

NATIONAL INSTITUTE OF CARDIOVASCULAR DISEASES, KARACHI

BIDDING DOCUMENT

Single Stage – Two Envelope Procedure
Rule 46 of the Sindh Public Procurement Rules, 2010 (Amended upto date)

Total Pages: 41

NIT # NICVD/TN/Khi/SC/No.13/24-25

Submission Date: 29 April, 2025 11:00 a.m.

Opening Date: 29 April, 2025 11:30 a.m.

**Invitation of Bids for Supply, Installation, Testing &
Commissioning of 750RT High C.O.P Chiller, Cooling Tower
1500RT & Pumps at NICVD Karachi.**

NOTICE INVITING TENDER (NIT)

08-04-2025

National Institute of Cardiovascular Diseases

Rafiqi (H.J) Shaheed Road, Karachi

Tel. No. 3521-8530, 9920-1271-75 Ext. 419 & 335, Fax: 9920-1289

Website: www.nicvd.org

Ref: NICVD/TN/Khi/SC/No.13/24-25

TENDER NOTICE FOR NICVD KARACHI

Online Tenders through EPAD SPPRA addressed to Executive Director NICVD, Karachi are invited under SPPRA rules, 2010 (Amended 2019) from well reputed Companies, Authorized distributors, sole agents, must be registered with Sales Tax Department on FOR basis.

S No.	Description	Tender No.	Quantity & Specifications are available in Tender Documents	Last Date & time of Submission of Bids	Opening Date & Time of Technical Bids
01	Invitation of Bids for Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi.	31-2024		29-04-2025 Tuesday At 11:00 a.m.	29-04-2025 Tuesday At 11:30 a.m.

Bidding documents should be downloaded from EPADs (SPPRA) & should submit pay order of **Rs. 5000/-** for each tender in the name of Executive Director, NICVD Karachi from **14-04-2025 to 29-04-2025**.

Bids should be submitted in SINDH EPADs before above submission details. Only Technical bids will be opened online on the above mentioned date and time in the presence of Tender Opening Committee and bidders at **11:30 a.m sharp**. Financial bid will be opened a few days later, after scrutinizing the technical bids.

All tenders will be accepted along with a pay order / bank draft of 1% of the total bid amount in the name of Executive Director, NICVD, Karachi as bid security in Procurement department before submission of bid.

EXECUTIVE DIRECTOR

Note:

Evaluation criteria would be strictly followed.
This advertisement is also available on EPADS & NICVD website.

BID DATA SHEET

The following specific data shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB) / Terms & Conditions. Whenever there is a conflict, the provisions herein shall prevail over those in ITB / T&C.

1.	Name of Procuring Agency:	National institute of Cardiovascular Diseases, Karachi
2.	Bidding Procedure:	Single Stage – Two Envelope Procedure
3.	Name of Contract:	Invitation of Bids for Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi
4.	Tender fee:	Rs. 5,000/- (Five Thousand Rupees Only) Non-Refundable in shape of Pay Order / Demand Draft in favor of Executive Director, NICVD Karachi.
5.	Submission of Tender fee & Bid Security Address:	National institute of Cardiovascular Diseases, Karachi Phone No. 021-99201289
6.	Language of the Bid:	English
7.	Currency of the Bid:	The price quoted shall be in Pakistani Rupee on DDP Basis
8.	Bid Prices:	The price shall be fixed during the contract period.
9.	Bid Security:	The amount of bid security shall not be less than 1% of the total contract value in the form of a Call Deposit issued by a scheduled bank of Pakistan, in favor of the Executive Director Nicvd, Karachi.
10.	Bid Validity Period:	90 days
11.	Tender Purchasing date:	As Per NIT
12.	Deadline for bid submission:	As Per NIT (Online through EPADs at https://eprocure.gov.pk/)
13.	Date, Time and Place of Bid opening:	As Per NIT (Online through EPADs at https://eprocure.gov.pk/)
14.	Alternate / Conditional Bid:	Not Allowed
15.	Joint Venture / Consortium Bid:	Not Allowed
16.	Period of Contract:	One Year.
17.	Performance Security:	The amount of Performance Security shall not be less than 5% of the total contract value of one year (12 months).

SCOPE OF WORKS

Invitation of Bids for Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi:

Chiller:

- **Option 1: 750 RT Direct Fired Dual Fuel LiBr, Absorption Chiller**
- **Option 2: 750 RT Water Cooled, Vapor Compression, Electrical Centrifugal Chiller**

Cooling Tower/Pumps:

- **Cooling Tower of 1500 RT Cross Flow, Axial Fan, Rectangular type (3 cells)**
- **Circulation/Condenser Pumps (1 No. Each) (1550/3000 USGPM)**

▪ General Scope of Works:

1. **Supply of the (one selected type) Chiller:** Provision of a state-of-the-art chiller, cooling tower that meets the specified technical requirements and industry standards.
2. **Ancillary Works:** Installation/connection of necessary piping, power termination and ducting (if any) to support the efficient operation of the chiller & cooling tower, pumps.
3. **Installation, Testing and Commissioning:** Professional installation of the chiller, cooling tower and associated systems, followed by thorough testing and commissioning to ensure optimal performance.
4. **Training, Warranty, PSI, O&M Services (for One Year) and Documentation:** Comprehensive training for technical team on the operation and maintenance of the new chiller system, O&M for 1st year of installation, warranty covers along with detailed documentation and manuals. A pre-shipment factory site inspection to be arranged by the supplier/successful bidder for the maximum two (nominated) representatives of the customer.

▪ Scope of Supply (for Dual Fuel Direct Fired Absorption Chiller):

(Refer Schedule for detailed scope...Annex-A)

- High Pressure Generator Shell
- Dual fuel burner with one set pilot gas valve control system
- Low Pressure Generator and Condenser Shell
- Evaporator and Absorber Shell
- Heat Exchangers: High temperature heat exchanger, low temperature heat exchanger
- Auto-purging system & Auto de-crystallization system
- With solution pump, Refrigerant pump and vacuum pump installed on the chiller.
- Control panel: color touch screen/HMI of renowned brand & micro-processor-based auto-control system fully wired and commissioned.
- Solution pump inverter included.
- Transportation steel support
- Special tools for commissioning and spare parts for one year running to be supplied free of charge as per listed below
- Initial charge of: Lithium Bromide solution duly inhibited with Octyl alcohol, 1 Lot
- Operation & Maintenance Manual for chiller, burner, canned pumps, vacuum pumps and all type of related instruments.

▪ **Technical Specifications (for Dual Fuel Direct Fired Absorption Chiller)**

QTY.	NET CAPACITY (USRT)	CHILLED/CONDENSER WATER FLOW	COP	CHILLED WATER TEMPERATURE		CONDENSER WATER ENT, TEMP. °F	CHILLER FOULING FACTOR	CONDENSER FOULING FACTOR	Natural gas Calorific value Gas/Diesel	Annual Operating Hours (Est.)
		US GPM		-	ENTERING °F						LEAVING °F
1 No.	750	1900/3380	1.42	11.5	6.5	32	0.0005	0.001	970 (Btu/Cft)/ 10,400 kcal/kg	6000

▪ **Scope of Supply (Water Cooled, Vapor Compression, Electrical, Centrifugal Type)**

(Refer Schedule for detailed scope...Annex-B)

- FRC: Full refrigerant charge, R-134a
- Chiller shall be supplied with full Refrigerant charge. Any top up if required at site shall be provided by the Supplier free of cost.
- Controller/HMI
- Compressor circuit breaker
- GFI: Ground Fault Interrupt
- ECO: Economizer
- VSD/VFD: Motor starter mode
- BMS Communication: BACNET TCP/IP
- CDTS: Compressor Discharge Temperature Sensor
- IP65 Control Panel
- SI1:Spring Vibration Isolators(1" Deflection)
- Water Flow Switches
- Victaulic Coupling/ Flanges to be provided.
- Harmonic Filters upto 85% to be provided.
- Chiller noise level i-e <80 dB
- The electric power supply range $400 \pm 7.5\%$ % volts, 3 Phase, 50 cycles.

▪ **Technical Specifications (Water Cooled, Vapor Compression Centrifugal, Electrical Type)**

QTY.	NET CAPACITY (USRT)	CHILLED WATER FLOW	CONDENSER WATER FLOW	CHILLED WATER TEMPERATURE		CONDENSER WATER ENT, TEMP. °F	CHILLER FOULING FACTOR	CONDENSER FOULING FACTOR	CHILLER PRESSURE DROP (FT.)	CONDENSER PRESSURE DROP (FT.)
		US GPM	US GPM	ENTERING °F	LEAVING °F					
1 No.	750	1800	2250	54	44	90	0.0005	0.001	15 (MAX.)	15 (MAX.)

▪ **Technical Specifications (Cooling Tower 1500 RT Cross Flow, Axial Fan, Rectangular type, 3 cells)**

Qty	Net Capacity	No. of Cells	Type	Construction Inside/Outer	Power	Protection/Insulation
01	1500 RT	03	Package type, belt driven cross flow induced	SS-304/FRP	3P,400VAC, 50 Hz	IP55/F Class

- **Expected Delivery at site/Completion timeline:** Complete work including site delivery, rigging, installation, testing & commissioning must be concluded within 180 days of confirmed Purchase/Work Order.

▪ **Standards Compliance:**

- ASHRAE standards 90.1-2013
- AHRI certified.
- Electrical Panels: IEC/NEMA compliant
- Any deviation in specs/model shall solely be finalized & selected by Head of Engineering/Customer & shall be treated binding

▪ **Bill of Quantity (BoQ):**

- Decommissioning, isolation, dismantling & removal (at designated place) for existing Flue Gas Type Absorption Chiller, complete in all respects with piping & electrical cable work/termination per site requirement
- Transportation, rigging, installation, testing, commissioning & Placement of new 750 RT Chiller, complete with civil works
- Connection/piping & Integration of new 750 RT Chiller with existing piping/header, complete in all respects with reconnection of all piping lines, fittings, valves, gauges, supports, insulation, cladding etc with standard sizes & specs. This includes (HMI) remote monitoring/data logging with network cabling work
- Same as above work for the existing rooftop mount 1500 RT Cooling Tower with the new one, per specs given, Complete in all respects
- Any other work related to above job, if required at the site

▪ **Technical Submittal & Relevant Requirements:**

- The bidder shall submit complete technical details including but not limited to the parameters included for Cooling Tower, Pumps & for Chiller (Refer Schedules), details as; Dimensions, Make/Manufacturer Name, Country of Origin, Model, Part Numbers, Wiring Diagrams i-e Power & Control Diagrams, Piping Diagrams; Detailed Technical Specifications, applicable testing standards of complete chiller including its individual parts e.g. Evaporator, Condenser, Economizer, Compressor, Compressor Motor, Refrigerant Pump, Vacuum Pump (where applicable), Oil Pump, Oil Heater, Oil Cooler, VFD/VSD (including its all parts), Microprocessor Cards/HMI, Control Circuits, Relays, Communication Modules, Display, Sensor, Transmitters, Safety Devices etc.
- Where applicable, bidder shall also submit valid documentary proofs of certification & sole distribution rights etc
- The bidder to submit the specs compliance sheet *Annex-C* (sample prepared for Centrifugal Chiller only) for the relevant type & customize accordingly.
- Bidder shall submit material safety data sheet (MSDS) of Refrigerant & Compressor oil charged in machine and other items (where applicable)

▪ **REQUIREMENTS AFTER INSTALLATION:**

- Bidder shall submit OEM verified complete technical literature as follows in both Soft and Hard Form:
- 02 x Sets of Original Operation & Maintenance Manuals from OEM.
- 02 x Sets commissioning report of the Chiller, Cooling Tower, Pumps containing complete data
- 02 x Sets 01-Year Operation & Maintenance Plan of Chiller & Cooling Tower (covered in initial bid price/warranty)
- Factory/Facility based training for customer's nominated representative(s)
- 02 x Sets of Operation & Maintenance Instructions for Operators and a set of Large Size high quality finish sticker fixed at chiller site

▪ **Inquiries and Clarifications**

- Any inquiries or requests for clarification regarding the tender document should be submitted to the following representative in writing no later than 3:00 p.m. before 03 days of submission date of bid. All responses to inquiries will be shared with all registered bidders to ensure a fair and transparent process.

Engr. Gulzar A. Shaikh
Head of Engineering
National Institute of Cardiovascular Diseases (NICVD)
Rafiqi (H.J) Shaheed Road, Karachi

NICVD

Operational Specification

1.	Quantity	..	..	..	..	1 No.
2.	Net Capacity	..	..	..	..	750 TR
3.	Chilled Water Flow	..	..	..	..	1800 US GPM
4.	Condenser Water Flow	..	..	..	..	3375 US GPM
5.	Chilled Water Entering Temperature	..	..	..	..	54°F
6.	Chilled Water Leaving Temperature	..	..	..	..	44°F
7.	Condenser Water Entering Temperature	..	..	..	..	90°F
8.	Chiller Fouling Factor	..	..	..	..	0.0005
9.	Condenser Fouling Factor	..	..	..	..	0.001
10.	Chiller Pressure Drop	..	..	..	..	15 ft Max.
11.	Condenser Pressure Drop	..	..	..	..	15 ft Max.

Guide specifications

General

The Double-Effect Gas Direct-Fired Absorption Chiller-Heater is capable of producing chilled or hot water based on the capacities shown on drawings and schedules.

Each chiller-heater is of hermetic design and factory helium leaktested.

Chiller-heater must ship as a one-piece assembly charged with nitrogen and without solution and refrigerant water charging.

All unit mounted controls, control panels and forced draft link-less type gas burner are factory mounted, wired, tested, and shipped pre-installed as integral components of the chiller-heater. The gas train is shipped loose for field installation.

Purchase price must include start-up service and a parts and labor warranty for a period of one year from start-up or eighteen months from delivery, whichever occurs first.

Base unit includes

- Absorber, evaporator and condenser
- High temperature generator and low temperature generator
- High temperature solution heat exchanger and low temperature solution heat exchanger
- LTG refrigerant condensate heat exchanger
- Exhaust gas heat exchanger for EX model only
- Hermetic solution circulation pump, solution spray pump, and refrigerant pump
- Compact 10 barg waterboxes with hinges for chilled/hot water
- Marine type 10 barg waterboxes for cooling water
- Epoxy paint inside chilled/hot waterboxes and cooling waterboxes
- Control panel
- Power supply 380 V / 3 phase / 50Hz with four wires for China or three wires for other GB regions
- Pressure release valve for over pressure relief 0,8 barg .
- Chilled/hot water pressure differential switch
- Compound gauge

- Automatic purge system including vacuum pump
- 4-20 mA remote temperature reset control for chilled/hot water
- LiBr (lithium bromide + lithium molybdate inhibitor)
- Gas burner
- Gas train, which will be installed at the field
- Deionized water refrigerant
- 2-Ethyl Hexyl Alcohol
- Modbus RTU
- Factory end of line function test
- Initial startup
 - Dry shipment

Construction

The chiller-heater must consist of a low temperature generator, a high temperature generator, high temperature solution heat exchanger, low temperature solution heat exchanger, LTG refrigerant condensate heat exchanger, absorber, condenser and evaporator. To minimize the risk of corrosion, the evaporator dispersion tray and the absorber dispersion tray are made of stainless steel. Each dispersion tray has two stage constructions and any foreign material is removed from the LiBr solution or the refrigerant at the first stage tray to avoid any degradation of dispersion performance by clogging.

The evaporator, absorber, condenser, and low temperature generator are of shell and tube construction. The high temperature generator is a one-pass water tube design. A shell-side pressure releasing valve is furnished and set to blow at 0.8 barg.

The evaporator cycle and the absorber cycle must consist of two-step (upper stage and lower stage). This technology makes absorber solution concentration weak and makes the high temperature generator solution temperature lower than the ordinary machine, which extends the machine life.

The high temperature generator section has a unique water tube design where the dilute LiBr solution coming from the high temperature heat exchanger is inside the tubes, and the products of combustion (exhaust gas from burning of natural gas), are on the shell side. The one-pass water tube design is efficient and compact with a lower pressure drop compared to the conventional smoke tube type design, as well as the two-pass water tube design. Being more efficient, the exhaust gas leaving temperature is lower than the smoke tube design. The one-pass water tube design also uses less volume of LiBr solution resulting in a faster startup time. It does not require any ceramic refractory compared to the conventional design resulting in improved reliability.

The low temperature generator is gravity fed falling film design without any spray nozzle.

Three plate-type solution heat exchangers (high temperature solution heat exchanger, low temperature solution heat exchanger and LTG refrigerant condensate heat exchangers) are equipped to achieve higher efficiency.

The exhaust gas heat exchanger is a stainless steel water tube type, and is equipped to achieve lower exhaust gas temperature and higher efficiency.

The LiBr solution flow type is in parallel flow cycle. The flow of weak solution pumped from the absorber must initially pass through the low temperature solution heat exchanger to improve operating efficiency by preheating and is divided into two paths. One path leads to the high temperature generator through the high temperature solution heat exchanger and the other leads to the low temperature generator in parallel.

The unit is hermetically tight and built to very stringent conditions. It operates under a vacuum that improves performance and reliability ensuring design performance to GB/T 18362-2008 Standard (2.03×10^{-6} Pa*m^J/s).

Tube materials

Evaporator, absorber, and condenser tubes are plain type and made of 0.6 mm wall copper material or stainless steel (SUS316L), and the inside of these tubes is also plain type without any spiral and fin for easy maintenance. Low temperature generator tubes are also plain type and made of 0.6 mm wall copper or stainless steel (SUS436LTB). High temperature generator tubes are carbon steel.

Waterboxes

Waterboxes are removable to facilitate tube cleaning and replacement, whereas, evaporator waterboxes are compact type, and absorber and condenser waterboxes are the marine type. All of the water boxes have hinges for easy maintenance. Water circuit tubing to be replaceable from either end of the absorption unit. All waterboxes and associated water circuit nozzles and tube bundles is designed for 10 barg working pressure and is pressure air tested at 11 barg. Vent and drain connections are provided on each waterbox. All the water connections are equipped with DIN/GB flange (HG/T20592). Mating flanges are not included. The inside of the waterboxes and waterbox covers are coated with epoxy resin paint.

Automatic decrystallization system

The chiller-heater must have an anti-crystallization system. The absorber and the evaporator are located side by side in a same shell and separated by the eliminator. When the concentration rate of lithium bromide in the chiller-heater goes up, the water level at the evaporator must increase and automatically spill over to the absorber and the concentration rate of the solution at the absorber goes down. When the solution temperature, pressure, or concentration of LiBr rises to each protection point and the chiller-heater runs in the load limitation, the refrigerant blow solenoid valve opens automatically and dilutes the solution to prevent crystallization.

Pumps

Solution pump, solution spray pump, and refrigerant pumps are hermetically sealed, self-lubricating, totally enclosed, factory-mounted, wired, and tested. Motor windings must not be exposed to lithium bromide or water. The suction and discharge connections for each pump is fully welded to the unit piping to minimize the opportunity for leaks. Pump durability is designed to operate for a total of 60,000 hours.

Fully automatic purging system

The chiller-heater is equipped with an automatic purging system to remove non-condensable gases from the unit during operation. Non-condensables are collected by an eductor and accumulated in the purge tank. The control panel can sense the pressure increase in the purge tank and automatically remove the non-condensable gas through the operation of an electric vacuum pump.

The purge pump is an oil rotary double stage design, and must be furnished complete with a motor and all required accessories. The purge pump is shipped mounted on the chiller-heater and connecting hose is factory installed. The purge pump oil is charged at the factory site.

Lithium bromide and refrigerant

Lithium bromide must contain lithium molybdate corrosion inhibitor to minimize the rate of ferrous metal corrosion on both the solution and refrigerant sides of the unit. The solution and deionized refrigerant water are kept in barrels and shipped with the chiller. They are then charged at the field during the commissioning.

Dry shipment

The solution and refrigerant water are kept in the barrels and shipped with the chiller. They are charged in the field during the commissioning. The chiller is charged with N2 to 0.3 barg during the delivery.

Linkless type gas burner

The gas burner and gas train are designed and built according to GB standards and codes. Capacity control for the gas burner is proportional control. A linkless type gas burner ensures ideal air-fuel ratio and high combustion efficiency throughout its capacity control range. The air-fuel ratio can be adjusted through the operator panel on the burner unit by entering the required valve opening value. No mechanical adjustment is required.

The gas burner must include a main and pilot gas shut off valve, a main gas governor, high and low gas pressure switch, low air pressure switch, UV flame detector, gas pressure gauge, and a gas strainer,

Control panel

Each unit is furnished complete with a factory mounted and pre-wired control system. The control panel enclosure is equipped with a hinged access door with lock and key. Protection rating of the control panel is equivalent to IP42. All temperature sensors and other control devices necessary to sense unit operating parameters are factory mounted and wired to the panel. The control panel includes a touch panel showing all system parameters in various languages with numeric data in metric units.

The operating program is stored in non-volatile memory (SRAM) to eliminate chiller-heater failure due to AC power failure.

Capacity control - The control panel must automatically control the input gas flow rate to maintain the programmed leaving chilled or hot water set-point for cooling loads. Capacity control range under standard condition is 20% to 100%. The input (gas) flow rate is manually adjustable from the control panel to any setting between minimum and maximum when automatic operation is not required.

Solution pump variable frequency drive (option) - Frequency control unit for solution circulation pump and solution spray pump can be equipped on direct-fired absorption chiller-heaters as an option. This unit controls the frequency of solution pumps to improve part load efficiency of chiller- heater depending on high temperature pressure, temperature, and concentration.

Main screen: Should comprises of all but not limited below options;

1. Equipment Status

- Chiller-heater Stop/Operating/Failure Activating
- Burner Combustion ON/OFF
- Solution Circulation Pump, Solution Spray Pump, Refrigerant Pump ON/OFF
- Purge Pump ON/OFF
- Burner Fan Motor ON/OFF
- Chilled/Hot Water Pump/Cooling Water Pump ON/OFF

2. Operation Status

- Startup
- Low Combustion
- Temperature Control
- Thermo OFF
- Dilution Operation
- Set Point of Chilled/Hot Water Leaving Temperature
- Burner control valve Control Output
- Burner **control** valve position
- Chilled/Hot Water Entering/Leaving Temperature
- Cooling Water Entering/Leaving Temperature
- **Refrigerant** Temperature

- **Absorber** Temperature
- High Temperature Generator Temperature
- High Temperature Generator Pressure
- High Temperature Generator Concentration
- Exhaust Gas Temperature
- Purge **Tank** Pressure

3. Condition Lamps

- Chiller-heater Stop/Operation
- Local/Remote
- Failure/Alarm

4. Operation button

- Chiller-heater Stop/Operation
- Local/Remote Mode Select

Data screen

1. Measured Value

- Chilled/Hot Water Entering Temperature (°C)**
- Chilled/Hot Water Leaving Temperature (°C)
- Cooling Water Entering Temperature (°C)
- Cooling Water Leaving Temperature (°C)
- Evaporator Refrigerant Temperature (°C)
- Absorber** Temperature (°C)
- High Temperature Generator Temperature (°C)
- High Temperature Generator Pressure (kPa)
- High Temperature Generator Concentration (wt %)
- Exhaust Gas Temperature (°C)
- Purge Tank Pressure (kPa)
- Burner Control Valve **Control** Output (%)
- Burner **Control** Valve Opening (Position) (%)
- Air Control** Valve **Control** Output (%)
- Air Control** Valve Position (%)
- Residential** Hot Water Leaving Temperature (°C) (auxiliary hot water heat exchanger equipped model only)

Operation Hours

- Total **Operation** Hours
- Cooling Operation Hours Heating Operation Hours Solution Pump Operation Hours Refrigerant Pump Operation Hours Burner Combustion Hours

3. Frequency

- Total **Operation** Times Cooling Operation Times Heating Operation Times Start Times Failure Times Alarm Times Auto Purge Times

4, Trend

- Chilled/Hot Water Temperature Cooling Water Temperature High Temperature Generator Temperature High Temperature Generator Pressure

5. History Menu

- Hourly Temperature Trend (12 hours)
- Minutely Temperature Trend (12 minutes)
- Failure History (6 times)

- Alarm History (6 times)

6. Maintenance Information

- Solution Analysis
- Control Panel Parts Replacement
- Solution Pump Overhaul
- Refrigerant Pump Overhaul
- Combustion Check
- Burner Parts Replacement

Failure/alarm screen

1. Failure

- Chilled/Hot Water Time Out
- Cooling Water Time Out
- Ignition Time Out
- Ignition Condition Unsatisfied
- Operation Interlock
- Cooling Water Pump Interlock
- Chilled/Hot Water Suspension
- Chilled Water Overcooled/Hot Water High Temperature
- Refrigerant Overcooled
- Constantly Monitoring Interlock
- Combustion Monitoring Interlock
- Emergency Failure Interlock
- Cooling Water Suspension (cooling water suspension switch equipped model only)
- Low Cooling Water Inlet temperature

2. Alarm

Abnormal Purge Frequency

Purge System Abnormal

Chilled Water Overcool Prevention Control

Refrigerant Overcool Prevention Control

Cooling Water Tube Fouling

High Temp generator Tube Fouling

Refrigerant Pump Stop

High Temp Generator High Pressure Prevention Control High Temp Generator High

Temperature Prevention Control High Temp Generator High Concentration

Prevention Control

Low Cooling Water Inlet Temperature

- High Cooling Water Inlet Temperature
- Recording Sensor Abnormal
- Low Battery

Setting screen

1. Control Parameter

- Setting Method Local/**Remote**
- Setting Base Temperature
- Remote Setting Differential
- Chilled / Hot Water Set Point (display)
- Automatic Stop Temperature
- Automatic Restart Temperature

2. Operation Switch

- Forced Dilution ON/OFF
- Refrigerant Pump Auto or Stop
- Operation Mode - Cooling/Heating
- Cool/Heat Simultaneous OFF / ON (auxiliary hot water heat exchanger equipped model only)
- Residential hot water only operation ON/OFF (auxiliary hot water heat exchange equipped model only)
- Fuel Type - Gas/Oil (dual fuel burner equipped model only)
- Purge Mode Auto/Manual
- Manual Purge ON / OFF

3. Date & Time

Touch panel mechanical specification

- Screen size : 10.4 in.
- Electrical power supply : DC24 V
- Electrical power consumption : Less than 17 W
- Display : TFT 65,536 colors or equivalent
- Graphic mode : 640x480 dot (VGA) or equivalent

Language

The following languages must be available for the touch panel screen with selectable operation:

- English
- Arabic
- Japanese
- Chinese (simplified and traditional)

WATER COOLED CENTRIFUGAL CHILLER

OPERATIONAL SPECIFICATIONS

1.	Quantity	..	..	..	..	1 Nos.
2.	Capacity	..	..	..	..	750 TR
3.	Minimum refrigerant circuits	..	..	..	..	2 Nos.
4.	Chilled water flow	..	..	..	..	1800 US gpm
5.	Chilled water entering temperature	..	..	..	..	53°F
6.	Chilled water leaving temperature	..	..	..	..	43°F
7.	Chilled water fouling factor	..	..	..	..	0.0005
8.	Evaporator maximum pressure drop	..	..	..	..	15 ft
9.	Condenser water flow	..	..	..	..	2250 US gpm
10.	Condenser water entering temperature	..	..	..	..	90 °F
11.	Condenser water fouling factor	..	..	..	..	0.001
12.	Condenser maximum pressure drop	..	..	..	..	15 ft

1.0 GENERAL

1.1 CODE & COMPLIANCE

All materials and workmanship described herein shall be in accordance with the latest editions and addenda of the codes and standards listed below and all Federal, State, and local codes, and/or specifications, the more stringent shall be govern.

ASTM	American Society for Testing and Materials
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers
NEC	National Electrical Code
UL	Underwriters Laboratories
TEMA	Tubular Exchanger Manufacturer's Association
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association

The water chiller completes with all controls and accessories shall be constructed to comply with all the requirements of material and workmanship according to the latest JIS / ASME Codes.

The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

Conform to ANSI/ASME Boilers and Pressure Vessels Code Section VIII, Division 1 for design and fabrication of pressure vessels for manufacture of tubular heat exchangers and heat exchanger shells as applicable.

ARI Standard 550/590 - Standard for Water Chilling Packages using the Vapor Compression Cycle.

ANSI/ASHRAE Standard 15 - Safety Code for Mechanical Refrigeration.

Where this specification is more stringent than those above, this specification shall govern. Where a direct conflict arises, Customer Representative shall be notified for clarification prior to installation.

1.2 QUALITY ASSURANCE

All materials and equipment to be used for this contract shall be standard products of a reputable manufacturer regularly engaged in the production of same. Equipment manufacturer shall be a company specializing in manufacture, assembly, and field performance of provided equipment with a minimum of five (5) years experience. Where more than one unit of an item is required, all shall be provided by the same manufacturer using identical components. The manufacturer's nameplate shall include model number, serial number and performance data and shall be permanently affixed to all equipment furnished under this contract. The equipment shall be manufacturer's latest model.

Any work and/or material may be inspected by Customer Representative at any time. Any work or materials found to be defective or which do not meet the requirements of these specifications, shall be replaced by the Vendor at his own expense. Such inspection shall not relieve the vendor from full responsibility for the quality and correctness of his work.

All materials shall be new, unused and free of defects and imperfections. No substitutions are permitted without written approval of the customer.

Factory pressure testing of the chiller condenser and evaporator sections shall be in strict conformance with all applicable sections of the ASME code and shall bear the standard ASME symbol.

All equipment or components of this Section shall meet or exceed the requirements and quality of the items herein specified and as denoted on the Drawings.

1.3 SUBMITTALS

The proposal shall include the following:

- a. Total cost and individual unit costs (in case of more than one unit).
- b. Terms of payment.
- c. Technical information as requested under "Equipment Compliance sheet"
- d. Shop drawings and submittal data shall be provided for review by the successful vendor within fifteen (15) calendar days of notice of the award. Submit three copies of the drawings and data in English Language.

The submittals and shop drawings shall be complete in all respects including the following information:

- a. Product Data
- b. Drawings indicating components, assembly, dimensions, weights and loadings, required clearances, and location and size of field connections.
- c. Indicate equipment, piping and connections, valves, strainers, and thermostatic valves required for complete system.
- d. Capacity ratings shall be data in accordance with ARI 5501590-03.
- e. Provide manufacturer's assurance that equipment will operate over complete range (10 percent – 100 percent rated capacity) without the use of hot gas bypass and without surging.
- f. Part load performance data in accordance with ARI 5501590-03. Plot chiller performance from 100 percent to 10 percent in 10 percent increments with constant entering condenser water temperatures at 86, +80 +75 + 70 + 65 + 60 degrees F for every 10 percent reduction.

- g. Chiller load performance data in accordance with ARI relief with a capacity reduction from 100 percent to 10 percent in 10 percent increments.
- h. Record Documents
- i. Submit manufacturer's installation instructions.
- j. Submit pressure test reports of vessel shell and tube bundle pressure tests.

Operation and Maintenance Data

- a. At Substantial Completion, submit operation and maintenance data that includes start-up and shutdown instructions, assembly Drawings, and spare parts lists.
- b. Shop drawings and submittals shall be reviewed by customer and the reviewed drawings will be returned to the vendor.
- c. Vendor shall resubmit revised drawings within ten (10) calendar days.

Two weeks before shipment the vendor shall deliver to customer three bound copies of operating and maintenance data on all equipment furnished which shall include the following (separated by individual unit):

- a. Shop Drawings.
- b. Model no., system/tag and serial numbers of all equipment.
- c. Performance data.
- d. Manufacturer's written instructions for the operation and maintenance of the component equipment.
- e. Lubrication schedule indicating all equipment to be lubricated, recommended lubrication interval and type and quality of lubricant to be used.
- f. List of spare parts.

1.4 SPARE PARTS

The tenderer shall include the price of complete set of spare parts for all items supplied by him required for two years operation for the specified operating hours.

1.5 DELIVERY, STORAGE & HANDLING

Unit shall be delivered factory assembled with protective crating and covering and their delivery coordinated in sufficient time to allow movement into building.

Preparation for shipment shall be in accordance with Vendor's standards and noted herein. Vendor shall be solely responsible for the adequacy of the preparation for shipment provisions with respect to materials and applications.

Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit and for a 6 month period of outdoor storage at job site prior to installation. Control panel shall be protected from moisture penetration.

Bracing, supports and rigging connections shall be provided to prevent damage during transit, lifting and unloading.

Equipment shall be completely free of water prior to any shipment preparation.

Metal filter elements shall be cleaned and reinstalled prior to shipment.

Mechanical seals, carbon rings and other sealing devices shall be installed for shipment. If shaft packing is required, two (2) sets of packing in unused condition shall be supplied; one (1) set installed and one (1) set boxed and shipped with the equipment.

Miscellaneous parts shall be tagged or marked with the equipment item number for which they are intended.

Equipment containing insulating oils, antifreeze solutions or fluids shall be prominently tagged at openings to indicate the nature of the contents, shipping and storage precautions.

The system shall be shop-assembled on a single skid and completely piped and wired, unless otherwise specified.

1.6 WARRANTY

Vendor shall guarantee and provide a written statement as proof that the unit shall perform as specified on the Data Sheets.

All equipment shall be guaranteed for satisfactory performance and shall be warranted against faulty design, defective or improper materials.

The Material and Workmanship Guarantees shall be extended for a period of eighteen months from the date of shipment or one year from the date the equipment is placed in service whichever occurs first.

1.7 FACTORY INSPECTION AND TESTING

Each unit shall be assembled at the factory, inspected and determined to be in compliance with the specifications. Any deviations found shall be corrected.

Owner reserves the right to visit the factory and inspect the equipment prior to shipment. The vendor shall notify the owner 2 weeks prior to shipment when the equipment will be ready for inspection. Deviations identified during the inspection shall be corrected.

The cost of testing the equipment shall be part of the equipment price. The cost of travel, boarding and lodging etc. pertaining to the Owner representative and Consultant (2 persons) shall also be borne by the Supplier/Manufacturer as part of. Should the equipment need to be retested the Supplier shall bear the expenses of the Owner representative and Consultant (2 persons) and any subsequent visits at no extra cost to the Owner.

2.0 PRODUCT

2.1 GENERAL

The minimum cooling capacity of each unit and conditions of operation shall be as given in the Schedule of Equipment.

The unit shall be factory wired to the extent possible to minimize the external wiring required at site. The main control panel to be mounted on the unit preferably at eye level. The electric power supply for the main motors shall be 400±10 volts 50 cycles 3 phase and for the control circuit 230±10% volts 50 cycles 1 phase.

All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

2.2 REFRIGERANTS

Base bid for the proposed chiller using refrigerant: R-134a.

2.3 COMPRESSORS:

Hermetic drive centrifugal compressor type or open drive compressor type.

Compressors using an unloading system that requires dynamic penetrations through the compressor housing or linkages, or both that must be lubricated and adjusted are acceptable provided the manufacturer provides a five-year inspection agreement consisting of semi-annual inspection, lubrication, and annual change out of any compressor seals.

Hermetic Drive Motors

- a. Liquid refrigerant cooled with internal thermal overload protection devices embedded in the winding of each phase.
- b. Motors shall be compatible with the starting method specified hereinafter.

Open Drive Motors

- a. Open drip-proof, squirrel cage, induction type motors may be provided as an alternative.
- b. If an open drive motor is provided, the manufacturer shall provide a double seal shaft seal and a five-year parts and labor warranty against any shaft seal or other compressor housing penetration leaks.
- c. The manufacturer shall verify in the submittal that the scheduled chiller room ventilation system will accommodate the additional heat and maintain the equipment room at design indoor temperature based on 95 degrees F outdoor ambient ventilation air available.
- d. If additional cooling is required, manufacturer shall be responsible for the supply, installation, wiring and controls of a cooling system. Motors shall be compatible with the specified starting method.

2.4 EVAPORATOR AND CONDENSER:

Chiller capacity selection shall be based on a water side fouling factor of 0.0005 in the evaporator tubes and 0.001 in the condenser tubes. Evaporator and condenser water pressure drops shall not exceed those scheduled on the Drawings. The NPLV rating of the chiller supplied shall not exceed the NPLV value scheduled on the Drawings. Chillers shall be rated in accordance with the latest edition of ARI Standard 550/590 and shall conform to the latest edition of ASHRAE 15 Safety Code.

Shell and tube type using welded steel shells and copper tubes with integral fns, rolled or silver brazed to tube sheets. Tube supports to be at maximum of 4'-0".

The evaporator shall be designed such that refrigerant liquid is to be distributed evenly across the evaporator and that potential of having liquid refrigerant carryover into the compressor is eliminated.

Refrigerant baffles in the condenser to distribute entering gases and to concentrate non-condensable gases.

Water Pipe Connections

Evaporator and condenser connections shall be flange pipe connections.

- a) Grooved to Flange Adaptors
- b) Welded Steel Flanges

Provide marine water boxes on condenser.

- a) Welded steel arranged to permit inspection of tubes from either end without disturbing water chamber of connecting water piping.
- b) Condenser head covers shall be hinged at both ends of condenser shell. The hinges shall be installed at the top (12 o'clock position) so that the condenser head is supported and is able to swing free of the shell. The hinged support connection at top of the condenser head shall have a pivot assembly, so that the head can be rotated when hanging from the support beam.
- c) Inside of condenser water boxes and head covers should have an enamel/polymer coat of paint/linings resistant to cooling tower treatment chemicals.

- d) A magnesium anode of sufficient size to account for electrolysis shall be placed inside of condenser section. The attachment device for magnesium anode shall be a threaded rod with nut and washer. Rods should be welded to inside of head and coated with same material as the inside of the condenser head cover. Nut and washers shall be of plastic material.

Design waterside of evaporators and condensers for 150 PSI working pressure and test not less than 1.5 times maximum working pressure.

Test refrigerant side not less than 1.5 times maximum working pressure and not less than 45 PSI.

Provide taps in water boxes for vents, drains, and control connections.

Provide condenser and evaporator tubes with minimum tube wall thickness of 0.035 inches.

Evaporator and condenser tubes may be internally enhanced to improve heat transfer efficiency.

Provide refrigerant over-pressurization safety relief. Re-seating refrigerant pressure relief valves are the preferred option over rupture discs.

2.5 CONTROLS

Provide stand-alone direct digital controller for each chiller. Controller shall be microprocessor-based and BACnet compatible with factory packaging and testing of required control components for reliable equipment operation.

The chiller control panel shall provide control of chiller operation and monitoring of chiller sensors, actuator, relays and switches. The panel shall be a complete system for stand-alone chiller control and include controls to safely and efficiently operate the chiller. The panel shall be equipped with building automation system (BAS) interface.

Safeties: The chiller control panel shall monitor such safeties as motor starting and running, time between compressor motor starts, low chilled water temperature, high condenser, refrigerant pressure, low evaporator refrigerant temperature, evaporator and condenser water flows, low oil pressure, high oil temperature, and proper operation of unit controls and sensors.

Provide steel control cabinet containing the following operating and safety controls:

- a) Automatic and manual capacity controller.
- b) Ammeter and voltmeters for monitoring each phase.
- c) Automatic current limiting overload device.
- d) H-O-A switches for oil pump and purge pump.
- e) Switch and pilot light for oil separator heater.
- f) Operating hour counter.
- g) A thirty-minute programmable anti-recycle program timer.
- h) Suction pressure gauge.
- i) Discharge pressure and condenser temperature gauge.
- j) Oil pressure gauge.
- k) Low chilled water temperature cutout and recycle thermostat.
- l) Motor temperature cutout.
- m) Motor bearing temperature cutout.
- n) High refrigerant pressure cutout with manual reset.
- o) Low refrigerant temperature cutout with manual reset.
- p) Low oil pressure cutout.
- q) Purge system daily pump-out limit exceeded.
- r) Guide vane time delay switch to prevent vane opening until compressor has obtained full speed. This sequence is not applicable for compressor driven by variable speed drive.
- s) Pilot lights for safety circuit items.
- t) On-off maintained contact switch for control circuit.
- u) Chilled and condenser water pressure or flow switches.
- v) Demand limiting device for "off-season" operation to limit electrical demand to any desired fraction of full load current from 40 percent to full load.
- w) Electronic chilled water temperature controller.
- x) Automatic starting with condenser water temperature down to 60 degrees F.
- y) "First-out" indication of the machine safety controls.
- z) Automatic reset after power loss to previous operating parameters.

The front of the chiller control panel shall be capable of displaying the following:

- i. Entering and leaving evaporator water temperature.
- ii. Entering and leaving condenser water temperature.
- iii. Chilled water setpoint.
- iv. Electrical current limit setpoint.
- v. Chiller operating mode.
- vi. Chiller operating parameters.
- vii. Chiller diagnostic codes.

Facility Management system interface module fully compatible with BAS.

2.6 STARTER

The chiller manufacturer shall furnish a reduced voltage Solid-state starter for the compressor motor. Starter shall be factory mounted and wired on the chiller. The starter shall provide, through the use of silicon-controlled rectifiers, a smooth acceleration of the motor without current transitions or transients. The starter enclosure shall be NEMA 1, with a hinged access door with lock and key. Electrical lugs for incoming power wiring shall be provided.

The control center shall be provided with digital display of the following:

- a) phase voltage A,B,C
- b) phase current A,B,C
- c) Input power (kW)
- d) kW Hours
- e) Starter Model
- f) Motor Run (LED)
- g) Motor Current % Full Load Amps
- h) Current Limit Set points
- i) Pull down Demand Time Left
- j) The control center shall be provided with following programmable features:
- k) Local Motor Current Limit
- l) Pull down Demand Limit
- m) Pull down Demand Time

The control center shall be provide with low line voltage, 115-volt control transformer, three-leg sensing overloads, phase rotation and single phase failure protection, high temperature safety protection, motor current imbalance and under voltage safeties, open and close SCR protection, momentary power interruption protection. The Solid Stage Starter is cooled by a closed loop, fresh water circuit consisting of a water to water heat exchanger and circulating pump.

2.7 VARIABLE SPEED DRIVE

A variable speed drive shall be factory installed on the chiller. The variable speed drive 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 van position independently for maximum part-load efficiency by analyzing information fed to it by sensors located throughout the chiller.

Drive shall be pulse width modulation type utilizing insulated gate bipolar transistors 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 UL listed.

The following features shall be provided:

- a) A door interlocked circuit breaker, capable of being padlocked.
- b) UL listed ground fault protection.
- c) Overvoltage and under voltage protection.
- d) 3-phase sensing motor.

- e) Over current protection.
- f) Single phase protection
- g) Insensitive to phase rotation.
- h) Over temperature protection.
- i) Digital readout at the chiller unit control panel of
 - Output Frequency.
 - Output Voltage.
 - Input Kilowatts (kW) and Kilowatt-hours (kWh).
 - Self-diagnostic service parameters.

Separate meters for this information shall not be acceptable. A 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 UL listed. The following digital readouts shall be provided at the chiller unit control panel as part of the filter package:

- a) Input kVA.
- b) Total power factor.
- c) 3-Phase input voltage.
- d) 3-Phase input current.
- e) 3-Phase input voltage total harmonic distortion (THD).
- f) 3-Phase input current total demand distortion (TDD).
- g) Self-diagnostic service parameters.

2.8 REFRIGERANT MONITOR

Provide calibrated, refrigerant monitor for specific refrigerant used, capable of detecting concentrations of 10 ppm for low level detection.

Provide monitor with audible and visual alarms that activate at a value corresponding to the TL V of the refrigerants in use. The alarm system shall annunciate visual and audible alarms inside the machinery room and outside each entrance to the room.

Monitor shall have the capability of detecting, alarming and controlling from 0-50 ppm. Digital display accuracy shall be within one (1) ppm.

Monitor shall require only minimum maintenance.

- a) Recalibrate no more than once every five (5) years.
- b) Re-zeroing no more than once every week.

Monitor shall be capable of operation in ambient temperatures from 40 to 105 degrees F.

Outputs:

- a) Two (2) analog setpoints and three (3) binary with individual closure setpoints.
- b) Connect one alarm contact to the BAS to indicate alarm condition into the BAS system.
- c) Remaining alarm contacts shall initiate closure of magnetic motor starters to energize the refrigerant purge supply fan and exhaust fan.

Manufacturers: Bacharach, General Analysis Corporation, Yokogawa, and MSA.

Chiller Purge System

Manufacturers of low pressure machines must provide a purge system.

The purge shall operate independently of the chiller and can be operated while the machine circulation water pumps are shutdown. No external water cooling source shall be required.

If the purge system cannot operate when the machine and pump are off, a positive pressure device, such as a belly heater, shall be provided on the evaporator to raise the pressure of the bundle above atmospheric pressure when the machine is off. This will prevent non-condensables from entering the machine. The additional power draw of this device shall be included in the quoted machine efficiency.

Any excess purge requirement will enable a fault indication light at the purge and a contact closure shall be provided for remote annunciation.

The unit indication shall include:

- a) Lights indicating condenser running, fault indication, and sequence operation.
- b) Elapsed time meter (monitor amount of leak rate).
- c) Binary outputs to indicate purging of air from the purge unit and purge shutdown due to excessive operation.
- d) Purge shall be the highest efficiency offered by the manufacturer, but in no case shall it be less than the following:
 - With the chiller operating at standard operating conditions and with a condensing refrigerant temperature at 80 degrees F, the purge shall be rated for no more than one pound of refrigerant per one pound of non-condensable gases.

2.9 PUMP-OUT SYSTEM

Units operating with refrigerant having positive pressure at 75 degrees F (HFC-134a, etc.) shall have the capability of storing the entire refrigerant charge in the condenser or shall be provided with a pump-out system for each machine.

Pump-out systems shall be complete with transfer pump, condensing unit, and tank constructed in accordance with ASME Code for Unfired Pressure Vessels bearing the National Board stamp.

Pump-out systems shall be supplied and warranted by the chiller manufacturer.

2.10 HEAD PRESSURE CONTROL

Manufacturer shall provide head pressure controller to modulate two-way butterfly valve in condenser return to cooling tower to ensure chiller operation at start-up with 60 degree F condenser water temperature.

3.0 EXECUTION

3.1 INSTALLATION

Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

All installation shall be in accordance with manufacturer's published recommendations.

Installation shall comply with requirements of ANSI/ASHRAE 15-2001.

Install piping at condenser and evaporator to avoid interfering with tube cleaning or repair.

Install piping to minimize weight and length of piping sections, which must be removed prior to head removal.

Install chillers on isolation pads as specified by the Manufacturer.

Provide a competent, factory trained representative to completely supervise the installation and to perform all on-Site run-in tests.

3.2 TESTING

Chiller performance must include an ARI approved selection method. Verification of date and version of computer program selection of catalog is available to the Engineer.

Include in the bid price a factory performance test for each chiller under full load conditions in an ARI certified test facility. The manufacturer shall supply a certified test report to confirm performance as specified. Proper ARI certification documents for the test loop shall be made available upon request from the manufacturer for inspection. The performance test shall be conducted in accordance with ARI Standard 550/590-03 procedures and tolerances

Demonstrate stable operation at minimum load during the factory performance test. Machine shall be modified to include hot gas bypass if 10 percent load cannot be demonstrated.

The performance test shall be run with clean tubes in accordance with ARI 550/590-03 to include the following:

A downward temperature adjustment shall be made to the design leaving evaporator water temperature to adjust for the specified fouling of the tubes.

An upward temperature adjustment shall be made to the design entering condenser water temperature to adjust for the specified fouling of the tubes.

There shall be no exceptions to conducting the performance test with clean tubes and with temperature adjustments per items 1 and 2. The manufacturer shall clean tubes, if necessary, prior to the test to obtain a test fouling factor of 0.00010 hr. sq. ft. F /BTU.

Factory test instrumentation shall be per ARI Standard 550/590-03 and the calibration of all instrumentation shall be traceable to the National Institute of Standards and Technology.

Notify the Owner fourteen (14) calendar days in advance to witness the factory performance test. Include in the bid price, all travel expenses for two (2) Owner's representatives and Engineer to travel to manufacturer's factory to witness the performance test.

A certified test report of all data shall be submitted to the Engineer prior to Substantial Completion. An officer of the manufacturer's company shall sign the factory certified test report. Preprinted certification will not be acceptable; certification shall be in the original.

The equipment will be accepted if the test procedures and results are in conformance with ARI Standard 550/590-03. If the equipment fails to perform within allowable tolerances, the manufacturer will be allowed to make necessary revisions to manufacturer's equipment and retest as required.

3.3 START-UP, TESTING AND COMMISSIONING

A factory trained Engineer duly authorized by the unit manufacturer shall supervise the commissioning of the unit and give instructions at site to the Employer's operating personnel for operation and maintenance of the units for a period of atleast two weeks.

The unit shall be commissioned and tested as per the Manufacturer's recommendation.

PROJECT: Invitation of Bids for Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi

SITE: NICVD KARACHI

SUPPLIERS NAME:

MANUFACTURERS NAME:

MAKE & MODEL:

COUNTRY OF ORIGIN:

S. no.	General	Bidders (Compliance) Comments
1	Confirm that each unit will be completely factory-packaged including evaporator, variable speed drive, condenser, compressor, motor, microprocessor control centre and all interconnecting unit piping and wiring	
2	Confirm that the chiller will be painted prior to shipment and will be packaged to protect the unit during shipment.	
3	Confirm that in dual compressor chillers each compressor is provided with a dedicated motor and motor controller.	
	REFRIGERANT	
1	Confirm that the centrifugal chillers are utilizing high efficiency, zero Ozone Depleting Potential (ODP) refrigerant HFC-134a	
2	Confirm that the initial charge of refrigerant and oil will be shipped loose for each unit and charged by the chiller supplier service technician during start-up.	
3	Confirm that 10% spare refrigerant is supplied with the chillers.	
	COMPRESSOR	
1	Confirm that the compressor will be a single stage or double-stage centrifugal type powered by an open drive or hermetic electric motor.	
2	Confirm that compressor castings shall be designed for a minimum 235 psig working pressure and hydrostatically pressure tested at a minimum 352 psig for R-134a units.	
3	Confirm that the rotor assembly will consist of a heat treated alloy steel drive shaft and impeller shaft with cast alloy aluminum, fully shrouded impeller.	
4	Confirm that internal single helical gears with crowned teeth will be designed so that more than one tooth is in contact at all times to provide even load distribution and quiet operation.	
5	Confirm that gravity fed oil reservoir will be built into the top of the compressor to provide lubrication during coast-down in the event of a power failure.	
6	Confirm that capacity control shall be accomplished by the adaptive capacity control, providing optimal relationship between compressor speed and inlet pre-rotation vane position.	
7	Confirm that the unit will be provided with variable refrigerant orifice technology to allow stable chiller operation with entering condenser water temperatures down to 13°C, and shall be capable of continuous, reliable operation with low temperature cooling tower water during part load operation in accordance with AHRI Standard 550/590.	
8	Confirm that the chillers are provided with chiller efficiencies at 10% load increments at the following entering condenser water temperatures (ECWTs):	

	90°F 85°F, 80, 75, 70, 65, 60, 55 and minimum possible.	
9	Confirm that the chiller is capable of unloading till 15% at constant condenser entering water temperature without the use of hot gas bypass valve.	
	MOTOR	
1	Confirm that Power shall be supplied to the compressor motor at 400V/3ph/50Hz.	
2	Confirm that motors shall be hermetic drive or open drive conforming to the specifications given below:	
2.1	<i>For Hermetic Drive Motors</i>	
2.2	Confirm that chiller is provided with a driveline designed for service including and electric motor that is outside of the refrigerant stream.	
2.3	Confirm that hermetic motors must include motor winding temperature RTDs, one per phase.	
2.4	Open Drive Motors	
2.5	Confirm that the open-drive motor will be an open drip proof (ODP), squirrel cage, induction type.	
2.6	Confirm that the manufacturer shall provide a double seal shaft seal and a five-year parts and labor warranty against any shaft seal or other compressor housing penetration leaks.	
2.7	Confirm that additionally a shaft seal leakage containment system shall be provided consisting of an oil reservoir to collect oil and refrigerant that leaks past the seal, with a float device to open when the reservoir is full, directing the refrigerant/ oil mixture back into the into the compressor housing. A refrigerant sensor shall be located next to the open drive seal to detect leaks.	
2.8	Confirm that the motor shall be provided with a D-flange, bolted to a cast iron adapter mounted on the compressor to allow the motor to be rigidly coupled to the compressor to provide factory alignment of motor and compressor shafts.	
2.9	Confirm that motor drive shaft will be directly connected to the compressor shaft with a flexible disc coupling. Coupling will have all metal construction with no wearing parts to assure long life, and no lubrication requirements to provide low maintenance.	
	EVAPORATOR	
1	Confirm that evaporator will be of the shell & tube, flooded type or hybrid flooded-falling film type, designed for 180 psig working pressure on the refrigerant side. Shell will be fabricated from rolled carbon steel plate with fusion welded seams; have carbon steel tube sheets, drilled and reamed to accommodate the tubes; and intermediate tube supports spaced no more than four feet apart.	
2	Confirm that the refrigerant side will be designed, tested and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section VIII- Division 1 or applicable code as per country of origin.	
3	Confirm that tubes shall be high-efficiency, internally and externally enhanced type having plain copper lands at all intermediate tube supports to provide maximum tube wall thickness at the support area.	
4	Confirm that each tube will be roller expanded into the tube sheets providing a leak proof seal, and be individually replaceable. Water velocity through the tubes will not exceed 12 fps.	
5	Confirm that two liquid level sight glasses will be located on the side of the shell to aid in determining proper refrigerant charge.	
6	Confirm that aluminium mesh eliminators will be located above the tube bundle to prevent liquid refrigerant carryover to the compressor.	
7	Confirm that the evaporator will have a refrigerant relief device sized to meet the	

	requirements of ASHRAE 15 Safety Code for Mechanical Refrigeration.	
8	Confirm that the heat exchanger construction will comply with the requirements of ASHRAE 15 Safety Code for Mechanical Refrigeration.	
9	Confirm that water boxes for the evaporator shall be removable, compact-type to permit tube cleaning and replacement.	
10	Confirm that anti-sweat insulation will be attached to the evaporator shell, flow chamber, tube sheets, suction connection, and (as necessary) to the auxiliary tubing at the factory.	
11	Confirm that refrigerant flow to the evaporator shall be controlled by a variable orifice for improving unloading capabilities. The variable refrigerant orifice technology shall allow stable chiller operation with entering condenser water temperatures down to 12.8°C.	
	CONDENSER	
1	Confirm that condenser will be of the shell & tube type, two-pass arrangement, designed for 235 psig working pressure on the refrigerant side.	
2	Confirm that shell will be fabricated from rolled carbon steel plate with fusion welded seams; have carbon steel tube sheets, drilled and reamed to accommodate the tubes; and intermediate tube supports spaced no more than four feet apart.	
3	Confirm that the refrigerant side will be designed, tested and stamped in accordance with ASME Boiler and Pressure Vessel Code, Section VIII- Division 1 or applicable code as per country of origin.	
4	Confirm that tubes shall be high-efficiency, internally and externally enhanced type having plain copper lands at all intermediate tube supports to provide maximum tube wall thickness at the support area. Each tube will be roller expanded into the tube sheets providing a leak proof seal, and be individually replaceable. Water velocity through the tubes will not exceed 12 fps.	
5	Confirm that condenser head covers shall be hinged at both ends of condenser shell.	
6	Confirm that stub-out water connections will be provided with either having Victaulic grooves or flanges.	
7	Confirm that refrigerant over-pressurization safety relief is provided.	
	LUBRICATION SYSTEM	
1	Confirm that lubrication oil shall be force fed to all compressor bearings, gears and rotating surfaces by an external variable speed oil pump. The oil pump shall vary oil flow to the compressor based on operating and stand by conditions, ensuring adequate lubrication at all times.	
2	Confirm that the oil pump shall operate prior to start up, during compressor operation and during coast down. Compressor shall have an auxiliary reservoir to provide lubrication during coast down in case of power failure.	
3	Confirm that an oil reservoir separate from the compressor, shall contain a submersible oil pump and an oil heater, thermostatically controlled to remove refrigerant from the oil.	
4	Confirm that oil shall be filtered with externally mounted 0.5 micron replaceable cartridge oil filter equipped with service valves.	
5	Confirm that oil cooling shall be done via refrigerant cooled oil cooler with all piping factory installed.	
6	Confirm that oil side of the oil cooler shall be provided with service valves.	
	CONTROLS	
1	Confirm that the chiller shall be controlled by a stand-alone microprocessor based control centre. The chiller control panel shall provide control of chiller operation and monitoring of chiller sensors, actuators, relays and switches.	

2	Confirm that the control panel shall include a 250mm diagonal color liquid crystal display (LCD) surrounded by “soft “keys. The screen shall detail all operations and parameters, using a graphical representation of the chiller and its major components.	
3	Confirm that control Panel language shall be English. Data shall be displayed in either English or Metric units as per choice of the operator.	
4	Confirm that smart Freeze Point Protection shall run the chiller upto 2.2 °C leaving chilled water temperature, and not have nuisance trips on low water temperature.	
5	Confirm that the panel shall display countdown timer messages so the operator knows when functions are starting and stopping.	
6	Confirm that the chiller control panel is also provided with following accessories:	
6.1	System operating information, including:	
A	Entering and leaving chilled water temperature	
B	Entering and leaving condenser water temperature	
C	Evaporator and condenser saturation temperature	
D	Differential oil pressure	
E	Percent motor current	
F	Evaporator and condenser saturation temperature	
G	Compressor discharge temperature	
H	Oil reservoir temperature	
I	Compressor thrust bearing positioning and oil temperature	
J	Operating hours	
K	Number of compressor starts	
6.2	Digital programming of set points through the universal keypad, including:	
A	Leaving chilled water temperature	
B	Percent current limit	
C	Pull-down demand limiting	
D	Six-week schedule for starting and stopping the chiller, pumps and tower	
e	Remote reset temperature range	
6.3	Status messages, indicating:	
A	System ready to start	
B	System running	
C	System coast down	
D	System safety shutdown-manual restart	
E	System cycling shutdown-auto restart	
F	System pre-lube	
G	Start inhibit	
6.4	Confirm that safety shutdowns enunciated through the display and the status bar, and consisting of system status, system details, day, time, cause of shutdown, and type of restart required. Safety shutdowns with a fixed speed drive shall include:	
a	Evaporator – low pressure	
b	Evaporator – transducer or leaving liquid probe	
c	Evaporator – transducer or temperature sensor	
d	Condenser – high pressure contacts open	
e	Condenser – high pressure	
f	Condenser – pressure transducer out of range	
g	Auxiliary safety – contacts closed	
h	Discharge – high temperature	
i	Discharge – low temperature	

j	Oil – high temperature	
k	Oil – low differential pressure	
l	Oil – high differential pressure	
m	Oil – sump pressure transducer out of range	
n	Oil – differential pressure calibration	
o	Oil – variable speed pump – pressure set point not achieved	
p	Control panel – power failure	
q	Motor or starter – current imbalance	
r	Thrust bearing – proximity probe clearance	
s	Thrust bearing - proximity probe out – of – range	
t	Thrust bearing – high oil temperature	
u	Thrust bearing – oil temperature sensor	
v	Watchdog – software reboot	
6.5	Safety shutdowns with a Variable Speed Drive (VSD) shall include	
a	VSD shutdown – requesting fault data	
b	VSD – stop contacts open	
c	VSD – 105% motor current overload	
d	VSD – high phase A, B, C inverter heat sink temp	
e	VSD – high converter heat sink temperature	
6.6	Cycling shutdowns enunciated through the display and the status bar, and consisting of system status, system details, day, time, cause of shutdown, and type of restart required. Cycling shutdowns with a fixed speed drive shall include:	
a	Multiunit cycling – contacts open	
b	System cycling - contacts open	
c	Oil - low temperature differential	
d	Oil – low temperature	
e	Control panel - power failure	
f	Leaving chilled liquid - low temperature	
g	Leaving chilled liquid - flow switch open	
h	Motor controller – contacts open	
i	Motor controller – loss of current	
j	Power fault	
k	Control panel - schedule	
l	Starter – low supply line voltage	
m	Starter – low supply line voltage	
n	Proximity probe – low supply voltage	
o	Oil-variable speed pump - drive contacts open	
6.7	Cycling shutdowns with a VSD shall include	
a	VSD shutdown – requesting fault data	
b	VSD – stop contacts open	
c	VSD initialization failed	
d	VSD - high phase A, B, C instantaneous current	
e	VSD – phase A, B, C gate driver	
f	VSD – single phase input power	
g	VSD – high DC bus voltage	
h	VSD – pre charge DC bus voltage imbalance	
i	VSD – high internal ambient temperature	
j	VSD – invalid current scale selection	
k	VSD – low phase A, B, C inverter heat sink temp	
l	VSD – low converter heat sink temperature	
m	VSD – pre-charge - low DC bus voltage	

n	VSD – logic board processor	
o	VSD – run signal	
p	VSD – serial communications	
7	Confirm that the operating program shall be stored in non-volatile memory (EPROM) to eliminate reprogramming the chiller due to AC power failure or battery discharge.	
8	Confirm that a fused connection through a transformer in the compressor motor starter to provide individual over-current protected power for all controls.	
9	Confirm that a numbered terminal strip for all required field interlock wiring is provided.	
10	Confirm that the microprocessor shall be capable of communicating with the Building Management System (BMS) using BACnet over IP protocol.	
	COMPRESSOR MOTOR STARTER	
1	Confirm that the chillers shall be supplied with 400V/50Hz Variable Speed Drive (VSD) factory installed on the chiller.	
2	Confirm that the VSD shall be provided with harmonic filters that limit electrical power supply distortion to comply with the guidelines of IEEE Std. 519-1992.	
3	Confirm that the filters shall be unit mounted within the same NEMA -1 enclosure and shall be UL listed.	
4	Confirm that drive shall be PWM type utilizing IGBT's with a power factor of 0.95 or better at all loads and speeds.	
5	Confirm that the VSD will 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.	
6	Confirm that the following features are provided:	
6.1	Door interlocked circuit breaker capable of being padlocked.	
6.2	UL listed ground fault protection.	
6.3	Over voltage and under voltage protection.	
6.4	3-phase sensing motor over-current protection.	
6.5	Single phase protection.	
6.6	Insensitive to phase rotation.	
6.7	Over temperature protection.	
6.8	Confirm that kW Meter - The unit's input power consumption will be measured and displayed digitally via the unit's control panel.	
6.9	Confirm that the KW meter accuracy shall be $\pm 3\%$ of reading. KW meter scale shall be 0 - 750 KW.	
6.10	Confirm that kWh Meter – The unit's cumulative input power consumption shall be measured and displayed digitally via the unit's control panel.	
6.11	Confirm that the KWh meter shall be re-setable and its accuracy shall be $\pm 3\%$ of reading.	
6.12	Confirm that kWh meter scale shall be 0 – 999,999 kWh.	
6.13	Confirm that ammeter – Simultaneous three-phase true RMS digital readout via the unit control panel.	
6.14	Confirm that the current transformers shall provide isolated sensing.	
6.15	Confirm that the ammeter accuracy shall be $\pm 3\%$ of reading.	
6.16	Confirm that ammeter scale shall be 0 - 550 A RMS.	
6.17	Confirm that voltmeter – Simultaneous three-phase true RMS digital readout via the unit control panel.	
6.18	Confirm that the voltmeter accuracy shall be $\pm 3\%$ of reading.	
6.19	Confirm that voltmeter scale shall be 0 – 500 VAC.	
6.20	Confirm that elapsed Time Meter – Digital readout of the unit's elapsed running	

	time (0 – 800,000 hours, re-setable) shall be displayed via the unit control panel.	
6.21	Confirm that chillers are provided with quick start control enabling the chiller controller to rapidly restart and load the chiller and deliver chilled water at set point temperature following a power interruption event.	
6.22	Confirm that the Variable Speed Drive shall be water cooled or air-cooled designed to remove heat from the VSD for proper operation.	
	REFRIGERANT MONITOR	
1	Confirm that calibrated refrigerant monitor is provided for specific refrigerant used, capable of detecting concentrations of 10 ppm for low level detection.	
2	Confirm that monitor is provided with audible and visual alarms that activate at a value corresponding to the TLV of the refrigerants in use.	
3	Confirm that monitor shall have the capability of detecting, alarming and controlling from 0-50 ppm. Digital display accuracy shall be within one (1) ppm.	
4	Confirm that recalibration is not required not more than once every five (5) years.	
5	Confirm that re-zeroing is not required not more than once every week.	
6	Confirm that monitor shall be capable of operation in ambient temperatures from 5 to 45 degrees C.	
7	Refrigerant Monitor Outputs:	
8	Confirm that two (2) analog set-points and three (3) binary with individual closure set-points are provided.	
9	Confirm that one alarm contact is connected to the BMS to indicate alarm condition into the BMS system.	
10	Confirm that remaining alarm contacts shall initiate closure of magnetic motor starters to energize the refrigerant purge supply fan and exhaust fan.	
	SPARES	
1	Confirm that the spares are provided as specified and as per manufacturer's recommendation which shall be suitable for 2 years of normal operation.	
	ACCESSORIES	
1	Confirm that the units shall be provided complete with neoprene pad vibration isolators for supporting the unit on the foundations, muffler, crankcase heater, oil failure protection switch, relief valves, water flow switches, and all other standard safety and operational devices necessary for complete automatic operation.	
2	Confirm that water Flow Sensors – Thermal type water flow sensors shall be factory mounted in the chilled and condenser water nozzles, and factory wired to the Control Panel. Sensor probe shall be made of 316 Stainless Steel.	
3	Confirm that the Units shall be provided with sound insulation to cover the compressor and motor housing, the compressor discharge pipe, etc to attenuate the noise of the chiller.	
	COMMISSIONING & TESTING	
1	Confirm that the Contractor shall provide a factory-trained Commissioning Engineer, employed by the chiller manufacturer, to charge chillers with and place unit into operation, and calibrate all controls in accordance with the manufacturer's written start-up, operating, and maintenance instructions.	
2	Confirm that the Commissioning Engineer shall furnish a start-up log indicating that proper operating sequences and operating and safety control functions are obtained.	
3	Confirm that the Commissioning Engineer shall subject the chiller(s) to tests recommended by the manufacturer and these test reports shall be submitted to the Customer by the Contractor in suitable test forms.	
4	Confirm that a pre-shipment factory site inspection to be arranged by the	

	supplier/successful bidder for the maximum two (nominated) representatives of the customer.	
	TEST RUN	
1	Confirm that the Contractor shall Test Run all chillers for a period of one month simultaneously.	
2	Confirm that the Contractor shall maintain a log of all operating parameters, and provide the same to the Owner/ Consultant on a daily basis.	
3	Confirm that the Contractor shall monitor the operation of the chillers closely and monitor that proper operation of the chiller, operating sequences and operating and safety control functions are being obtained. Improper operation, if any shall be specifically identified and information provided to the Owner/ Consultant.	
4	Confirm that during the Test Run period, the Commissioning Engineer shall instruct the owner's personnel in the proper start-up, operating, and maintenance procedures of the chillers.	
	We hereby certifying that the above information is correct and we shall be held responsible for any deviation from above data.	
	SIGNATURE OF MANUFACTURER/SUPPLIER	CUSTOMER'S REMARKS

6. Instructions to the Bidders: -

- 6.1 Bidder must read all the contents of NIT as well as the Bidding Document and understand all the requirements.
- 6.2 The bidder must ensure that the Bid Form / Price Schedule is filled in all respects, without any confusion.
- 6.3 There should not be any over-writing, double writing, crossed, or additional conditions.
- 6.4 Rates are to be quoted clearly in digits as well as in words.
- 6.5 Each document/paper submitted by the bidder shall be signed/stamped by the bidder on the face of the document.
- 6.6 Bids shall be upload on EPADS in accordance with Single stage – Two Envelope Procedure.
- 6.7 Bidder shall examine the Bid Evaluation Criteria and insert appropriate document in the Technical / Financial Proposal accordingly.
- 6.8 Conditional Bids, Telegraphic Bids, Bids not accompanied by Bid Security of required amount and form, bids received after specific date and time and bids of Black Listed firms shall be treated as rejected / non-responsive.

7. Eligibility Criteria (Mandatory Requirement)

Eligibility Criteria: The bidder who meets the following eligibility criteria / mandatory requirements would be declared responsive for further evaluation as per the Evaluation Criteria specified in this bidding document. Verifiable documentary proof for all following requirements is a mandatory requirement, noncompliance will lead to disqualification. The bids disqualified / not responsive to the MANDATORY ELIGIBILITY EVALUATION CRITERIA provided shall not be eligible for further evaluation.

S.No	Mandatory Eligibility Criteria & List of documents to be enclosed: -
1	Scanned Tender Purchase Receipt / Pay Order of Tender Fee.
2	Scanned copy of complete Bidding Document, duly signed and stamped on its each/every page as acceptance of all terms & conditions.
3	Scanned Copy of the Pay order / Bank Draft of Bid Security / Earnest Money should be attached along with E-Bid document. (Original bid security should be submitted at NICVD, KARACHI before the deadline of E-Bid opening).
4	Copy of CNIC of signatory of the Bid Forms.
5	Valid Income Tax Registration Certificate (FBR) (Active Taxpayer) Bidder must be available on ' List of Active Tax Payers ' of FBR website (for Income Tax).
6	Valid Sales Services Tax (SST-SRB) Registration (Active Taxpayer) Bidder must be available on ' List of Active Tax Payers ' SRB website (for Sindh Sales Tax).
7	Bidder / Company Profile / Details.
8	Registration or proof of Business (Minimum Last 5 Years) Valid documentary evidence must attached.
9	Affidavit on stamp paper duly notarized to the effect that: (i) The bidder is neither blacklisted nor suspended by any National / International, including Provincial and Federal Government. (ii) The bidder is not awarded any punishment from any Court of Law. (iii) The bidder has submitted the correct and complete information along with the bid/offer. If any Document/information is found forged/engineered /fake/bogus at any stage, the bidder may be Declared as Blacklisted in accordance with law and the performance guarantee and payment, if any may be forfeited.
10	Average annual turnover in the last 03 years (on the closing of last fiscal year) should not be less than Rs. 50 million, demonstrated through Income Tax Returns (ITR – FBR), with the audited statement of accounts details to be submitted.
11	Existing and any past service providers are only eligible for bidding upon providing recent Satisfactory Performance Certificates after the date of advertisement, for respective periods of services from NICVD, Karachi duly signed and stamped. No other certificates will be accepted for eligibility.
12	Bidders past experience of at least 03 projects in the public sector either government /semi-government/autonomous bodies during the last 05 years providing similar services of Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi with pieces of evidence work order, agreement, performance certificate etc.

Invitation of Bids for Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi:
EVALUATION CRITERIA

S. NO.	DESCRIPTION	TOTAL POINTS
01	Bio data of key personal with designation, education & experience and details of man power owned by the company, stock levels or financial capability of minimum PKR 30 Million.	15
02	Detail of experience of the firm for relevant job with supply/installation of minimum 500 RT Chiller within last 03 years.	15
03	Detail of registration with professional/regulatory Body (HVAC Society etc)	10
04	Work experience certificate for relevant scope/services.	10
05	Recommendation of End user & technical committee.	15
06	Previous experience with NICVD (Yes 05 or No 00)	05
07	Certificate of certified/sole service provider for relevant services/speciality services (where applicable)	10
08	Technical bid submission, compliance of standards & requirements etc.	10
09	Comprehensive solution/cost competitiveness considering service delivery, cost effectiveness, technical specification compliance & value for money.	10
	Total points	100

Eligibility Criteria:

Bidder which meets the above **eligibility criteria / mandatory requirements** would be declared responsive for further evaluation as per the Evaluation Criteria specified in this bidding document. Verifiable documentary proof for all following requirements is a mandatory requirement, noncompliance will lead to disqualification.

8. Financial Proposal

- 8.1 Bidder(s) must ensure that the following documents are enclosed with the Financial Proposal.
- 8.2 Bid Security of required amount in shape /form of pay order.
- 8.3 Bid form(s)/Price Schedule duly filled in all respect clearly quote the price.
- 8.4 Once again note that bidder must ensure that the Bid Form / Price Schedule is filled in all respect, without any confusion, there should not be any over-writing, double writing, crossed, additional conditions and Rates are quoted clearly in digits as well as in words.
- 8.5 Bidder(s) must understand that all payments / transaction shall be made in Pakistani Rupees (PKR) only.
- 8.6 Bidder(s) must work carefully and gross rates to be quoted, including all applicable taxes and also incorporate the impact of Sales Tax. NICVD shall made payments after deduction of all applicable taxes including Income Tax & SST and other taxes, if any.
- 8.7 Only those who qualified in Mandatory Evaluation shall be eligible for Financial Proposal(s). All bids shall be opened online through EPADS.
- 8.8 Bids not accompanied by the Bid Security of required amount and form shall be rejected.
- 8.9 Procuring Agency shall not be responsible for any erroneous calculation of taxes and all differences arising out shall be fully borne by the Successful Bidder. However, any subsequent changes in rates or structure of applicable taxes by the Government at any time during execution/evaluation period shall be passed to the Procuring Agency.

9. Validity of Bids: -

- 9.1 Bids shall remain valid for ninety (90) days w.e.f. date of opening of Technical Proposals. The bids without or less than Ninety (90) days validity will be rejected.

10. Alternate Bids: -

- 10.1 Alternate Bids shall NOT BE ALLOWED, if any bidder elects to submit alternative bid(s) / proposal(s), both bids ORIGINAL and ALTERATIVE will be rejected straightaway.

11. Announcement of Bid Evaluation Report

- 11.1 Bids/Offeres including Technical Proposal and Financial Proposals to be evaluated by the Committee constituted by the NICVD for the purpose.
- 11.2 The Bid Evaluation Report shall be announced and shall be hoisted on websites of the Authority (E P A D S S P P R A) and Procuring Agency and intimated to all the bidders at least three (3) working days prior to the award of Contract.

12. Award of Contract: -

- 12.1 The bidder whose offered rate is found lowest amongst other technically qualified bidders shall be considered for acceptance of the offer provided that it fulfills the laid down terms and conditions of the tender, irrespective of their score in the previous step.
- 12.2 NICVD reserve rights to cancel any/all bids, subject to the relevant provisions of SPP Rules 2010 (Amended up to date).

13. Signing of Contract: -

- 13.1 In case of award, the contractor shall sign the contract on appropriate stamp paper. All charges including payment of duty shall be borne by the Contractor.

14. Period of Contract: -

Initially contract shall be signed for a period of One-year (12 months), however, NICVD at its own discretion can extend the period of contract for a further 01 (01) Years till the finalization of new tender. The contractor shall be bound to provide the services for extended period with increase in rate 10% yearly with same terms & conditions.

15. Bid Security / Performance Guarantee: -

The Bidder shall enclose the **Bid Security not less than 1% of the total contract value of the 12 months (one year)** in the shape of Deposit at Call or Pay Order or Demand Draft or a Bank Guarantee in favour of Executive Director, NICVD Karachi issued by a scheduled bank in Pakistan valid for a period of 28 days beyond the bid validity period.

- 15.1 The Bid Security of unsuccessful bidder shall be returned after award of contract or within one week of expiry of bid.
- 15.2 The Successful bidder shall submit the **Performance Security not less than 5% of the total contract value of the 12 months (one year)** in the shape of Deposit at Call or Pay Order or Demand Draft in favour of Executive Director, NICVD Karachi issued by a scheduled bank in Pakistan valid for a period of ninety (90) days beyond the date of completion / expiry of the contract.
- 15.3 The Bid Security of successful bidder shall be returned after receipt of Performance Security. However, the successful bidder can adjust the Bid Security towards Performance Guarantee, in this situation; the successful bidder shall submit the balance amount on account of Performance Guarantee.
- 15.4 The Performance Security shall be forfeited, in case of bidder fails to provide the satisfactory services. The Performance Security of the bidder shall be returned after expiry of contract period.

16. Commencement of Services: -

- 16.1 Services shall be commenced from the date of signing of contract agreement.

17. General Conditions: -

- 17.1 It will be the responsibility of the Bidder that all factors have been investigated and considered while submitting the Bid and no claim whatsoever including those of financial adjustments to the contract / Letter of Acceptance awarded under this Bid Process will be entertained by the NICVD. Neither any time schedule, nor financial adjustments arising thereof shall be permitted on account of failure by the Bidder.
- 17.2 Bidder shall comply with all Pakistani Laws, permits, codes and regulation applicable to the bidder's performance of services. Bids against the Government Rules and Policy, Conditional Bids, Telegraphic Bids, Bids not accompanied by Bid Security of required amount and form, bids received after specific date and time and bids of Black Listed firms will not be considered and will be rejected.
- 17.3 Bidder will follow the disciplinary rules of the NICVD.
- 17.4 The NICVD reserves the right to increase / delete the number of **ITEMS** to be covered on the same rates and terms and condition of the Contract Agreement.
- 17.5 It must be clearly understood that the Terms and Conditions and Specifications are intended to be strictly enforced. No escalation of cost except arising from increase in quantity by the Bidder on the demand and approval of the Competent Authority of NICVD will be permitted throughout the contract period.
- 17.6 The tenderer should be fully and completely responsible for all the deliveries and deliverables to the NICVD, Karachi. Bidder shall not claim or charge transportation, loading / unloading, labor or any other charges related to or in the name of logistics, accidents, insurance, freight etc.
- 17.7 Bidder shall be responsible for remedying the defect(s) on the same date on which complaint was launched.
- 17.8 Bidders are also required to state, in their proposals, the name, title, contact number (landline, mobile), fax number and e-mail address of the bidder's authorized representative through whom all communications shall be directed until the process has been completed or terminated.
- 17.9 Failure to supply required items / services within the specified schedule will invoke penalty as imposed by the competent authority of NICVD.
- 17.10 NICVD will not be responsible for any costs or expenses incurred by bidders in connection with the preparation or delivery of bids.
- 17.11 The Bidder will provide the Quarterly Repair and Maintenance Report to the nominated person of NICVD.
- 17.12 Bidder shall not be allowed to alter or modify his bid after the opening of the bids. However, the procuring agency may seek and accept clarification to the bid that do not change substances of the bids.
- 17.13 The Bids shall be evaluated in accordance with the specified evaluation / eligibility / qualification / responsiveness criteria and terms & conditions of the bidding document.
- 17.14 Bidding Documents shall take precedence, in case of discrepancies between the Invitation for Bids

(IFB) /Notice Inviting Tender (NIT) and the Bidding Documents.

- 17.15 Bidder will depute the supervisors and other adequate staff for carrying out the desired services.
- 17.16 Bidder will be liable for any loss or damage caused by any act or default on the part of his servant or employee to the said premises and / or NICVD property on which decision of NICVD will be final.
- 17.17 During the currency of the contract, the firm will provide goods and services as per terms and conditions, to be settled later on in the shape of contract agreement.

18. Redressal of Grievances by the Procuring Agency: -

- 18.1 Redressal of Grievances & settlement of dispute will be as per Rule 31 of SPPRA Rule-2010 (Amended upto date).

19. Cancellation of Contract: -

- 19.1 If the contractor fails to provide the satisfactory services, the NICVD shall be entitled at his option to cancel the contract and recover the damages besides forfeiture of Performance security. The NICVD shall not be liable to any risks and costs whatsoever in consequence of such cancellation of the contract.

20. Arbitration: -

- 20.1 Any difference or dispute or liability of whatsoever nature arising out of the contract or in any way relating to the contract or to its construction or fulfillment should be settled as far as possible, amicably between the NICVD and Contractor. If the parties fail to come to an amicable settlement the same shall be referred to the award of Arbitrators to be nominated one each by the NICVD and Contractor within fifteen (15) days of notice from either side or in the case of the said Arbitrators not agreeing, then to the award of an Umpire to be appointed by the Arbitrators in writing prior to proceeding with the arbitration. The decision of the Arbitrators or the Umpire, as the case may be, shall be final and binding on both the parties. The arbitration shall take place at Karachi, under Pakistani Law of Arbitration.

21. Applicable Laws: -

- 21.1 The Contract shall be governed by the Laws of Pakistan and the Courts of Karachi – Pakistan shall have exclusive jurisdiction.

DECLARATION OF ANNUAL TURNOVER AND INCOME TAX RETURN
(On Bidder / Company / firm's Letterhead)

[Location, Date]

To: [Name and address of Employer]

Dear Sir,

1) I/we hereby declare that, our firm's Annual Turnover is as follow (As per Income Tax Returns & Audit Reports attached):

F.Y ONE	F. Y. TWO	F. Y. THREE
PKR_____ (Million)	PKR_____ (Million)	PKR_____ (Million)

And,

2) I/we hereby declare that, our firm had filed Income Tax Returns for last 3 years Supported by copy ITR/STR of Last 03 (three) years.

Yours sincerely

Authorized Signature [In full and initials]:

Name and Title of Authorized Signatory:

Name of Bidder:

Stamp / Seal: Encl:

As above

VALID LIST OF CLIENT'S DETAILS
(On Bidder / Company / firm's Letterhead)

[Location, Date]

To: [Name and address of Employer]

Dear Sir,

I/we hereby mention following list of valid Clients details where our firm had provided services, supported by copy of agreements / orders / work orders for your reference:

Sr. No.	Client Name / End User	Nature of Client (Govt. / Semi Govt. Sector)	Scope of Work / Specifications	Name & Location of Project	Year	Total Order Value (PKR)

Yours sincerely

Authorized Signature [In full and initials]:

Name and Title of Authorized Signatory:

Name of Bidder:

Stamp / Seal:

**INTEGRITY PACK
(AFFIDAVIT)**

**DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BY
THE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS**

M/s. _____, the service provider hereby declared that:

- (a) Its intention not to obtain the procurement / services / work of any contract, right, interest, privilege, or other obligation or benefit from the NICVD, KARACHI or any administrative or financial offices thereof or any other department under the control of the NICVD, KARACHI through any corrupt practice(s).
- (b) Without limiting the generality of the forgoing the bidder / company / firm / agency represents and warrants that it has fully declared the charges, fees, commission, taxes, levies etc, paid or payable to anyone and not give nor agreed to give and shall not give or agree to give to anyone within the NICVD, KARACHI directly or indirectly through any means any commission, gratification, bribe, gifts, kickback whether described as consultation fee or otherwise, with the object of obtaining or including the procurement or service contract or order or other obligations whatsoever from the NICVD, KARACHI, except that which has been expressly declared pursuant hereto.
- (c) The bidder / company / firm / agency / accepts full responsibility and strict liability for making any false declaration / statement, not making full disclosure, misrepresenting facts or taking any action likely to degrade the purpose of declaration, representation and warranty. It agrees that any contract / order obtained aforesaid shall without prejudice to any other right & remedies available to the NICVD, KARACHI under any law, contract, or other instrument, be stand void at the discretion of the NICVD, KARACHI.
- (d) Notwithstanding any right and remedies exercised by the NICVD, KARACHI in this regard, bidder / company / firm / agency agrees to indemnify the NICVD, KARACHI for any loss or damage incurred by it on account of its corrupt business practice & further pay compensation to the NICVD, KARACHI in any amount equivalent to the loss of any commission, gratification, bribe, gifts, kickback given by the bidder / company / firm / supplier / agency / service provider as a fore said for the purpose of obtaining or inducing procurement / work / service or other obligation or benefit in whatsoever from the NICVD, KARACHI.

National Institute of Cardiovascular Diseases, Karachi
Signature & Seal

(Name of Security Firm)
Signature & Seal

Note: This integrity pact is mandatory requirement other than auxiliary services / works.

FORM OF CONTRACT
(Specimen purpose only)

THIS AGREEMENT made on this _____ day of _____ 2025 between M/s. _____
_____(Name and Address of the Contractor)
(hereinafter referred to as the CONTRACTOR, which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and assigns) of the ONE PART and the NATIONAL INSTITUTE OF CARDIOVASCULAR DISEASES, KARACHI, KARACHI (herein after referred to as the NICVD, KARACHI, which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and assigns) of the OTHER PART.

WHEREAS the Contractor is a service provider
AND

WHEREAS the NICVD, KARACHI is procuring agency. The NICVD, KARACHI intends to hire firm for "Invitation of Bids for Supply, Installation, Testing & Commissioning of 750RT High C.O.P Chiller, Cooling Tower 1500RT & Pumps at NICVD Karachi (Ref No: _____ therefore, invited bids through N.I.T NO.NICVD, KARACHI _____.

WHEREAS the Contractor (successful bidder) submitted his bid vide _____ in accordance with the bid document and was selected as "successful bidder" pursuant to the bidding process and negotiation on contract prices, awarded the "Letter of Acceptance / Intent" (LoA/LoI) No.to the Contractor on _____.

BOTH THE PARTIES HERETO agree to abide the terms and conditions as mentioned in:

(Conditions of Contract) of Tender Document

(Signature of Contractor / Authorized Representative)

(Signature of Authorized Officer of the NICVD, KARACHI)

Name: _____
Designation: _____
Address: _____
Seal: _____

Name: _____
Designation: _____
Address: _____
Seal: _____

WITNESS - 1

WITNESS - 2

Name: _____
CNIC#: _____
Address: _____

Name: _____
CNIC#: _____
Address: _____

M.I.C.V.D.