OF COMPLIANCE)													
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	BHEL APPROVED DOC	BHEL APPROVED DOC	INSPC. REPORT	✓	P	V	-	

NOTES:

1 LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ASME/IEC ETC.) INDICATED IN QP SHALL BE REFERRED.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(V) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, **D**: DOCUMENTATION

** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **B**: BHEL/ THIRD PARTY INSPECTION AGENCY, **C**: CUSTOMER, **P**: PERFORM, **W**: WITNESS, **V**: VERIFICATION, AS APPROPRIATE **MA**: MAJOR, **MI**: MINOR, **CR**: CRITICAL

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:		MANOJ MEENA	Checked by:		Suman
Reviewed by:		Sandeep Lodhi	Reviewed by:	23.2.24	Harish

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 1 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	B/ C				D	M	B	C	
1.0 LED TYPE LIGHTING FIXTURES														
A	**Bought out items / in-process checks**													
1.1	LED chip	LED chip efficacy	Major	Visual	Manufacturer Standard	-	LM 80 report	Approved GA drawing	LM 80 report	√	P/ V	V	V	At the time of final Inspection
		LED chip CRI & CCT	Major	Visual	Manufacturer Standard	-	LM 80 report	Approved GA drawing	LM 80 report	√	P/ V	V	V	At the time of final Inspection
		Reported TM21 (L80) lifetime of LED chip	Major	Visual	Manufacturer Standard	-	LM 80 report	Approved GA drawing	LM 80 report	√	P/ V	V	V	At the time of final Inspection
1.2	LED Driver	Compatibility with LED module / chip, controls & protection features	Major	Visual	Manufacturer Standard	-	Approved GA drawing	Approved GA drawing	Certificate of Compliance	√	P/ V	V	V	Certificate of Compliance by LED driver manufacturer / lighting fixture supplier that driver meets all requirements as per approved GA Drawing
		THD & pf check	Major	Electrical	Manufacturer Standard	-	Approved GA drawing	THD <10% and pf >=0.9	Inspection report	√	P/ V*	-	-	Refer note No. 1

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	22/02/24	MEET SAGAR SINGH RAJPAL	Checked by:	23/02/24	Kundan
Reviewed by:	22/2/24	HEMA KUSHWAHA	Reviewed by:	26.02.24	Harish

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 2 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	D	**			
					M	B/ C					M	B	C	
1.3	Castings	Freedom from defects	Major	Visual	Manufacturer Standard	-	Manufacturer Standard	Casting shall be free from any defects such as blow holes , surface blisters , cracks and cravities etc.	Inspection report		P/ V *	-	-	Refer note No. 1
1.4	Sheet metal forming and fabrication	Freedom from defects	Major	Visual	Manufacturer Standard	-	Manufacturer Standard	Manufacturer Standard	Inspection report		P/ V *	-	-	Refer note No. 1
1.5	Pre-treatment and powder coating	Pre-treatment process checks, Powder Coating finish, thickness , uniformity of coating and adhesion	Major	Visual, chemical & mech	Manufacturer Standard	-	Manufacturer Standard	Nominal coating thickness 50 microns or more	Inspection report	√	P/ V *	V		Refer note No. 1

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	24/2/24	MEET SAGAR SINGH RAJPAL	Checked by:	24/2/24	Kundan		
Reviewed by:	24/2/24	HEMA KUSHWAHA	Reviewed by:	24/2/24	Harish Kumar		

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 3 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	B/ C				D	M	B	C	
B	**Acceptance Tests on LED Lighting fixtures**													
1	**LED Lighting fixture**	LED chip make	Major	Visual	-		Accepted type test reports (LM80) report	LM80 report	Certificate of compliance	√	V	V	V	
2		Constructional features including: Internal writing , terminal block, earthing terminal, safety chain (if applicable)	Major	Visual	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
3		Degree of protection test in case of lighting fixtures having IP X4 and above rating.	Major	Mechanical	1 Sample per type	1 Sample per type	IS 10322	Approved GA drawing	Certificate of compliance	√	P	W	V	
4		Resistance to dust (applicable if IP5X and above)	Major	Optical	Manufacturer Standard	-	IS 10322	Approved GA drawing	Certificate of compliance	√	P/ V *	V	V	Refer note No. 1
5		Photometry check	Major	Optical	Manufacturer	-	LM79, IS 16106	Approved GA drawing	Certificate of	√	P/ V	V	V	Refer note No. 1

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	22/02/24	MEET SAGAR SINGH RAJPAL	Checked by:		Kundan			Reviewed by:			
Reviewed by:	24/2/24	HEMA KUSHWAHA	Reviewed by:	22/2/24	Hema			Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
		CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 4 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	B/ C				D	M	B	C	
					Standard				compliance		*			
6		Dimensions	Major	Visual	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
7		LED driver: THD and pf check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	THD<10% and pf >= 0.9	Inspection report	√	P	W	W	At lighting fixtures supplier test lab.
8		LED driver: Precision current control check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
9		LED driver: Open circuit protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
10		LED driver: short circuit protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
11		LED driver: overload protection simulation check	Major	Electrical	1 Sample per type	1 Sample per type	Approved GA drawing	Approved GA drawing	Inspection report	√	P	W	W	
12		LED driver: surge protection	Major	Electrical	1 Sampl	1 Sampl	Approved GA drawing	Certificate of compliance	Certificate of	√	V	V	V	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	24/02/25	MEET SAGAR SINGH RAJPAL	Checked by:		Kundan			Reviewed by:			
Reviewed by:	24/02/24	HEMA KUSHWAHA	Reviewed by:		Harish			Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 5 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY **			REMARKS
					M	B/ C				D	M	B	C	
1	2	3	4	5	6		7	8	9					
		compliance check			e per type	e per type		that surge protection is provided.	compliance					
3.0 JUNCTION BOXES & RECEPTACLES														
A	**Acceptance Tests**													
1	**Acceptance Tests**	Dimensions	Major	MEASUREMENT	100%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	Components shall be of approved Make
2		Paint Shade/ Thickness	Major	VISUAL/MEAS.	10%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	At the time of final Inspection
3		HV/ IR	Major	ELECT.TESTS	100%	-	2KV AC FOR 1 MINUTE	2KV AC FOR 1 MINUTE	Inspection report		P	V	-	
4		Degree Of Protection	Major	TEST	1 Sample/Type	-	IS:2147	IS:2147	TEST CERT.	√	P	V	-	
5		Special tests if any, explosion proof etc.	Major	TEST	1 Sample/Type	-	IS:2148	IS:2148	TEST CERT.	√	P	V	-	
6		Operation Check	Major	TEST	10%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	
7		Mechanical Interlock	Major	TEST	10%	-	Approved GA drawing	Approved GA drawing	Inspection report		P	V	-	
4.0 PACKING														
	PACKING	Soundness of Packing against transit damage	Major	Visual	100%	10%	Approved Packing procedure	Approved Packing procedure	Inspection report	√	P	W	-	

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	22/02/24	MEET SAGAR SINGH RAJPAL	Checked by:		Kundan		
Reviewed by:	22/2/24	HEMA KUSHWAHA	Reviewed by:		Harish		

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		S.O./C. NO	DATE:
	CUSTOMER :		QP NO.:PE-QP-999-558-E001, R05	DATE: 22.02.2024
	PROJECT:		PO NO.:	DATE:
	ITEM: LIGHTING FIXTURES, LAMPS & MISC. ITEMS	SYSTEM:STATION LIGHTING SYSTEM	SECTION: II	SHEET 6 OF 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									*	**			
1	2	3	4	5	6		7	8	9	D	M	B	C
					M	B/ C							

NOTES:

1. P/V"- means test will be performed either by lighting fixture supplier or their sub-vendor and verified by lighting fixture supplier.
2. Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) Indicated in QP shall be referred.
3. Items like ceiling fans, emergency lighting unit, flexible conduit, 24V supply module, ladders, hume pipe, switchboxes, exit signs etc. Will be cleared based on COC (certificate of compliance).

LEGENDS:

*Records, identified with "Tick"(√) shall be essentially included by supplier in QA Documentation,
** **M**: Supplier/ Manufacturer/ Sub-Supplier, **B**: Main supplier/ BHEL/ Third Party Inspection Agency, **C**: Customer,
P: Perform, **W**: Witness, **V**: Verification, as appropriate
MA: Major, **MI**: Minor, **CR**: Critical, **D**: Documentation

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by	22/04/24	MEET SAGAR SINGH RAJPAL	Checked by					Reviewed by			
Reviewed by	24/2/24	HEMA KUSHWAHA	Reviewed by					Approved by			

	MANUFACTURER / BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO: PE-TS-XXX-507-E012	DATE:
		CUSTOMER: -NA-		QP NO.: PE-QP-999-507-E006, REV. 04	DATE:04.01.2024
		PROJECT: -NA-		PO NO.:	
		ITEM: CABLE TRAY SUPPORT SYSTEM-WELDED(GALV)	SYSTEM: CABLING		SHEET 1 OF 2

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
					6						**			
					M	B				D	M	B	C	
1	2	3	4	5			7	8	9					
1.0 RAW MATERIAL														
1.1	MILD STEEL SECTIONS (CHANNEL & ANGLES)	1. CHEM. & PHY. PROPERTIES	MA	VERIFICATION OF TC's	100%	-	IS -2062	IS -2062	~~MILL~~ TC	√	P/V	V	-	
		2.DIMENSIONS	MA	MEASUREMENT	100%	-	IS - 808	IS - 808	QC RECORD		P	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%	-	IS-2062	IS-2062	QC RECORD		P	-	-	
1.2	ZINC	CHEM.COMP.	MA	CHEM TEST	EACH HEAT	-	IS-209	IS-209	TC	√	P/V	V	-	
2.0 IN-PROCESS														
2.1	CUTTING	1.DIMENSIONS	MA	MEASUREMENT	100%	-	Refer remarks	Refer remarks	QC RECORD	√	P	V	-	REFER NOTE-1
		2.SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM DEFECTS & SLAG	QC RECORD	√	P	V	-	
2.2	SURFACE PREPARATION	1.CLEANING, PICKLING & RINSING & FLUXING	MA	VISUAL	100%	-	IS:2629	IS:2629	QC RECORD		P/V	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS:2629	IS:2629	QC RECORD		P/V	-	-	
2.3	GALVANIZING	1.TEMPERATURE OF ZINC BATH	MA	MEASUREMENT	CONTINUOUS	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	REFER NOTE-2
		2.DROSS	MA	VISUAL	PERIODIC	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	
		3.RATE OF IMMERSION	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG FLUX, STAIN ETC.	QC RECORD		P/V	-	-	

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:	22/2/24	MANOJ MEENA	Checked by:	22/2/24	Mintoo
Reviewed by:	22/2/24	HEMA KUSHWAHA	Reviewed by:	22/2/24	Harish

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER / BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO: PE-TS-XXX-507-E012	DATE:
	CUSTOMER: -NA-		QP NO.: PE-QP-999-507-E006, REV. 04	DATE:04.01.2024
	PROJECT: -NA-		PO NO.:	
	ITEM: CABLE TRAY SUPPORT SYSTEM-WELDED(GALV)	SYSTEM: CABLING		SHEET 2 OF 2

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERSTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
					6						**			
					M	B				D	M	B	C	
1	2	3	4	5			7	8	9					
3.0 FINISHED ITEMS														
3.1	**CABLE TRAY SUPPORT SYSTEM-WELDED(GALV)**	1. DIMENSIONS	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	IS - 808	IS - 808	INSP.REPORT	√	P	W	-	REFER NOTE-1
		2. SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, SLAG, ROUGHNESS,FLUX, STAIN ETC.	INSP.REPORT	√	P	W	-	
		3.MASS OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-6745	610 gms/ Sq m	INSP.REPORT	√	P	W	-	
		4.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP.REPORT	√	P	W	-	
		5.THICKNESS OF ZINC COATING	MA	PHYSICAL TEST	IS-4759	IS-4759	Refer remarks	Refer remarks	INSP.REPORT	√	P	W	-	REFER NOTE-3
		6.ADHESION	MA	MECH.TEST	IS-4759	IS-4759	IS-2629	IS-2629	INSP.REPORT	√	P	W	-	
		7.PACKING	MA	VISUAL	100%	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP.REPORT	√	P	√	-	

NOTES:

1. LENGTH OF ONE MEMBER OF CABLE TRAY SUPPORT SYSTEM-WELDED(GALV) SHALL BE 5.5 MTRS TO 6.5 MTRS
2. GALVANIZATION IS TO BE DONE AT BHEL APPROVED GALVANIZATION PLANTS LISTED IN ANNEXURE-1 TO QUALITY PLAN
3. THICKNESS OF ZINC COATING SHALL BE 75 MICRONS (MINIMUM)) & 86 MICRONS (AVERAGE).
4. LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ASME/IEC ETC.) INDICATED IN QP SHALL BE REFERRED

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, **D**: DOCUMENTATION
** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **B** : BHEL/ THIRD PARTY INSPECTION AGENCY, **C**: CUSTOMER,
P: PERFORM, **W**: WITNESS, **V**: VERIFICATION, AS APPROPRIATE MA: MAJOR, **MI**: MINOR, **CR:** CRITICAL

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:		MANOJ MEENA	Checked by:		
Reviewed by:		HEMA KUSHWAHA	Reviewed by:		

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER : -NA-		QP NO.: PE-QP-999-507-E005, REV. 04	DATE: 04.01.2024
		PROJECT: -NA-		PO NO.:	DATE:
		ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING		SHEET 1 of 3

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	B				D	M	B	C	
1	2	3	4	5	6		7	8	9	*	**			
1.0 RAW MATERIAL														
1.1	HOT ROLLED CARBON STEEL SHEET	1 CHEM & PHY PROPERTIES	MA	VERIFICATION OF TC'S	100%	100%	IS -1079	IS -1079	TC	√	P/V	V	-	
		2 DIMENSIONS	MA	MEASUREMENT	100%	-	IS-1730	IS-1730	QC RECORD		P	-	-	
		3 SURFACE FINISH	MA	VISUAL	100%	-	IS-1079	IS-1079	QC RECORD		P	-	-	
1.2	ZINC	CHEM COMP.	MA	CHEM TEST	EACH HEAT	EACH HEAT	IS-209	IS-209	TC	√	P/V	V	-	
2.0 IN-PROCESS														
2.1	FABRICATION	1 DIMENSIONS	MA	MEASUREMENT	100%	100%	APPD DOCUMENT	APPD DOCUMENT	QC RECORD	√	P	V		
		2 WELDING QUALITY	MA	VISUAL	100%	100%	ASME SEC. IX	ASME SEC. IX	QC RECORD	√	P	V		Welding is to be done by qualified welders in accordance with ASME SEC. IX article III. WPS , PQR & WPQ to be reviewed during inspection.
		3 SURFACE FINISH	MA	VISUAL	100%	100%	FREE FROM DEFECTS & SLAG	FREE FROM DEFECTS & SLAG	QC RECORD	√	P	V	-	
2.2	SURFACE PREPARATION	1 CLEANING, PICKLING & RINSING & FLUXING	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	

BIDDER/SUPPLIER	
Sign & Date	
Seal	

BHEL						
	ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name	
Checked by:		MANJU MEENA	Checked by:		Mintoo	
Reviewed by:		HEMA KUMAWAT	Reviewed by:	22/2/24	Harish	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER : -NA-		QP NO.: PE-QP-999-507-E005, REV. 04	DATE: 04.01.2024
	PROJECT: -NA-		PO NO.:	DATE:
	ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING		SHEET 2 of 3

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	D	**			
					M	B					M	B	C	
2.3	GALVANISING	1.TEMPERATURE OF ZINC BATH	MA	MEASUREMENT	CONTINUOUS	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	Galvanization is to be done at galvanization plant listed in Annexure-1 to quality plan.
		2.DROSS	MA	VISUAL	PERIODIC	-	IS-2629	IS-2629	QC RECORD		P/V	-	-	
		3.RATE OF IMMERSION	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD		P/V	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG FLUX, STAIN ETC.	QC RECORD		P/V	-	-	
3.0 FINISHED ITEMS														
3.1	(CABLE TRAY, ACCESSORIES &)	1. DIMENSIONS	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	APPD.DRG	APPD. DOCUMENT	INSP.REPORT	√	P	W	-	
		2. SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	APPD. DRG	FREE FROM BURRS, SLAG, ROUGHNESS,FLUX, STAIN ETC.	INSP.REPORT	√	P	W	-	
		3.RIGIDITY (FOR TRAYS)	MA	DEFLECTION TEST	05 No./ LOT/	05 No./ LOT/	APPD. DRG	APPD. DOCUMENT	INSP.REPORT	√	P	W	-	600MM wide Ladder & perforated cable tray to be tested. Maximum deflection shall not exceed 7MM on mid span on uniform loading of 100KG/M.

BIDDER/SUPPLIER	
Sign &Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:	Manoj	MANOJ MEENA	Checked by:	Manjoo	Manjoo
Reviewed by:	Hema	HEMA KUSHWAHA	Reviewed by:	22/2/24	Hanuman

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO	DATE:
		CUSTOMER : -NA-		QP NO.: PE-QP-999-507-E005, REV. 04	DATE: 04.01.2024
		PROJECT: -NA-		PO NO.:	DATE:
		ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING		SHEET 3 of 3

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY **			REMARKS
					M	B				D	M	B	C	
1	2	3	4	5	6		7	8	9					
3.0 FINISHED ITEMS														
		4 MASS OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-6745	APPD. DOCUMENT	INSP. REPORT	√	P	W	-	
		5 UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP. REPORT	√	P	W	-	
		6 THICKNESS OF ZINC COATING	MA	PHYSICAL TEST	IS-4759	IS-4759	APPD. DOCUMENT	APPD. DOCUMENT	INSP. REPORT	√	P	W	-	
		7 ADHESION	MA	MECH. TEST	IS-4759	IS-4759	IS-2629	IS-2629	INSP. REPORT	√	P	W	-	
		8 COUPLER PLATE	MA	VISUAL	100%	100%	APPD. DOCUMENT	APPD. DOCUMENT	INSP. REPORT	√	P	W	-	Inspector to mention the total number of bags/bundles of coupler plates, nuts, bolts & washer in the inspection report.
		9 NUT & BOLT	MA	VISUAL	100%	100%	APPD. DOCUMENT	APPD. DOCUMENT	INSP. REPORT	√	P	W	-	
		10 WASHER	MA	VISUAL	100%	100%	APPD. DOCUMENT	APPD. DOCUMENT	INSP. REPORT	√	P	W	-	Further manufacturer shall attach the detail of total number of bags/bundles of the respective items with packing list.
		11 PACKING	MA	VISUAL	100%	100%	APPD. DOCUMENT	APPD. DOCUMENT	INSP. REPORT	√	P	V	-	

NOTES:

1. LATEST REVISION/ YEAR OF ISSUE OF ALL THE STANDARDS (IS/ASME/IEC ETC.) INDICATED IN QP SHALL BE REFERRED.

LEGENDS:

*RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. **D**: DOCUMENTATION

** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **B**: BHEL/ THIRD PARTY INSPECTION AGENCY, **C**: CUSTOMER,

P: PERFORM, **W**: WITNESS, **V**: VERIFICATION, AS APPROPRIATE **MA**: MAJOR, **MI**: MINOR, **CR**: CRITICAL

BIDDER/SUPPLIER	
Sign & Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Checked by:			Checked by:		
Reviewed by:			Reviewed by:		

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

Note: This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.

MEASURING INSTRUMENTS

Item Components / Sub System Assembly	Dimensions (R)	Make, Model, Type, Rating (R)	Process / Electrical connection (R)	Calibration (R)	Test as per standard(R)	Insulation Resistance (R)	IBR Certification (As applicable)(R)	Hydro Test(R)	Material Test certificate (R)	Degree of Protection Test
Pressure Gauge (IS-3624 and IS-3624)	Y	Y	Y	Y	Y					Y
Temperature Gauge (IS-2147)	Y	Y	Y	Y	Y					
Level Switch (IS-2147)	Y	Y	Y	Y	Y					Y

R-Routine Test A- Acceptance Test Y – Test applicable

PROCESS CONNECTION AND PIPING

Tests / Items	Visual & Dimensions ®	GA, BOM, Layout of component & construction feature, Paint Shade/thickness ®	Flattening,flaring,hydrotest/hardness check as per ASTM standard (A)	Component Ratings ®	Wiring ®	Make, Model, Type, Rating®	IR & HV ®	Review of TC for instrument/devices (R)	Accessability of TBs/Devices Illumination,grounding ®	Tubing ®	Leak/Hydro test(A)	Chemical/physical properties of material (A)	Proof pressure test,Dismantling & reassembly test,Hydrulic Impulse and vibration test (R)	Tests as per standards & specification
Junction Box (IS-2147)	Y	Y*		Y		Y	Y							
Impulse pipes and tubes	Y		Y			Y						Y		
Socket weld fittings ANSI B-16.11	Y					Y						Y		Y
Compression fittings	Y					Y					Y	Y	Y	
Instrument valves & Valve manifolds	Y					Y					Y	Y		
*-applicable for painted junction boxes.														

®-Routine Test A-Acceptance Test Y – Test applicable

INSPECTION AND

TEST REQUIREMENTS

FOR INSTRUMENTATION

CONTENT

ATTACHMENT

1. INSPECTION AND TESTS

1.1 General

1.1.1 All instruments and system-oriented items shall undergo factory testing and inspection by authorized Third party representatives / Owner and PMC unless specified otherwise.

1.1.2 Wherever inspection at manufacturer's shop is waived because of any reason, the sub vendor's own testing reports shall be verified before despatch. In no case items shall be released without proper inspection verification.

1.1.3 The inspection and testing shall be carried out as per related specifications, international codes and practices/standards, approved documents and/or any other documents attached along with specifically suggesting testing to be carried out at manufacturer' works.

1.1.4 Items, for which 'Witness Inspection' is specifically exempted, manufacturer shall forward the test certificates as desired for review. The material shall be despatched only after obtaining written despatch clearance.

1.1.5 No system or system oriented item shall be despatched without integrated factory testing witnessed by representatives of / Third party inspector / Owner /PMC. The testing procedures shall be detailed out, based on testing requirements indicated in individual system specifications and shall be approved by Owner/ PMC. It must certify that the system is actually ready before calling the Owner/PMC for FAT. Also all the necessary documents and literature are to be submitted before calling for FAT.

1.1.6 Testing and inspection for all items shall be carried out as per approved factory testing procedures.

1.1.7 Performance specifications must be detailed out on each time which shall be verified by third party agency / by Owner / PMC during factory testing.

1.1.8 Acceptable criteria for Radiography and other NDT requirements for the instruments / instrument castings shall be inline with those specified in 'Piping Specifications' have been attached elsewhere in this package.

1.1.9 IBR certifications shall be provided by in the appropriate format duly signed by IBR authority or their authorised agency.

1.1.10 Verification of setpoint of rupture disc shall be part of witness inspection. Testing shall be carried out on the rupture disc, which are part of the actual rupture disc batch of manufacturer. This shall be in addition to the 3 numbers of spare rupture discs already indicated in the requirements. The testing, in general, shall be as per ASME section VIII.

1.1.11 Inspection and test items, witness inspection items for each kind of instrument at FAT (Factory acceptance test) shall be as shown in Table A.

1.1.12 Inspection and acceptance standards

Inspection and acceptance standards shall be as follows.

1.2 Visual Inspection

1.2.1 Conformation items

1. Type and model
2. Tag no.
3. Rating
4. Range, Scale and symbol of unit
5. Set pressure and capacity of safety valves
6. Valve characteristics and CV value of control valves
7. Name of materials
8. Nameplate
9. Colour of painting
10. Die Marking (nominal size, material of flange and direction of flow)
11. Accessories
12. Quantity

1.2.2 Harmful defects

- Defect such as cracks, deformation and flaws shall not be found in the casting, forging and machined surface of the pressure rating part.
- Defect such as inside surface weld protrusion; lack of fusion and incomplete penetration shall not be found in welded places of pressure retaining part.

1.2.3 The instrument shall be in rugged design and assembly of all components within the enclosure fixed firmly to avoid loosening or falling-off of any parts.

1.2.4 Painting of instrument's surface shall be such that there is no defect or lack of uniformity.

1.3 Dimensional Inspection

[X] Main parts
[ ]
[ ]

Check and conform to the requirement of Purchaser's Spec, approved drawings or applicable code and standards.

1.4 Material Inspection

1.4.1 Mill test certificates

Manufacturer shall submit the mill test certificates for the following parts.

1. ANSI class 900 or above (ALL material used at the P.T. ratings)

2. The following parts made of steel for :
   - High temperature service (Alloy steel above C-Mo steel used at temperature of 400ºC or over)
   - Low temperature service (Iron and steel material of design temperature bellow minus 11ºC containing Al-killed steel)
   - Corrosion-resistant materials

I.	Temperature detective parts	: **[X]**	Flange and Thermowell
II.	Orifice assembly	: **[X]**	Flange
III.	Venturi tube, Flow nozzle and Low-loss tube	: **[X]**	Body
IV.	Positive displacement flow meter and	: **[X]**	Body, Strainer and

	Turbine meter		Straightner
V.	Area type flow meter	: **[X]**	Body and Flange
VI.	Displacement type liquid level meter	: **[X]**	Chamber and Flange
VII.	Glass Gauge	: **[X]**	Body and Flange
VIII.	Control valve	: **[X]**	Valve body, Bonnet, Plug, Seat and Vane
IX.	Safety valve	: **[X]**	Valve body, Nozzle and Disc
X.	Condensate pot	: **[X]**	Body
XI.	Gas eliminator	: **[X]**	Body

1.4.2 Material grade 316SS or 316L SS of stainless steel, Purchaser may require Vendor to carry out the qualitative analysis for molybdenum.

1.5 Non-Destructive Examination

1. Control valve and safety valve
   Following Par. 1.5.2 and 1.5.3

2. Other instruments
   Shall be carried out in accordance with manufacture's standards approved by Purchaser

1.5.1 Ultrasonic Examination

1. Forging material on Orifice flange and Flow nozzle
   [X] ANSI class 900 or above
   [ ]

1.5.2 Radiography Examination

[ ] The pressure retaining casting parts

1. Applicable material and quantity (refer table VI)
   - Welded parts : [ ] JIS Z 3104, Z 3106
     [X] ASME VIII Division 1 uw-51 "Radiographic & Radioscopic Examination of Welded Joints"

2. Acceptant standards and grade
   - Casting : [ ] JIS G 0581
     [X] ASTEM E 446-9 or 186-93

Table VI Radiography Examination

Materials			Quantity
Casting	class 1500 or over	C-steel	One out of total quantity of the same type, size and rating for pressure retaining critical parts(a)
	class 900 or over	C-Mo steel	
	class 600 or over	Cr-Mo steel Stainless steel	
	class 300 or over	Al-killed steel 2.5 Ni steel 3.5 Ni steel	
Pressure retaining welded parts	class 1500 or over	C-steel C-Mo steel	One spot on each welded parts per same material and same welder. All welded crossing parts
	class 300 or over	Cr-Mo steel Stainless steel	
	class 150 or over	Al-killed steel 2.5 Ni steel 3.5 Ni steel	

a. Following parts are Critical parts.
- Groove-welded parts of cast body
- Flangeneck and valve seat's vicinity of cast body
- Other welded parts included in pressure retaining parts

Note: 1. In case of practical difficulty to perform Radiography Test, Manufacture shall notify Purchaser in advance, and for such case, magnetic particle or liquid penetrant examination may be used in accordance with Par. 1.5.3 with Purchaser's approval.

2. For the welded parts having nominal size of 1-1/2 in. or below, magnetic particle or liquid penetrant examination in Par. 1.5.3 may be used.

1.5.3 Magnetic Particle or Liquid Penetrant Examination

[X] For the pressure retaining parts

Table VII Magnetic particle / Liquid penetrant examination

Materials			Quantity
Casting	class 900 or over	C-steel	20% of total quantity of the same type, size and rating for pressure retaining critical parts (a)
	class 600 or over	Cr-Mo steel Cr-Mo steel Stainless steel	
	class 150 or over	Al-killed steel 2.5 Ni steel 3.5 Ni steel	
Pressure retaining welded parts (b)	class 150 or over	All materials	20% of total welded parts

a. Refer to Par. 1.5.2(1).
b. Including butt groove-welded parts at site.

1.6 Pressure Test

1.6.1 Control Valve

1. Body and Bonnets

[X] Hydrostatic test with Applicable codes and standards

2. Body of special type

[X] Hydrostatic test

Test pressure and Hold time

[X] 1.5 times of max. Operating pressure / min. 2 kgcm2g
[X] Minimum 5 minutes.

3. Permanent distortion or Leakage

[X] shall not be found

1.6.2 Safety Valve or Safety Relief Valve

1. Pressure retaining parts

[X] Hydrostatic test before assembling

i. Test pressure and Hold time

[ ] 1.5 times of Max. Operating pressure / min. 2 kgf/cm2g.
[X] 2.2 times of Max. Operating pressure.
[X] Minimum 5 minutes.

ii Distortion or leakage
[X] shall not be found

2. The out side parts of enclosed type
[X] Hydrostatic test after assembling

i. Test pressure and Hold time
[X] 1.5 times. Nominal pressure of flange
[ ] 2.2 times. Nominal pressure of flange
[X] Minimum 5 minutes.

ii. Defects
[X] Shall not be found

3. Special type valves

[X] Hydrostatic test with the manufacturer's standards approved by purchaser, where Par. 1.6.2(1) and (2) are not applicable

1.6.3 The pressure retaining parts of instrument

[X] Hydrostatic test or Pneumatic test as per applicable codes and standard

I Test pressure and Hold time
[X] 1.5 time of Max. Operating pressure / Min. 2 kg/cm2g
[X] Min. 5 minutes

ii Permanent distortion or Leakage
[X] Shall not be found

If the above mentioned test is technically difficult, the test shall be carried out in accordance with the manufacturer's standards approved by purchaser.

1.7 Pneumatic Test

1.7.1 The pneumatic test for instrument

I Test pressure & Hold time

[X] Max. Operating Pressure. (Design press.)
[X] Minimum 5 minutes

ii Permanent distortion or Leakage

[X] Shall not be found

1.8 Seat Leakage Test

1.8.1 Control Valve

Allowable leakage valve / (code):

[X] ANSI B16.104 (FCI 70-2)

Unless other wise specified, butterfly valves shall not require the seat leakage test.

1.8.2 Safety valve

Seat leakage test (closing property) as follows.

1. Safety valve for Steam

   i. Test pressure

      [X] 90% of set pressure

   ii. Leakage

      [X] Shall not be found

2. Safety valve for Gas

   i. Test pressure

      [X] 90% of set pressure

   ii. Allowable leakage value (Refer Table – VIII)

Table VIII - Allowable leakage value of Safety valve

Type	Orifice Area (mm)	Number of Bubbles (min)	Leakage Value (cm3/min)
General	16.0 and less 20.5 and over	40 20	11.80 5.90
Balance bellows	16.0 and less 20.5 and over	50 30	14.75 8.85

3. Relief safety valves, Vacuum breakers and atmospheric valve
   [X] Manufacture's standard (approved by Purchaser)

1.9 Performance Test

For each instruments, the performance test shall be carried out in accordance with procedure approved by Client / PMC.
Acceptance standard shall be in accordance with applicable codes & standard, All specification, and manufacture's standard shall be approved by Client / PMC.

1.10 Steam Test

Steam test shall be performed as follows:

[ ] Valves used for steam service Temperature of 450°C or more, and the body ratings of class 600 and above.

[ ] After attaining the steady surface temperature same as temperature of the service with the pressure of service condition.

In the case, when steam test has been performed and the report is submitted for the valve of same type, same bore size and material from the same lot, the steam test for the other valves may be omitted.

1. Leakage

   i. Body : [ ] Shall not be found
   ii. Seat : [ ] As per specified leakage value

2. Operation

   [ ] To be smooth

   After the steam test, the test of Par. 1.6 and Par. 1.8 shall be carried out.

1.11 Insulation Resistance Test

1. Power supply circuit & alarm circuit : 10M Ω or over (instrument panel: 3 MΩ or over/each panel)

2. Signal circuit : 5M Ω or more (instrument panel: 3 MΩ or More per panel)

The test shall be carried out in accordance with the applicable codes & Standards. Due to any technical constraint to measure, this test can be omitted

1.12 High-voltage Test

1. A-C power supply and alarm circuits

   i. Voltage level less than 250 V : **[X]** A-C 1500 V

   ii. Voltage level 250 V and above : **[X]** A-C 2E + 1000V

   'E' is the rated voltage.

2. D-C power supply circuits : **[X]** A-C 500V

   Test can be omitted in case of any technical constraint.

Table A : Table of Inspection and Test Items

Kind of Instrument	Inspection and Test Items										
	Visual insp.	Dimensional insp.	Material insp.	Non-destructive exam	Pressure test	Pneumatic test	Seat Leakage test	Performance test	Insulation resistance test	High voltage test	Steam test
1 Thermocouple	○ ●T	○●T	—	—	—	—	—	□●T	□●T	□●T	—
2 Resistance thermometer bulb	●T ○	●T ○	—	—	—	—	—	●T □	□●T	□●T	—
3 Compensating lead wire	○●T	○●T	—	—	—	—	—	□●T	□●T	□●T	—
4 Bimetallic thermometer	○●T	○●T	—	—	—	—	—	□●T	—	—	—
5 Gas or liquid-filled thermometer	○●T	○●T	—	—	—	—	—	●T □	—	—	—
6 Thermowell	○●T	○●T	○ □●T	○ □●T	○ □●T	—	—	—	—	—	—
7 Orifice plate	○●T	○ □●T	○●T	—	—	—	—	—	—	—	—
8 Orifice flange	○●T	○●T	○ □●T	○ □●T	—	—	—	—	—	—	—
9 Restriction orifice	○●T	○ □●T	○●T	—	—	—	—	—	—	—	—
10 Flow nozzle low-loss tube	○●T	○●T	○ □●T	○ □●T	○ □●T	—	—	—	—	—	—
11 Venturi tube	○●T	○●T	○ □●T	○ □●T	○ □●T	—	—	—	—	—	—
12 Positive displacement flow meter	●T ○	●T ○	●T ○ □	●T ○ □	●T ○ □	—	—	●S ○ □	●T ○ □	●T ○ □	—
13 Area type flow meter	○●T	○●T	○ □●T	○ □●T	○ □●T	—	—	○ □●T	○ □●T	○ □●T	—
14 Thermal mass flow meter	●T ○	●T ○	●T ○	—	●T ○ □	—	—	●S ○ □	●T ○ □	●T ○ □	—
15 Turbine meter	●T ○	●T ○	●T ○ □	●T ○ □	●T ○ □	—	—	●S ○ □	●T ○ □	●T ○ □	—
16 Differential pressure flow meter	●T ○	●T ○	—	—	●T ○ □	—	—	●T ○ □	●T ○ □	●T ○ □	—
17 Differential pressure transmitter	●T ○	●T ○	—	—	●T ○ □	—	—	●T ○ □	●T ○ □	●T ○ □	—
18 Magnetic flow meter	●T ○	●T ○	●T ○	●T ○ □	●T ○ □	—	—	●S ○ □	●T ○ □	●T ○ □	—
19 Bourdon gauge	○●T	○●T	—	—	○ □●T	—	—	○ □●T	—	—	—
20 Draft gauge	○●T	○●T	—	—	—	—	—	○ □●T	—	—	—
21 Differential pressure gauge	○●T	○●T	—	—	○ □●T	—	—	○ □●T	—	—	—
22 Pressure transmitter	○●T	○●T	—	—	○ □●T	—	—	○ □●T	○ □●T	○ □●T	—
23 Displacement type level indicator, controller	●T ○	●S ○ □	●T ○	●T ○	●S ○ □	—	—	●S ○ □	●S ○ □	●T ○ □	—
24 Chamber for displacement type level meter	○●T	○ □●T	○ □●T	○ □●T	○ □●T	—	—	—	—	—	—
25 Glass gauge	○●T	○ □●T	○ □●T	○ □●T	○ □	—	—	—	—	—	—

Kind of Instrument	Inspection and Test Items										
	Visual insp.	Dimensional insp.	Material insp.	Non-destructive exam	Pressure test	Pneumatic test	Seat Leakage test	Performance test	Insulation resistance test	High voltage test	Steam test
26 Float type level meter,	●T ○	●S ○	●T ○ □	●T ○ □	●S ○ □	—	—	●S ○ □	●S ○ □	●T ○ □	—
27 Differential pressure type level meter	○●T	●T ○	●T ○	—	●T ○ □	—	—	●T ○ □	●T ○ □	●T ○ □	—
28 Purge type level meter	○●T	○●T	—	—	—	—	—	○ □●T	—	—	—
29 Capacitance type level meter	○●T	●T ○ □	●T ○	—	—	—	—	●T ○ □	●T ○ □	●T ○ □	—
30 Conductivity type level meter	○●T	●T ○	●T ○	—	—	—	—	●T ○ □	●T ○ □	●T ○ □	—
31 Conductivity type level meter	●T ○	●S ○	—	—	—	—	—	●S ○ □	●S ○ □	●T ○ □	—
32 Weight sounding type level meter	●T ○	●S ○	—	—	—	—	—	●S ○ □	●S ○ □	●T ○ □	—
33 Radiation type level meter	●T ○	●S ○	—	—	—	—	—	●S ○ □	●S ○ □	●T ○ □	—
34 Pneumatic type control valve	●T ○	●S ○	●T ○ □	○ □●T	●S ○ □	—	●S ○ □	●S ○ □	●T ○ □	●T ○ □	
35 Hydraulic type control valve	●T ○	●S ○	●T ○ □	●T ○ □	●S ○ □	—	●S ○ □	●S ○ □	●T ○ □	●T ○ □	
36 Motor-operated control valve	●T ○	●S ○	●T ○ □	●T ○ □	●S ○ □	—	●S ○ □	●S ○ □	●S ○ □	●S ○ □	
37 Self-acting control valve	○●T	○●T	○ □●T	○ □●T	○ □●T	—	—	○ □●T	—	—	—
38 Indicator	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
39 Recorder unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
40 Controller unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
41 Integrator unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
42 Alarm setting unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
43 Computing unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
44 Converter unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
45 Limiter unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
46 Power source unit	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
47 Instrument panel	●T ○	●S ○	—	—	●T ○ □	●S ○ □	—	●S ○ □	●T ○ □	●T ○ □	—
48 Instrument desk	●T ○	●S ○	—	—	—	—	—	●S ○ □	●T ○ □	●T ○ □	—
49 Gauge board	●T ○	●S ○	—	—	●T ○ □	●S ○ □	—	●S ○ □	●T ○ □	●T ○ □	—
50 Safety valve	●T ○	●S ○ □	●T ○ □	●T ○ □	●T ○ □	—	●S ○ □	●S ○ □	—	—	—
51 Pilot operated safety relief	●T	●S	●T	●T	●T	—	●S	●S	—	—	—

Kind of Instrument	Inspection and Test Items										
	Visual insp.	Dimensional insp.	Material insp.	Non-destructive exam	Pressure test	Pneumatic test	Seat Leakage test	Performance test	Insulation resistance test	High voltage test	Steam test
valve	○	○ □	○ □	○ □	○ □		○ □	○ □			
52 Vacuum breaker	●T ○	●S ○ □	●T ○ □	●T ○ □	●T ○ □	—	●S ○ □	●S ○ □	—	—	—
53 Atmospheric valve	●T ○	●S ○ □	●T ○ □	●T ○ □	●T ○ □	—	●S ○ □	●S ○ □	—	—	—
54 Gas chromato-graph	●T ○	●T ○	—	—	—	●T ○ □	—	●S ○ □	●S ○ □	●T ○ □	—
55 Mass spectro-meter	●T ○	●T ○	—	—	—	●T ○ □	—	●S ○ □	●S ○ □	●T ○ □	—
56 Infrared type gas analyzer	●T ○	●T ○	—	—	—	●T ○ □	—	●S ○ □	●S ○ □	●T ○ □	—
57 Magnetic type gas analyzer	●T ○	●T ○	—	—	—	●T ○ □		●S ○ □	●S ○ □	●T ○ □	—
58 Thermal conductivity type analyzer	●T ○	●T ○	—	—	—	●T ○ □	—	●S ○ □	●S ○ □	●T ○ □	—
59 Combustion type gas analyzer	●T ○	●T ○ □	—	—	—	●T ○ □	—	●S ○ □	●S ○ □	●T ○ □	—
60 Density type gas analyzer	●T ○	●T ○	—	—	—	—	—	●S ○ □	●S ○ □	●T ○ □	—
61 Photo-electric type analyzer	●T ○	●T ○	—	—	—	—	—	●T ○ □	●T ○ □	●T ○ □	—
62 Moisture analyzer	○●T	●T ○	—	—	—	—	—	●T ○ □	●T ○ □	●T ○ □	—
63 pH meter	○●T	○●T	—	—	—	—	—	○ □●T	○ □●T	○ □●T	—
64 Turbidity analyzer Water quality analyzer	●T ○	●T ○	—	—	●T ○ □	—	—	●T ○ □	●T ○ □	●T ○ □	—
65 Density meter	○●T	○●T	—	—	○ □●T	—	—	○ □●T	○ □●T	○ □●T	—
66 Electric conductivity meter	○●T	○●T	—	—	○ □●T	—	—	○ □●T	○ □●T	○ □●T	—
67 Flame detector	●T ○	●T ○	—	—	—	—	—	●S ○ □	●S ○ □	●T ○ □	—
68. Mass Flow meter	●T ○	●T ○	●T ○ □	●T ○ □	●T ○ □	—	—	●S ○ □	●T ○ □	●T ○ □	—
69. Vortex Flow Meter	●T ○	●T ○	●T ○ □	●T ○ □	●T ○ □	—	—	●S ○ □	●T ○ □	●T ○ □	—
70 Gas detector	●T ○	●T ○	—	—	—	—	—	●S ○ □	●S ○ □	●T ○ □	—

○ : Tested by Manufacturer.
● : Tested by manufacturer & witnessed by 3rd party inspector(TPI).
□ : Manufacturer will submit Inspection & test records.
T : Total Inspection by TPI.
S : Sample inspection by TPI.(10% of total quantity of the same type & rating.

Notes: PMC/OWNER may witness any or all testing in stages during manufacturer or at final stage before shipment.

PAINTING REQUIREMENT

Sl no	Condition	Surface Preparation	Primer Coat	No. of Coats	DFT (in Microns)	Intermediate Coat	No. of Coats	DFT (in Microns)	Final Coat	No. of Coats	DFT (in Microns)	Total DFT
EXTERNAL SURFACE - OVER GROUND PIPING												
1	CW/Clarified Water	SHOT BLASTING/ ABRASIVE BLASTING OR POWER TOOL CLEANING.	ZINC CHROME PRIMER (ALKYD BASE) BY BRUSH/ SPRAY TO IS 104. OR RED OXIDE ZINC PHOSPHATE PRIMER (ALKYD BASE) TO IS	2	25	SYNTHETIC ENAMEL (LONG OIL ALKYD) TO IS 2932.	1	30	SYNTHETIC ENAMEL (LONG OIL ALKYD) TO IS 2932	2	35	150
INTERNAL SURFACE (FOR PIPE 1000 NB AND ABOVE)												
2	CW/Clarified Water	SHOT BLASTING/ ABRASIVE BLASTING OR POWER TOOL CLEANING.	EPOXY BASED ZINC RICH PRIMER	1	50	-	-	-	COAL TAR EPOXY	2	75	200
BURRIED CW PIPING (CONCRETE ENCASED)												
3	CW PIPE IN BIDDER'S SCOPE SHALL BE CONCRETE ENCASED STEEL LINED DUCTS. CONCRETE ENCASEMENT SHALL BE OF MIN 500 MM THICK WITH SQUARE SHAPE OUTSIDE. M20 GRADE PCC ENCASEMENT SHALL BE PROVIDED OTHER THAN LOCATIONS OF DUCT CROSSING ROAD, RAIL OR ANY OTHER FACILITY WHERE RCC ENCASEMENT OF GRADE M25 SHALL BE ADOPTED. TOP OF CW DUCT ENCASEMENT SHALL BE MIN. 1.5 M BELOW FGL.										
STRUCTURAL STEEL												
4	CW/Clarified Water	Shot blasting/ Abrasive blasting or Power tool cleaning.	Sealed Zinc spray as per BS 5493.	1	250	zinc Phosphate Epoxy	1	30	coal tar Epoxy paint	3	75	505
CIVIL STRUCTURES												
5	REFER CIVIL SPECIFICATION (BOOK 2 OF 2)											

	TECHNICAL SPECIFICATION INDUCED DRAFT COOLING TOWER 2000 TPD BCGCL COAL TO AMMONIUM NITRATE - LSTK-1	PE-TS-544-165-W001 Rev. No. 00 07.05.2026

DOCUMENTATION REQUIREMENT

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID

Sl. No.	DOCUMENT TITLE
1	PQR CREDENTIALS
2	COMPLIANCE SHEET (DULY SIGNED AND STAMPED)
7	PERFORMANCE GUARANTEE SCHEDULE (DULY SIGNED AND STAMPED)
3	GENERAL ARRANGEMENT DRAWING FOR COOLING TOWER, INCORPORATING ALL RELEVANT DIMENSIONS, COLD WATER CHANNELS / SLUDGE CHAMBER/ SCREENS/ GATES IN THE COLD WATER CHANNEL, STAIRCASE ETC.
4	PUMPING HEAD CALCULATIONS
5	THERMAL DESIGN CALCULATIONS
6	TOWER PERFORMANCE CURVES
8	TECHNICAL DEVIATION SCHEDULE (IF ANY)
9	UNPRICED COPY OF THE PRICE SCHEDULE (INDICATING “QUOTED” FOR THE LISTED ITEMS).

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE

Sl. No.	DOCUMENT TITLE	SUBMISSION SCHEDULE
A	**BASIC DRAWINGS / DOCUMENTS**	
1	GENERAL ARRANGEMENT OF INDUCED DRAUGHT COOLING TOWER	6 WEEKS FROM LOI
2	GA OF C.W. BASIN OF COOLING TOWER	6 WEEKS FROM LOI
3	THERMAL DESIGN & FRICTION LOSS CALCULATIONS AND CHARACTERISTIC & PERFORMANCE CURVES FOR IDCT	6 WEEKS FROM LOI
4	CIVIL DESIGN BASIS OF IDCT	8 WEEKS FROM LOI
5	LAYOUT AND DETAILS OF FOUNDATION	15 WEEKS FROM LOI
6	GA OF FOUNDATION, POND WALL AND PEDESTAL	15 WEEKS FROM LOI
7	METHODOLOGY STATEMENT FOR PILING WORKS	12 WEEKS FROM LOI
8	STRUCTURAL DESIGN OF 760 MM DIA. BORED CAST IN-SITU TEST PILES FOR COOLING TOWERS PACKAGE	12 WEEKS FROM LOI
9	LOCATION OF BORED CAST IN SITU TEST PILES FOR COOLING TOWERS	12 WEEKS FROM LOI
10	NUMERATION AND RC DETAILS OF TEST PILE	12 WEEKS FROM LOI
11	DESIGN CALCULATION OF SUB STRUCTURE FOR CT	16 WEEKS FROM LOI
12	DESIGN CALCULATION FOR SUPER STRUCTURE OF CT	16 WEEKS FROM LOI
13	ANALYSIS & DESIGN OF POND WALL, POND FLOOR	15 WEEKS FROM LOI
14	LAYOUT AND DETAILS OF PILE/FOUNDATION OF INTERNAL FILL SUPPORT STRUCTURE	16 WEEKS FROM LOI
15	LAYOUT AND DETAILS OF POND FLOOR AND GRILLAGE COLUMN FOOTINGS	16 WEEKS FROM LOI
16	R.C. DETAILS OF PILECAP/FOUNDATION, POND WALL AND PEDESTAL	16 WEEKS FROM LOI
B	**DETAILED DRAWINGS / DOCUMENTS**	
1	SCHEMATIC ARRANGEMENT OF FILL & FILL SUPPORTING DETAILS FOR COOLING TOWER	21 WEEKS FROM LOI

2	SCHEMATIC ARRANGEMENT OF INTERNAL DISTRIBUTION SYSTEM FOR COOLING TOWER	21 WEEKS FROM LOI
3	SCHEMATIC ARRANGEMENT OF EXTERNAL HW DISTRIBUTION SYSTEM OF COOLING TOWER	30 WEEKS FROM LOI
4	SCHEMATIC ARRANGEMENT OF DRIFT ELIMINATORS FOR COOLING TOWER	31 WEEKS FROM LOI
5	SCHEMATIC ARRANGEMENT OF MECHANICAL EQUIPMENT OF COOLING TOWER	31 WEEKS FROM LOI
6	TDS FOR DRIFT ELIMINATOR FOR IDCT	31 WEEKS FROM LOI
7	TDS FOR FILL FOR IDCT	31 WEEKS FROM LOI
8	TDS FOR DISTRIBUTION PIPES	31 WEEKS FROM LOI
9	GAD AND DATA SHEET OF DRIVE SHAFT ASSY. FOR IDCT	31 WEEKS FROM LOI
10	SLUDGE PUMPS-GA & DATA SHEET .	42 WEEKS FROM LOI
11	CHAIN PULLEY BLOCKS-DATA SHEET AND GA FOR IDCT	42 WEEKS FROM LOI
12	TDS FOR FAN MAINTENANCE FACILITIES FOR IDCT	42 WEEKS FROM LOI
13	GAD AND DATA SHEET FOR BFV'S	42 WEEKS FROM LOI
14	GA & TDS FOR CI GATE VALVE .	42 WEEKS FROM LOI
15	GAD AND DATA SHEET OF FAN ASSY FOR IDCT	31 WEEKS FROM LOI
16	GAD AND DATA SHEET OF GEARBOX FOR IDCT	31 WEEKS FROM LOI
17	R.C. DETAILS OF COLD WATER BASIN COLUMN & WALL	15 WEEKS FROM LOI
18	ANALYSIS & DESIGN OF PRECAST BEAMS	21 WEEKS FROM LOI
19	ANALYSIS AND DESIGN OF COLUMNS FOR INTERNAL FILL SUPPORTING STRUCTURE	21 WEEKS FROM LOI
20	GA OF FILL SUPPORTING STRUCTURE	21 WEEKS FROM LOI
21	DETAILS OF DIAGONAL COLUMNS FOR COOLING TOWER	21 WEEKS FROM LOI
22	DESIGN OF LOWER TIER AND TIE BEAMS	21 WEEKS FROM LOI
23	DESIGN OF UPPER TIER BEAMS	21 WEEKS FROM LOI
24	R.C DETAILS OF TRANS BEAM AT ELIMINATOR LEVEL	21 WEEKS FROM LOI
25	R.C DETAILS OF LONG BEAM AT ELIMINATOR LEVEL	21 WEEKS FROM LOI
26	RC DETAILS OF END WALLS & PARTITION WALL	21 WEEKS FROM LOI
27	LAYOUT PLAN OF CT AT FANDECK LEVEL & GENERAL ARRANGEMENT OF FANDECK SLAB	25 WEEKS FROM LOI
28	RC DETAILS OF FAN DECK SLAB	21 WEEKS FROM LOI
29	RC DETAILS OF LONG & TRANS BEAMS AT FAN DECK LEVEL	21 WEEKS FROM LOI
30	DETAILS OF ACCESS DOOR	25 WEEKS FROM LOI
31	RC DETAILS OF FAN CYLINDER	25 WEEKS FROM LOI
32	DETAILS OF C.W. OUTLET, HOIST SUPPORT STRUCTURE AND EMBEDMENT DETS.	25 WEEKS FROM LOI
33	RC DETAILS OF PIPE SUPPORT	25 WEEKS FROM LOI
34	DESIGN CALCULATION FOR STAIRCASE FOR CT	25 WEEKS FROM LOI
35	ANALYSIS & DESIGN OF STAIRCASE	25 WEEKS FROM LOI

36	DETAILS OF STAIRCASE	25 WEEKS FROM LOI
37	R.C. DETAILS OF ACCESS STAIRWAY	25 WEEKS FROM LOI
38	R.C. DETAILS OF GRDR PLINTH SUPPORTING INCLINED COLUMN	28 WEEKS FROM LOI
39	DESIGN CALCULATION FOR OUTLET, SLUDGE PIT & PIPE SUPPORT FOR IDCT	25 WEEKS FROM LOI
40	ANALYSIS & DESIGN OF COLD WATER OUTLET & MONORAIL LIFTING ARRANGEMENT	25 WEEKS FROM LOI
41	R. C. DETAILS OF CW OUTLET, EMBEDMENT DETAILS OF GATES & TRASH RACKS	25 WEEKS FROM LOI
42	ANALYSIS & DESIGN OF DESLUDGE CHAMBER	25 WEEKS FROM LOI
43	R.C. DETAILS OF DRAIN SUMP AND DRAIN BOX	25 WEEKS FROM LOI
44	R.C. DETAILS OF MAIN HOT WATER DUCT	25 WEEKS FROM LOI
45	ANALYSIS & DESIGN OF PLATFORM	25 WEEKS FROM LOI
46	DETAILS OF INTERMEDIATE ACCESS/ CHANGEOVER PLATFORM	25 WEEKS FROM LOI
47	DETAILS OF EXTERNAL TRESTLES FOR HOT WATER PIPING	25 WEEKS FROM LOI
48	RC DETAILS OF INTERMEDIATE TIER BEAMS	25 WEEKS FROM LOI
49	DETAILS OF PRECAST BEAM AT DRIFT ELIMINATOR LEVEL	25 WEEKS FROM LOI
50	NUMERATION AND RC DETAILS OF COLUMN BRACKETS SUPPORTING PRECAST GRID BEAMS	25 WEEKS FROM LOI
51	DESIGN OF PEDESTALS FOR HOT WATER PIPING	25 WEEKS FROM LOI
52	DESIGN OF TEST SETUP ARRANGEMENT FOR INITIAL PILE LOAD TESTING WORKS	25 WEEKS FROM LOI
53	DESIGN OF INTERMEDIATE TIER BEAMS	25 WEEKS FROM LOI
54	DESIGN OF COLUMN BRACKETS	25 WEEKS FROM LOI
55	ANALYSIS & DESIGN OF MISCELLANEOUS ITEMS (STOP LOG GATES, TRASH RACKS, ETC)	25 WEEKS FROM LOI
56	DESIGN CALCULATION FOR STOP LOG GATE/ SLIDE GATE	25 WEEKS FROM LOI
57	DETAILS OF SCREEN TRASH RACK AT OUTLET	42 WEEKS FROM LOI
58	DETAILS OF EXTERANL M.S. LADDER	25 WEEKS FROM LOI
59	PITOT TUBE INSTALLATION & PIT DETAILS FOR COOLING TOWER	30 WEEKS FROM LOI
60	CONTROL & OPERATION PHILOSOPHY	31 WEEKS FROM LOI
61	PG TEST PROCEDURE	50 WEEKS FROM LOI
62	QAP- DRIVES SHAFT FOR IDCT	37 WEEKS FROM LOI
63	QAP-GEARBOX FOR IDCT	37 WEEKS FROM LOI
64	QAP- FILL FOR IDCT	37 WEEKS FROM LOI
65	QAP- PVC ELIMINATOR FOR IDCT	37 WEEKS FROM LOI
66	QAP- DESLUDGE PUMP	45 WEEKS FROM LOI
67	QAP- FAN FOR IDCT	37 WEEKS FROM LOI
68	QAP OF BF VALVE	37 WEEKS FROM LOI
69	QAP OF GATE VALVE/SLUICE VALVE	45 WEEKS FROM LOI
70	QAP OF HOT WATER MANIFOLD	45 WEEKS FROM LOI
71	ELECTRICAL LOAD LIST	10 WEEKS FROM LOI
72	CABLE SCHEDULE AND CABLE INTERCONNECTION	15 WEEKS FROM LOI

73	I/O LIST	15 WEEKS FROM LOI
74	INSTRUMENT CABLE SCHEDULE	15 WEEKS FROM LOI
75	INSTRUMENT SCHEDULE	15 WEEKS FROM LOI
76	CONTROL SCHEME/LOGIC DIAGRAM (TO BE IMPLEMENTED IN DDCMIS)	15 WEEKS FROM LOI
77	FIELD JB TERMINATIONS	15 WEEKS FROM LOI

MDL for IDCT shall be finalized after award of contract.

BHEL / Customer comments on drgs/docs shall be furnished within 14 days of submission date. However, drgs/docs submitted shall be complete in all respects with revised drawing submitted incorporating all comments. Any incomplete drawing submitted shall be treated as non-submission with delays to bidder's account. For any clarification/ discussion required to complete the drawings, the bidder shall himself depute his personal to BHEL for across the table discussions/ finalizations/ submissions of drawings.

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT

Sl. No.	DOCUMENT TITLE
1	APPROVED DOCUMENTS
2	CALIBRATION CERTIFICATES
3	O&M MANUAL
4	ALL TEST CERTIFICATES

DOCUMENTATION REQUIREMENT

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID	
Sl. No.	**DOCUMENT TITLE**
1	PQR CREDENTIALS
2	COMPLIANCE SHEET

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE		
Sl. No.	**DOCUMENT TITLE**	**SUBMISSION SCHEDULE**
1	TECHNICAL DATASHEETS OF TRANSMITTERS,LOCAL INSTRUMENTS, JB, ETC.	
2	IO LIST	
3	INSTRUMENT SCHEDULE	
4	CONTROL & OPERATIONAL WRITE-UP FOR THE SYSTEM WITH SET POINTS	
5	CONTROL SCHEME/LOGIC DIAGRAM (TO BE IMPLEMENTED IN DDCMIS)	
6	CABLE SCHEDULE (IN EXCEL FORMAT)	
7	CABLE INTERCONNECTION	
8	FIELD JB TERMINATIONS	
9	HMI PICTURES/PLANT SCHEMATICS	
10	ANNUNCIATION & SOE LIST	
11	INSTRUMENTS INSTALLATION DIAGRAM	
12	QUALITY PLAN DULY SIGNED & STAMPED FOR APPLICABLE ITEMS	

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT	
Sl. No.	**DOCUMENT TITLE**
1	APPROVED DOCUMENTS
2	CALIBRATION CERTIFICATES
3	O&M MANUAL
4	ALL TEST CERTIFICATES

Schedule of Performance Guarantees

1	Total IDCT Pumping head (MWC) permissible, viz. static head plus frictional losses as below: - Static head w.r.t. FGL - Frictional losses within bidder's T.P. with 10% margin	
2	Guaranteed Cold water temperature at design capacity & parameters with the working cells (deg C)	
3.0	Guaranteed power consumption at inlet to motor terminals of fans, at design capacity and design conditions:	
3.1	Per fan motor (KW)	
3.2	Total for the working cells, per Cooling Tower (KW)	

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

Date

PRE QUALIFICATION REQUIREMENT (TECHNICAL)

ENQUIRY NO.:

PROJECT: 2000 TPD BCGCL COAL TO AMMONIUM NITRATE - LSTK-1

The Bidder should meet the qualifying requirements of any one of the qualifying routes stipulated under clause 4.3.1 or 4.3.2 or 4.3.3.

4.3.1 The bidder should have designed, constructed and commissioned at least one (01) number Induced Draught Cooling Tower in RCC or Pultruded Fiberglass Reinforced Plastic (FRP) Construction of capacity not less than 13000 m3/hr which should have been in successful operation for at least one (1) year as on the date of subject Enquiry/NIT.

In case the reference cooling tower was designed by a party other than the Bidder, the Bidder shall employ a cooling tower Design Agency, who has independently designed an Induced Draught Cooling Tower of same type as being offered of capacity not less than 13,000 m3/hr in RCC or Pultruded Fiberglass Reinforced Plastic (FRP) construction and which should have been in successful operation for at least one (1) year as on the date of subject Enquiry/NIT.

Further, if such design agency has not carried out the engineering activities by itself in respect of the system of the reference installation against which the design agency is seeking the qualification, then the engineering of the package shall be carried out by an Engineering firm who should have engineered an Induced Draught Cooling Tower of same type & construction as being offered of capacity not less than 13,000 m3/hr in RCC or Pultruded Fiberglass Reinforced Plastic (FRP) construction and which should have been in successful operation for at least one(1) year as on the date of subject Enquiry/NIT.

In such a case, the Bidder shall be required to furnish a letter of technical support from the Cooling Tower Design agency and Engineering firm (as applicable) for successful performance of Cooling Tower system, as per the format enclosed in the bidding document. This letter of technical support should be submitted prior to the placement of order on approved bidder.

OR

4.3.2 The Bidder should be a wholly or partially (with minimum 51% holding) held Indian subsidiary of a firm who in turn meets the requirements of clause 4.3.1 above. Further, the Bidder on its own or along with its holding company should have executed / be executing at least one contract involving design, construction and commissioning of at least one (1) number Induced Draft Cooling Tower in RCC / Pultruded Fiberglass Reinforced Plastic (FRP) Construction of capacity not less than 6500 m3/hr.

In such a case, the Bidder should furnish a letter of technical support from Holding Company (i.e. the firm meeting requirements of clause 4.3.1 above) for successful performance of the Cooling Tower as per the format enclosed in the bidding document. This letter of technical support should be submitted prior to the placement of order on approved bidder.

OR

4.3.3 The Bidder who has independently constructed RCC cooling tower of capacity not less than 13,000 Cu.M/Hr can also participate along with its Holding company / Subsidiary / Collaborator / Associate who in turn meets the requirements of clause 4.3.1 above.

In such a case, the Bidder shall be required to furnish a Deed of Joint Undertaking executed by the Bidder and it's Holding company / Subsidiary / Collaborator / Associate for the successful performance of Cooling Tower, as per the format enclosed with the bidding documents. The Deed of Joint Undertaking (DJU) shall be submitted along with bid/offer. In case of award, Bidder and it's Holding company / Subsidiary / Collaborator / Associate shall each be required to furnish an on-demand bank guarantee for INR 7 million (Seven Million only) in addition to the contract performance security to be furnished by the bidder.

General notes of the PQR are as under:

1. The Bidder should offer only the same type i.e. counter flow or cross flow and of the same construction type i.e. RCC construction or FRP construction of Cooling Towers for which the bidder / Holding Company / Subsidiary / Collaborator / Associate (i.e., the firm meeting requirements of clause 4.3.1 above) is qualified.

2. Bidder to submit supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.

3. Notwithstanding anything stated above, BHEL/Customer reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in overall interest of BHEL/Customer.

4. Consideration of offer shall be subject to customer's approval of bidder.

5. After satisfactory fulfilment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all other terms of the tender.

PROVENNESS OF INDUCED DRAFT COOLING TOWER

I. (A) Details of Induced draught Cooling Towers (as per clause 4.3.1of TECHNICAL PQR

In support of Sub-Qualifying Requirements of Clause 4.3.1 of TECHNICAL PQR ~~Section VI of Bidding Document,~~ we confirm that We/our Sub-vendor have designed, constructed and commissioned at least one (01) number Induced Draught Cooling Tower in RCC or Pultruded Fiberglass Reinforced Plastic(FRP) Construction of capacity not less than 13000m3/hr which has been in successful operation for atleast one year(1) inline with TECHNICAL PQR.

The reference Cooling Towers are of the same type i.e. counter flow or cross flow as is being offered and of the same construction type i.e. RCC construction or FRP construction as being offered by us.

The details of the reference cooling tower is furnished below:

Sl. No.	**Description/Details**	**Plant**
1.	Description of Work and Name of Client	.....
2.	Location/Address of the Plant/works	.....
3.	Address of the Client (including Contact Person Name, Telephone No, e-mail etc.)	.....
4.	No. of Cooling Towers	.....
5.	Capacity of each Cooling Tower (Cu.M/hr.)	.....
6.	Type of Fill (splash/modular/trickle type)	.....
7.	Type of Construction	.....
8.	Whether scope of works included	
	(a) Design of Cooling Towers by Bidder/its Sub-vendor	YES*/NO*
	(b) Construction of Cooling towers	YES*/NO*

Signature of authorized signatory.....

	(c) Commissioning of Cooling towers	YES*/NO*
9.	Date of Commissioning of the Cooling tower	
10.	Certificate from client to substantiate Bidder's QR data is enclosed at Annexure ..... to this Attachment-3K	YES*/NO*
11.	Whether the reference cooling tower at sl. No. 1 is designed by the bidder/ sub vendor	YES*/NO*
12a.	Whether the reference cooling tower at sl. No. 1 is got designed by bidder/ sub vendor	YES*/NO*
12b.	Name of the Design agency of the reference Cooling tower	
12c.	Whether the reference cooling tower is Engineered by the design agency	YES*/NO*
12d.	Name of the Engineering firm who has engineered the reference cooling tower	
13.	Whether Documentary evidence/ certificate(s) from client enclosed for the above data	Yes* / No*
14.	We confirm to submit a letter of technical support at the time of placement of order on our sub-vendor	

- * Strike off whichever is not applicable.

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

(Common Seal).....

(Bidder / Sub vendor / Design Agency / Engineering firm)

Signature of authorized signatory.....

I. (B) Details of Induced draught Cooling Towers (as per clause 4.3.2 of TECHNICAL PQR

In support of Sub-Qualifying Requirements of Clause 4.3.2 of TECHNICAL PQR ~~VI of Bidding Document~~, we confirm that We are a wholly or partially (with minimum 51% holding) held Indian subsidiary of a firm who fulfills the requirements in Clause 4.3.1 of TECHNICAL PQR. . We , on our own/ alongwith our holding company have executed/ are executing atleast one contract involving design, construction and commissioning of atleast one(1) number Induced Draft Cooling Tower in RCC/ Pultruded Fiberglass Reinforced Plastic (FRP) Construction of capacity not less than 6500m3/hr.

We shall furnish a letter of technical support from our Holding Company for the satisfactory performance of Cooling Towers as per the format enclosed in the bidding document before placement of award of Cooling Tower.

The details of the reference cooling tower is furnished below:

Sl. No.	**Description/Details**	**Plant**
1.	Description of Work and Name of Client	.....
2.	Location/Address of the Plant/works	.....
3.	Address of the Client (including Contact Person Name, Telephone No, e-mail etc.)	.....
4.	No. of Cooling Towers	.....
5.	Capacity of each Cooling Tower (Cu.M/hr.)	.....
6.	Type of Fill (Other than splash/modular/trickle type) Bidder to Specify the type of fill	.....
7.	Type of Construction	.....
8.	Whether scope of works included	
	(a) Design of Cooling Towers by Bidder/its Sub-vendor associate/Collaborator	YES*/NO*
	(Name of Designer)	.....

Signature of authorized signatory.....

	(b) Construction of Cooling towers	YES*/NO*
	(c) Commissioning of Cooling towers	YES*/NO*
9.	Date of Commissioning of the Cooling tower	
10.	Certificate from client to substantiate Bidder's QR data is enclosed at Annexure ..... to this Attachment-3K	YES*/NO*
11.	Whether the reference cooling tower at sl. No. 1 is designed by the bidder/ sub vendor	YES*/NO*
12.	Whether the reference cooling tower at sl. No. 1 is designed by Sub-vendor's own engineers	YES*/NO*
13.	Whether Documentary evidence/ certificate(s) from client enclosed for the above data	Yes* / No*
14.	We confirm to submit a letter of technical support at the time of placement of order on our sub-vendor	

- * Strike off whichever is not applicable.

Date :

(Signature).....

Place :

(Printed Name).....

(Designation).....
(Common Seal).....

Date :

(Signature).....

Place :

(Printed Name).....

(Bidder / Sub vendor / Associate/ Collaborate)

Signature of authorized signatory.....

I. (C) Details of Induced draught Cooling Towers (as per clause 4.3.3 of TECHNICAL PQR

In support of Sub-Qualifying Requirements of Clause 4.3.3 of TECHNICAL PQR ~~VI of Bidding Document~~, we confirm that We/our Sub-vendor have independently constructed RCC cooling towers of capacity not less than 13000 m3/hr and our Holding company/Collaborator/Associate fulfills the requirements in Clause 4.3.1 of TECHNICAL PQR ~~Part-A, Section-VI of Bidding Documents.~~

We shall furnish a Deed of Joint Undertaking executed by us/ our sub-vendor and Holding company/Collaborator/Associate for the successful performance of Cooling Tower, as per the format enclosed with the bidding documents. The Deed of Joint Undertaking (DJU) shall be submitted along with an on demand bank-guarantee at the time of placement of order on the approved sub-vendor.

The details of the reference cooling tower is furnished below:

Sl. No.	Description/Details	Plant
1.	Description of Work and Name of Client	.....
2.	Location/Address of the Plant/works	.....
3.	Address of the Client (including Contact Person Name, Telephone No, e-mail etc.)	.....
4a.	No. of Cooling Towers	.....
4b.	Capacity of each Cooling tower	.....
5.	Date of commissioning of Cooling tower	……
6.	Certificate from client to substantiate Bidder's QR data is enclosed at Annexure ..... to this Attachment-3K	YES*/NO*
7.	Details of ref cooling tower of Holding company /Collaborator/ Associate as per clause 4.3.1	
8.	Whether scope of works included	
	(a) Design of Cooling Towers by Bidder/its Sub-vendor associate/Collaborator	YES*/NO*
	(Name of Designer)	.....
	(Name of Eningeering firm)	……

Signature of authorized signatory.....

	(b)	Construction of Cooling towers	YES*/NO*
	(c)	Commissioning of Cooling towers	YES*/NO*
9.		Date of Commissioning of the Cooling tower	
10.		Certificate from client to substantiate Bidder's QR data is enclosed at Annexure ..... to this Attachment-3K	YES*/NO*
11.		Whether the reference cooling tower at sl. No. 1 is designed by the bidder/ sub vendor	YES*/NO*
12.		Whether the reference cooling tower is designed by Sub-vendor's own engineers	YES*/NO*
13.		Whether Documentary evidence/ certificate(s) from client enclosed for the above data	YES* /NO*
14.		We confirm to submit a letter of Deed of Joint Undertaking at the time of placement of order on our sub-vendor	
15.		Documentary evidence / Certificate from client to substantiate Bidder's QR data is enclosed at Annexure ..... to this Attachment-3K	YES*/NO*

□ * Strike off whichever is not applicable.

Date : (Signature).....

Place : (Printed Name).....

(Designation).....

(Common Seal) .....

(Bidder / Sub-vendor / Holding Company / Collaborator / Associate)

FORMAT FOR FILLING THE DETAILS OF PROVENNESS
LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF (EQUIPMENT/SYSTEM NAME) FOR

2000 TPD BCGCL COAL TO AMMONIUM NITRATE - LSTK-1

TO
[EMPLOYER'S NAME & ADDRESS]

Sub: Letter of Technical Support submitted From …….. (name of the Associate*/ Collaborator*/ Desginer* / Engineering firm* / Holding Company*/Subsidiary*) undertaking the responsibility for satisfactory performance of ……(Name of the equipment/system*).

Dear Sirs,

1. In accordance with the Award of the Contract by …… (Name of the Contractor) to M/s. ……. (Name of the sub-vendor), we, the aforesaid Associate*/ Collaborator*/ Design agency* / Engineering firm* / Holding Company*/Subsidiary*, (M/s …….) shall be fully responsible for the satisfactory performance of the ……..(Name of the equipment/system*).

2. Further, the manner of achieving the objective set forth in point 1 above shall be as follows
   For …….. (Name of the equipment/system*):
   (a) We shall be fully responsible for design, engineering & commissioning (as applicable) and extending all necessary support for putting in to satisfactory operation and carrying out the Guarantee Tests (as applicable) for ……..(Name of the equipment/system*) to the satisfaction of the Employer.

   (b) We shall depute technical experts to Bidder's/sub-vendor's works for supervision during manufacturing, assembly, inspection, as and when required by Employer. We shall participate in site erection, commissioning and final testing (as and when necessary) of the…….(Name of the equipment/system*).

   (c) We shall participate in Technical Co-ordination meetings (TCMs) from time to time, as and when required by Employer.

   (d) We shall promptly carry out all the corrective measures and shall promptly provide corrected design and shall undertake replacements, rectifications or modifications to the equipment/system* as and when required by Employer in case the equipment/system* fails to demonstrate successful performance as per contract at site.

3. We, the Associate*/ Collaborator*/ Design agency* / Engineering firm* / Holding Company* do hereby undertake and confirm that this Letter of Technical Support shall be valid for a period of seven (7) years or up to the end of defect liability period of the contract, whichever is later.

Signature of the Authorised Representative:……..…
For M/s …….
(Associate*/ Collaborator*/ Design agency* / Engineering firm* / Holding Company*/Subsidiary*)
Name ……
Designation …….
Date:……
Common Seal of the Company

***: Strike off whichever is not applicable..**

Signature of authorized signatory.....

FORM OF DEED OF JOINT UNDERTAKING TO BE PROVIDED FOR INDUCED DRAFT COOLING TOWER TECHNICAL SPECIFICATIONS

(ON NON-JUDICIAL STAMP PAPER OF APPROPRIATE VALUE)

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY BIDDER/SUB VENDOR AND ITS HOLDING COMPANY/SUBSIDIARY/COLLABORATOR/ASSOCIATE FOR SUCCESSFUL PERFORMANCE OF COOLING TOWER MEETING THE REQUIREMENTS STIPULATED IN THE TECHNICAL SPECIFICATION.

The DEED OF JOINT UNDERTAKING executed this ……day of ……Two thousand ……. by M/s …… (BIDDER/SUB VENDOR)……. (hereinafter called the BIDDER/ ~~SUB VENDOR~~, which expression shall include its successors, administrators, executors and permitted assigns) AND

The DEED OF JOINT UNDERTAKING executed this ……day of ……Two thousand ……. by M/s …… (HOLDING COMPANY/SUBSIDIARY /COLLABORATOR/ASSOCIATE) a Company incorporated under ……having its Registered Office at …… (hereinafter called the HOLDING COMPANY/SUBSIDIARY /COLLABORATOR/ASSOCIATE, which expression shall include its successors, administrators, executors and permitted assigns) AND

in favour of …….., having its Registered Office at .... ("Employer" which expression shall include its successors, administrators, executors and assigns).

WHEREAS, the Employer invited Bids for design, engineering, manufacture, supply, transportation to site, construction, installation, testing, commissioning and conductance of guarantee tests for the EPC Package for --------- (hereinafter referred to as "Plant") vide its Bidding Document No. ------, which interalia include Cooling tower(s).

WHERAS M/S ----------(Bidder) has submitted its proposal in response to the aforesaid invitation for Bid by the Employer for EPC package for ----- against the employer's bidding documents no. -------- interalia including design, engineering, manufacturing, supply, transportation to site, installation, testing and commissioning (including trial operation and performance and guarantee test) of cooling tower(s).

AND WHEREAS vide
clause 4.3.3 of TECHNICAL SPECIFICATIONS ~~(SECTION-VI, PART-A, SUB-SECTION-IA),~~ it has been specified that bidder/ ~~sub-vendor~~ who has independently constructed RCC cooling towers can also participate alongwith it's Holding company/Subsidiary/Collaborator/Associate who in turn meets the requirements of clause 4.3.1 of TECHNICAL SPECIFICATIONS ~~(SECTION-VI, PART-A, SUB-SECTION-IA).~~

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

1. We the bidder/~~sub vendo~~r and our Holding company/Subsidiary/Collaborator/Associate, do hereby declare and undertake that we shall be jointly and severally responsible to the Employer for the successful performance of the Cooling tower(s).

2. In case of any breach of the Contract by the contractor /~~its sub-vendo~~r, we the Holding company/Subsidiary/ Collaborator / Associate do hereby undertake, declare and confirm that we shall be fully responsible for the successful performance of the cooling tower(s) and undertake to carryout all the obligations and responsibilities under this Deed of Joint Undertaking in order to discharge the bidder/~~sub vendor~~ obligations stipulated under the Contract. Further, if the Employer sustains any loss or damage on account of any breach of the Contract for the cooling tower , we undertake to promptly indemnify and pay such loss/damages caused to the Employer on its written demand without any demur, reservation,

Contest or protest in any manner whatsoever. This is without prejudice to any rights of the Employer against the bidder/sub vendor under the Contract and/or guarantees. It shall not be necessary or obligatory for the Employer to first proceed against the bidder/~~sub vendor~~ before proceeding against the Holding company/Subsidiary / Collaborator / Associate nor any extension of time or any relaxation given by the Employer to the bidder/~~sub vendor~~ shall prejudice any rights of the Employer under this Deed of Joint Undertaking to proceed against the Holding company/Subsidiary / Collaborator / Associate. The liability of the contractor, ~~his sub-vendor~~ and the Holding company/ Collaborator / Associate shall be limited to an amount equal to 100% of the value of the contract** between the contractor and the sub supplier for the equipments/systems.

3. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objective set forth in paragraph 1 above shall be as follows:
(a) We, Holding company/Subsidiary / Collaborator / Associate shall ensure that complete design, manufacturing, quality assurance and installation of the cooling tower(s) is carried out inline with drawings and procedures and shall be fully responsible for its compliance so as to ensure satisfactory, reliable, safe and trouble free performance of cooling tower(s) .
Further, we, Holding company/Subsidiary / Collaborator / Associate shall extend our quality surveillance / supervision / quality control to the bidder / sub vendor during Design, engineering, erection, commissioning and performance testing of cooling tower(s).
Further, Holding company/ Collaborator / Associate shall depute their technical experts from time to time to the bidder / ~~sub vendor~~ works / Employer's project site as required by the Employer and agreed to by bidder /~~ sub vendor~~ to facilitate the successful performance of the cooling tower(s) as stipulated in the aforesaid Contract.
Further, Holding company/Subsidiary / Collaborator / Associate shall ensure proper design, manufacture installation, testing and successful performance of the cooling tower under the said contract in accordance with stipulations of Bidding Documents and if necessary, Holding company/Subsidiary / Collaborator / Associate shall advise the bidder/~~sub vendo~~r suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.
(b) In the event the bidder/~~sub vendor~~ fail to demonstrate that the cooling tower(s) meet the guaranteed parameters and demonstration parameters as specified in the contract, Holding company/Subsidiary / Collaborator / Associate shall promptly carry out all the corrective measures related to engineering services at their own
expense and shall promptly provide corrected design to the Employer.
(c) Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the cooling tower(s) and payment of financial liabilities and penalties and fulfillment of all other contractual obligations as provided under the contract shall be the joint and several responsibility of the bidder/sub vendor and Holding company/Subsidiary / Collaborator / Associate.

4. We, the contractor/~~sub vendor~~ and Holding company/Subsidiary / Collaborator / Associate do hereby undertake and confirm that this Undertaking shall be irrevocable and shall not be revoked till ninety (90) days after the end of the defect liability period of the last equipment covered under the Contract and further stipulate that the Undertaking herein contained shall terminate after ninety (90) days of satisfactory completion of such defect liability period. In case of delay in completion of defect liability period, the validity of this Deed of Joint Undertaking shall be extended by such period of delay. We further agree that this Undertaking shall be without any prejudice to the various liabilities of the Contractor including Contract Performance Security as well as other obligations of the Contractor in terms of the Contract.

5. The Contractor/sub vendor will be fully responsible for the quality of all the equipment/main assemblies/components manufactured at their works or at their Vendors' works or constructed at site, and their repair or replacement, if necessary, for incorporation in the Plant and timely delivery thereof to meet the completion schedule under the Contract.

6. In case of Award, in addition to the Contract Performance Security for the contract, the Holding company/Subsidiary / Collaborator / Associate shall furnish 'as security' an on demand Performance Bank Guarantee in favour of the Employer as per provisions of the bidding documents. The value of such Bank Guarantee shall be equal to INR 7 Million (Indian Rupees SEVEN Million only) and it shall be guarantee towards the faithful performance /compliance of this Deed of Joint Undertaking in accordance

with the terms and conditions specified herein. The bank guarantee shall be unconditional, irrevocable and valid till ninety (90) days beyond the end of defect liability period of the last equipment covered under the Contract. In case of delay in completion of the defect liability period, the validity of this Bank Guarantee shall be extended by the period of such delay. The guarantee amount shall be promptly paid to the Employer on demand without any demur, reservation, protest or contest.

7. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Contract Documents. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and the Courts of Delhi shall have exclusive jurisdiction.

8. We, Holding company/Subsidiary / Collaborator / Associate and contractor /sub vendor agree that this Undertaking shall form an integral part of the Contracts from the date of signing of this Deed of Joint Undertaking. We further agree that this Undertaking shall continue to be enforceable till its validity.

9. That this Deed of Joint Undertaking shall be operative from the effective date of signing of this Deed of Joint Undertaking.

IN WITNESS WHEREOF, Holding company/Subsidiary / Collaborator / Associate and contractor / sub vendor through their authorised representatives, have executed these presents and affixed common seal of their respective companies, on the day, month and year first mentioned above.

1. WITNESS For M/s
.....
(Holding company/Subsidiary / Collaborator / Associate)
.....
(Signature of the Authorised representative)

Name.....
(Official Address)
Designation.....
Common Seal of the
Company.....

1. WITNESS ForM/s
.....
(*sub vendor)
.....
(Signature of the Authorised representative)

Name.....
(Official Address)
Designation.....
Common Seal of the
Company.....

1. WITNESS For M/s
.....
(Bidder/Contractor)
.....
(Signature of the Authorised representative)

Name.....
(Official Address)
Designation.....
Common Seal of the
Company.....

Signature of authorized signatory.....

1. WITNESS For M/s
.....
(JV company/Subsidiary company)
.....
(Signature of the Authorised representative)

Name.....
(Official Address)
Designation.....
Common Seal of the
Company.....
Note :
1) Power of Attorney of the executants of this DJU is to be furnished.
2) * Strike out, whichever is not applicable.
3) ** Copy of priced purchase order for the equipment shall be furnished by Bidder.

COMPLIANCE CERTIFICATE

1	It is hereby confirmed that the complete technical specification (Book-1 of 2 and Book-2 of 2) has been read and understood. We confirm compliance to the tender specification including any prebid clarification and amendments issued prior to techno-commercial bid opening without any deviation.
2	It is hereby declared that any technical submittals which was not specifically asked by BHEL in NIT shall not to be considered as part of bid and shall not be evaluated by BHEL.

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

Date