

SOLICITATION # 191N6520Q0084-SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF AHUs AT ENCLAVE COMPOUND, AMERICAN EMBASSY, NEW DELHI

REQUEST FOR QUOTATIONS

1. PRICE

The contractor shall complete all work, including furnishing all labor, material, equipment, and services required under this contract for the following firm fixed price and within the time specified. The Government will make payment in local currency. The rates below shall include all direct and indirect costs, insurance (see FAR 52.228-4 and 52.228-5), overhead, and profit (including insurance). The prices include all expenses and materials required to complete the work.

Total - Rs. _____
VAT – Rs. _____
Grand Total - Rs. _____

2. GOODS AND SERVICES TAX (GST)

GOODS AND SERVICES TAX (GST is not included in the CLIN rates. Instead, it will be priced as a separate Line Item in the contract and on Invoices.

3. **Completion time:** 90 working days from the receipt of e-mail notification as an intimation to proceed.

PERFORMANCE WORK STATEMENT

The purpose of this firm fixed price purchase order is to **Supply, Installation and commissioning of 8 air handling units at American Center New Delhi**, in accordance with Attachment A.

SCOPE OF SERVICES

The Contractor shall provide personnel, supplies and equipment, as identified in this solicitation for supply and Installation services as described in statement of work, of this contract.

TYPE OF CONTRACT

This is a fixed price type contract for the services as defined in the attached statement of work. The fixed price will include all work, including furnishing all labor, materials, equipment and services, overhead (including cost of Workers’ Compensation and War-Hazard Insurance, which shall not be a direct reimbursement) and profit, unless otherwise specified.

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GOODS AND SERVICES TAX (GST). The Contractor shall include GST as a separate charge on the Invoice and as a separate line item.

Offeror, registered with GST tax authority, should submit a copy of GST tax registration certificate along with the offer. In case of GST registration, please mention the type of category of GST registration (work vendor or composite vendor). This is a mandatory requirement for evaluation purpose. Acceptability will be determined by assessing the offeror's compliance with the terms of the solicitation. The Government will determine contractor responsibility by analyzing whether the apparent successful offeror complies with the requirements of FAR 9.1.

In order to enable the U.S. Government to claim GST refunds, the offeror shall indicate GST separately. If GST is indicated separately, the contractor shall furnish tax invoices in accordance with New Delhi GST regulations. GOI registered vendors must print the Embassy's UIN No. 0717USA00138UNS on their invoice otherwise their invoice shall be rejected by the Embassy.

INSPECTION BY GOVERNMENT: The services being performed hereunder and the supplies furnished for installation and commissioning therefor will be inspected from time to time by the COR, or his/her authorized representatives, to determine that all work is being performed in a satisfactory manner, and that all supplies are of acceptable quality and standards.

The Contractor shall be responsible for any countermeasures or corrective action, within the scope of this contract, which may be required by the Contracting Officer as a result of such inspection.

INSTRUCTIONS FOR SUBSTANTIAL / FINAL COMPLETION / PUNCH LIST SCHEDULE / TIMELINE

Please note that before commencement of the work the contractor will provide a schedule. This schedule should list timelines to include substantial/ final completion/ punch list times and any other times that require any types of deliverables. This schedule shall be prepared by the contractor in due coordination with the COR. The contractor should coordinate with the COR to discuss and agree on the schedule before commencement of the project. COR should plan for this schedule accordingly. Due to unforeseen circumstance that could arise during these projects this schedule will be flexible and can change as long as COR and the contractor both agree on any changes.

Notwithstanding anything contained hereinafter, the following clause on "Liquidated Damages-Construction" (FAR Subpart 52.211-12) will apply.

If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the U.S. Government in the amount of 1% for each calendar day of delay subject to a maximum of 10% of the total contract value, until the work is completed or accepted.

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INSURANCE

Insurance Requirements

The Contractor is required by FAR 52.228-5, "Insurance - Work on a Government Installation" to provide whatever insurance is legally necessary during the performance of the contract. The Contractor shall at its own expense provide and maintain during the entire performance period the following insurance amounts:

General Liability (includes premises/operations, collapse hazard, products, completed operations, contractual, independent contractors, broad form property damage, personal injury)

- 1. Bodily Injury on or off the site stated in Indian local currency:

| | |
|----------------|--------------|
| Per Occurrence | Rs.100,000 |
| Cumulative | Rs.1,000,000 |

- 2. Property Damage on or off the site in Indian local currency:

| | |
|----------------|--------------|
| Per Occurrence | Rs.100,000 |
| Cumulative | Rs.1,000,000 |

Copy of Workers' Compensation Statutory, as required
Workers' Compensation by host country law Occupational Disease
(Workmen's Compensation Act 1923)

The foregoing types and amounts of insurance are the minimums required. The Contractor shall obtain any other types of insurance required by local law or that are ordinarily or customarily obtained in the location of the work. The limit of such insurance shall be as provided by law or sufficient to meet normal and customary claims.

The Contractor agrees that the Government shall not be responsible for personal injuries or for damages to any property of the Contractor, its officers, agents, servants, and employees, or any other person, arising from an incident to the Contractor's performance of this contract. The Contractor shall hold harmless and indemnify the Government from any and all claims arising there from, except in the instance of gross negligence on the part of the Government.

The Contractor shall obtain adequate insurance for damage to, or theft of, materials and equipment in insurance coverage for loose transit to the site or in storage on or off the site.

The general liability policy required of the Contractor shall name "the United States of America, acting by and through the Department of State", as an additional insured with respect to operations performed under this contract.

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This plan provides an effective method to promote satisfactory contractor performance. The QASP provides a method for the Contracting Officer's Representative (COR) to monitor Contractor performance, advise the Contractor of unsatisfactory performance, and notify the Contracting Officer of continued unsatisfactory performance. The Contractor, not the Government, is responsible for management and quality control to meet the terms of the contract. The role of the Government is to monitor quality to ensure that contract standards are achieved.

| Performance Objective | Scope of Work Para | Performance Threshold |
|---|--------------------|--|
| <u>Services.</u> Performs all services set forth in the scope of work. | As mentioned above | All required services are performed and no more than one (1) customer complaint is received per month. |

CONTRACTOR IDENTIFICATION (JULY 2008)

Contract performance may require contractor personnel to attend meetings with government personnel and the public, work within government offices, and/or utilize government email.

Contractor personnel must take the following actions to identify themselves as non-federal employees:

- 1) Use an email signature block that shows name, the office being supported and company affiliation (e.g. "John Smith, Office of Human Resources, ACME Corporation Support Contractor");
- 2) Clearly identify themselves and their contractor affiliation in meetings;
- 3) Identify their contractor affiliation in Departmental e-mail and phone listings whenever contractor personnel are included in those listings; and
- 4) Contractor personnel may not utilize Department of State logos or indicia on business cards.

(End of clause)

652.232-70 PAYMENT SCHEDULE AND INVOICE SUBMISSION (FIXED-PRICE) (AUG 1999)

(a) General. The Government shall pay the Contractor as full compensation for all work required, performed, and accepted under this contract the firm fixed-price stated in this contract. Partial payment is authorized under this contract.

(b) Invoice Submission. The Contractor shall submit invoices in an original and one copy to the Contracting' Officer's Representative (COR) To constitute a proper invoice, the invoice shall include all the items required by FAR 32.905(e).

1. Please submit electronic / scanned invoices to dedicated email box FMCDBOInbox@state.gov .
2. Subject line must mention; PO#, Invoice#, Amount.

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3. Electronic / scanned invoice must be labelled as "Tax Invoice". The invoice must have GST number of the vendor and American Embassy's UIN number 0717USA00138UNS.
4. Electronic / scanned invoice must list GST rate percentage for each category of goods or services.
5. Electronic / scanned invoice EITHER typed or hand written, hand-writing on a typed invoice is not acceptable.
6. Scanned invoice should be readable.
7. Vendor should only submit invoice after delivering goods or services.
8. Payment is processed within 30 days through EFT (electronic funds transfer) from the date of receipt of correct invoice. For any queries regarding payment, please contact Mr. Yogesh Kumar at GargYK@state.gov and Mr. Manoj Kumar Sharma SharmaMK@state.gov .

The Contractor shall show Goods and Services Tax (GST) as a separate item on invoices submitted for payment.

(c) Contractor Remittance Address. The Government will make payment to the Contractor's address stated on the cover page of this contract, unless a separate remittance address is shown below:

652.236-70 ADDITIONAL SAFETY MEASURES (OCT 2017)

In addition to the safety/accident prevention requirements of FAR 52.236-13, Accident Prevention Alternate I, the contractor shall comply with the following additional safety measures.

(a) High Risk Activities. If the project contains any of the following high risk activities, the contractor shall follow the section in the latest edition, as of the date of the solicitation, of the U.S. Army Corps of Engineers Safety and Health manual, EM 385 1 1, that corresponds to the high risk activity. Before work may proceed, the contractor must obtain approval from the COR of the written safety plan required by FAR 52.236-13, Accident Prevention Alternate I (see paragraph (f) below), containing specific hazard mitigation and control techniques.

- (1) Scaffolding;
- (2) Work at heights above 1.8 meters;
- (3) Trenching or other excavation greater than one (1) meter in depth;
- (4) Earth-moving equipment and other large vehicles;
- (5) Cranes and rigging;
- (6) Welding or cutting and other hot work;
- (7) Partial or total demolition of a structure;
- (8) Temporary wiring, use of portable electric tools, or other recognized electrical hazards. Temporary wiring and portable electric tools require the use of a ground fault circuit interrupter (GFCI) in the affected circuits; other electrical hazards may also require the use of a GFCI;

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(9) Work in confined spaces (limited exits, potential for oxygen less than 19.5 percent or combustible atmosphere, potential for solid or liquid engulfment, or other hazards considered to be immediately dangerous to life or health such as water tanks, transformer vaults, sewers, cisterns, etc.);

(10) Hazardous materials - a material with a physical or health hazard including but not limited to, flammable, explosive, corrosive, toxic, reactive or unstable, or any operations, which creates any kind of contamination inside an occupied building such as dust from demolition activities, paints, solvents, etc.; or

(11) Hazardous noise levels as required in EM 385-1 Section 5B or local standards if more restrictive.

(b) Safety and Health Requirements. The contractor and all subcontractors shall comply with the latest edition of the U.S. Army Corps of Engineers Safety and Health manual EM 385-1-1, or OSHA 29 CFR parts 1910 or 1926 if no EM 385-1-1 requirements are applicable, and the accepted contractor's written safety program.

(c) Mishap Reporting. The contractor is required to report immediately all mishaps to the COR and the contracting officer. A "mishap" is any event causing injury, disease or illness, death, material loss or property damage, or incident causing environmental contamination. The mishap reporting requirement shall include fires, explosions, hazardous materials contamination, and other similar incidents that may threaten people, property, and equipment.

(d) Records. The contractor shall maintain an accurate record on all mishaps incident to work performed under this contract resulting in death, traumatic injury, occupational disease, or damage to or theft of property, materials, supplies, or equipment. The contractor shall report this data in the manner prescribed by the contracting officer.

(e) Subcontracts. The contractor shall insert this clause, including this paragraph (e), with appropriate changes in the designation of the parties, in subcontracts.

(f) Written program. The plan required by paragraph (f)(1) of the clause entitled "Accident Prevention Alternate I" shall be known as the Site Safety and Health Plan (SSHP) and shall address any activities listed in paragraph (a) of this clause, or as otherwise required by the contracting officer/COR.

(1) The SSHP shall be submitted at least 10 working days prior to commencing any activity at the site.

(2) The plan must address developing activity hazard analyses (AHAs) for specific tasks. The AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk. Work shall not begin until the AHA for the work activity has been accepted by the COR and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives.

(3) The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by EM 385 1 1) shall be identified and included in the AHA. Proof of their competency/qualification shall be submitted to the

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(End of clause)

652.242-70 CONTRACTING OFFICER'S REPRESENTATIVE (COR) (AUG 1999)

(a) The Contracting Officer may designate in writing one or more Government employees, by name or position title, to take action for the Contracting Officer under this contract. Each designee shall be identified as a Contracting Officer's Representative (COR). Such designation(s) shall specify the scope and limitations of the authority so delegated; provided, that the designee shall not change the terms or conditions of the contract, unless the COR is a warranted Contracting Officer and this authority is delegated in the designation.

(b) The COR for this contract is **Maintenance Supervisor.**

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ATTACHMENT A



PERFORMANCE WORK STATEMENT (PWS)

US EMBASSY, NEW DELHI
REPLACEMENT OF AIR HANDLING UNITS at Enclave Plant, New Delhi
STATEMENT OF WORK

Name of Work: Supply, Installation, and commissioning for 8 air handling units at Enclave Compound Office Spaces, New Delhi.

Brief Description:

The scope of work is as follows:

SUPPLY:

- (a) Supply installation and commissioning of
1. one 24000 cfm capacity bowling alley ahu
 2. one 20000cfm capacity restaurant ahu

Indoor type, double skin insulated 40 mm PUF insulation pre plasticized floor mounted type air handling units fabricated out of extruded aluminum section. The AHU consisting of supply air inlet, return air inlet, exhaust and fire dampers, cooling/heating coil made of aluminum finned copper tube with 4 row deep coil sections, fan sections backward curved EC fan, drive assembly set, motor 'v' belts, pre and fine cassette type filters 1500cfm each, 304/316 S.S drain pan and 35 mm drain pipe, duly insulated with 13mm closed cell linked insulation.

3. One 35000 cfm swing space ahu

Outdoor type, double skin insulated 40 mm PUF insulation pre plasticized floor mounted type air handling units fabricated out of extruded aluminum section. The AHU consisting of supply air inlet, return air inlet, exhaust and fire dampers, cooling/heating coil made of aluminum finned copper tube with 4 row deep coil sections, fan sections backward curved EC fan, drive assembly set, motor 'v' belts, pre and fine cassette type filters 1500cfm each, 304/316 S.S drain pan and 35 mm drain pipe, duly insulated with 13mm closed cell linked insulation.

4. Four 2000 cfm capacity GSO roof top ahus

Outdoor type, double skin insulated 40 mm PUF insulation pre plasticized floor mounted type air handling units fabricated out of extruded aluminum section. The AHU consisting of supply air inlet, return air inlet, exhaust and fire dampers, cooling/heating coil made of aluminum finned copper tube with 4 row deep coil sections, fan sections backward curved EC fan, drive assembly set, motor 'v' belts, pre and fine cassette type filters 1500cfm each, 304/316 S.S drain pan and 35 mm drain pipe, duly insulated with 13mm closed cell linked insulation.

5. One 4000cfm capacity floor mounted ahu at commissary(Warehouse)

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- (b) Qualified and dedicated supervision during installation and commissioning of the air-handling units per Scope of Work. Once installation is done contractor shall carry out the commissioning of the new equipment in presence of manufacturer representative and get a certification on successful installation and commissioning.
- (c) The contractor should provide three sets of shop drawings with complete data's and details of the equipment. The contractor shall get a pre-approval from COR before proceeding with manufacturing of the actual equipment.
- (d) Contractor shall provide two sets of as build drawings and documents related to manufacturing and installation of the AHU for records.

INSTALLATION AND COMMISSIONING

Dismantling of Existing AHU and Installation and commissioning of NEW AHU in all respects is responsibility of the contractor.

1. Dismantle the old AHU from the AHU Room and remove the material from the embassy premises.
2. The salvage value of old AHU to be quoted hence old AHU shall be contractor property. Dismantling of existing Air handling unit complete.
3. Install the new AHU as per the manufacture recommendation. Contractor has to transport all the parts from the loading area to the AHU room.
4. Provide and install the new electrical panel with voltmeter, ammeter, all control wiring, auxiliary contacts, star delta starter, MCB indicator lamps, start stop buttons, DC controls overload relay & single-phase preventer compatible to the new AHU.
5. Provide & fix TATA MS C Class piping duly insulated with 2" thick nitrile rubber insulation of 18Kg/CM2 density and providing all inlet outlet and other Valves, 3 way motorized valve, pressure Gauge/thermometer shall be replaced with new of leader make and compatible to the AHU.
6. PAINT the pipelines exposed with 3 coat of enamel paint and insulate all the chilled water pipeline a and fittings with the nitrile rubber 2" insulation

COMMISSIONING

- (1) Inspect field assembly of components of air-handling units.
- (2) Verify that shipping, blocking, and bracing are removed.

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- (3) Verify that unit is secure on mountings and supporting devices and that connections for piping, ductwork, and electrical are complete. Verify that proper thermal overload protection is installed in motors, starters, and disconnects.
- (4) Verify that manual and automatic volume control, and fire and smoke dampers in connected ductwork systems are in fully open position.
- (5) Check the designed cfm during operation of the air handling unit.

Contractors are advised to go through the attached scope of work & specifications.

Please quote your lump sum price for the entire work including all overheads and local taxes etc.

Note: This will be a lump sum contract and nothing extra will be entertained on any account.

First phase comprises of supply of air handling units. The second phase comprises testing and commissioning of the equipment. The work to be carried out by professional workers and certified fitter and sheet metal worker in good workmanship and neat manner as per the 1996 SMACNA "HVAC Duct Construction Standards.

Specification of AHU

PART 1 - PRODUCTS

1.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equivalent to meet the specification:

Recommended Manufacturers: .

- A. Carrier (OR EQUIVALENT MAKE)
- B. Zeco Aircon Industries (OR EQUIVALENT MAKE)
- C. Edgetech (OR EQUIVALENT MAKE)

1.2 MANUFACTURED UNITS

- A. General Description: Factory assembled, consisting of fans, motor and drive assembly, coils, damper, plenums, filters, drip pans, and mixing dampers.
- B. Motor and Electrical Components:

Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application.
Provide Engraved plastic Laminate Labels, Signs and Instruction plate minimum size 130sq.cm. The engrave legend in white letters on black face and punch for mechanical fasteners.

1.3 CABINET

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- A. Materials: Formed and reinforced galvanized steel panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed. Units located outdoors shall be treated with a corrosion protective coating and exterior finish.
 - 1. Outside Casing: Steel, 0.0598 inch (1.3 mm).or plasticized
 - 2. Outside Casing: Galvanized steel, 0.0516 inch (1.3 mm). plasticized
 - 3. Inside Casing: Galvanized steel, 0.0276 inch (0.7 mm).
 - 4. Floor Plate: Stainless steel 304/316 , 0.1406 inch (3.0 mm).
- B. Insulation: Coated, 40+2 kg/cum. PUF, complying with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," for insulation A. Hot Surfaces: Normal operating temperatures of 100 deg F (38 deg C) or higher.
- B. Dual-Temperature Surfaces: Normal operating temperatures that vary from hot to cold.
- C. Cold Surfaces: Normal operating temperatures less than 75 deg F (24 deg C).
- D. Thermal resistivity is designated by an r-value that represents the reciprocal of thermal conductivity (k-value). Thermal conductivity is the rate of heat flow through a homogenous material exactly 1 inch (25.4 mm) thick. Thermal resistivity (r-value) is expressed by the temperature difference in degrees Fahrenheit (Kelvins) between the two exposed faces required to cause 1 BTU per hour (1 Watt) to flow through 1 square foot (1 square meter) at mean temperatures indicated.
- E. Thermal Conductivity (k-value): Measure of heat flow through a material at a given temperature difference; conductivity is expressed in units of Btu x inch/h x sq. ft. x deg F (W x m/sq. m x K).
- F. Density: Is expressed in pcf (kg/cu. m).
- G. Material certificates, signed by the manufacturer, certifying that materials comply with specified requirements where laboratory test reports cannot be obtained.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Conform to the following characteristics for insulation including facings, cements, and adhesives, when tested according to ASTM E 84, by UL or other testing or inspecting organization acceptable to the authority having jurisdiction. Label insulation with appropriate markings of testing laboratory.
 - 1. Interior Insulation: Flame spread rating of 25 or less and a smoke developed rating of 50 or less.
 - 2. Exterior Insulation: Flame spread rating of 75 or less and a smoke developed rating of 150 or less.
- B. Access Panels and Doors: Same materials and finishes as cabinet and complete with hinges, latches, handles, and gaskets.
 - 1. Fan section shall have inspection and access panels and doors sized and located to allow periodic maintenance and inspections.

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- C. Drain Pans: Formed sections of stainless steel sheet. Fabricate pans in sizes and shapes to collect condensate from cooling coils (including coil piping connections and return bends) and humidifiers when units are operating at maximum-catalogued face velocity across cooling coil.
 - 1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
 - 2. Drain Connections: Both ends of pan.
 - 3. Pan-Top Surface Coating: Elastomeric compound.
 - 4. Units with stacked coils shall have an intermediate drain pan or drain trough to collect condensate from top coil.

1.5 FAN SECTION

- A. Fan-Section Construction: direct mounted EC fan , consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, and support structure, equipped with formed-steel channel base for integral mounting of fan, motor, and casing panels. Mount fan scroll, wheel, shaft, bearings, and motor on structural-steel frame, with frame mounted on base with vibration isolation.
- B. Housings: Fabricate from formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff, spun-metal inlet bell, and access doors or panels to allow entry to internal parts and components.
- C. Fan Assemblies: dynamically balanced and designed for continuous operation at maximum rated fan speed and motor power. backward-curved blades.
 - 1. Backward Curved: Black steel with enamel or galvanized finish, and having an inlet flange, back plate, shallow blades with inlet and tip curved backward in direction of airflow, and steel hub.
 - 2. Shafts: Hot-rolled steel; turned, ground, and polished, and having keyway to secure to fan wheel hub.
 - 3. Shaft Bearings: Pre-lubricated and sealed, self-aligning, pillow-block-type ball or roller bearings with the following:
 - a. Rate Bearing Life: ABMA 9 or ABMA 11, L-50 of 400,000 hours.
 - 4. Vibration Control: Install fans on restrained open-spring vibration isolators, minimum 1-inch (25-mm) static deflection, with side snubbers.
- D. Fan-Section Source Quality Control: The following factory tests are required.
 - 1. Sound Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Fans shall bear AMCA-certified sound ratings seal.
 - 2. Factory test fan performance for flow rate, pressure, power, air density, rotation speed, and efficiency. Establish ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

1.6 BASIC MOTOR REQUIREMENTS

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- A. Basic requirements apply to mechanical equipment motors, unless otherwise indicated.
- B. Frequency Rating: 50 Hz.
- C. Voltage Rating: 415 VOLT 3 PHASE to which motor is connected.

Temperature Rating: 50 deg C maximum temperature rise at 40 deg C ambient for continuous duty at full load (Class F Insulation).

Service Factor: 1.15 for polyphase motors

- F. Motor Construction: NEMA MG-1, general purpose, and continuous duty, Design B.
Bases: Adjustable.
- G Capacity and Torque Characteristics: Rated for continuous duty and sufficient to start, accelerate, and operate connected loads at designated speeds, in indicated environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
- H. Enclosure: Open drip proof, unless otherwise indicated.

1.7 POLYPHASE MOTORS

- A. Description: NEMA MG 1, medium induction motor.
 - 1. Design Characteristics: NEMA MG 1, Design B, unless otherwise indicated.
 - 2. Energy-Efficient Design: Premium efficiency E-type.
 - 3. Stator: Copper windings, unless otherwise indicated. Multispeed motors have separate winding for each speed.
 - 4. Rotor: Squirrel cage, unless otherwise indicated.
 - 5. Bearings: Double-shielded, pre-lubricated ball bearings suitable for radial and thrust loading.
 - 6. Temperature Rise: Match insulation rating, unless otherwise indicated.
 - 7. Insulation: Class F, unless otherwise indicated.
- B. Motors Used with Reduced-Inrush Controllers: Match wiring connection requirements for indicated controller, with required motor leads brought to motor terminal box to suit control method.
- C. Rugged-Duty Motors: Where indicated, motors are totally enclosed with 1.25 minimum service factor, greased bearings, integral condensate drains, and capped relief vents. Windings are insulated with non-hygroscopic material. External finish is chemical-resistant paint over corrosion-resistant primer.
- D. Source Quality Control: Perform the following routine tests according to NEMA MG 1:
 - 1. Measurement of winding resistance.
 - 2. No-load readings of current and speed at rated voltage and frequency.
 - 3. Locked rotor current at rated frequency.
 - 4. High-potential test.

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5. Alignment.

E. Bearings: The following features are required:

5. Ball or roller bearings with inner and outer shaft seals.
6. Grease lubricated.
7. Designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor.

F. Enclosure Type: The following features are required:

Open dripproof motors where satisfactorily housed or remotely located during operation.

G. Overload Protection: Built-in, automatic reset, thermal overload protection.

H. Noise Rating: Quiet.

I. Efficiency: Energy-efficient motors shall have a minimum efficiency as scheduled according to IEEE 112, Test Method B. If efficiency is not specified, motors shall have a higher efficiency than "average standard industry motors" according to IEEE 112, Test Method B.

J. Nameplate: Indicate full identification of manufacturer, ratings, characteristics, construction, and special features.

K. Starters, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 16 Sections.

1.8 COILS

A. Coil Sections: Common or individual, insulated, galvanized steel casings for heating and cooling coils. Design and construct to facilitate removal and replacement of coil for maintenance and to assure full airflow through coils.

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- B. Coil Construction: Rigidly supported across full face, pitched to allow drainage.
 - 1. Fins: Aluminum, mechanically bonded to tubes.
 - 2. Tubes: Seamless copper.
 - 3. Coil Casing: Galvanized steel.
 - 4. Headers for Water Coils: Steel, or copper with connections for drain valve and air vent, and threaded piping connections.
- C. Water Coils: Drainable with threaded plugs, serpentine with return bends in smaller sizes and with return headers in larger sizes.
- D. Coil-Performance Tests: Factory-test cooling and heating coils, except sprayed surface coils for rating according to ARI 410, "Forced-Circulation Air-Cooling and Air-Heating Coils."

1.8 DAMPERS

- A. General: Leakage rate, according to AMCA 500, "Test Methods for Louvers, Dampers and Shutters," shall not exceed 2 percent of air quantity at 2000-fpm (10-m/s) face velocity through damper and 4-inch wg (1000-Pa) pressure differential.
 - 1. Damper operators shall be electrically operated. Actuator (make Anergy or Honey well or equivalent make) shall be compatible with BMS SYSTEM (Make: Automatic logic control or equivalent make)
- B. Combination Filter/Mixing Box: Parallel-blade galvanized steel damper blades mechanically fastened to steel operating rod in reinforced, galvanized steel cabinet. Connect operating rods with common linkage and interconnect linkages so dampers operate simultaneously. Cabinet support members shall hold 2-inch- (50-mm-) thick, pleated, flat permanent or throwaway filters. Provide hinged access panels or doors to allow removal of filters from both sides of unit.

1.9 FILTER SECTION

- A. Description: Type >B= - Factory-fabricated, dry, extended-surface filters with holding frames and having performance characteristics as indicated. Provide pre-filters prior to all extended surface filters.
- B. Media: Fibrous material formed into deep V-shaped pleats and held by self-supporting wire frames.
MERV 8 and MERV13 pre and fine filtration for PM 2.5, 90-95 efficiency % efficiency of filters will be checked with measurement BEFORE AND AFTER THE FILTERS and AIR FLOW OF THE FILTERS MUST BE ABOVE 1000 CFM.
- C. Frame: Nonflammable with suitable fasteners and gaskets to hold media and media frame and to prevent unfiltered air from passing between media frames and holding devices.
- D. Filter Section: Provide filter media holding frames arranged for flat or angular orientation, with access doors on both sides of unit.

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- E Ratings: Provide filters with rated face velocity of 2.5 m/s, initial resistance of 75 Pa with 50 to 60 percent ASHRAE 52 efficiency, and 150 Pa with 90 to 95 percent efficiency, and final rated resistance of 300 Pa.

1.10 DUCT CONNECTION and PLENUM

Supply and return duct made of 22 gauge GI metal sheet and insulated from end to end with UV resistant material and insulation as per ASHRAE outdoor insulation for outdoor AHUs and indoor insulation for plenum of all the AHUs.

2.2 MATERIAL

All materials shall be best of their kind. Enamel, plastic emulsion shall be used of Asian make only. The paint container shall also have ISI certification mark. All paints and painting materials to be used shall be delivered to the site in the manufacturer's scaled containers with the manufacturer's label intact. The containers shall be opened just before use.

2.3 WORKMANSHIP

All the work shall be done by the Contractor through skilled workmen, experienced in the trade.

No materials shall be adulterated, thinned, mixed or otherwise altered except as recommended by the manufacturers and approved by the supervising officer. Apply two coats of paint and one finishing coat on the prepared surface. Each coat must be thoroughly dry before applying the next coat. All finished surfaces shall be smooth and of even shade to the satisfaction of the supervising officer. No patches shall be allowed. If some surfaces are uneven or patchy, as much area as needed for satisfactory matching shall be redone. Finished surfaces shall not have brush or any other marks. Unless otherwise required, all surfaces requiring same finish shall match in shade and texture.

2.4 PROTECTION AND CLEANING

The contractor will be required to furnish cover for furniture and equipment for protection from paint droppings and dust, and drape cloth covering the floor under the area being painted. After completion of work, the floors, glass panes, door handles, light switches, etc. will be thoroughly cleaned and the debris removed from the premises and deposited in the nearest municipal bin and the area should be left clean to the satisfaction of the supervising officer. Carpets will be covered and protected under protective cover.

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Annexure- A

Safety standards to be followed at construction and renovation sites

General

1. All workers on the work site must wear shoes. No worker with flip flops will be allowed to work at site.
2. All the workers should wear full clothes. No half pants and other non-appropriate clothing (Dhoti) will be accepted.
3. Malba / trash accumulated on the site should be removed at a regular interval (if possible on daily basis) so that it should not pose any trip hazard.
4. Employee exposed to hazards created by different works environment shall be protected by personal protective equipment. Appropriate protective clothing for any operation varies with the size, nature and location of work to be performed.
5. In extreme hot conditions drinking water must be made available to the worker and working duration in exposed conditions should be scheduled accordingly.
6. It is the responsibility of the contractor to made available all the PPE (Personal Protective Equipment) as per the requirement of the work site and as directed by the COR. Any mishap due to negligence on the part of the contractor will be entirely contractor's responsibility.

Machinist / Welding Jobs

1. Hot work permit is required to be filled for each hot work to be performed on USG site.
2. Contractor shall follow attached standards regarding different type of welding to be done on the site.
3. All workers who are arc welding must use a full face shield with #10 or darker lenses. No worker will be allowed to arc weld with sun glasses, no matter how dark the lenses.
4. All the workers working on grinding and sanding job should have approved face masks and goggles for face and eye protection.
5. Workers handling the heavy metallic material should have appropriate gloves and safety shoes as per the job requirement.
6. Lifting and shifting of the heavy material to be done with the help of appropriate machines.
7. Compressed gas cylinder shall be properly marked and should always be kept in standing positing with guard against fall.
8. Hoses connected to the cylinder should be in good condition.
9. In case Arc welding is done inside the premises proper ventilation should be arranged in the vicinity.
10. Contractor should use welding shield during the work to protect the people around against any potential vision hazard.
11. Always keep an approved fire extinguisher near the site of welding.

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12. Workers working with metal sheets must wear appropriate gloves to avoid any cuts on the hands or mishap on the site.
13. Electrical connections for the welding set and the grounding for the same shall be done properly to the satisfaction of the embassy electrician. Please refer electrical section in the document.

Ladders Safety

1. Contractor will use aluminum or fiber glass ladders for all purposes. Wooden ladders are not allowed on the site.
2. Proper ladder for a specific job should be used (for example fiber glass ladders for electrical work etc.).
3. Damaged ladders or ladders with missing supports, shoes etc should not be used on the site.
4. Height of the ladder should be at least two feet above the required height for the work.

Electrical

1. All the equipment / machines to be used for the execution of the job should be properly grounded.
2. All the extension boards to be used at the site should have proper earthing.
3. All connections to any of the outlets should be through three pin plug. Direct connection of wires in not allowed on the site.
4. Damaged wiring/ cabling for the machines / tools to be used at site are not acceptable. The extension cord or wire with the machines should be one core.
5. Electricians working on the site should wear shoes with rubber soles and should use rubber gloves during execution of the work.
6. Any heavy equipment to be plugged in for the work should be done under supervision of the embassy electrician. Contractor on his own should not plug in heavy equipment.
7. No taped joint or undersize wiring is allowed at the site for the work.

Carpentry

1. Carpenters should have dust mask to protect them from the potential hazard from saw dust. In case sanding machine is used at the site the machine should have proper guards and operator should have suitable PPE (personal protective equipment) with them. For e.g. safety goggles, safety shoes, gloves etc.
2. All the wood to be used at the site should be properly stacked at one side. It should not be scattered around and pose a threat for a trip hazard.
3. Entire site should be kept clean from the saw dust at the end of the day.
4. Carpenter shall use machine guards if at all machines are used at the site.
5. All the care should be taken to protect the flooring against any kind of potential damage.
6. All the drill machines or other electrical tools to be used at the site should be properly grounded and wired.

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7. Contractor should use proper tools and tackles for the execution of the work at site.
8. Nails and other sharp material which can pose a threat of accident should not be scattered on the site.

Fire

1. Contractor shall provide and place fire extinguishers as per the requirement of the site (as recommended by the COR).
2. No flammable material should be kept inside the premises at any given point of time.

Lock Out / Tag Out

1. Lock out devices should be used during the testing of the electrical points and wiring.

Confined spaces

1. If at all contractor has to work in a confined space he should contact the COR before proceeding with the work. Contractor should arrange all the equipment as instructed by the COR to accomplish the job in a safe manner.

Hearing Protection

1. Contractor should assure that all the workers working in noisy surroundings should wear ear muffs or other approved devices.

Height Protection

1. Any work to be carried out over and above 8'-0" needs a sturdy metal pipe scaffolding to carry out that work. Ladder or any other arrangement needs to a preapproval from COR to be implemented on the site.