



Semi-Conductor Laboratory

Government of India, Department of Space
Sector-72, S.A.S. Nagar-160071, Near Chandigarh (Punjab) India.
Phone: +91-172-2237401-09, Fax: +91-172-2237410.
Email: hps@sclchd.co.in Website: www.sclindia.com

PUBLIC TENDER NOTICE (Ref. No. P&S/TSSG/2009/11)

Semi-Conductor Laboratory (SCL) engaged in the design, development and manufacture of VLSIs at its facility at S.A.S. Nagar (Mohali), Punjab, India invites bids for execution of a project comprising supply, installation, testing and commissioning of the following items for its Central Air conditioning plant.

Tender Reference Number	Item Description	Quantity	Schedule of Pre-Bid Conference for entire project, Date & Time (IST)	Last date of submission of sealed bids Date & Time (IST)	Opening of Technical Offers Date & Time (IST)
P&S/2009/TSSG/17	i) Centrifugal Water Chilling Machines ii) Cooling Tower. iii) Piping, valves, fittings, insulation, electrical & instrumentation etc.	02 Nos. 01 No. As indicated in 'Quote Format' attached as PART-C to the Tender Document.	May 22, 2009 at 1200 hours.	June 05, 2009 by 1500 hours.	June 05, 2009 at 1600 hours.

The "Tender Document" shall remain on our website till June 04, 2009. Interested HVAC vendors are requested to download abovesaid document for the above listed items and are also requested to advise by e-mail /fax their particulars including their company profile and the number of such projects executed. Vendors downloading Tender Document from SCL's/DOS's website are required to provide a demand draft of Rs. 208/- towards Tender Document fee alongwith their bid.

Only HVAC vendors having executed at least two projects involving supply, installation and commissioning of Chilling Machines of capacity not less than 350 TR are eligible to submit the bids to SCL for the project covered by this Tender. Bidder should have supplied 350 TR and above capacity Chilling Machines in India which shall be working for more than three years. It may be noted that the jobs covered by this Tender are being treated by SCL as one project and SCL shall award the contract for the complete project to only one vendor. Only those HVAC vendors fulfilling the abovesaid requirements and who can execute the complete project shall submit their bids. Bids received for part work shall not be considered.

With a view to provide clarifications, if any, to the prospective bidders on the specifications of the above listed items and the Commercial and Other Terms & Conditions of the Tender Document, SCL shall hold a 'Pre-Bid Conference' at its premises at S.A.S. Nagar, Punjab as per schedule indicated above. In light of the abovesaid objective of the Pre-bid conference, prospective vendors must ensure that they or their authorized representatives attend the same as per the above given schedule.

Before submitting the bids the prospective bidders are advised to go through the minutes of proceedings of the Pre-bid conference which shall be placed at SCL's website and take the clarifications/modifications/ changes (if any) mentioned therein into account while submitting the bid.

The bids shall be submitted by the vendors in accordance with the 'Procedure for submission of bids' given in the Tender Document and should reach SCL, S.A.S. Nagar no later than the last date and time indicated above. SCL takes no responsibility for the delay or loss in transit of any document related to this Tender Notice. SCL reserves the right to procure all the abovesaid items or some of the above listed items or defer or cancel the abovesaid Tender without assigning any reason thereof.

Sr. Head, Purchase & Stores Division

SEMI-CONDUCTOR LABORATORY (SCL)

TENDER DOCUMENT REF No. P&S/34403/K-01/2009

The prospective HVAC vendors are requested to go through all the PARTS (A-E) of this Tender Document carefully and submit their bid complying with the instructions and as per commercial & other Terms and Conditions given herein to meet our objectives.

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PART-A**INSTRUCTIONS TO BIDDERS**

1. **This Tender Document should be read in conjunction with the specification sheets of each of the tendered items given in PART-B.**
2. **Only HVAC vendors having executed atleast two projects involving supply, installation and commissioning of chilling machines of capacity not less than 350 TR are eligible to submit the bids to SCL for the project covered by this Tender Document. Bidder should have supplied Chilling Machines in India of capacity 350 TR and above which shall be working for more than three years.**
3. **It may be noted that the jobs covered by this Tender Document are being treated by SCL as one project and SCL shall award the contract for the complete project to one vendor. Only those HVAC vendors who can execute the complete project shall submit their bids. Bids received for part work shall not be considered.**
4. **Bids received on fax/email and unsealed bids shall be treated as invalid and shall be rejected.**
5. **The prices should be quoted for each of the tendered items for the recommended makes only as given in PART-B in the 'Quote Format' given in PART-C. A quote for any 'make' other than the recommended 'makes' shall not be considered.**
6. **The vendors are required to give detailed price break-up for each of the tendered items such as basic price, excise duty, if applicable, taxes, installation, testing and commissioning charges and Service Tax. Accordingly it is mandatory for vendors to give their prices in the 'Quote Format' given at PART-C.**
7. Bids should be in total conformity with technical specifications mentioned in the specification sheet. Exclusions/deviations should be separately listed out by the bidder and shall be given with '**Part-1**' marked 'Technical'.
8. Bidders are expected to comply with the 'Commercial and other Terms & Conditions' given in the Tender Document. In case of any deviation, the reasons thereof should be clearly specified in the comments/response column of PART-D.
9. Bidder shall sign all pages of the **Part-1** marked 'Technical and Unpriced Commercial Offer' and **Part-2** marked 'Priced Commercial Offer'. Bidder shall initial corrections/overwriting(s) if any.

In case of any discrepancy between rates mentioned in figures and words, the rates whichever are less shall prevail.

In case of any discrepancy between rates mentioned in the unit price column and amount column, the correct amount after multiplying unit rate with quantity shall prevail.

10. The quantity of pipes and fittings shown in the Tender Document is tentative and subject to any variations depending upon the actual site requirements. The Contractor shall prepare working drawings showing layout of pipes and fittings based on actual site requirements and shall get the same approved from SCL before ordering such items. The support for the piping work shall be provided by SCL.
11. **A Pre-bid conference shall be held with the prospective vendors at Semi-Conductor Laboratory, S.A.S. Nagar (Mohali), Punjab as per schedule indicated in the Public Tender Notice to clarify technical/commercial queries of the bidders, if any, relating to specifications of the items covered by this Tender Document and commercial and other Terms and Conditions of this Tender Document. The prospective vendors must, therefore, ensure that they or their authorized representatives attend the said pre-bid conference at SCL as per the given schedule.**

In order to enable meaningful discussions in the Pre-bid conference, the prospective vendors are requested to list the queries/clarifications planned to be sought by them on this Tender Document and the specifications in the Pre-bid conference, in a "Query Sheet" given at PART-D (iv) of this Tender Document. These Query Sheets shall be discussed and the clarifications sought therein shall be provided during the Pre-bid conference. **The prospective vendors are requested to send us the said Query Sheets listing their questions, if any, in advance to reach us at least two days before the Pre-bid conference.**

No queries/clarifications shall be entertained after the Pre-bid conference and the vendor(s) shall be required to submit their bid(s) as per schedule laid down in the Tender Document.

Before submitting the bids all the prospective vendors are requested to go through the minutes of proceedings of the Pre-bid conference which shall be placed at SCL's website and take the clarifications/ modifications/changes (if any) mentioned therein into account while submitting the bid.

12. **PROCEDURE FOR SUBMISSION OF BIDS:**
 - 12.1 The bids shall be submitted in three parts namely '**Part-1**' marked "**EMD**" which will contain a bank draft towards Tender document fee if Tender Documents have been down loaded from SCL's website and another bank draft towards

Earnest Money Deposit, **Part-2 marked "Technical"** which will comprise of the Technical Offer and the Unpriced commercial offer and **'Part-3' marked "Commercial"** which will contain the Priced Commercial Offer, **in separate sealed envelopes.**

12.2 The **Part-1** marked '**EMD**' shall contain the following:

- a) A bank draft of Rs. 208/- (Non refundable) towards Tender document fee if Tender Documents have been down loaded from SCL's website.
- b) A bank draft of Rs. 45,000/- towards Earnest Money Deposit (EMD). The earnest money for the selected bidder shall be retained till the execution of the contract including warranty. In all other cases, it will be refunded within three months of finalisation of the contract. Such earnest money as retained will be forfeited by SCL in the event of non-compliance of the selected bidder with any of the Terms and Conditions of the Contract or the contractor's failure to execute the contract.

Both the above bank drafts drawn in favour of Semi-Conductor Laboratory, payable at Chandigarh/S.A.S. Nagar (Mohali) and valid for a period of six months shall be put in a separate sealed envelope, **Part-1** marked "EMD".

No interest will be payable by SCL on the above EMD.

Submission of EMD by way of a Bank Guarantee or Bill of Exchange shall not be accepted.

No request for waiver of EMD shall be entertained.

Bid (s) not complying with this clause shall not be considered and shall be disregarded.

12.3 The '**Part-2**' marked '**Technical**' shall contain the following:

- a) Technical offer.
- b) Unpriced Commercial Offer including bidder's compliance/ comments to SCL's commercial and other terms and conditions **as per PART-D (i) of this Tender Document.**
- c) Complete product literature.
- d) **Number of projects involving supply, installation and commissioning of Water Chilling Machines of capacity 350 TR and above executed with the names and addresses of the clients alongwith necessary supporting documents such as Contract document, completion certificate etc.**

issued by clients.

- e) Requirements to be fulfilled by SCL, if any, for installation and commissioning.
 - f) Vendor's standard 'Acceptance procedure' for each of the major equipment covered by this Tender Document. However, the equipment shall be accepted as per mutually agreed Acceptance procedure.
 - g) Vendor's confirmation/response to the warranty clause given in PART-D (i) of this Tender Document.
 - h) Vendor's confirmation of the training needs spelt out in the Training clause given in PART-D (i) of this Tender Document.
 - i) Length of time for which spares/services will be available.
 - j) Vendor's confirmation to provide comprehensive post warranty maintenance support for the major equipment covered by this Tender Document for a period of five years.
 - k) Certificate of Bid Compliance (as per proforma enclosed at PART-D (v)).
 - l) A copy of latest audited annual accounts.
 - m) Name, address and the contact details of foreign principal(s) for chillers and other imported items under Controls and Instruments, if any, in the bid.
- 12.4
- a. In Part-3 marked 'Commercial', the bidder shall quote for all the items as per the "Quote Format" given at PART - C.**
 - b. A quote for any 'make' other than the recommended 'makes' given in PART-B shall not be considered.**
 - c. The bidder to quote for supply, installation and commissioning separately for each of the tendered items as per the quote format given at PART-C.
 - d. The bidder to provide detailed list with price and quantity itemwise for recommended spares and consumables for five years of operation for each of the items covered by this Tender Document.
 - e. The bidder to quote for 5 years post warranty Comprehensive Maintenance Contract (MC) for the chillers, cooling tower and the electrical & instruments under scope of this work including all the spares, instrument & controls and all the consumables like oils, greases,

refrigerant, gaskets, brushes, cleaning chemicals etc.. For scope of work under the abovesaid comprehensive maintenance contract, PART-B (F) may please be referred.

- 12.5 The sealed envelopes Part-1, Part-2 and Part-3 should be put in a single envelope which should also be sealed and superscribed with the Tender Document reference no., due date and time. The above individual sealed envelopes should also be superscribed with the Tender Document reference no., due date and time.

13. **Methodology of ordering:**

- 13.1 As mentioned in Clause no. 3 of PART-A (Instructions to Bidders) that the jobs covered by this Tender Document are being treated by SCL as one project and SCL shall award the contract for the complete project to one vendor only. Such vendor shall be called as "Contractor" who will be responsible for supply of all tendered materials required for execution of the complete project including installation and commissioning of the complete project and support during the warranty period and subsequent comprehensive 5 years maintenance contract.

For imported items, such as chillers and certain items under Controls and Instruments etc., the bidders are requested to quote in foreign currency to enable SCL to avail off concessional rates of customs duty wherever applicable. The abovesaid Contract shall include separate purchase orders for imported and indigenous items. The purchase order(s) for imported items shall be raised by SCL directly on the foreign principal of the successful bidder backed by the letter of credit(s) opened by SCL directly in favour of the said foreign principal. SCL shall get its consignment against the said purchase(s) order moved through its designated freight forwarder in the country of the foreign vendor to the seaport/airport of destination with the freight and other allied costs to be borne by SCL. All consignments against the said purchase order(s) shall be billed to and consigned to SCL by the said foreign principal(s). All shipping documentation including the invoice(s) shall be raised by the said foreign principal(s) directly in favour of SCL. The customs clearance of such items at the seaport/airport of destination shall be arranged by SCL and the customs duties as applicable shall be borne by SCL.

Note:-

The bidder to provide the name, address and the contact details of their foreign principal(s) in the bid.

The purchase order for the indigenous items including installation and commissioning of the entire project shall be raised by SCL in favour of the contractor.

- 13.2 For Imported items such as chillers bidders are requested to quote their prices on F.O.B. nearest seaport basis and for other imported items if any bidders are

requested to quote their prices on F.O.B nearest International airport basis as per list of International airports given at PART-E. For indigenous items covered under this Tender Document, prices should be quoted on F.O.R, SCL, S.A.S. Nagar (Mohali) basis **exclusive of Government levies, taxes, duties as may be applicable. The rates at which the said Government levies, taxes, duties are applicable, shall be indicated separately in the 'Quote Format' given at PART-C.** The octroi payable at S.A.S. Nagar (Mohali), if applicable, shall be to SCL's account.

14. The bids submitted as above should be sent at the following address and should reach SCL, S.A.S. Nagar, Punjab as per schedule indicated in the Public Tender Notice.

**Sr. Head, Purchase & Stores,
Semi-Conductor Laboratory,
Department of Space, Government of India,
Sector-72, S.A.S. Nagar, Punjab-160 071, India.
Phone: +91-172-2237401 to 409, Fax: +91-172-2237410
Email: hps@scldhd.co.in**

15. **Bids which are not submitted in accordance with the procedure given above are liable to be disregarded.**
16. SCL is not responsible for the loss/delay in transit of any bid/any document related to the Tender Document.
17. **Late and delayed bids will not be considered.**
18. Inner and outer envelopes shall indicate the name and address of the bidder.
19. SCL reserves the right to accept the lowest or any other bid in whole or in part without assigning any reason(s).
20. SCL reserves the right to verify all claims made by the bidder.
21. The '**Part-1**' marked '**EMD**' and '**Part-2**' marked '**Technical**', shall be opened as per schedule indicated in the Public Tender Notice at SCL, S.A.S Nagar, Punjab in the presence of the bidders/their authorized representatives who may wish to be present. The bidders are, therefore, requested to visit or depute their authorized representatives to SCL, S.A.S. Nagar (Mohali), Punjab to attend the said bid opening as per the schedule given above.
22. **Based on the response to the Tender Document, SCL reserves the right to extend the last date of submission of bids and to reschedule the opening of 'Technical' offers.**
23. The '**Part-3**' marked '**Commercial**' shall be opened only of the technically qualified bidders in the presence of the technically qualified bidders/their

authorized representatives who may like to attend the bid opening.

The schedule of opening of Priced commercial offers shall be intimated to the technically qualified bidders separately.

24. **The representatives of the bidders who are deputed to attend the Pre-bid conference, opening of Technical and Commercial offers should have an authorization from the bidder to attend the same.**
25. All correspondence and documents must bear SCL Tender Document reference number.
26. The authority of the person signing the bid, if called for, shall be produced.

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PART-B**SEMI-CONDUCTOR LABORATORY
S.A.S. NAGAR****TECHNICAL SPECIFICATIONS****SUMMARY****TECHNICAL SPECIFICATIONS OF WATER CHILLING MACHINE**

1. Type : Centrifugal with Variable Speed Drive/
Variable Frequency Drive complete
with condenser, evaporator (chiller),
expansion device, capacity control
device, A.C. drive, controls and
instruments, microprocessor based
controller and necessary insulation
etc..
2. Capacity : 500 TR
3. Refrigerant : 134a
4. Motor : Semi-hermatic / open type with
variable speed drive/variable
frequency drive, suitable for operation
on $415 \pm 10\%$ volts, 50 Hz, 3 Phase, AC
power supply complete with winding
temperature sensors/detectors.
5. Chilled water leaving
temperature : 45° F (7.2° C)
6. Chilled water entering
temperature : 55° F (12.7° C)
7. Chiller fouling factor : 0.0005 FPS Units
8. Condenser water entering
temperature : 90° F (32.2° C)
9. Condenser water leaving
temperature : 97.5° F (36.4° C)

10. Condenser fouling factor : 0.001 FPS Units
11. Type of Refrigerant : R-134a
12. Required Certification : ARI
13. Maximum permissible IKW/TR : 0.65
at full load
14. Recommended makes of : Carrier/Trane/York/Mc Quay
machine

TECHNICAL SPECIFICATIONS OF COOLING TOWER

- | | | |
|------------------------------|---|--|
| Quantity | : | 1 No. |
| Type | : | Rectangular, multi cell (four cells), counter flow type) FRP made induced draft |
| Capacity | : | 500 TR |
| Temp. drop. | : | 4.4 Deg. C. |
| Approach temp. | : | 4 Deg. C. |
| Ambient wet bulb temperature | : | 28 Deg. C. |
| Construction Basin | : | FRP, to hold sufficient water. |
| Upper structure/ supports | : | FRP/Structural steel |
| Louvre | : | PVC honecomb, integral with the fill. |
| Fill | : | PVC Film type |
| Nozzles | : | Water repelant nylon/polypropelene or as per manufactures standard. |
| Casing | : | FRP |
| Accessories | : | Fans with drive motors (IP 55), PVC fills, drift eliminator inlet and out let connections, inspection window, supports and supporting structures, base channels and steel ladder etc for safe and trouble free operation. All the parts of tower shall be easily |

accessible for maintenance. The tower shall be complete with make up water connection with float valve and isolating valve, quick fill connection with valve, drain connection with valve, over flow, connection, water level switch with alarm etc. The tank of the tower of sufficient capacity shall be of FRP. Necessary details and drawings along with required bolts, nuts and channel etc for installing the tower shall be covered under the scope of the bidder.

Recommended : BELL / Delta / Paharpur
Makes

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**SEMI-CONDUCTOR LABORATORY
S.A.S. NAGAR**

TECHNICAL SPECIFICATIONS

Scope:

SCL invites offers from experienced and reputed contractors for supply, unloading at site, and storage, installation, testing & commissioning of following machines/items at Semiconductor Laboratory, S.A.S. Nagar, Punjab.

- Water Chilling Machine - Centrifugal type, Water cooled chilling machine with Variable Speed Drive/ variable frequency drive having capacity of 500 TR complete with centrifugal compressor, semi hermetic/open type motor, condenser, evaporator, expansion/metering device, AC drive, micro processor based controller, full charge of refrigerant & oil, necessary insulation work and BMS etc. for efficient and satisfactory functioning.
- Cooling Towers - Induced Draft, counter flow, rectangular cooling towers in FRP construction having 4 cells with drives and other accessories.
- Condenser water and chilled water piping with valves, fittings, insulation, supports etc.
- Electricals and instrumentation.

**A) Centrifugal Water Chilling Machines:
Quantity : 2 nos.**

- | | | | |
|----|-------------|---|--|
| 1. | Type | : | Centrifugal with Variable Speed Drive/ Variable Frequency Drive complete with condenser, evaporator (chiller), expansion device, capacity control device, A.C. drive, controls and instruments, microprocessor based controller and necessary insulation etc.. |
| 2. | Capacity | : | 500 TR |
| 3. | Refrigerant | : | 134a |
| 4. | Motor | : | Semi-hermatic / open type with variable speed drive/variable frequency drive, suitable for operation on $415 \pm 10\%$ volts, 50 Hz, 3 Phase, AC power supply complete with winding temperature sensors/detectors and over current protection respectively. |

5. Chilled water leaving temperature : 45° F (7.2° C)
6. Chilled water entering temperature : 55° F (12.7° C)
7. Chiller fouling factor : 0.0005 FPS Units
8. Condenser water entering temperature : 90° F (32.2° C)
9. Condenser water leaving temperature : 97.5° F (36.4° C)
10. Condenser fouling factor : 0.001 FPS Units
11. Type of Refrigerant : R-134a
12. Required Certification : ARI
13. Maximum permissible IKW/TR at full load : 0.65
14. Recommended makes of machine : Carrier/Trane/York/Mc Quay

1.0 Centrifugal Compressor:

The unit shall have single/multi-stage centrifugal fan, semi-hermetic/open type, motor coupled directly or through gear shaft drive using helical gears. Centrifugal compressor shall be working on 134a refrigerant gas. The impeller shall be fully shrouded, self-aligned and precision balanced, over speed tested so as to ensure vibration free operation and fitted in a carefully matched cast iron volute. The impeller shall be designed for high efficiency and stability under all operating conditions from full load to 25% of the full load without surging at constant designed inlet condenser water temperature.

Compressor shall be provided with proper lubrication system along with required safety switches, oil level indicator, oil cooling & heating arrangement etc for safe and trouble free operation of the machine.

The compressor shall be fully field serviceable and of such design that servicing can be carried out without disturbing the connections with the machine. The reduction in the efficiency of the chillers shall not be more than 5% for 10 years of operation.

The tolerance of chillers shall be +5% on power consumption and -5% on capacity.

The NPLV figures of chillers shall hold good at least for 5 years from the date of acceptance.

For chiller start up, chilled water leaving temperature shall be at least 2 Deg. F above set point.

Motor

The motor shall be suitable for Variable Frequency Drive "Semi-hermetical or open type" of suitable capacity to operate the unit from 100% load to 25% by proportionately reducing the drive speed without surging. The motor shall be suitable for $415 \pm 10\%$ volts, 3 Phase 50 Hz AC supply. The motor shall be suitable for load characteristics and the operational duty of the driven equipment.

The semi-hermetic motor shall have adequate stator winding temperature detectors/winding temperature sensors. Continuous BHP rating of the motor shall not be less than the maximum power requirement of the compressor and drive under specified design conditions.

Capacity Control

The compressor shall be equipped for modulating the capacity from 100% down to 25% for stable operation without surging at constant design condenser water temperature. The capacity control shall be achieved by means of proportionate reduction in the speed of the drive. The compressor shall also be equipped with an automatic inlet guide van control for regulating its capacity as per manufacturer standard.

Inter Locking

The compressor motor shall be interlocked with the following:-

- i) Water flow sensor in the chilled water line.
- ii) Water flow sensor in the condenser water line.
- iii) Anti-freeze thermostat in chiller line.
- iv) Condenser water pumps (4 Nos).
- v) Chilled water pumps (4 Nos) .
- vi) Lubrication oil pressure.
- vii) Bearing high temp. cut-out.
- viii) Low refrigerant temperature cut-out.
- ix) Cooling towers (4 Nos).
- x) stator winding temperature detector/ sensors
- xi) Any other inter locking for safe and satisfactory operation of the machine.

Refrigerant Isolation Valves

Adequate valves, including check valves at the suction and discharge of the compressor, shall be provided in the unit to store refrigerant inside chiller/condenser during servicing.

Variable Speed Drive

A variable speed drive shall be factory-installed on the chiller. It shall vary the compressor motor speed by controlling the frequency and voltage of the electrical power to the motor. The adaptive capacity control logic shall automatically adjust motor speed and compressor pre-rotation independently for maximum part load efficiency by analyzing information fed to it by sensors located throughout the chillers.

Drive shall be PWM type utilizing IGBTs with a power factor of 0.95 or better at all loads and speeds.

The variable speed drive shall be unit-mounted in a NEMA-1 enclosure with all power and control wiring between the drive and chiller, factory – installed, including power to the chiller oil pump. Field power wiring shall be a single – point connection and electrical lugs for incoming power wiring shall be provided. The entire chiller package shall be U.L. listed.

The following features shall be provided:

A door interlocked circuit breaker, capable of being padlocked; U.L. listed ground fault protection; over voltage and under voltage protection; 3 phase sensing motor over -current protection; single phase protection; insensitive to phase rotation; over- temperature protection; digital readout - at the chiller unit control panel of:

- Output Frequency
- Input Voltage & current
- Phase output current
- Input kilowatts (KW) and kilowatt – hours (KWH)
- Self diagnostic service parameters
- Ready/ fault
- Speed
- Input KVA
- Total power factor
- 3-phase input voltage
- 3-phase input current
- 3-phase input voltage total harmonic distortion (THD)
- 3-phase input current total demand distortion (TDD)
- Self diagnostic service parameters.

Separate meters for this information shall not be acceptable.

An active harmonic filter that limits electrical power supply distortion for the variable speed drive to comply with the guidelines of IEEE Std. 519 – 1992 shall be provided. The filter shall be unit mounted within the same NEMA – 1 enclosure and shall be provided at the chiller unit control panel as part of the filter package.

The active harmonic filter shall perform during low frequency/load operations with VFD and at the same time the power factor shall be maintained at any point of time better than 0.95.

Following details are also required to be submitted:

1. Complete drawings of chiller control panel and VFD operation and maintenance manual having all drawings up to component level along with software copy.
2. List of recommended spares for control panel and VFD motor.
3. Internal cooling arrangement or AC cooling arrangement as required with power loss.
4. Preventive maintenance/repair centers in India.

2.0 Condenser:

Condenser shall be, water-cooled, shell & tube type sized for full pump down capacity.

Rating

The condenser capacity shall match the compressor capacity specified in the tender specifications.

- i. The condenser shall be selected for 4.2 degree C temperature rise of water through the condenser.
- ii. The condenser shall be designed for a fouling factor of 0.001 FPS units.
- iii. The condenser shall be designed for entering water temperature of 32.2 degree C. (90°F).
- iv. Pressure drop across condenser shall be less than 20 ft.

The condenser shall be horizontal, shell and tube type, designed, constructed and tested for the refrigerant specified in the tender specifications. The size and thickness of the shell & tube shall be adequate enough for the required duty as per manufacturer standard and the condenser should have necessary safety devices (minimum **two** pressure relief valves) and instruments for safe, long lasting & trouble free operation. The copper tubes for condenser shall be internally and externally grooved high heat transfer enhanced type. Pressure drop across the condenser shall be limited to 20 ft. only. The condenser shall have all necessary water & gas connections, water side drain connection, provision for de-scaling / cleaning, with isolating valves, etc.

Pressure Testing

- a) The condenser shall be tested at the manufacturer's works to 1.5 times the maximum working pressure or as specified by manufacturer for safe and trouble free operation.
- b) Pressure test certificates shall be produced by the vendor in respect of condenser.

3.0 Cooler/ Evaporator:

Cooler shall be the shell and tube, flooded type.

Rating

- i. The chiller shall be selected for 5.5 degree C temperature drop of water through the chiller.
- ii. The fouling factor shall be 0.0005 FPS units
- iii. The Cooler shall be designed for entering water temperature of 12.7 degree C.
- iv. Pressure drop across condenser shall be less than 20 ft.

The cooler shall be horizontal, shell and tube type, designed, constructed and tested for the refrigerant specified in these specifications. The size and thickness of the shell and tubes shall be adequate enough for the required duty as per manufacturer standard and the cooler should have necessary safety devices (minimum **one** pressure relief valves) and instruments for safe, long lasting & trouble free operation. The copper tubes for cooler shall be internally and externally grooved high heat transfer enhanced type. Pressure drop across evaporator shall be limited to 20 ft. only. The cooler shall have all necessary water & gas connections, safety devices, instruments and water drain connection along with provision for de-scaling / cleaning, with isolating valves, etc.

4.0 Refrigerant Plumbing:

- i) Refrigerant piping shall be designed and installed so as to:
 - a) Ensure circulation of adequate refrigerant at all loads.
 - b) Ensure oil return to oil reservoir of compressor positively and continuously.
 - c) Keep pressure losses within limits, especially in suction lines.
 - d) Prevent oil/liquid refrigerant from entering the compressor when the compressor is working as well as when it has stopped.
 - e) Prevent trapping of oil in evaporator or suction lines, which may return to the compressor in the form of slug.
- ii) Refrigerant piping, fitting and valves etc. shall be of compatible material adequately sized for safe and trouble free operation & maintenance as per manufacturer's standards.

Pressure Testing

- a) The chiller shall be tested at the manufacturer's works to 1.5 times the maximum working pressure or as specified by the manufacturer for safe and trouble free operation.
- b) Pressure test certificates shall be produced by the vendor in respect of cooler.

Insulation, gas and oil

Insulation (closed cell type) shall conform to Under-writers Laboratories (UL) standard-94 having adequate thickness as per manufacturers specifications/ recommendations. The chillers shall be factory charged with refrigerant and oil as well as factory insulated. The machines shall be properly packed (sea worthy packing) to avoid any kind of damage during transit. However sufficient quantity of insulation material (as per manufacturer's standards) shall also be supplied along with the machine so as to take care of any such eventuality.

Painting

The complete chilling unit shall be supplied as per manufacturer's standard finish painting wherever applicable.

5.0 Micro-processor Controller:

Chilling unit shall be complete with a microprocessor based interactive control console in a locked enclosure factory mounted (directly on the unit), pre-wired with all operating and safety controls and instruments. It will provide start, stop, safeties, interlocks, capacity control and indications for operation of the chiller unit. It should be possible to operate the chiller on auto as well as manual mode. It should be possible to view cause of shut down, to change digital programmable essential set points and type of restart required.

All safety and cycling shutdowns shall be enunciated through the alpha-numeric display and consist of day, time, cause of shutdown and type of restart required. Cycling shutdown shall include low leaving chilled water temperature, chiller & condenser water flow interruption and power fault.

Safety shutdowns shall include low oil pressure, high compressor discharge pressure, low evaporator pressure, low refrigerant temperature motor controller fault and sensor malfunctions.

The default display screen shall indicate the following minimum information.

- i) Date and time
- ii) Inlet and outlet chilled water temperatures.

- iii) Inlet and outlet condenser water temperatures
- iv) Differential oil pressure
- v) Percent motor rated current
- vi) Evaporator & condenser refrigerant pressures and temperatures
- vii) Chiller operating hours (hour run)
- viii) Oil sump temperature
- ix) Status message
- x) Bearing temperatures
- xi) Motor winding temperatures
- xii) Any other information for safe and trouble free operation.

Security access shall be provided to prevent unauthorized change of set points and to allow manual operation of the guide vanes and oil pump.

On initiation of start, the microprocessor control system shall check all pre-start safeties to verify that all pre-start safeties are within limits. (If one is not, an indication of the fault will be displayed and the start aborted). The vendor is required to provide detailed write-up (manual)/drawings) of the micro-controller system.

Note:

All the instruments and controls connected to the machine and the microprocessor controller shall be OEM standards. Bidder to furnish details.

Testing and inspection

Inspection of the chillers will be carried out by SCL representatives at the vendor's works, who should have ARI certified test bed.

Both the chillers shall be tested on ARI certified test bed. at four load points (i.e. at 25%, 50%, 75% and 100%load). Bidder to include charges for testing and inspection of both the chillers in the chiller price. However, transportation, boarding/lodging of SCL representatives will be borne by SCL.

After installation and commissioning, the entire system under the scope shall be tested during warranty period for satisfactory working for seven working days in winter, monsoon and summer seasons separately before giving the final performance certificate.

Guarantee

- a) The vendor shall submit a written guarantee for a period of one year from the date of commissioning for successful/trouble free running of the entire system under scope. Any breakdown during guarantee period shall be attended by the vendor free of cost within 24 hours of information including replacement of the parts, if any, at his (vendor's) own cost.

- b) Vendor to submit a written guarantee from the manufacturer of the equipments for availability of spare parts of all the machines for at least 15 years of operation of the plant.

Time Period

Supply, installation and testing/commissioning of the entire work shall be completed within four months from the date of award of contract by SCL.

6.0 GENERAL CONDITIONS

- 1) All the civil works for erection and commissioning of the machine shall be done by SCL. However, necessary drawings and other details shall be provided by the vendor. The drawings, especially relating to foundations and electrical schemes shall be provided within 2 weeks from the date of award of contract by SCL. The machines shall be adequately isolated against transmission of vibrations to the building structure.
- 2) Necessary foundation bolts, nuts, leveling-screws vibration pads etc. wherever required, for mounting the machines, shall be provided by the vendor as per manufacturer's drawings/ recommendations. Making suitable modification/trimming of the foundation(s) and usage of ISMB 250 base frame or as required for better ground clearance shall be included in the bidder's scope.
- 3) Vendor shall provide the machines factory charged with refrigerant & oil and factory insulated.
- 4) **Computerized selection print out of the offered centrifugal chilling machines with VFD and active harmonic filter shall be submitted with the technical bid.**
- 5) The Contractor shall provide test certificates of the centrifugal chilling machines for the test conducted at part load conditions (25%, 50%, 75% and 100%) to prove Net Part Load Values (NPLV) for the centrifugal chilling machines to be supplied to SCL.
- 6) **Technical leaflets and General layout of all machines showing their overall dimensions shall be provided in duplicate along with the technical bid.**
- 7) Complete drawings of all the machines showing schematic diagrams of refrigeration circuit, electrical & electronic circuit and operation/maintenance manual with spare parts list etc as applicable shall be provided in duplicate at the time of supply of the machines.
- 8) The vendor shall provide complete training for operation, maintenance and working of the systems at SCL's site to 6-8 SCL's personnel free of cost.

- 9) Vendor to provide certificate showing the date of manufacture of the machine and certifying that the machine being supplied is new and not a used/old/second hand/refurbished/reconditioned machine.
- 10) Electrical terminations shall be suitable to receive suitable size of aluminium conductor cables.
- 11) Copper Earth electrodes for the chillers and its electrical scheme, will be provided by the vendor. Supply and laying of copper strips from electrodes to respective equipments and interconnections inside plant room shall also be carried out by the vendor.
- 12) Vendor should send prior intimation, sufficiently in advance for arranging pre-despatch inspection. The chillers and electrical panel should separately undergo all acceptance and routine tests as per tender specifications and relevant IS/BS/ARI latest standards at the respective manufacturer's works before despatch. Department representatives will witness the same. All required materials, instruments, tools, etc. for conducting the above tests shall be arranged by the vendor.
- 13) Necessary power supply is available inside the plant room. The vendor shall bring KWH meter, ELCB and Switch fuse unit with proper earthing system and necessary wires/cables for drawing power supply. The power drawn will be charged at departmental rates.
- 14) Vendor to provide necessary test certificates relating to the equipments and material supplied.
- 15) Software to be supplied as per the contract shall be licensed version only and shall be registered in the name of SCL. Original user manual/license/media and operation manual shall be provided along with supply.
- 16) Water quality at SCL is as under:-
 - Hardness (raw water) – 200 ppm approx.
 - Hardness (soft water, through zeolite process) – 10 ppm. approx.

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TECHNICAL SPECIFICATIONS SHEET
(To be filled in by the Vendor)

CENTRIFUGAL WATER CHILLING MACHINES:

1. General

- a. Make
- b. Type
- c. Model
- d. Type of Refrigerant
- e. Overall dimensions (mm) L x W x H
- f. Operating Weight (Kg.)
- g. Type of Vibration isolators
- h. Certification

2. Compressor

- a. Manufacturer
- b. Model No.
- c. Drive arrangement
- d. Suction temperature
- e. Condensing temperature
- f. Actual capacity of the machine at designed suction and condensing temperature.
- g. Total IKW at 100% Load
- h. NPLV

- i. Type of Capacity Control.
- j. Noise level at 1 meter distance

3. Compressor Motor

- a. Motor Manufacturer.
- b. Type
- c. Motor Rating (KW)
- d. Electrical Characteristic
- e. Method of Starting
- f. Class of Insulation
- g. AC Drive Manufacturer
- h. Type of AC drive
- i. Full load Current (Amps.)
- j. Starting Current (Amps.)
- k. Running Current (Amps.)

4. Condenser

- a. Manufacturer
- b. Model
- c. Type
- d. Shell dia (mm)
- e. No. of passes
- f. Water flow (US GPM)

- g. Water velocity (MPS)
- h. Pressure drop of water
- i. Water temperature IN (degree C)
- j. Water temperature OUT (degree C)
- k. No. of tubes
- l. Tube material
- m. Tube thickness
- n. Type of fins/grooves if any, in tubes
- o. Fouling Factor (in FPS)

5. Cooler

- a. Manufacturer
- b. Model
- c. Type
- d. Shell dia (mm)
- e. Tube length (mm)
- f. No. of tubes
- g. Tube thickness
- h. Tube material
- i. Type of fins/grooves if any, in tubes
- j. No. of passes
- k. Water flow (US GPM)
- l. Water velocity (MPS)
- m. Pressure drop of water

n. Water temperature

Entering - degree C
 Leaving - degree C

o. Fouling Factor

6- Chiller

- a) Operating limit of the chilling machine with respect to minimum condenser water inlet temperature. The maximum entering condenser water temperature (ECWT) of 32.2 °C (90 °F) is already specified.
- b) NPLV value to be given based on:
 - 100% load (at 32.2° C condenser water inlet temp)
 - 75% load (at 28° C condenser water inlet temp)
 - 50% load (at 26° C condenser water inlet temp)
 - 25% load (at 26° C condenser water inlet temp)
- c) Surge limits i.e. at what percentage of full load machine will surge.
- d) Starting time for chiller in seconds, from zero to full speed (max. rpm).
- e) Anti-recycle time (in minutes)
- f) Bearing life in hours.
- g) Values of MTBF and MTRR

B) Cooling Tower:

Quantity : 01 No.

Type : Rectangular, multi cell (four cells), counter flow type) FRP made induced draft.
 Width of cooling tower shall be limited to 3.5 meters

Temp. drop. : 4.4 Deg. C.

Approach temp. : 4 Deg. C.

Ambient wet bulb temperature : 28 Deg. C.

Water quantity : 2000 US GPM/suitable for offered chillers.

Construction Basin : FRP, to hold sufficient water.

Upper structure/ : FRP/Structural steel

supports

- Louver : PVC honeycomb, integral with the fill.
- Fill : PVC Film type
- Fan blades FRP
- Nozzles : Water repellent nylon/polypropylene or as per manufactures standard.
- Casing : FRP
- Motor for the above : Adequately sized TEFC, squirrel case induction motor (efficiency level EFF 1 as per IS 12615, YEAR 2004) suitable for 415V \pm 10%, 3 Phase, 50 Hz \pm 5% directly coupled to fan and suitable for out door installation with IP 55 or better protection.
- Accessories : PVC fills, drift eliminator inlet and out let connections, inspection window, supports and supporting structures (including for fan & motor), base channels for safe, trouble free & vibration less operation and steel ladder etc for attending fan, motor and other parts of cooling tower during maintenance/check-ups. All the parts of tower shall be easily accessible for maintenance. The tower shall be complete with make up water connection with float valve and isolating valve, quick fill connection with valve, drain connection with valve, over flow connection, water level switch with alarm (DDC compatible) etc. The tank of the tower shall be of sufficient capacity and shall be made of FRP. Necessary bolts, nuts and channel etc required for installation of the tower shall be covered under the scope of the bidder. The pipes and M.S. structure (including base frame) shall be FRP coated up to a distance of one meter from the cooling tower.

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TECHNICAL SPECIFICATIONS SHEET
(To be filled in by the Vendor)

COOLING TOWER:

Manufacturer	:	-----
Model No.	:	-----
Type	:	-----
Total weight	:	-----
Dimensions	:	-----
Construction	:	-----
Drive type	:	-----
Power Consumption	:	-----
No. of motors	:	-----
H.P. of each motor	:	-----
RPM of the motor / fan	:	-----
Running current of each motor	:	-----
Cooling tower quantity	:	-----
Water inlet temperature	:	-----
Water outlet temperature	:	-----
Wet Bulb temperature	:	-----
Water connection size (inlet)	:	-----
Water connection size (outlet)	:	-----
Fan capacity	:	-----
Total fan pressure	:	-----
Air velocity at fan outlet	:	-----
Water tank capacity required	:	-----
Water loss in the tower	:	-----

C) Piping, Valves and Fittings:

The piping shall include modifications/connections to condenser water and chilled water headers, the chiller connections, cooling tower connections, drain connections, equalizing connections, vent connections and make water connections etc.. The piping shall be complete with supports. The piping passing through walls shall have M.S. pipe sleeves. The chilled water piping shall be supported using PU blocks having density not less than 160 Kg/sq. mtr and the condenser water piping using high density wooden blocks duly treated with anti termite chemical and dipped in bitumen. The piping system is laid in such a way that any chiller can be operated with any pump and cooling tower.

- i) All the pipes and fittings shall be MS Heavy class and shall be complete with valves, fittings, flanges, neoprene gaskets, nuts, bolts, washers and supports of proper size, as required. The pipes up to 150 mm dia shall be of MS 'Heavy' class (C class) conforming to BIS 1239. The pipes of 200 mm dia and above shall be as per BIS 3589 having minimum wall thickness of 6 mm. The flanges, nuts & bolts shall be heavy duty suitable for 300 psi.
- ii) The valves of size 2'' and above shall be CI heavy-duty (flanged ends) butter-fly type and the smaller sizes shall be heavy-duty ball valves of cast steel (CS) body and SS ball having threaded ends.
- iii) The bends and fittings up to 150 mm shall be heavy duty and those above shall be fabricated from the heavy duty pipes as specified above.
- iv) Pressure gauges shall be of 4'' dial size, 0-10 kg/sq.cm. range and ½'' connection size, Bourdon type with sensing element and movement of SS. The pressure gauges shall be installed with isolating ball balls of specified make.
- v) The piping shall be tested at a pressure of not less than 10 Kg/sq. cm for 24 hours.
- vi) Condenser water piping shall be cleaned from any rust and dust. Two coats of red oxide primer shall be applied on the entire surface and thereafter two coats of reputed make paint (colour- parrot green) shall be applied.

D) Insulation:

The scope covers insulation of chilled water, piping, valves, fittings and the insulation of portion of the existing pipe/pipe headers which may get damaged during installation/connections of chillers etc.

- i) Insulation on chilled water piping, valves, fittings, etc. shall be done using TF quality polystyrene/thermocole of not less than 65 mm thickness and having

density of not less than 18 Kg/cubic meter pipe sections/ slabs. The pipes and the other surfaces where insulation is to be applied shall be cleaned so that surface is free from rust, dust and other foreign materials.

- ii) Two coats of 85/25 bitumen/CPRX shall be applied on the entire pipe surface and the inside surface of the pipe section/slabs (as required) of insulating material so that the insulating mass sticks with the pipe properly. Thereafter white transparent polyethylene sheet of thickness not less than 400 gauge shall be wrapped all along sealing the insulation mass, overlapping the joints by not less than 50 mm and sealing them properly using bitumen/CPRX.
 - a) For the areas exposed to atmosphere, over polyethene sheet, GI 24 gauge, Hexagonal wire netting shall be wrapped which shall be covered by two coats of sand cement plaster of 6-8 mm thickness each mixed with water proof compound and then 0.5 mm thick aluminium sheet shall be used as cladding to cover the insulation in a quality manner on the entire surface
 - b) For the areas under the building/ un-exposed areas, over the polyethene sheet, 0.5 mm thick aluminium sheet shall be used as cladding to cover the insulation in a quality manner.

E) Electrical and instrumentation:

The scope includes:

- a. Local control panel for cooling tower.
- b. Power and control cabling from existing MCC to cooling tower motors and the local control panel.
- c. Instrumentation & communication cables, aluminum cable trays for instruments, under the scope, including their interconnectivity with the controllers and/ or BMS complete with other material required for supporting, laying/ clamping and tagging of cables and cable trays.
- d. Double earthing for chillers as well as cooling tower drives using copper strips and copper wire of appropriate size.
- e. Termination of cables in the existing MCC, in the cooling tower and chiller drives including all the required material like gland, gland plate/gland support etc.

Note: The power cables up the chillers and up to the existing MCC (for cooling tower) shall be provided by SCL. However termination, including required material, in the MCC and with the chillers shall be in the scope of the work.

Spare cubicles:

- 1- In the existing MCC, one completely equipped and wired control module is provided, for cooling tower, which shall be used by the vendor.

Control and Indications:

1. Push buttons will be heavy duty, oil tight, and push to actuate type with integral plate marked with its function.
2. Each push button shall be provided with 2NO+2NC contacts rated for 10Amps @ 240VAC.
3. One service-Test selector switch for auto manual selection shall be provided for all motor feeders.
4. RUN-STOP and TRIP indications shall be provided for each motor feeder.
5. Relays shall be provided for interfacing with DDC system.
6. Lamps shall be LED type rated for 240V AC. Lens and lamps shall be replaceable from the front.
7. For control supply, the contractor shall provide 415V/240V control transformers with 100% standby arrangement.
8. The contactor shall provide one no. Control circuit supervision relay for each MCC. Contact multiplication relay if required shall also be provided.
9. To suit the DDC requirements of A/M selection, necessary A/M selector switches to be provided in the MCC.

Meters:

1. All indicating instruments shall be digital, Switchboard type with accuracy class +/- 2% full scale.
2. One common KWH meter for all cooling tower cells put-together shall be provided.

Cable termination:

1. Existing MCC is designed for cable entry from top.
2. All provisions and accessories shall be furnished for termination of cables including removable gland plates, cable supports, crimping type tinned copper/aluminum lugs, double compression brass glands and terminal blocks.
3. Gland plate shall be minimum 4 mm thick.

Local Push button station:

1. LPB shall be furnished in sheet steel enclosure of min. 2mm thickness, weather proof gasketed construction suitable for outdoor use without canopy conforming to IP55 or better.
2. Enclosure shall be suitable to mounting on column/wall with anodized inscription plate, earthing terminal and cable/conduit entry from top.

3. The push button shall be of one start-stop push button with start button spring return and stop button stay put type. All stop buttons shall be lockable type.
4. Ammeter 96x96mm shall be provided in each local push button stations.
5. Each push button shall be provided with 2NO+2NC contacts rated for 10Amps @ 240VAC.
6. Local-remote selection switch shall be provided in each LPB.

Painting:

Local push button stations shall be painted with light grey with 7 tank process and caution notice plate shall be fixed at the back of each vertical panel.

Drawings data and manuals:

To be submitted with confirmation to technical queries.

Outline dimensions showing general arrangement, space requirement etc.

Single line diagram

Consolidated bill of material

To be submitted for approval/ distribution.

Outline dimensions showing general arrangement, space requirement etc.

Single line diagram

Consolidated bill of material

Control schematic complete with terminal numbers

Wiring diagrams.

Approved makes:

ACB, Contactors overload relays, switches:	L&T/Siemens
Push button:	Teknic/L&T/Vaishno
Selector Switch:	Kaycee/ L&T
Fuse:	L&T/ Alstom/Siemens
Control Transformer:	AE/IMP/Indcoil
Terminal Block:	Elmex
Meters:	AE/IMP/Universal
CTs & PTs:	AE/Kappa/Indcoil
KWH meter:	L&T/Siemens/ENERCON
Indications:	L&T/Siemens
Relays:	OEN/PLA
Gland, Lugs:	Dowell

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GUIDELINE SPECIFICATION FOR DIRECT DIGITAL CONTROL (DDC) SYSTEM

INTRODUCTION -HVAC SYSTEM, CONTROLS AND BMS OBJECTIVE

The AC plant room houses the chillers, chilled water and condenser water pumps, cooling towers, etc., The chillers are connected to large blowers of Clean Rooms and AHUs / blowers through a chilled water circulation system for air-conditioning. The AHUs are spread over in different buildings and floors. For effective air- conditioning, it is necessary to precisely control & monitor temperature, pressure, water and air flow rates, voltage, current, etc., as provided for and carryout signature interpretation on routine basis. For this purpose, a DDC system is required. This shall increase the energy savings for the A/C system, due to the possibility of load management more precisely. The DDC system shall have energy management algorithm to continuously hold the leaving **chilled water temperature between 7.2 and 12.7 deg C** as set during commissioning based on the no. of AHUs in operation while ensuring, temperature, humidity, dew point set points are not compromised. Further refer "Guideline for Chiller Management Software/logic". It shall be conforming to MONITORING AND PROVISION OF CONTROL for following sub-systems:

Sub-systems to be monitored :

The existing system comprises of 2 Nos. centrifugal chillers, 4 Nos. condenser water pumps, 4 Nos. chilled water pumps, 3 Nos. cooling tower (4 cells each) fan motors, 2 MCCs (one for chilled water pumps & cooling towers and other for condenser water pumps). The existing BMS, under installation/commissioning, shall monitor and control the operations of the above system. It consists of two work stations (central computer system comprising of Xenon/Quadracore dual processor, 3.2 GHz or above, 80 GB or more SCSI HDD, 1GB RAM, COMBO DRIVE 52X24X52 or better DVD -RW, 2x1 MB cache memory, 19" TFT colour monitor with mouse, MM key board with provision for 8 serial and one parallel ports (make: IBM/DELL/HP/COMPAQ), lazer printer HPLJ1320N). The work- stations are interconnected but independent.

Two nos. of chillers and one cooling tower is proposed to be added to the existing system. Accordingly operation , control and monitoring of these two nos. of chillers (500 TR each) and one cooling tower (04 cells) shall be done through the existing BMS by adding suitable/required no. of controllers, signal cards etc. based on the I/O summary as well as some spare slots to have better maintainability.

Keeping the above requirement in mind, vendor shall supply, install and commission instruments, controllers, signal cards and required soft ware to operate, monitor and control the machines and the cooling tower to be supplied under the scope of the tender as well as to integrate the existing BMS (Sauter make) so that all the 4 nos. of chillers are operated at an optimum efficiency.

Guideline for chiller plant management software/logic

1. The software shall decide on individual or combinations of chiller packages that will require the least KW per TR for the air-conditioning system. The data from chiller manufacturer shall be used for this purpose.
2. The data of chillers, pumps and cooling towers shall be used to specify on screen, the repair/ trouble shooting/ maintenance work to be undertaken by the operator.
3. While switching 'ON' the AC plant, the chiller package, which has run least number of hours, has to come 'ON'. The other chiller packages have to come 'ON', in an ascending order of running hours.
4. The load sharing between the chillers must be possible. While sharing the load, each chiller shall be loaded to 80% initially, then depending on the total demand, the equal loading factor on individual chiller shall be decided and brought down in steps.

NOTE: For achieving the above, DDC system or suitable software program could be foreseen to do the run time equalization for the entire chiller system.

5. Individual or Combinations of chiller packages for run time equalizing, load sharing, sequencing and using the available power supply through Local Electricity Board power source, throughout the day, month and year shall be automatically decided by the software. Overrides/user defined mode of operation shall always be available to overcome any circumstance and in the event of discretion of the plant in-charge.

The central system software as well as when software, if residing in DDC system shall provide facility for nominating any one of the chiller packages as STANDBY by suitable selection on the chiller screen or through the laptop or other suitable handheld device, over and above the load sharing, sequencing and run time equalization facilities called for in the above paragraphs.

DDC

The standalone controller shall be with EPROM chip of required capacity with inbuilt psychrometric calculation -function blocks for performing all required closed loop and open loop (interlocks) functions at the various locations (High side and low side) shall be a part of the controller. The controller shall be housed in IP-54 enclosure, providing all required data acquisition, processing capability as required. The controller should be complete with port for display and keypad. The controllers shall be completely wired in 'Rittal' or equivalent panels and all interface relays required for interfacing to external system like MCC etc.

The DDC's shall be true standalone with peer to peer communication and shall have minimum the following features:-

32 / 64 bit processor with cycle time less than 150 milli seconds.

Inbuilt real time clock (**time stamping from external devices are not acceptable**).

Inbuilt memory for viewing any historic data base at least for 10000 events of various signals in each controller. Parameters like various temperatures, RH, pressure and any other stipulated parameters should be possible for storing within each controller and shall be available for viewing / uploading in the event central system is switched OFF or the communication network is under maintenance. (**Storing of historic database at other locations other than individual DDC is not acceptable**).

The DDC shall have inbuilt port for accepting the POT (portable operator terminal) and **any other external cabling method is not acceptable**. The POT shall display all parameters pertaining to all the controllers connected in the installation from any controller.

Provision shall be available for connecting Laptops or PC directly to DDC for any detailed evaluation locally in the controller for any exigency.

Portable Operator Terminal (POT) shall also be provided to read, write and change any parameters on a bus by plugging it to anyone of the controllers on the communication trunk. It shall have facility for viewing all parameters including alarms by scrolling on its fascia. The POT shall have min. three password levels as mentioned elsewhere. **Separate cabling for connecting the POT shall not be acceptable**. Changing the parameters locally from any outstation shall be done by POT which is truly portable and hand held **and not via Laptops**. Following parameters shall have a minimum facility of viewing and editing as applicable namely:

- Passwords
- Alarms
- Status
- Measurement values
- Counter values
- Set point adjustment
- Set clock time
- Program time commands

FIELD SENSORS / DEVICES:

A "list of I/O summary" is given for vendor information.

CENTRAL CONTROL SYSTEM:

Process Data Manager (PDM), as per specifications. in "Minimum Guideline BOQ for BMS" with keyboard, mouse, 19 inch. Colour monitor as required, with suitable storage, processing capabilities working on Operating Systems such as Windows XP Professional or later. A control system is required to ensure the following minimum important functions:

- Monitoring of the conditions of all field controlled spaces
- Data acquisition
- Facility for defined control functions
- Alarm indications

All controls shall be capable of operating at ambient of 0 to 50 Deg.c and 90% R.H. Accuracy of measuring devices shall be as follows:

- Temperature +/- 0.5 Deg. C
- Humidity +/- 2 to 5% over the range of 10 to 90 %
- Pressure +/- 1.5% of measured value.

CONTROL FUNCTION :

Manual Mode should be possible in MCC. The DDC system shall provide the safe A/M switching command so that the authority for A/M mode switching is not freely available. As per electrical inspectorates requirement **it shall be possible to switch OFF any of the running motors locally, immaterial of A/M mode.** Further the system shall ensure that **even when the DDC fails or power supply to DDC fails, the system without any manual interface, switches over to manual mode for switching the motor On / Off.** All this shall be a part of the electrical safe A/ M scheme incorporated in the DDC. **To cater to this requirement of A/M selection, at MCC level, suitable selector switches shall be provided.**

Proper sequencing of the equipments shall be ensured so that no equipment runs unless the system demands. Load, time sharing and sequencing of the chillers & other equipments shall be ensured to reduce the KW per TR of the Air-conditioning system. The load characteristics of the chillers shall be utilized by the chiller management software (to be supplied by vendor) to operate the chillers with best possible combinations to achieve least KW per TR. For further details refer "Guidelines for Chiller Management & Software/logic".

The control is to be realized with a 32/ 64 bit microprocessor based controller with in built real-time clock, battery backup for a minimum period of 5 years for RAM, historical database, in a powder coated - enclosure, completely pre-wired with transformer, terminals etc. with I/O's as per enclosed I/O list. The DDC system shall manage each event according to priority, storing of status updates, maintenance issues and critical events in individual files. Provision with independent port for suitable display shall also be available. Loss of data shall be avoided in case of PC failure.

The DDC system shall have the following additional features also.

Peer to peer communication between standalone controllers is a must. However the design of the control function in any DDC or group of DDC shall be to ensure that the smooth functioning of all envisaged closed loop and interlocking controls work independently of the peer-to-peer capability thus providing a TOTAL TRUE STANDALONE DDC SYSTEM.

At the central system HOTSTANDBY feature shall be provided for any smooth (without interruption) changeover from failed PDM to HOTSTANDBY PDM and all data be available at the STANDBY PDM continuously for this.

The MAC or network available through out the Centre is CSMA/CD commonly called the ETHERNET server with its OFC network, shall be utilized for data acquisition, transfer, control and monitoring. DDC system shall form a Bus network with this system. The specifications of ETHERNET server are:-

Protocol -TCP / IP
 Transparent to any network
 Hubs are available in each block/building/floor/wing
 Cabling network is with optical fibre cable (OFC)
 Server speed 100-133 MBPS
 Node level 10MBPS

The DDC system shall be compatible to protocols of the makes of chillers such as York, Mcquay, Trane and Carrier or other reputed makes. Hence, it is necessary that it has a open or universal protocol. **In case of non-compatibility, gateways can be utilized.** It is deemed that either open protocol software is included or the required gateway and necessary softwares are included for this purpose. **Total coordination and compatibility between the Chiller supplier and DDC supplier and respective system is extremely important and deemed to have been taken care of and all related cost included for this.**

Field Bus (connecting various controllers and PDM) Capability

Minimum Baud Rate : 19200 bauds
 Data width : 64 Bits

DDC SOFTWARE -Essential functions of system:

The system comprises the Design, Supply, Storage, Installation, Testing, Commissioning and handing over of an integrated Direct Digital Control (DDC) system by a specialist manufacturer:

The essential functions of the system are as follows:-

Centralised operation of the plant (remote control)
 Dynamic and Animated Graphic details of Plant and Building

Early recognition of faults
 Faults statistics for identification
 Trend register to identify discrepancies, energy consumption etc;
 Preventive maintenance and plant servicing
 Optimum support of personnel
 Control optimization of all connected electrical and mechanical plant
 Prevention of unauthorized or unwanted access
 Own error diagnosis integrated system
 AutoCAD integration
 DDC shall be divided into three levels viz., management, process and field levels.
 Access protection shall be provided for these levels as required.
 The software shall be modular and based on Windows XP Professional or later, 64 Bit standard.

Software application shall minimum have:

Plant Viewer	:	Graphics based operation of the plant
Trend Viewer	:	Logging and display of measured values
Alarm Viewer	:	Display of alarm messages
Log Viewer	:	Logging of alarms, system events and user activities
Web enablement	:	All the above viewers shall be browsed through a local area network or internet as required by the user.

Software License Deed: Software to be supplied as per the requirements shall be of licensed version only. Original user manual/ license/media and operation manual shall be provided along with supply. The software supplied shall be a complete package including all the development tools (Graphic editor, trend editor, alarm editor and all other tools used for developing the software for this project) for the purpose of future modification / addition and RUNTIME version. Only providing RUNTIME version is not acceptable. The software shall be LAN based and the **licensed copy with all required hardware locks (Dongles) shall be provided for minimum of 5 users on LAN**. The users are connected to the existing CSMA / CD -Ethernet server based LAN explained earlier.

Alarm Message shall be communicated to all or any as per client requirements to following devices namely:

1. Fax , 2. Mobile and 3. Email

All the related software shall be included for performing these tasks.

The report generated by the Software shall be user definable. **It shall be possible to navigate from screen to screen or function to function in a simple user friendly manner, like for example, going from graphic view to trending or processing reports to word, excel, access, power point, AUTOCAD and such related formats, shall be possible by click of one button only on the screen of graphic view and vice-versa.**

The ambient temperature and time functions can be combined to vary the start/stop time of the system from 15 to 75 minutes before the office start/closes depending upon whether ambient is 15 to 35 deg. C at start/stop time.

Cables

Twisted pair cables shall be used for sensors, differential signals, etc, Shielded twisted pair or shielded multi conductor cabling shall be used for noisy environments.

All necessary data acquisition equipments, cables shall be quoted which will be inclusive of accessories, laying and termination charges etc. as required. Supports for cabling and conduits shall be as specified by SCL.

Documentation:

In order to have clear system documentation the following documents have to be provided.

- ❖ System diagram
- ❖ Wiring diagram
- ❖ List of parameters

While handing over, all documents must be updated and provided with the date of commissioning.

Training :

Training shall be imparted to the concerned SCL staff by the DDC Contractor and shall utilize specified manuals and **As-Built documentation**. Operator training shall include total seven sessions each of six-hour encompassing:-

- Modifying text and graphics
- Sequence of operation review
- Selection of all displays and reports
- Use of all specified OS functions
- Use of Portable Operators Terminals, Trouble shooting of sensors (determining bad sensors)
- Password assignment and modification.

INPUT/OUTPUT SUMMARY FOR DIRECT (D) DIGITAL (D) CONTROL (C) SYSTEM						
Sr No.	DESCRIPTION	QTY.	Analog		Digital	
			Input AI	Output AO	Input BI	Output BO
A	Automation Station For HVAC High Side					
I	Chiller (500 TR x 2 Nos.)					
1	Chiller On/Off	2				2
2	Chiller Run Status	2			2	
3	Chiller Trip Alarm	2			2	
4	Chiller In/Out temp. (Water)	2	4			
5	Condenser In/Out temp. (Water)	2	4			
6	Chiller power consumption (KW)	2	2			
7	Cooling towers power consumption (KW) (1 x 4 cells)	1	1			
9	Chilled Water flow rate	2	2			
10	Condenser water flow rate	2	2			
11	B/F valve with actuator for coolers and condensers	4	4	4		
IV	Cooling Tower (1 x 4 = 4 cells)					
1	CT Fan On/Off	4				4
2	CT Run Status	4			4	
3	CT Fan trip alarm	4			4	
4	Water Level at sump	1			1	
5	Sump temperature	1	1			
6	Local/remote at MCC				4	
7	Local/remote at LCP				4	
	Spare		10	4	10	6
	Total		30	8	31	12

Note:

1. Temperature sensors, actuator/automatic/modulating butterfly valves, relays, level switches, auxiliary contactor, add on blocks for the contactors/switch gears, cabling, flow meter, KWH meter etc. and all that is required as per I/O summary shall be DDC compatible and shall be complete with SS impulse piping and isolation valves/manifold etc. as required. The input/output summary of DDC is as enclosed.
2. Calibrated KWH meter/gauges/sensors shall be traceable to accredited test house standards.
3. Electrical protections i.e. UV/OV.MPR/CT's/Control transformer /Potential transformer etc shall be offered for chillers. All the protection devices/relays/circuit breakers etc. to be DDC compatible including KWH meter.

4. SCL shall provide 415V+/-10%, 50 Hz, 3 Phase, 4 wire incoming power supply to the chillers through existing bus bars of size 75mm x 12mm. Connection of bus bar to VFD, Isolator, Motor etc. shall be in the scope of the Bidder.
5. All power/control/instrumentation cables including required lugs, cable glands shall be supplied, laid and terminated by the contractor. Size of control cables will be 2.5 mm² copper and minimum size of power cable will be 4mm² copper. The cables shall be PVC insulated 1.1KV grade, armoured, overall PVC sheathed as per relevant IS with latest amendments.

F) Annual Maintenance Contract:

The chillers, cooling towers and the electrical & instruments under scope of this work shall be covered under Comprehensive Maintenance Contract (MC) for a period of 5 years after expiry of the warranty period.

There shall be minimum four quarterly preventive maintenance visits per year and emergency/breakdown visits shall be provided as and when required. Emergency/breakdown calls shall be attended to within 24 hours of the information.

All the spares including instruments & controls and all the consumables like oils, greases, refrigerant, gaskets, brushes, cleaning chemicals etc. shall be in the scope of the bidder during the period of the Maintenance Contract.

G) LIST OF RECOMMENDED MAKES:

Sr.	Description	Make
1.	Centrifugal chilling m/c	Trane/York/Carrier/McQuay
2.	Cooling towers	Bell/Delta/Paharpur
3.	Butterfly & ball Valve	Audco only
4.	Pipes	Tata/BST/Jindal
5.	Insulation	Lloyds/ Beardsell/Styrene Packing
6.	Pressure/Temp Gauges	H Guru/Bells/A.N. Instruments/Waaree Instruments
7.	Flow Meter	Siemens/Sauter/GE-Sontay/onicon
8.	Cables	Universal/CCI/Ecko/National
9.	Switchgears for Motor Control Centers (MCC)	L&T/Siemens/Alstom

- | | | |
|-----|---|--|
| 10. | DDC Controllers/
sensors/actuators/
automatic butterfly
valves/relays. | Siemens/Sauter/Johnson Controls |
| 11. | Level switch | Siemens/Sauter/Johnson controls/Sontay |
| 12. | Kilowatt Hour Meter | ENECON/Siemens/L&T |
| 13. | Motorized Valve | Sauter/Siemens/Johnson Controls/Belimo |

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PART C

QUOTE FORMAT

Tender Document Ref. No. P&S/34403/K-01/2009

QUOTE FORMAT										
Tender Document Ref. No. P&S/34403/K-01/2009										
				SUPPLY				INSTALLATION, TESTING & COMMISSIONING CHARGES		
Sr.	Description of Item	Qty.	Unit	Unit Rate (exclusive of Excise Duty and Taxes)	Excise Duty; Rate and amount	Taxes, rate and amount (CST, VAT etc. indicate whichever is applicable)	Total	Unit Rate (exclusive of Service Tax)	Service Tax; rate and amount	Total
1	Centrifugal water chilling m/c complete with condenser, cooler motor (semi-hermatic or open) suitable for operation on 415 □ 10% volts, 50 Hz, 3 phase AC power supply with VFD & active harmonic filter, micro processor controller, instrumentation etc as specified and with all other accessories required to make the installation complete. Capacity - 500 TR Chilled water entering temp. – 55° F (12.7° C) Chilled water leaving temp. – 45° F (7.2° C) Condenser water entering temp. – 90° F (32.2° C) Condenser water leaving temp. – 97.5° F (36.4° C) Refrigerant – R- 134a Max. Permissible IKW/TR – 0.65 Pressure drop across cond. and cooler – less than 20 feet Fouling factor for condenser 0.001 FPS units Fouling factor for cooler 0.0005 FPS units.	2	Nos.							
2	Cooling Tower, Induced draft, counter flow type, having four cells in FRP construction complete with motor and other accessories as specified. Temp drop : 4.4° C Approach temp. : 4° C Ambient wet bulb temp. : 28° C Water quantity : 2000 US gpm/suitable for offered chillers Capacity : Compatible to above specified chillers Other accessories : as specified.	1	No.							

3	Piping:									
a)	Condenser water piping: Supply, installation, testing and commissioning of piping with fittings and supports as specified for:									
	250 mm dia for chillers and cooling tower	60	RM							
	150 mm dia for for cooling towers water equalization	30	RM							
	100 mm dia for cooling tower drain	10	RM							
	80 mm dia for cooling tower overflow	5	RM							
	50 mm dia for cooling tower make-up	5	RM							
	25 mm dia for cooling tower make-up	5	RM							
b)	Chilled Water piping (insulated): Supply, installation, testing and commissioning of chilled water piping (insulated) with fillings and support as specified :									
	250 mm dia for chillers	25	RM							
c)	High pressure rubber bellows at inlet & outlet of condenser and chilled water connections of chillers	8	Nos.							
	Pressure gauge at the inlet and outlet of condenser and cooler of the chillers	8	Nos.							
4	VALVES									
a)	Condenser water line: Supply, installation and commissioning of valves with flanges, nuts, bolts and neoprene gasket.									
	250 mm (butterfly type) at the inlet and outlet of condenser water lines of centrifugal water chilling machines.	4	Nos.							
	250 mm (butterfly type) at the inlet and outlet of condenser water of cooling tower	2	Nos.							
	100 mm butterfly type valve at the drain lines of cooling tower.	1	No.							
	50 mm butterfly type valve at the make up (quick fill) of cooling towers	1	No.							
	50 mm butterfly type valve at the drain lines of condenser and	2	Nos.							
	25 mm Ball valve at the makeup of cooling towers	1	No.							
	Float valves, size 1" at the makeup of cooling towers	1	No.							

b)	Chilled Water Line: Supply, installation and commissioning of valves with flanges, nuts, bolts, neoprene gasket and insulation.									
	250 mm (Butterfly type) at the inlet and outlet of chilled water lines of centrifugal water chilling machine.	4	Nos.							
5	Electricals:									
	Local Push Button Stations.									
	Cooling Tower	1	No.							
	Cables (FRLS type), including required lugs, cable glands and their termination etc. as specified.									
	Power cables	1	Lot							
	Control cables	1	Lot							
	Instrumentation cables	1	Lot							
	Earthing	1	Lot							
	Cable trays of aluminium having suitable size	1	Lot							
6	Controls and Instruments									
a)	Central Equipment consisting of system controllers, interface controllers for DDC controllers (Qty. 01 set or as required)	1	Set							
b)	Graphical interface software based on MS windows. The software shall be open system architecture type, which facilitates interoperability with other system. Complete functions as described in specs, shall be included, including Advanced alarm management, Web enablement and Hot Standby features. Minimum 5 User Licences with complete HW Lock (if applicable) and Floating license software with auto queuing facility with media and preloaded. Node lock license is not acceptable. (Qty. 01 set or as required)	1	Set							

PART-D (i)

**FORMAT FOR COMPLIANCE/RESPONSE
TO COMMERCIAL AND OTHER TERMS & CONDITIONS TO BE SUBMITTED AS PART OF
UNPRICED COMMERCIAL OFFER (Part-2 marked Technical)**

Sr.	Terms	Confirmation of bidder's compliance/response
1.	<u>DEFINITIONS:</u>	
	a) The term 'Purchaser' shall mean Semi-Conductor Laboratory.	
	b) The term 'Contractor' shall mean the firm or the company to whom the contract is awarded or their heirs and who shall be responsible for successful execution of the project including support during warranty and subsequently under maintenance contract.	
	c) The term Contract shall mean, the communication to be signed by the authorized personnel of both purchaser and the Contractor intimating mutual acceptance of the purchaser and the Contractor of the terms and conditions mentioned therein and accepting the tender or offer of the Contractor for supply, installation, testing and commissioning of the complete project.	
	d) The term "Stores" shall mean what the Contractor agrees to supply under the contract.	
2.	WARRANTY:	
2.1	The Contractor shall provide for all the items covered by this Tender Document comprehensive warranty for parts as well as labour for a period of 12 months from the date of successful commissioning of the entire project at SCL at no extra charge.	

During warranty, the Contractor shall provide the following:

Preventive Maintenance (PM) visits on quarterly basis.
Emergency/breakdown visits as and when required. The Contractor shall attend to breakdowns as and when reported within 24 hours of receipt of call from SCL.
All expenses on the visit(s) of the Contractor's engineer such as to-and-fro travel costs, local transportation, boarding and lodging etc. during warranty shall be borne by the Contractor.

2.2 **Warranty Replacements:**

- a) If in the opinion of the purchaser it becomes necessary to replace or renew any defective stores, during the warranty period, such replacement or renewal shall be made by the Contractor free of all costs to the Purchaser provided the notice informing the Contractor of the defect is given by the Purchaser within a period of 14 months from the date of acceptance thereof.
- b) All replacement parts during the warranty period including the imported parts, if any, shall be supplied by the Contractor, free-of-cost. For imported parts, the freight and insurance upto SCL, S.A.S. Nagar, Punjab and customs duty applicable in India shall be to the Contractor's account including compliance with the customs procedures in India. The indigenous replacement parts shall be supplied by the Contractor free-of-cost on F.O.R. SCL, S.A.S. Nagar, Punjab basis.
- c) All defective parts including the imported parts shall be returned by

SCL to the Contractor, if requested, on 'Freight to pay' basis. However, should the Contractor desire the imported defective parts to be returned by SCL directly to their foreign principal, the same shall be re-exported by SCL at the Contractor's cost.

- d) All the replacement stores shall be warranted for a period of 12 months from the date of arrival of the Stores at Purchase's site.

3. GUARANTEE AND REPLACEMENT:

- 3.1 The contractor shall submit a written guarantee that the Stores supplied comply fully with the specifications laid down, for material, workmanship and performance.
- 3.2 For a period of twelve months after the commissioning and acceptance of the Project, if any defects discovered therein are found to have developed under proper use from faulty materials, design or workmanship, contractor shall remedy such defects at his own cost provided he is called upon to do so within a period of 14 months from the date of acceptance thereof by the purchaser who shall state in writing in what respect the stores or any part thereof are faulty.
- 3.3 Should the contractor fail to rectify the defects, the purchaser shall have the right to reject or repair or replace at the cost of the contractor the whole or any portion of the defective stores.
- 3.4 The decision of the Purchaser, notwithstanding any prior approval or acceptance or inspection thereof on behalf of the Contractor regarding defective parts or any defect has developed within the said period of 12 months or as to whether the nature of the defects requires renewal or replacement shall be final, conclusive and binding on the contractor.

4. **Uptime:**

The Contractor shall guarantee a minimum Uptime of 95% during the warranty period on the basis of 24 hours working, 7 days a week. In the event of contractor's failure to maintain the above Uptime, the warranty period shall be extended by the period in excess of the allowable downtime.

5. **TERMS OF PAYMENT**

5.1 PURCHASE ORDER FOR IMPORTED ITEMS:

An irrevocable letter of credit (LC) shall be opened for 100% value of the purchase order in favour of the foreign vendor upon the contractor furnishing Bank Guarantee equal to 10% of the total contract value as per format given at PART-D (iii) valid till the expiry of the warranty period.

85% of the LC value shall be payable after shipment of such items on presentation of shipping documents to the bank with a usance period of 30 days and balance 15% of the LC value shall be payable upon successful commissioning of the entire project.

5.2 PURCHASE ORDER FOR INDIGENOUS ITEMS INCLUDING INSTALLATION & COMMISSIONING OF THE ENTIRE PROJECT:

85% of the value of the materials supplied shall be paid within 30 days of the receipt of the materials at SCL, S.A.S. Nagar, Punjab. Balance 15% of the value of materials supplied and 100% charges of installation and commissioning of the entire project shall be payable upon successful commissioning of the entire project at SCL, S.A.S. Nagar, Punjab upon the contractor furnishing a Performance Bank Guarantee for 5% of the total contract value (including imported parts) which shall be valid till the expiry of the

warranty period. In the event of the Contractor not providing the Performance Bank Guarantee, the payment of balance 15% of the value of the materials supplied and 100% of the installation and commissioning charges of the entire project shall be payable after the expiry of the warranty period.

Note:

For piping and fittings the balance amount payable upon commissioning of the entire project shall be worked out based on actual measurements.

- 5.3 100% amount shall not be payable on dispatch of materials.
- 5.4 All bank charges outside India related to the LC which shall be opened by SCL in favour of the foreign vendor for imported parts shall be borne by the foreign vendor and all bank charges in India related to the said LC shall be borne by SCL.
- 5.5 All amendment charges in the LC referred to above, beyond the agreed upon delivery period or the amendments to be made for reasons attributable to the foreign vendor shall be to the foreign vendor's account.
- 5.6 The charges for installation and commissioning shall be paid after deduction of income tax at source as per Indian Income Tax Act, 1961.
- 5.7 For payments in respect of indigenous materials, installation, testing and commissioning, bank charges, if any, payable to SCL's banker shall be borne by SCL and bank charges, if any, payable to the Contractor's banker shall be borne by the Contractor.
6. The Letter of Credit will be operative on presentation of the under mentioned documents:

- a) Original Bill of Lading/Airway Bill.
 - b) Commercially certified invoices describing the stores delivered, quantity, unit rate and their total value in triplicate. The invoice should indicate the Agency Commission, if any, separately.
 - c) Packing list showing dimensions and weight of individual packages/crate.
 - d) Country of origin certificate in duplicate.
 - e) Test Certificates as specified in the Contract.
 - f) Declaration by the seller that the contents in each package/crate are not less than those entered in the invoices and the quality of the stores is guaranteed as per specifications asked for by the Purchaser.
 - g) Guarantee Certificate vide Clause 3 above.
7. For imported items, if the Contractor is the Indian agent of the foreign vendor on whom the order and LC are going to be raised for the said imported items, the rate at which the agency commission is payable to the Contractor by his foreign principal should be indicated in the bid and the said agency commission shall be paid by the Purchaser directly to the Contractor in Indian rupees after the successful execution of the project.

8. **ACCEPTANCE:**

The Contractor shall provide details of the Acceptance Test Procedure for each of the items listed in the Tender Document. Each item under this Tender Document shall be accepted at SCL as per mutually agreed Acceptance Test Procedure. Pre-dispatch inspection may be done at SCL's option. Final acceptance shall be done at SCL, S.A.S. Nagar and shall be given subject to

successful acceptance of the entire project comprising all items covered by this Tender Document continuously running for one week meeting all parameters.

9. INSTALLATION AND COMMISSIONING:

It shall be the responsibility of the Contactor to carry out installation, commissioning and demonstration of performance of each of the items covered under this Tender Document as well as the performance of the entire project as per SCL's tendered specifications at SCL, S.A.S. Nagar, Punjab.

On receipt of intimation from SCL, the Contractor shall depute its engineer(s) to SCL within one week to commence installation and commissioning and will demonstrate the functionality of each of the items covered by this Tender Document as well as the functionality of the entire project to SCL's specifications as per mutually agreed Acceptance procedure. The Contractor shall be responsible for any loss/damages sustained due to delay on the part of the Contractor to sent it's engineer for installation and commissioning.

Failure to commission any of the tendered items/entire project successfully shall entitle SCL to full refund of the payment made and the interest thereon. Decision regarding successful installation and commissioning shall rest solely with SCL.

10. TECHNICAL DOCUMENTATION:

The Contractor shall provide the following technical documentation:

- Complete drawing of machine showing schematic diagrams of refrigeration circuit, electrical & electronic circuit and operation/ maintenance manual with spare parts list in duplicate to be provided by the manufacturer/vendor at the time

of supply of the items covered by this Tender.

- One set shall be sent by the bidder prior to shipment and the second set shall be sent alongwith the shipment.
- All documents including bid, specifications, schedule notices, correspondence, operating and maintenance instructions/drawings or any other writings shall be in English Language.

11. TRAINING:

The Contractor shall provide on-site training to 6-8 SCL's personnel, free of cost on operation, working and maintenance of the entire project at SCL, S.A.S. Nagar.

12. SUPPLY OF SPARES AND SERVICES:

The Contractor shall guarantee supply of spares and services for a minimum period of 15 years from the date of acceptance of the complete project.

13. FREIGHT FORWARDER:

For imported items, the shipment of consignments shall be effected through SCL designated freight forwarder only by air/sea. The contact details of the same shall be indicated in the relevant purchase order(s).

14. PROJECT COMPLETION SCHEDULE:

SCL expects the Contractor to complete execution of the entire project within four months from the date of award of the Contract. The Contractor to indicate project completion schedule and delivery period of imported items such as chillers etc. in the 'Technical & Unpriced Commercial offer' (Part-2 marked 'Technical').

15. **EXPORT FORMALITIES, TAXES & DUTIES:**

All Licenses/Government clearances other than under Indian law, if any, required for the imported items shall be the responsibility of the Contractor/the foreign vendor. All Licenses/ Government clearances under Indian law, if any, required for such imported items shall be arranged by SCL.

Any statutory clearance required for supply of indigenous items under the Contract shall be the responsibility of the Contractor.

Taxes and duties payable for supply of the imported items other than in India shall be the responsibility of the Contractor /the foreign vendor. Taxes and duties etc payable under Indian law and in India only for imported as well as indigenous items shall be the responsibility of SCL.

16. **NEW MACHINE CERTIFICATE:**

The contractor shall submit a certificate alongwith each of the items covered vide this Tender Document as well as with the documents for claiming payment indicating the date of manufacture and certifying that the item supplied is a brand new item and not a used/refurbished/ remanufactured/ reconditioned item.

17. **COUNTRY OF ORIGIN CERTIFICATE:**

In respect of the imported items, the foreign vendor shall submit a certificate regarding country of origin of the items supplied, issued by a chamber of commerce or any other Govt. authorized agency alongwith other documents for negotiation of the LC.

18. **VALIDITY:**

The bidder's quotation must be valid for 90 days from the bid closing date.

19. **IMPORT LICENCE:**

Reference to Import License No and date, if any, and contract number and date shall be prominently indicated in all the documents vide Clause no. 6 above.

20. **DEMURRAGE :**

The Contractor/foreign vendor shall bear demurrage, if any, incurred by the Purchaser due to delayed presentation of shipping documents as prescribed in Clause no. 6 above to the Bankers within reasonable time (say within 10-12 days from the date of bill of lading for sea consignments and within 3-4 days from the date of Airway bill for air consignments).

21. **GUARANTEED TIME OF PROJECT COMPLETION:**

The project completion schedule stipulated in the Contract shall be deemed to be the essence of the contract. Project must be completed within the schedule specified therein.

22. **INSPECTION AND ACCEPTANCE TESTS:**

- a) Inspection/Test Certificates should be provided for the goods after testing thoroughly at the manufacturer's works who should have ARI certified test bed. If any inspection by Lloyds or any other testing agency is considered necessary, it shall be arranged by Contractor on chargeable basis after getting prior approval from SCL.
- b) The purchaser's representatives shall be entitled at all reasonable times during manufacture to inspect,

examine and test at the Contractor's/foreign principal's/ manufacturer's premises the material and workmanship of all stores to be supplied under this Contract and if part of the said Stores is being manufactured on other premises, the Contractor shall obtain for the Purchaser' representative permission to inspect, examine, and test as if the material were being manufactured on the Contractor's premises. Such inspection, examination and testing shall not release the contractor from the obligations under this contract.

- c) For tests on the premises of the Contractor or any of his sub-contractors/foreign principal, the contractor shall provide free of cost assistance, labour, materials, electricity, fuel and instruments as may be required or as may be reasonably needed by the Purchaser's representative to carry out the tests efficiently.
- d) The piping system under the scope shall be tested hydraulically at a pressure not less than 10Kg/cm².
- e) When the Stores have passed the specified test, the Purchaser's representative shall furnish a certificate to this effect in writing to the Contractor. The Contractor shall provide copies of the test certificates to the Purchaser as may be required.
- f) It is expressly agreed that the acceptance of the stores contracted for is subject to final approval in writing by the Purchaser.

23. **MODE OF DESPATCH:**

- a) Stores shall be dispatched through SCL designated freight forwarder or through any other Agency nominated by the Purchaser. A copy of the invoice and packing list should be invariably kept inside each of the package.
- b) Part shipment is not allowed for imported items unless specifically agreed to by us.

24. **PORT OF ENTRY:**

Nava Sheva/Mumbai seaports for materials to be sea-freighted and IGI Airport, New Delhi for materials to be air freighted. For materials to be sea freighted, preference shall be given to Indian Flag vessels.

25. **PORT CONSIGNEE:**

Purchase & Stores Officer,
Semi-Conductor Laboratory,
S.A.S. Nagar-160071, Punjab, India.

26. **ULTIMATE CONSIGNEE:**

Purchase & Stores Officer,
Semi-Conductor Laboratory,
S.A.S. Nagar-160071, Punjab, India.

27. **SHIPPING MARKS:**

The marks on the shipping documents such as invoice, bill of lading/airway bill and on the packages should be as follows:

Purchase order no. _____ date _____
Semi-Conductor Laboratory,
Government of India, Department of Space,
Sectpr-72, S.A.S. Nagar-160071,
Punjab, India.

Destination _____
Port of entry _____

28. INSURANCE OF STORES:

- a) For imported items, the purchaser shall be responsible for insuring such items for transit risks from the port of loading to SCL, S.A.S. Nagar, Punjab, India and insurance costs shall be to SCL's account. The Contractor shall, however, be responsible for notifying to the purchaser or the insurers nominated by the purchaser complete dispatch details of the proposed shipments including the value of each shipment and other relevant data immediately after shipment to enable the purchaser or the insurers to arrange for transit insurance.
- b) For indigenous items, the contractor shall be responsible for insuring such items for transit risks upto SCL, S.A.S. Nagar and the insurance costs for the same shall be to the account of the Contractor.
- c) For all stores contracted for (imported as well as indigenous), the insurance of the stores for risks during storage and erection at SCL shall be the responsibility of the Contractor and the attendant insurance costs shall be to Contractor's account.

29. CONTRACTOR'S DEFAULT LIABILITY:

The purchaser may upon written notice of default to the Contractor terminate the contract in whole or in part in circumstances detailed hereunder:

- a) If in the judgment of the Purchaser the Contractor fails to make delivery/ installation/commissioning of stores within the time specified in the contract or within the period for which extension has been granted by the Purchaser to the Contractor.
- b) If in the judgment of the Purchaser the contractor fails to comply with any of the other provisions of the contract.

- c) In the event the Purchaser terminates the contract in whole or in part, the purchaser reserves the right to purchase/install/commission on such terms and in a manner as he may deem appropriate stores similar to that terminated and the contractor shall be liable to the purchaser for any additional costs for such similar stores and or for liquidated damages for delay as defined in Clause 34 until such reasonable time as may be required for the final supply/ installation/commissioning of stores.
- d) In the event the purchaser terminates the Contract, the purchaser in addition to any other rights provided in this article, may require the contractor to transfer title and deliver to the purchaser under any of the following cases in the manner and as directed by the purchaser.
- i) Any completed stores
 - ii) Such partially completed stores, drawing information and contract right (herein after called manufacturing material) as the Contractor has specifically produced or acquired for the contract as terminated. The purchaser shall pay to the Contractor the contract price for completed stores delivered and accepted by the purchaser and for manufacturing materials delivered and accepted.
- e) In the event the purchaser does not terminate the contract, the Contractor shall continue the performance of the contract in which case he shall be liable to the purchaser for liquidated damages for delay as set out in Clause 34 until the stores are accepted.

30. **INSURANCE OF CONTRACTOR'S PERSONNEL DEPLOYED FOR INSTALLATION AND COMMISSIONING AT SCL SITE.**

Insurance of Contractor's personnel deployed for installation and commissioning at SCL site shall be arranged by the Contractor and shall be Contractor's sole responsibility. The Contractor shall comply with all the statutory requirements such as ESI, PF etc. in respect of such workmen. Contractor shall indemnify SCL against any claims arising out of injury/accidents/mishaps to any of its workmen during execution of the project at SCL.

31. **REPLACEMENTS:**

- a) For imported materials, if any Stores is damaged or lost during transit, the purchaser shall give notice to the contractor setting forth particulars of such stores damaged or lost during transit. The Contractor shall arrange for the replacement of such stores to be effected within a reasonable time to avoid unnecessary delay in the intended usage of these stores. The price of replacement items shall be paid by the purchaser on the basis of original price indicated in the contract or as reasonably worked out from the contract. The cost of damages will however be claimed by the purchaser from the insurance company. The Customs Clearance of such replacement items shall be arranged by the Purchaser and the customs duty as may be applicable on the replacement items shall be to SCL's account.
- b) For indigenous materials, if any stores is damaged or lost during transit, the purchaser shall give notice to the Contractor setting forth particulars of such stores and the contractor shall arrange for the replacement items to be supplied to SCL within a reasonable time at no extra charge to SCL. The Contractor shall, however, claim the cost of damages from his insurance company.

32. REJECTION:

In the event any of the Stores supplied by the Contractor is found defective in material or workmanship or otherwise not in conformity with the requirements of the contract specifications, the purchaser shall either reject the stores or request the contractor in writing to rectify the same. The Contractor on receipt of such notification shall either rectify or replace the defective stores free of cost to the purchaser. If the contractor fails to do so, the purchaser may at his option either:

- a) Replace or rectify such defective stores and recover the extra cost so involved from the contractor, or
- b) Terminate the contract for default as provided under Clause 29 above.
- c) Acquire the defective stores at a reduced price considered equitable under the circumstances. The provision of this article shall not prejudice the Purchaser's rights under Clause 34.

33. FORCE MAJEURE

Neither of the parties hereto shall be liable for damage or have the right to cancel for any delay or default in performing its obligations if such delay or defaults are caused by conditions beyond its control including but not limited to fire, storm, floods, earthquakes, acts of God, government restrictions, continuing domestic or international problems (such as wars, rebellion, insurrections, strikes, riots, work stoppages, Labour dispute) or delay as to ancillary materials, which affect the dates of fulfillment of any obligations as per the purchase order. Such dates will be respectively postponed for the period of continuance of such force majeure circumstances and the other party can

suspend the performance of its obligations correlated to the postponed obligation of the affected party.

The obligation thus postponed shall be resumed after the force majeure circumstances have ceased. At the beginning, during and at the pre-visible end of the force majeure circumstances the parties shall promptly consult with each other about appropriate counter measures to be taken.

If the performance of obligations of any party should be delayed more than six (06) months by reasons of force majeure circumstances mentioned above, the parties shall mutually consult about the subsequent performance of obligations.

34. DELAY IN COMPLETION/LIQUIDATED DAMAGES:

If the contractor fails to complete the project within the time specified in the contract or any extension thereof, the purchaser shall recover from the contractor as liquidated damages a sum of one-half of one percent (0.5 percent) of the contract price of the uncompleted project for each calendar week of delay. The total liquidated damages shall not exceed ten percent of the contract price of the uncompleted project.

35. REQUIREMENT OF ADDITIONAL NUMBERS OF STORES/SPARE PARTS ORDERED:

The contractor shall also undertake supply of additional number of items covered by the Contract as considered necessary by the purchaser at a latter date. The actual price to be paid shall be mutually agreed to after negotiations.

36. PACKING:

a) The contractor wherever applicable shall pack and crate all stores for

sea/air shipment as applicable in a manner suitable for export to a tropical humid climate, in accordance with internationally accepted export practices and in such a manner so as to protect it from damage and deterioration in transit by road, rail, air or sea. In the event of damage to any of the stores contracted for due improper packing, the contractor shall be responsible for replacement of the item or any part thereof as the case may be.

- b) The contractor shall ensure that each box/unit of shipment is legibly and properly marked for correct identification. The failure to comply with this requirement shall make the contractor liable for additional expenses involved.
- c) The contractor shall notify the purchaser the date of shipment from the port of embarkation as well as the expected date of arrival of such shipment at the designated port of arrival.
- d) The contractor shall give complete shipment information concerning the weight, size, content of each packages etc. in the packing list for each of the contracted stores.
- e) Trans-shipment of items shall not be permitted except with written permission of the Purchaser.
- f) Apart from the original dispatch documents to be presented by the Contractor for payment, a non-negotiable set of dispatch documents shall also be sent by the contractor to the purchaser by courier within 7 days from the date of shipment for consignments to be sea freighted and immediately upon shipment of

consignments to be air freighted.

Bill of Lading/Airway Bill (two non-negotiable copies)

Invoice (3 copies)

Packing list (3 copies)

Test Certificate (3 copies)

Certificate of Origin.

The Contractor shall also ensure that every shipment is accompanied with one copy of the non-negotiable set of shipping documents.

37. LOADING, UNLOADING, TRANSPORTATION AND STORAGE AT SITE:

For indigenous items to be supplied by the Contractor on F.O.R SCL, S.A.S. Nagar basis, loading, unloading, transportation and proper storage at SCL site shall be arranged by the Contractor at his cost. However, space for storage shall be provided by SCL. For imported items unloading and storage at SCL site shall be arranged by the contractor at his cost. However, the space for storage shall be provided by SCL.

38. ARBITRATION:

If at any time any question, dispute or differences whatsoever shall arise between the purchaser and the Contractor upon or in connection with the contract, either party may forthwith give to the other notice in writing of the existence of such question, dispute or difference and the same shall be referred to the adjudication of two arbitrators, one to be nominated by the Purchaser and the other to be nominated by the Contractor and in the event of any difference, the procedure for arbitration of the international Chamber of Commerce at Paris shall be adopted. The expenses of the

arbitrators and umpire shall be paid as may be determined by them. However, the venue of arbitration shall be in India.

39. INDEMNITY:

The contractor shall warrant and be deemed to have warranted that all Stores supplied against this contract are free and clean of infringement of any Patent , copy right or trademark and shall at all times indemnify the purchaser against all claims which may be made in respect of the Stores for infringement of any right protected by patent, Registration of design or Trade Mark and shall take all risk of accidents of damage which may cause a failure of the supply from whatever cause arising and the entire responsibility for the sufficiency of all the means used by him for the fulfillment of the contract.

40. COUNTER TERMS AND CONDITONS OF SUPPLIERS:

Where counter terms and conditions printed or cyclostyled conditions have been offered by the supplier, the same shall not be deemed to have been accepted by the purchaser unless specific written acceptance thereof is obtained.

41. SECURITY INTEREST:

On each item to be delivered under this contract, including an item of work in progress in respect of which payments have been made in accordance with the terms of the contract, Purchaser shall have a security interest in such items which shall be deemed to be released only at the time when the applicable deliverable item is finally accepted and delivered to the Purchaser in accordance with the terms of the contract. Such security interest of the Purchaser shall constitute a prior charge as against any other charge of interest created in respect of such items by any other entity.

42. **APPLICABLE LAW:**

The Contract shall be interpreted, construed, and governed by the laws of India.

43. Any item not specifically mentioned but required to complete the project shall be supplied by the Contractor at no extra cost.

44. **CANCELLATION OF CONTRACT:**

In the event of Contractor's failure to execute the Contract as per terms and conditions mentioned therein, Purchaser reserves the right to claim compensation for the loss suffered by the Purchaser on account of Contractor's failure to execute the Contract and such compensation shall be worked out on mutually agreeable basis.

The contractor may also specify obligations if SCL decides to cancel the contract for reasons attributable to SCL.

Signature of the vendor _____

Name _____

Company Seal _____

Date _____

__**

PART D (ii)**PROCEDURE FOR EVALUATION OF BIDS**

The following elements shall broadly be considered for evaluation of 'Priced Commercial Offers':

1. Basic Price quoted by the bidder as per the 'Quote Format' given in PART-C.
2. The charges for installation and commissioning.
3. Compliance with the Payment Terms prescribed in this document.
4. In the event, the bidder offers Payment Terms more stringent than SCL's prescribed Payment Terms, the bid of the bidder shall be loaded for loss of interest taking the prevailing benchmark prime lending rate into account and the better Payment Terms shall be extended equivalent advantage.

In the event of the vendor seeking a Confirmed Letter of Credit, the vendor's bid shall be loaded @ 0.5% of the LC value towards confirmation charges.

In the event of the vendor requiring SCL to bear bank charges outside India (foreign bank charges), the vendor's bid shall be loaded @ 0.5% of the LC value towards bank charges outside India.

5. In the event of the bidder not providing the Bank Guarantee/Performance Bank Guarantee as sought vide SCL's prescribed Payment Terms, the bid of the bidder shall be loaded suitably.
6. The prices of recommended spares and consumables for five years of operation sought vide Clause no.12.4d of PART-A shall not be taken into account for evaluation of Priced Commercial offers.

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PART D (iii)**DRAFT OF PERFORMANCE BANK GUARANTEE**

THIS GUARANTEE made on thisday of2009 BETWEEN.....BANK, a banking company incorporated in.....and having its Branch office at(hereinafter called "Bank") which expression shall, unless repugnant to context or contrary to the meaning thereof, include its successors permitted assigns of one part and SEMI-CONDUCTOR LABORATORY having its registered office at Sector 72, S.A.S. Nagar (Mohali), PUNJAB, INDIA-160071 (hereinafter called "PURCHASER" which expression shall, include its successors permitted assigns) of other part.

WHEREAS PURCHASER has placed a firm Contract for supply, unloading at site, storage, installation, testing and commissioning of (hereinafter called "CONTRACT") at a total cost of Rs. (Rupees.....) on M/s. (hereinafter called "CONTRACTOR") AND WHEREAS it is one of the terms of the said Contract that CONTRACTOR shall furnish to PURCHASER a Guarantee of a Bank which shall be for ___% of the value of Contract and shall be valid from the date of commissioning of the entire project to the expiry of the warranty period AND WHEREAS BANK has, at the request of CONTRACTOR agreed to give in favour of PURCHASER a Guarantee in manner hereinafter appearing which PURCHASER has agreed to accept.

NOW THIS DEED WITNESSETH AS FOLLOWS:

1. In pursuance of Contract and consideration of promises BANK hereby Guarantees to PURCHASER the observance and fulfillment by CONTRACTOR of the terms of the said Contract relating to said CONTRACT and of the performance warranty which is a part of said Contract and agrees and undertakes that if CONTRACTOR
 - a. fails to observe and fulfill the said terms of said Contract and/or the performance warranty.
 - b. not attending the call within one month in the case of breakdown of any item covered by the Contract during the warranty period.
 - c. not paying the scheduled PM visits as required by the Contract during the warranty period.
 - d. does not ship essential spares leading to breakdown for more than one month.
 - e. the BANK shall immediately pay to PURCHASER on demand such sum or sums of money to the extent of Rs. being ___% of the value of

said Contract on account of losses and damages suffered by PURCHASER as may be claimed by PURCHASER by reason of such non-observance and non-fulfillment by CONTRACTOR as aforesaid and shall also indemnify PURCHASER against all costs, charges, expenses which may be incurred by PURCHASER in connection herewith. BANK shall pay the said amount without demur or protest or without recourse to CONTRACTOR. Any such demand placed on BANK shall be conclusive as regards the amount due and payable by BANK under this Guarantee.

2. This Guarantee is a continuing guarantee and not revocable except with the previous written consent of PURCHASER and save as aforesaid, it will continue to be in force until CONTRACTOR has maintained the schedule/ completion of said CONTRACT under the said Contract and observed and fulfilled the said performance warranty and all other terms and conditions of said Contract.
3. PURCHASER may without affecting BANK'S liabilities and obligations hereunder grant time or other indulgence to or compound with CONTRACTOR or enter into any agreement or agree to forbear to enforce any of the terms and conditions of said Contract against CONTRACTOR or agree to vary any of the terms and conditions of the said Contract.
4. This guarantee shall not be affected by any change in the constitution of PURCHASER by absorption with any other body or corporation or otherwise and this Guarantee will be available for enforcement by such body or corporation.
5. All compensation and payments received by PURCHASER from or on behalf of CONTRACTOR shall be regarded as payments in gross and in the event of Contract being terminated by the contractor for reasons attributable to contractor, PURCHASER will be entitled to proceed against the properties of CONTRACTOR in respect of the whole of CONTRACTOR'S indebtedness to PURCHASER under this guarantee without any right on the part of BANK to stand in PURCHASER'S place in respect of or to claim the benefits of such compensation and payment or any security held by PURCHASER until PURCHASER shall have received the full amount of the claim against CONTRACTOR.
6. This Guarantee shall continue to be in force notwithstanding the discharge of M/s. _____ by operation of law and shall cease only on payment of the full amount by BANK to PURCHASER of the amount hereby secured and on the claims of PURCHASER against CONTRACTOR in respect of Contract.
7. The Guarantee shall be in addition to and not in substitution for any other Guarantee or Security of CONTRACTOR given or to be given to PURCHASER in respect of said Contract by BANK (whether alone or jointly with others).
8. This Guarantee shall remain in force for the period of Warranty after installation and commissioning of the entire project to the satisfaction of PURCHASER. Unless

demand or claim under this guarantee is made within 6 (six) months from the date of expiry of this Guarantee, all the rights of PURCHASER hereunder shall be forfeited and BANK shall be relieved and discharged of all liabilities hereunder.

9. Any Notice by way of request, demand or otherwise hereunder may be sent by e-mail, fax or registered post to BANK addressed as aforesaid.
10. These presents shall be governed by and construed in accordance with Indian Law.
11. All disputes relating to the Contract and/or Guarantee shall be referred to and be subject to the exclusive jurisdiction of the Civil Courts in Punjab, India irrespective of anything mentioned in any correspondence or otherwise.

IN WITNESS whereof BANK has executed these presents the day and year first above written.

SIGNED AND DELIVERED for and on behalf of the above named.

****_****_****

PART D (iv)**QUERY SHEET**

M/s (Name, address and contact person of prospective bidder)

1. Tender Document Reference No. _____.
2. Date of pre-bid Conference _____
3. Details of persons scheduled to participate in the Pre-bid conference including Passport number(s) and Nationality in case the representative(s) is coming from outside India.
4. Query /Queries.

Sr.	Clause Reference	Bidder's Query/Clarification Sought

Note:

- 1 The prospective bidders are requested to send the Query Sheet listing their questions, if any, in advance to reach us at least two days before the Pre-bid conference.
- 2 Please use extra sheets, if required.

****_**_****

PART D (v)**PROFORMA FOR STATEMENT OF COMPLIANCE
TO BE PROVIDED BY THE BIDDER ALONGWITH THE BID**

TENDER DOCUMENT REFERENCE No.
(To be filled by the Bidder)

1. This is to certify that we have carefully gone through the specifications of the items related to the above Tender Document Reference number, minutes of proceedings of the Pre-bid conference and changes in the specifications of the tendered items and clarifications, if any, placed at SCL's web site subsequent to the minutes of proceedings of the Pre-bid conference, Instructions to Bidders, Quote Format, Format for Compliance/Response to the Commercial & Other Terms and Conditions and Procedure for evaluation of bids of the Tender Document. We have based our bid on various clauses of the abovesaid Tender Document and hereby confirm that we:

have submitted the bid for brand new items.

have offered items meeting the prescribed specifications.

accept all the clauses as indicated in the abovesaid documents.

accept all the clauses except for the clauses and reasons thereto as indicated against such clauses in the columns of PART-D titled Format for Compliance/Response to the Commercial and Other Terms & Conditions .

Authorized Signatory:.....

Name:.....

Title

Name of the Company

.....

PART-E**LIST OF INTERNATIONAL AIRPORTS**

Sr. No.	COUNTRY	INTERNATIONAL AIRPORT
1.	USA	NY, LA & CH.
2.	BRAZIL	SAO PAULO
3.	AUSTRIA	VIENNA
4.	BELGIUM	BRUSSELS
5.	DENMARK	COPENHAGEN
6.	FINLAND	HELSINKI
7.	FRANCE	PARIS, MARSEILLE
8.	GERMANY	FRANKFURT, MUNICH
9.	ITALY	MILAN
10.	THE NETHERLAND	AMSTERDAM
11.	POLAND	WARSAW
12.	SLOVAKIA	BRATISLAVA
13.	SWEDEN	STOCKHOLM
14.	SWITZERLAND	ZURICH
15.	UNITED KINGDOM	LONDON
16.	CHINA	SANGHAI, SHENYANG, SHENZHEN
17.	DUBAI (UAE)	DUBAI
18.	HONGKONG	HONGKONG
19.	ISRAEL	TEL AVIV
20.	JAPAN	TOKYO, OSAKA
21.	MALAYSIA	KUALALUMPUR
22.	PHILLIPINES	MANILA
23.	SINGAPORE	SINGAPORE
24.	SOUTH KOREA	SEOUL
25.	TAIWAN	TAIPEI
26.	THAILAND	BANGKOK
27.	SOUTH AFRICA	DURBAN
28.	NEW ZEALAND	AUCKLAND

Note: By International airport we mean the airport from where the flights to IGI Airport New Delhi originate/operate

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