



**CONSULATE GENERAL OF THE  
UNITED STATES OF AMERICA**

**Dhahran, Saudi Arabia**

October 02, 2016

SUBJECT: Solicitation Number SSA20016Q0011 "Renovation Construction Project"

The Consulate of the United States of America invites you to submit a proposal for renovation of a residential house to office space project.

If you are interested in submitting a proposal on this project, read the instructions in Section L of the attached Request for Proposals (RFP).

If you intend to submit a proposal, you should thoroughly examine all documents contained in the contract solicitation package. The Consulate intends to conduct a site visit and hold a pre-proposal conference. The conference will be held at American Consulate General, Dhahran on October 12th, 2016 at 10:00 am. Submit any questions you may have concerning the solicitation documents in writing by October 18th, 2016. Responses will be sent in writing to all contractors on our list of interested parties.

Your proposal must be submitted in a sealed envelope marked "Renovation Construction Project" to **Mr. Barry Blades (Contracting Officer)** on or before **17:00 November 01<sup>st</sup>, 2016**. No proposal will be accepted after this time.

Complete the OFFER portion of the Standard Form 1442, including all blank spaces, and have the form signed by an authorized representative of your company, or the proposal may be considered unacceptable and may be rejected.

Order for a proposal to be considered, you must also complete and submit the following:

1. Section B and Attachment 4, Proposal Breakdown by Divisions;
2. Section K, Representations and Certifications;
3. Bar Chart illustrating sequence of work to be performed;
4. Additional information as required in Section L.

The contract will be a firm fixed price contract, with no adjustment for any escalation in costs or prices of labor or materials. Each offeror will be responsible for determining the amount of labor and materials that will be required to complete the project, and for pricing its proposal accordingly.

Please be advised that each offeror is responsible for furnishing complete information to its subcontractor and suppliers, such as details and quantities required by the drawings and specifications. Subcontractors and suppliers should not be referred to the Consulate or the Architect for determining the amount or quantities of materials required.



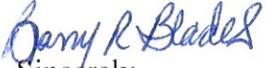
**CONSULATE GENERAL OF THE  
UNITED STATES OF AMERICA**

The construction completion time is forty five (45) working days, commencing from date of award. In the event of an unauthorized or unexcused delay in completing the project, liquidated damages in the amount of SAR 375.00 (\$100.00) per calendar day will be assessed until substantial completion of the project is achieved.

Please direct any questions regarding this solicitation either by fax; 013-3303296 or by email: [DhahranContractingOfficers@state.gov](mailto:DhahranContractingOfficers@state.gov), during regular business hours.

The Contracting Officer reserves the right to reject any or all proposals to waive any informality in proposals received. In addition, the Consulate reserves the right to establish a competitive range of one or more offerors and to conduct further negotiations concerning price and other terms before awarding the contract, or to award without discussions.

In order to be considered for selection the contractor must attend or send a representative to the site visit. A sign in sheet will be provided for the site visit.

  
Sincerely,  
Barry R. Blades  
Contracting Officer

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**SECTION A- THE SCHEDULE**

Please see attachment B form number SF-1442.

## SECTION B – CONTRACT PRICE/CONTRACT TYPE

### B.1 CONTRACT 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. This price listed below shall include all labor, materials, overhead and profit. In consideration of satisfactory performance of all scheduled services required under this contract, the Contractor shall be paid a firm fixed price for all the installation and services for renovation.

| DESCRIPTION   | LABOUR CHARGES | MATERIAL CHARGES | Total Price (SAR) |
|---|----------------|------------------|-------------------|
| The American Consulate General in Dhahran has a requirement to obtain the services of a contractor for House #64 renovations as per the attached scope of work. |                |                  |                   |

**\*Prices must be quoted in local currency – SAR only**

**Total Price (SAR)** \_\_\_\_\_

### B.2 VALUE ADDED TAX

Value Added Tax (VAT) is not applicable to this contract and shall not be included in the CLIN rates or invoices because the American Consulate General has a tax exemption certificate from the host government.

### B.3 TYPE OF CONTRACT

This is a firm-fixed price contract payable entirely in local currency (SAR). The Government will not pay additional sums due to any escalation in the cost of materials, equipment or labor. The Government may make changes in the contract price or time to complete only due to changes made by the Government in the work to be performed, or by delays caused by the Government.

## SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT



### STATEMENT OF WORK FOR GSO-General Services Office House 64 Renovations August 23, 2016

#### C.1 INTRODUCTION

- 1.0 The U.S. American Embassy in Dhahran KSA has a requirement for minor renovation and mold remediation of an existing residential house.
- C.1.1 Demolish interior walls, ceilings, closets, insulation, and windows.
  - C.1.2 Test for and remediate mold.
  - C.1.3 Install new electrical wiring, outlets and upsize existing panel.
  - C.1.4 Install, terminate, patch, and test data, phone, and security systems.
  - C.1.5 Install new HVAC unit.
  - C.1.6 Install new plywood, drywall on walls and ceilings, and insulation material.
  - C.1.7 Painting of interior walls.

#### C.2 GENERAL REQUIREMENTS

C.2.1 The work shall be executed in a diligent manner in accordance with a negotiated firm fixed price and performance period. The period of performance for the project shall be completed in 45 calendar days. Work shall not be performed after regular office hours and weekends. The Contractor shall have limited access to other portions of the Consulate compound except with permission by the Consulate.

C.2.2 The Contractor shall be required to prepare and submit bill of materials, safety plan and quality control schedules. These documents shall provide the necessary interfaces, coordination, and communication among the Consulate, Overseas Buildings Operations [OBO] and Contractor for the delivery of a completed refurbishment project.

#### C.3 SCOPE OF WORK

C.3.1 The Contractor shall be required to prepare and submit a Bill of Materials [BOM] and product data of all materials to be used in the project. The BOM's shall list the materials in sufficient detail that approval for the materials and equipment can be granted without further elaboration or specifications; if needed a sample should be provided. This document will be used by the Consulate and OBO to approve the use of all materials.

C.3.2 Logistics:

1. Staging/storage areas available in the area directly behind House 64.
2. Contractor shall coordinate and schedule the delivery of all materials with the consulate at least 48 hours prior to arrival.
3. Contractor to provide all tools and equipment needed for material handling.
4. The contractor is responsible for all transportation of material, removal of all waste, tools, equipment and labor necessary to execute the renovation project.
5. The contractor will not be provided office space at the Consulate during the execution of this scope of work. The contractor shall keep their operations within the vicinity of House 64 as required for conducting work.
6. The contractor shall not disturb adjacent houses or buildings which are occupied residential and office spaces except as required to execute this scope of work.
7. The site is 110V and has minimal access to 208V power. All tools must be the appropriate voltage.

C.3.3 Waste Removal:

1. Any Items that effect the work space and need to be removed either temporarily and reinstated; or need to be removed all together and reinstated with new materials shall be accounted for by the contractor and identified and agreed prior to commencement of any work.
2. Demolition waste shall be stored in a contractor provided dumpster adjacent to House 64 and shall be emptied by the contractor on a regular basis. Waste materials may not be left overnight on the ground outside of House 64.

C.3.4 Finishing & Clean up

1. Contractor shall keep the work area clean on a daily basis and keep a safe working environment for workers and Consulate inspections.
2. Any damage caused by the contractor in the execution of this scope of work shall be immediately repaired at expense of the contractor.

C.3.5 Demolition

1. Contractor shall perform demolition per Attachments and as described herein.
2. Remove all drywall and insulation in its entirety. These areas include base, walls, ceilings, and the interior of closets.
3. When removing drywall, existing wall fixtures (to include but not limited to kitchen and bathroom cabinets) shall be removed and replaced with original in the same condition.
4. Demo kitchen counter space to allow for the installation of a new closet as shown in Attachment 2a.
5. Remove 8 windows as shown on Attachment 1 Demo Plan and Attachment 4 SOW for Window Replacement. The windows will need to be removed from the interior of the house due to metal grilles installed on the exterior. Exterior security grilles shall remain in place.

6. Remove the 2 A/C window units and deliver them to post FM.
7. Demo existing outside HVAC unit to include all applicable ducting, electrical wiring, control wiring, and piping per Attachment 1 Demo Plan.
8. Post will remove all existing furniture in the living room before any work begins.

#### C.3.6 Mold Remediation

1. After demolition, the contractor will remediate all mold in the red clouded area as shown on Attachment 1 Demo Plan.
2. Contractor shall remove and remediate any mold found within the walls, closets, and/or ceiling cavities per appropriate methods. Contractor will submit a mold Remediation Plan, based on the attached 5 OBO/OM/SHEM Checklist for Mold Prevention, Recognition, and Clean Up to the CO for review and approval.
3. The consulate or OBO shall be notified if mold is found to extend into other spaces of the house other than the red clouded area.
4. Contractor shall provide appropriate protection for all workers entering the house during the course of demolition and mold remediation.
5. An interim full cleaning of the house shall be conducted at the completion of demolition and mold remediation prior to the storage or installation of any new material in the house.
6. Perform a mold spore test and documentation with acceptable results.
7. An inspection by the consulate and OBO shall occur at the completion of demolition and mold remediation.

#### C.3.7 Architectural

1. Contractor shall install thermal insulation in the exterior walls (Minimum R-20, based on climate zone 5 and 4 Marine and IECC code).
2. Contractor shall install thermal insulation in the ceiling/attic (Minimum R-38, based on climate zone 5 and 4 Marine and IECC code).
3. Contractor shall install sound batt insulation for the interior walls only for private offices and restroom. Sound insulation material will fill the entire area between the studs.
4. Contractor will install a layer of 12 mm drywall finish face in all areas where drywall was demo'd. This includes the entire interior of the house. All seams shall be taped, mudded smooth, and sanded.
5. Contractor shall install cement or green board drywall in the restroom as well as the base of kitchen walls as marked on drawing in green on Attachment 2a. In the kitchen it shall be no lower than cabinet height.
6. Contractor shall install on interior faces of all of the exterior walls one layer of 6 mm thick plywood substrate. Plywood shall be securely fastened to exterior studs with a minimum screw spacing of 400 mm on center. The plywood will be installed floor to ceiling and painted to match existing interior walls. Impacted electrical outlet depths will need to be adjusted accordingly.

7. Install 8 new operable windows in locations as shown on Attachment 1 Demo Plan and Attachment 4. Window panes shall be laminated glass or treated with an application of 8-mil shatter resistant window film.
8. Construct a full height floor to ceiling finished wall (standard construction – studs and drywall) with a separate residential door entrance leading to hallway per Attachment 2 Page 1.
9. Install an additional light and light switch to the new office created by the full height wall.
10. Construct a full height floor to ceiling finished closet (standard construction – studs and drywall) with double doors in the kitchen as shown on Attachment 2a. This closet will house the lockable IT cabinet.
11. Install residential style lock sets on all interior doors with the exception of the closet with the lockable cabinet.
12. Contractor shall paint all interior rooms to include walls, ceilings, and closets, and trim with a double coat of quality interior grade paint to match existing.
13. Replace tile and repair all underlying structural issues in bathroom on the exterior wall.
14. Contractor shall patch any exterior penetrations that are no longer being utilized.
15. Install an individual smoke detector in each room to include the hallway near the rear exterior door and each new office (SSM and FSNI) with the exception of the bathroom and the closets. These units will be provided by the Consulate for installation.
16. Install 2 mounted fire extinguishers provided by post. Locations TBD.
17. Furniture per Attachment 2 Page 1 is to be GFGI

#### C.3.8 Electrical, Telecom, and Security

1. Install surface mounted telecom Panduit and wiring to provide (14) Open Net, (2) Voice Only, and (5) Stand Alone Net outlets as shown in Attachment 2 Office Layout Page 2. Outlets and wiring shall be equivalent to that shown in Attachment 3b, 3c, and 3e. Use Single Outlet detail with Orange Data.
2. The lockable IT cabinet will be installed in the new closet in the kitchen. The Open Net fiber will be left with in a 3-meter service coil. See Attachment 3h for product data.
3. Contractor to provide a 36” lockable cabinet as shown in Attachment 3d to house the IT equipment within this closet.
4. There is an existing conduit pathway for the contractor to install OpenNet fiber from House 64 to House 41 – the Health Unit. The contractor may have to perform minimal trenching. Pathway to be verified during site visit.
5. The contractor is responsible for all installation, termination, patching and testing of the Voice and IT connections.
6. The existing cabinet in the Health Unit Office House 41 will need to be relocated in order to accommodate this fiber connection.
7. The data switch will be provided by the Government.
8. There is currently only one phone line to the house. The contractor will need to provide a second phone line in from an existing box (MDF) located

approximately 20 meters from House 64 and terminate in wall jacks in kitchen and living room as shown on Attachment 2 Office Layout Page 2. An existing conduit pathway is available.

9. Install additional electrical wiring and outlets at appropriate height per the new install as shown in Attachment 2a Electrical. Existing electrical outlets are to remain. The additional electrical 110v outlet inside the new closet that will house the lockable IT cabinet will require a dedicated 20 amp breaker in the electrical panel.
10. The contractor is to verify that the breakers inside the electrical panel are of sufficient capacity and may need to upsize them in order to meet the additional electrical requirements. The current capacity is 200 amps.
11. Install light switch for exterior fixture adjacent to front exterior door.
12. The 2 exterior hollow metal entry doors will be equipped with non-removable hinges on the inside and double key locks. The main entrance will have a simplex mechanical push button combination lock, a dead bolt lock, and a door viewer. The rear entrance will have a regular lock set, a dead bolt lock, and a door viewer. See product data for simplex mechanical push button locks in Attachment 3f.
13. Install a simplex mechanical push button combination lock and a dead bolt lock on the closet door with the lockable cabinet.
14. Install an ENS Select one speaker inside the house (Location TBD); tie into the existing system which has a box located on the perimeter wall behind the house, and test. The contractor will need to trench in a conduit pathway and provide the fiber for the security as this will need to be installed in a separate conduit as the telecom and voice.

#### C.3.9 Mechanical and Plumbing

1. Contractor shall install a new 6-ton AHU to include all applicable ducting, electrical wiring, control wiring, and piping. The new unit will be equivalent to what is provided in Attachment 3a. Electrical and HVAC requirements will need to be verified by the contractor. Note that the site is 110V. The contractor will need to provide a transformer rated for 200V to 24V for the control voltage.
2. The condition of the duct work and duct insulation to be verified by the contractor. If the condition is not acceptable, contractor to provide an optional cost for replacing the duct work with insulation. If the condition is acceptable, all duct insulation only is to be replaced.
3. All supply air diffusers are to be replaced with a new diffuser with integrated damper for air balancing.
4. Add a new diffuser with associated duct work to the newly added room (SSM office)
5. Contractor shall provide new exhaust fans in both bath and kitchen.

#### C.4.0 CONSTRUCTION REQUIREMENTS

C.6.1 The Contractor shall be responsible for all required materials, equipment and personnel to manage, administer, and supervise the project. All workmanship shall be of good quality and performed in a skillful manner as determined by the Consulate.

C.6.2 All materials incorporated into the project shall be new. The Contractor shall transport and safeguard all materials and equipment required for construction.

C.6.3 The Contractor shall at all times keep the work area free from accumulation of waste materials. Upon completing construction, the Contractor shall remove all temporary facilities and leave the project site in a clean and orderly condition acceptable to the Consulate.

#### C.5.0 DELIVERABLE SCHEDULE

C.7.1 The Contractor shall commence work under this contract promptly, execute the work diligently, and achieve final completion and acceptance of the roof replacement project including final cleanup of the premises within the period specified.

C.7.2 Milestones:

|                                |   |
|--------------------------------|---|
| Contractor Site Survey         | Within 1 week from RFP issuance         |
| Contractor Proposal            | Within 3 weeks from RFP issuance        |
| Award                          | Within 1 week after receiving proposals |
| Pre-construction Submittals    | Within 10 days of Award                 |
| Construction Begins            | Within 1 week of Award                  |
| Consulate & OBO Review         | Regular or upon completion of work      |
| Consulate/OBO Final Inspection | 7 days prior to completion              |
| Final Cleanup Begins           | 2 days prior to completion              |
| Work Completion                | 45 working days from award              |

#### C.6.0 SECURITY

C.8.1 This is a non-classified project. The work to be performed under this contract requires that the Contractor, its employees and sub-contractors submit corporate, financial and personnel information for review and approval by the Consulate.

Information submitted by the Contractor will not be disclosed beyond the Consulate. The contractor must immediately replace workers which are found to be unsuitable for security reasons at no additional cost.

**END OF STATEMENT OF WORK**

## **SECTION D - PACKAGING AND MARKING**

### **D.1 PLACE OF DELIVERY**

All deliverables shall be delivered to the following address:

*Attn.: Mr. Barry R. Blades  
Contracting Officer  
Consulate General of the U.S.A  
Dhahran (Doha) 31942  
Saudi Arabia*

### **D.2 PACKING AND MARKING**

Materials delivered to the site shall be export packed for surface shipment and marked as follows:

*House # 64 Renovation Project*

## SECTION E - INSPECTION AND ACCEPTANCE

### E.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at: <http://acquisition.gov/far/index.html> or <http://farsite.hill.af.mil/vffara.htm>. These addresses are subject to change.

If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use the Department of State Acquisition website at <http://www.statebuy.state.gov/> to access the links to the FAR. You may also use an Internet "search engine" (for example, Google, Yahoo or Excite) to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation clause(s) is/are incorporated by reference (48 CFR CH. 1):

| <u>CLAUSE</u> | <u>TITLE AND DATE</u>   |
|---------------|---|
| 52.204-18     | COMMERCIAL AND GOVERNMENT ENTITY CODE MAINTENANCE (JUL 2015)                |
| 52.204-19     | INCORPORATION BY REFERENCE OF REPRESENTATIONS AND CERTIFICATIONS (DEC 2014) |
| 52.232-27     | PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (JUL 2013)                        |
| 52.246-12     | INSPECTION OF CONSTRUCTION (AUG 1996)                                       |

### E.2 QUALITY ASSURANCE

The Contractor shall institute an appropriate inspection system set forth in a Quality Assurance Plan. The plan shall include checklists of duties to be carried out, ensuring these duties are carried out by the supervisory staff and senior employees, and carrying out weekly inspections to determine whether the various services are being performed according to the contract. The Contractor shall provide copies of the weekly inspection reports to the COR.

The Contractor shall correct and improve promptly any shortcomings and substandard conditions noted during inspections. The Contractor shall bring any conditions beyond the responsibility of the Contractor to the attention of the Contracting Officer or COR.

### E.2.1 MONTHLY REPORT

The Contractor shall submit to the COR a monthly progress report, along with the monthly invoice, summing up observations resulting from the inspections, progress, difficulties or irregularities encountered, resolution of problems, measures taken to improve conditions, recommendations, and other matters related to this contract.

### E.2.2. INSPECTION BY GOVERNMENT

The Consulate has the right to inspect and test all services called for by the contract, to the extent practicable at all times and places during the term of the contract. The Consulate OBO staff may perform Quality Assurance Inspections [QAI] and tests during installation to confirm the work is installed according to the SOW.

The COR, or his/her authorized representatives, will inspect from time to time the services being performed and the supplies furnished to determine whether 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.

## E.3 SUBSTANTIAL COMPLETION

### E.3.1 DEFINITIONS

(a) "Substantial Completion" means the stage in the progress of the work as determined and certified by the Contracting Officer in writing to the Contractor, on which the work (or a portion designated by the Government) is sufficiently complete and satisfactory. Substantial completion means that the property may be occupied or used for the purpose for which it is intended, and only minor items such as touch-up, adjustments, and minor replacements or installations remain to be completed or corrected which:

1. do not interfere with the intended occupancy or utilization of the work, and
2. can be completed or corrected within the time period required for final completion.

(b) The "date of substantial completion" means the date determined by the Contracting Officer or authorized Government representative as of which substantial completion of the work has been achieved.

### E.3.2 USE AND POSSESSION UPON SUBSTANTIAL COMPLETION

The Government shall have the right to take possession of and use the work upon substantial completion. Upon notice by the Contractor that the work is substantially complete (a Request for Substantial Completion) and an inspection by the Contracting Officer or an authorized Government representative (including any required tests), the Contracting Officer shall furnish the Contractor a Certificate of Substantial Completion. The certificate shall be accompanied by a Schedule of Defects listing items of work remaining to be performed, completed or corrected before final completion and acceptance. Failure of the Contracting Officer to list any item of work shall not relieve the Contractor of responsibility for complying with the terms of the contract. The Government's possession or use upon substantial completion shall not be deemed an acceptance of any work under the contract.

## E.4 FINAL COMPLETION AND ACCEPTANCE

### E.4.1 DEFINITIONS

(a) "Final completion and acceptance" means the stage in the progress of the work as determined by the Contracting Officer and confirmed in writing to the Contractor, at which all work required under the contract has been completed in a satisfactory manner, subject to the discovery of defects after final completion, and except for items specifically excluded in the notice of final acceptance.

(b) The "date of final completion and acceptance" means the date determined by the Contracting Officer when final completion of the work has been achieved, as indicated by written notice to the Contractor.

### E.4.2 FINAL INSPECTION AND TESTS

The Contractor shall give the Contracting Officer at least five (5) days advance written notice of the date when the work will be fully completed and ready for final inspection and tests. Final inspection and tests will be started not later than the date specified in the notice unless the Contracting Officer determines that the work is not ready for final inspection and so informs the Contractor.

### E.4.3 FINAL ACCEPTANCE

If the Contracting Officer is satisfied that the work under the contract is complete (with the exception of continuing obligations), the Contracting Officer shall issue to the Contractor a notice of final acceptance and make final payment upon:

(a) satisfactory completion of all required tests,

(b) a final inspection that all items by the Contracting Officer listed in the Schedule of Defects have been completed or corrected and that the work is finally complete (subject to the discovery of defects after final completion), and

(c) Submittal by the Contractor of all documents and other items required upon completion of the work, including a final request for payment (Request for Final Acceptance).

## SECTION F - DELIVERIES OR PERFORMANCE

### F.1 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at: <http://acquisition.gov/far/index.html> or <http://farsite.hill.af.mil/vffara.htm>. These addresses are subject to change.

If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use the Department of State Acquisition website at <http://www.statebuy.state.gov/> to access the links to the FAR. You may also use an Internet "search engine" (for example, Google, Yahoo or Excite) to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation clauses are incorporated by reference (48 CFR CH. 1):

| <u>CLAUSE</u> | <u>TITLE AND DATE</u>         |
|---------------|-------------------------------|
| 52.242-14     | SUSPENSION OF WORK (APR 1984) |

### F.2 52.211-10 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK (APR 1984)

The Contractor shall be required to:

- (a) Commence work under this contract within forty five (45) working days after the date the Contractor receives the notice to proceed,
- (b) Prosecute the work diligently.
- (c) Complete the entire work ready for use not later than forty five (45) working days. The time stated for completion shall include final cleanup of the premises and completion of "punch list" items.

### F.3 LIQUIDATED DAMAGES

#### F.3.1 52.211-12 LIQUIDATED DAMAGES - CONSTRUCTION (SEP 2000)

(a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay liquidated damages to the Government in the amount of SAR 375.00 (\$100.00) for each day of delay until the work is completed or accepted.

(b) If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Default clause.

#### F.3.2. ASSESSMENT AND APPORTIONMENT OF LIQUIDATED DAMAGES

Liquidated damages will be assessed from the completion date indicated in the contract or extensions thereof to the date of substantial completion as actually achieved by the Contractor, as determined by the Contracting Officer.

#### F.4 CONTRACTOR'S SUBMISSION OF CONSTRUCTION SCHEDULES

(a) The time for submission of the schedules referenced in Section I, 52.236-15, "Schedules for Construction Contracts", paragraph (a), is hereby modified to reflect the due date for submission as "ten (10) days after receipt of an executed contract".

(b) These schedules shall include the time by which shop drawings, product data, samples and other submittals required by the contract will be submitted for approval.

(c) The Contractor shall revise such schedules (1) to account for the actual progress of the work, (2) to reflect approved adjustments in the performance schedule, and (3) as required by the Contracting Officer to achieve coordination with work by the Government and any separate contractors used by the Government. The Contractor shall submit a schedule which sequences work so as to minimize disruption at the job site.

(d) All schedules shall be in the English language and any system of dimensions (English or metric) shown shall be consistent with that used in the contract. No extension of time shall be allowed due to a delay by the Government in approving such deliverables if the Contractor has failed to act promptly and responsively in submitting its deliverables. The Contractor shall identify each deliverable as required by the contract.

#### F.5 ACCEPTANCE OF SCHEDULE

When the Government has accepted any time schedule, it shall be binding upon the Contractor. The completion date is fixed and may be extended only by a written contract modification signed by the Contracting Officer. Acceptance or approval of any schedule or revision thereof by the Government shall not (1) extend the completion date or obligate the Government to do so, (2) constitute acceptance or approval of any delay, or (3) excuse the Contractor from or relieve the

Contractor of its obligation to maintain the progress of the work and achieve final completion by the established completion date.

#### F.6 NOTICE OF DELAY

If the Contractor receives a notice of any change in the work, or if any other conditions arise which are likely to cause or are actually causing delays which the Contractor believes may result in late completion of the project, the Contractor shall notify the Contracting Officer. The Contractor's notice shall state the effect, if any, of such change or other conditions upon the approved schedule, and shall state in what respects, if any, the relevant schedule or the completion date should be revised. The Contractor shall give this notice not more than ten (10) days after the first event-giving rise to the delay or prospective delay. Only the Contracting Officer may make revisions to the approved time schedule.

#### F.7 NOTICE TO PROCEED

(a) After receiving and accepting any bonds or evidence of insurance, the Contracting Officer will issue the Contractor a Notice to Proceed. The Contractor shall then prosecute the work commencing and completing performance not later than the time period established in the contract.

(b) It is possible that the Contracting Officer may elect to issue the Notice to Proceed before receipt and acceptance of any bonds. Issuance of a Notice to Proceed by the Government before receipt of the required bonds or policies shall not be a waiver of the requirement to furnish these documents.

#### F.8 WORKING HOURS

All work shall be performed during working hours 0800 to 1700, 08 hours a day and 06 days a week except for the holidays identified below. Other hours, if requested by the Contractor, may be approved by the Contracting Officer's Representative. The Contractor shall give 24 hours in advance to COR who will consider any deviation from the hours identified above. Changes in work hours will not be a cause for a price increase.

(a) The Department of State observes the following days as holidays:

- Saudi National Day
- Columbus Day
- Veterans Day
- Thanksgiving Day
- Christmas Day
- New Year's Day
- Martin Luther King, Jr's Birthday
- Washington's Birthday

If the Contractor's personnel work on a holiday, no form of holiday or other premium compensation will be reimbursed either as a direct or indirect cost, unless authorized pursuant to an overtime clause elsewhere in this contract.

#### F.9 EXCUSABLE DELAYS

The Contractor will be allowed time, not money, for excusable delays as defined in FAR 52.249-10, Default. Examples of such cases include:

- (1) Acts of God or of the public enemy,
- (2) Acts of the United States Government in either its sovereign or contractual capacity,
- (3) Acts of the government of the host country in its sovereign capacity,
- (4) Acts of another contractor in the performance of a contract with the Government,
- (5) Fires,
- (6) Floods,
- (7) Epidemics,
- (8) Quarantine restrictions,
- (9) Strikes,
- (10) Freight embargoes,
- (11) Delays in delivery of Government furnished equipment, and
- (12) Unusually severe weather.

In each instance, the failure to perform must be beyond the control and without the fault or negligence of the Contractor, and the failure to perform. Furthermore, the failure:

- (1) Must be one that the Contractor could not have reasonably anticipated and taken adequate measures to protect against,
- (2) Cannot be overcome by reasonable efforts to reschedule the work.
- (3) Directly and materially affects the date of final completion of the project.

#### F.10 PRE-CONSTRUCTION CONFERENCE

A preconstruction conference will be held 03 days after contract award at American Consulate General, Dhahran to discuss the schedule, submittals, notice to proceed, mobilization and other important issues that affect construction progress. See FAR 52.236-26, Pre-Construction Conference in Section I.

F.11 DELIVERABLES

The following items shall be delivered under this contract:

| <b>Description</b>                         | <b>Quantity</b> | <b>Delivery Date</b>                               | <b>Deliver To:</b> |
|--|-----------------|--|--------------------|
| H.11.1. Safety Plan                        | 1               | 05 days after award                                | CO                 |
| F.4. Construction Schedule                 | 1               | 03 days after award                                | CO                 |
| H.14.1. Submittal Register                 | 1               | 05 days after award                                | CO                 |
| F.10. Pre-Construction Conference          | 1               | 03 days after award                                | CO                 |
| F.4. (c). Updates to Construction Schedule | 1               | As emended   | CO                 |
| H.4.4. As-built Drawings and Warranties    | 1               | After final completion but before final acceptance | CO                 |
| E.4.2. Request for Final Acceptance        | 1               | 5 days before inspection                           | CO                 |
| F.6 Notice of Delay                        | 1               | Within 01 days after event                         | CO                 |
| F.8 Additional Hours                       | 1               | No later than 48 hours in advance of need          | CO                 |
| H.2.4 Evidence of Insurance                | 1               | 03 days after award                                | CO                 |
| H.17.2 Differing Site Condition            | 1               | Within 10 days of occurrence                       | CO                 |

## SECTION G - CONTRACT ADMINISTRATION DATA

### G.1 GENERAL INFORMATION

The Consulate does not make representations or warranties of whatsoever kind or nature, either expressed or implied, as to the quality, level of completion, accuracy, extent of compliance with the standards, codes and requirements described or referred to in this SOW, or the extent of coordination between or among the documents provided to the Contractor.

### G.2 AUTHORITY OF CONTRACTING OFFICER

All work shall be performed under the general direction of the Contracting Officer, who alone shall have the power to bind the Government and to exercise the rights, responsibilities, authorities and functions vested by the contract.

### G.3 MONITORING OF THE CONTRACTOR

#### G.3.1. 652.242-70 CONTRACTING OFFICER'S REPRESENTATIVE (COR) (AUG 1999)

(a) The Contracting Officer may designate in writing one or more Government employees, by 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.

(c) The COR for this contract is the **Mr. Mohammad Khan**.

#### G.3.2 DUTIES

The COR is responsible for inspection and acceptance of services. These duties include review of Contractor invoices, including the supporting documentation required by the contract. The COR may provide technical advice, substantive guidance, inspections, invoice approval, and other purposes as deemed necessary under the contract. The COR is designated as the authority to act for the Contracting Officer in matters concerning technical clarification, random inspection of Contractor performance to ensure compliance with contract specifications and acceptance of the Contractor's performance under this contract. The COR will coordinate all work with the Contractor during the term of this contract. The COR is not authorized to alter the contract's terms, or conditions, including the design to budget parameter. Such changes must be authorized by the Contracting Officer in a written modification to the contract. Reference to the project architect within documents incorporated into this contract shall be read to mean COR.

#### G.4 RESPONSIBILITY OF THE CONTRACTOR

- 4.1 The Contractor shall be responsible for the professional quality, technical accuracy, and the coordination of all construction and other services furnished under this contract. The Contractor shall, without additional compensation, correct or revise any errors or deficiencies in its construction and other services.
- 4.2 The Contractor shall identify a Project Site Manager who shall be responsible for the overall management of the project and shall represent the Contractor on the site during construction. The Project Site Manager shall speak English.
- 4.3 The Contractor is responsible for safety and shall comply with all local labor laws, regulations, customs and practices pertaining to labor, safety and similar matters. The Contractor shall promptly report all accidents resulting in lost time, disabling, or fatal injuries to the Consulate.
- 4.4 The Contractor shall be and remain liable to the Embassy in accordance with applicable law for all damages to the Consulate caused by the Contractor's negligent performance of any of the services furnished under this SOW.

#### G.5 PAYMENT

##### G.5.1 GENERAL

Payments are subject to FAR 52.232-5, "Payments under Fixed-Price Construction Contracts".

##### G.5.2 DETAIL OF PAYMENT REQUESTS

The payment will be made as thirty (30) days after the completion of the work as per U.S. Government Prompt Payment Act. After completion of request submit invoice to the following address;

Designated Billing Officer  
Management Section  
American Consulate General, Dhahran  
Saudi Arabia

##### G.5.3 PAYMENTS TO SUBCONTRACTOR

The Contractor shall make timely payment from the proceeds of the progress or final payment for which request is being made to subcontractors and suppliers following the Contractor's contractual arrangements with them.

#### G.5.4 EVALUATION BY THE CONTRACTING OFFICER

Following receipt of the Contractor's request for payment, and on the basis of an inspection of the work, the Contracting Officer shall make a determination as to the amount that is then due. If the Contracting Officer does not approve payment of the full amount applied for, less the retainage addressed in FAR 52.232-5, the Contracting Officer shall advise the Contractor of the reasons.

#### G.5.5 ADDITIONAL WITHHOLDING

The Government may withhold from payments due the Contractor any amounts as may be considered necessary to cover --

- (a) Wages or other amounts due the Contractor's employees on this project;
- (b) Wages or other amounts due employees of subcontractors on this project;
- (c) Amounts due suppliers of materials or equipment for this project; and
- (d) Any other amounts for which the Contractor may be held liable under this contract, including but not limited to the actual or prospective costs of correction of defective work and prospective liquidated damage when the Contractor has failed to make adequate progress.

This withholding is independent of monies retained by the Government under FAR 52.232-5, or otherwise as permitted to be retained under this contract.

#### G.5.6. PAYMENT

Under the authority of 52.232-27(a) the 14 day period identified in FAR 52.232-27(a)(1)(i)(A) is hereby changed to 30 days.

## **SECTION H - SPECIAL CONTRACT REQUIREMENTS**

### H.1 BOND/IRREVOCABLE LETTERS OF CREDIT REQUIREMENTS

#### H.1.1 BONDS/IRREVOCABLE LETTERS OF CREDIT REQUIRED

The Contractor shall furnish (1) a performance and guaranty bond and a payment bond on forms provided by and from sureties acceptable to the Government, each in the amount of 20% of the contract price, or (2) comparable alternate performance security (irrevocable letter of credit) approved by the Government such as letter of credit/guaranty shown in Section J.

#### H.1.2 TIME FOR SUBMISSION

The Contractor shall provide the bonds or alternate security as required by the paragraph H.1.1 above within ten (10) days after contract award. Failure to submit (1) the required bonds or other security acceptable to the Government in a timely manner; (2) bonds from an acceptable surety; or (3) bonds in the required amount, may result in rescinding or termination of the contract by the Government. If the contract is terminated, the contractor will be liable for those costs as described in FAR 52.249-10, "Default (Fixed-Price Construction).

#### H.1.3 COVERAGE

The bonds or alternate performance security shall guarantee the Contractor's execution and completion of the work within the contract time and the correction of any defects after completion as required by this contract, the payment of all wages and other amounts payable by the Contractor under its subcontracts or for labor and materials, and the satisfaction or removal of any liens or encumbrances placed on the work.

#### H.1.4 DURATION OF COVERAGE

The required performance and payment securities shall remain in effect in the full amount required until final acceptance of the project by the Government. Upon final acceptance, the penal sum of the performance security only shall be reduced to 10% of the contract price. The performance security shall remain in effect for one year after the date of final completion and acceptance, and the Contractor shall pay any premium required for the entire period of coverage. The requirement for payment security terminates at final acceptance.

#### H.1.5 FAR 52.228-2 - ADDITIONAL BOND SECURITY (OCT 1997)

The Contractor shall promptly furnish additional security required to protect the Government and persons supplying labor or materials under this contract if --

(a) Any surety upon any bond, or issuing financial institution for other security, furnished with this contract becomes unacceptable to the Government;

(b) Any surety fails to furnish reports on its financial condition as required by the Government; or

(c) The contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer; or

(d) An irrevocable letter of credit (ILC) used as security will expire before the end of the period of required security. If the contractor does not furnish an acceptable extension or replacement ILC, or other acceptable substitute, at least 30 days before an ILC's scheduled expiration, the Contracting Officer has the right to immediately draw on the ILC.

## H.2 INSURANCE

### H.2.1 AMOUNT OF INSURANCE

The Contractor is required by FAR 52.228-5 to provide whatever insurance is legally necessary. 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 US Dollars:

|                |              |
|----------------|--------------|
| Per Occurrence | \$ 30,000.00 |
| Cumulative     | \$ 30,000.00 |

2. Property Damage on or off the site in US Dollars:

|                |                                    |
|----------------|------------------------------------|
| Per Occurrence | Full value of the contract awarded |
| Cumulative     | Full value of the contract awarded |

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 and 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.

## H.2.2 GOVERNMENT AS ADDITIONAL INSURED

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.

## H.2.3 INSURANCE-RELATED DISPUTES

Failure to agree to any adjustment contemplated under this contract regarding insurance shall be a dispute within the meaning of the clause in Section I, 52.233-1, Alternate I, "Disputes". Nothing in this clause shall excuse the Contractor from proceeding with the work.

## H.2.4 TIME FOR SUBMISSION OF EVIDENCE OF INSURANCE

The Contractor shall provide evidence of the insurance required under this contract within ten (10) days after contract award. Failure to timely submit this evidence, in a form acceptable to the Contracting Officer, may result in rescinding or termination of the contract by the Government.

## H.3 DEFINITIONS

In addition to the definitions provided in Section I, FAR 52.202-1 and DOSAR 652.202-70, the following definitions shall apply when used in connection with this contract:

- (a) Contract Drawings or Drawings, where indicated by the context, means those drawings specifically listed in the construction contract or as later incorporated into the contract by contract modification.
- (b) Day means a calendar day unless otherwise specifically indicated.
- (c) Host Country means the country in which the project is located.
- (d) Material means all materials, fixtures and other articles incorporated in, or which are intended to remain with, the project.
- (e) Notice to Proceed means a written notice to the Contractor from the Contracting Officer authorizing the Contractor to proceed with the work under the contract as of a date set forth in the Notice.
- (f) Other Submittals includes progress schedules, shop drawings, testing and inspection reports, and other information required by the contract to be submitted by the Contractor for information or approval by the Government.

(g) Project Data includes standard drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the contract.

(h) Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the work will be judged.

(i) Schedule of Defects means the list of items, prepared in connection with substantial completion of the work or early occupancy or utilization of a portion thereof, which the Contracting Officer has designated as remaining to be performed, completed or corrected before the work will be accepted by the Government.

(j) Separate Contractor means a contractor, other than the Contractor or any of its subcontractors, to whom the Government has awarded a contract for construction of a portion of the project.

(k) Work means any and all permanent construction which is intended to be incorporated into the finished project and required to be performed or otherwise provided by the Contractor under this contract, unless otherwise indicated by the context.

#### H.4 OWNERSHIP AND USE OF DOCUMENTS

##### H.4.1 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND MODELS

(a) OWNERSHIP. All specifications, drawings, and copies thereof, and models, are the property of the Government.

(b) USE AND RETURN. The contractor shall not use or allow others to use the documents described in (a) above on other work. The Contractor shall return or account for the signed contractor set and additional copies provided to or made by the Contractor upon final completion of the work.

##### H.4.2 SUPPLEMENTAL DOCUMENTS

The Contracting Officer shall furnish from time to time such detailed drawings and other information as is considered necessary, in the opinion of the Contracting Officer, to interpret, clarify, supplement, or correct inconsistencies, errors or omissions in the Contract documents, or to describe minor changes in the work not involving an increase in the contract price or extension of the contract time. The Contractor shall comply with the requirements of the supplemental documents, and unless the Contractor makes objection within 20 days, their issuance shall not provide for any claim for an increase in the Contract price or an extension of contract time.

#### H.4.3 RECORD DOCUMENTS

The Contractor shall maintain at the project site:

- a current marked set of Contract drawings and specifications indicating all interpretations and clarifications, contract modifications, change orders, or any other departure from the contract requirements approved by the Contracting Officer; and
- a complete set of record shop drawings, product data, samples and other submittals as approved by the Contracting Officer.

#### H.4.4 "AS-BUILT" DOCUMENTS

After final completion of the work, but before final acceptance, the Contractor shall provide:

- complete set of "as-built" drawings, based on the record set of drawings, marked to show the details of construction as actually accomplished; and
- record shop drawings and other submittals, in the number and form as required by the specifications.

#### H.5 GOVERNING LAW

The laws of the United States shall govern the contract and its interpretation.

#### H.6 LANGUAGE PROFICIENCY

The manager assigned by the contractor to superintend the work on-site, as required by Section I, 52.236-6, "Superintendence by the Contractor", shall be fluent in written and spoken English.

#### H.7 LAWS AND REGULATIONS

##### H.7.1 COMPLIANCE REQUIRED

The Contractor shall, without additional expense to the Government, be responsible for complying with all laws, codes, ordinances, and regulations applicable to the performance of the work, including those of the host country, and with the lawful orders of any governmental authority having jurisdiction. Host country authorities may not enter the construction site without the permission of the Contracting Officer. Unless otherwise directed by the Contracting Officer, the Contractor shall comply with the more stringent of the requirements of such laws, regulations and orders and of the contract. In the event of a conflict between the contract and such laws, regulations and orders, the

Contractor shall promptly advise the Contracting Officer of the conflict and of the Contractor's proposed course of action for resolution by the Contracting Officer.

#### H.7.2 LABOR, HEALTH AND SAFETY LAWS AND CUSTOMS

The Contractor shall comply with all local labor laws, regulations, customs and practices pertaining to labor, safety, and similar matters, to the extent that such compliance is not inconsistent with the requirements of this contract.

#### H.7.3 SUBCONTRACTORS

The Contractor shall give written assurance to the Contracting Officer that all subcontractors and others performing work on or for the project have obtained all requisite licenses and permits.

#### H.7.4 EVIDENCE OF COMPLIANCE

The Contractor shall submit proper documentation and evidence satisfactory to the Contracting Officer demonstrating compliance with this clause when directed by the Contracting Officer.

### H.8 RESPONSIBILITY OF CONTRACTOR

#### H.8.1 DAMAGE TO PERSONS OR PROPERTY

The Contractor shall be responsible for all damages to persons or property that occur as a result of the Contractor's fault or negligence, and shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others.

#### H.8.2 RESPONSIBILITY FOR WORK PERFORMED

The Contractor shall be responsible for all materials delivered and work performed until final completion and acceptance of the entire work, except for any completed unit of work which may have been accepted in writing under the contract.

### H.9 CONSTRUCTION OPERATIONS

#### H.9.1 OPERATIONS AND STORAGE AREAS

(a) **CONFINEMENT TO AUTHORIZED AREAS.** The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the Contracting Officer.

(b) **VEHICULAR ACCESS.** The Contractor shall, and in accordance with any regulations prescribed by the Contracting Officer, use only established site entrances and roadways.

#### H.9.2 USE OF PREMISES

(a) **Occupied Premises.** If the premises are occupied, the Contractor, its subcontractors, and their employees shall comply with the regulations promulgated by the Government governing access to, operation of, and conduct while in or on the premises and shall perform the work required under this contract in such a manner as not to unreasonably interrupt or interfere with the conduct of Government business.

(b) **Requests from occupants.** The Contractor shall refer any request from occupants of existing buildings to change the sequence of work to the Contracting Officer for determination.

(c) **Access limited.** The Contractor, its subcontractors and their employees shall not have access to or be admitted into any building or portion of the site outside the areas designated in this contract except with the permission of the Contracting Officer.

#### H.10 TEMPORARY FACILITIES AND SERVICES

The Contractor may erect temporary buildings (such as, storage sheds, shops, offices) and utilities only with the approval of the Contracting Officer. The cost of these temporary buildings is included in the contract fixed price. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work. With the written consent of the Contracting Officer, the buildings and utilities may be abandoned and need not be removed.

#### H.11 SAFETY

##### H.11.1 DOSAR 652.236-70 ACCIDENT PREVENTION (APR 2004)

(a) *General.* The contractor shall provide and maintain work environments and procedures which will safeguard the public and Government personnel, property, materials, supplies, and equipment exposed to contractor operations and activities; avoid interruptions of Government operations and delays in project completion dates; and, control costs in the performance of this contract. For these purposes, the contractor shall:

- (1) Provide appropriate safety barricades, signs and signal lights;
- (2) Comply with the standards issued by any local government authority having jurisdiction over occupational health and safety issues; and,

(3) Ensure that any additional measures the contracting officer determines to be reasonably necessary for this purpose are taken.

(4) For overseas construction projects, the contracting officer shall specify in writing additional requirements regarding safety if the work involves:

- (i) Scaffolding;
- (ii) Work at heights above two (2) meters;
- (iii) Trenching or other excavation greater than one (1) meter in depth;
- (iv) Earth moving equipment;
- (v) 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;
- (vi) 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.);
- (vii) 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
- (viii) Hazardous noise levels.

(b) *Records.* The contractor shall maintain an accurate record of exposure data on all accidents 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.

(c) *Subcontracts.* The contractor shall be responsible for its subcontractors' compliance with this clause.

(d) *Written program.* Before commencing work, the contractor shall:

(1) Submit a written plan to the contracting officer for implementing this clause. The plan shall include specific management or technical procedures for effectively controlling hazards associated with the project; and,

(2) Meet with the contracting officer to discuss and develop a mutual understanding relative to administration of the overall safety program.

(e) *Notification.* The contracting officer shall notify the contractor of any non-compliance with these requirements and the corrective actions required. This notice, when delivered to the contractor or the contractor's representative on site, shall be deemed sufficient notice of the non-compliance and corrective action required. After receiving the notice, the

contractor shall immediately take corrective action. If the contractor fails or refuses to promptly take corrective action, the contracting officer may issue an order suspending all or part of the work until satisfactory corrective action has been taken. The contractor shall not be entitled to any equitable adjustment of the contract price or extension of the performance schedule on any suspension of work order issued under this clause.

## H.12 SUBCONTRACTORS AND SUPPLIERS

### H.12.1 CLAIMS AND ENCUMBRANCES

The Contractor shall satisfy as due all lawful claims of any persons or entities employed by the Contractor, including subcontractors, material men and laborers, for all labor performed and materials furnished under this contract, including the applicable warranty or correction period, unless the Government shall be directly liable by contract. The Contractor shall not at any time permit any lien, attachment, or other encumbrance to be entered against or to remain on the building(s), or the premises, whether public or private, or any portion thereof, as a result of nonperformance of any part of this contract.

### H.12.2 APPROVAL OF SUBCONTRACTORS

(a) REVIEW AND APPROVAL. The Government reserves the right to review proposed subcontractors for a period of five (5) days before providing notice of approval or rejection of any or all subcontractors.

(b) REJECTION OF SUBCONTRACTORS. The Government reserves the right to reject any or all subcontractors proposed if their participation in the project, as determined by the Contracting Officer, may cause damage to the national security interests of the United States. The Contractor agrees to promptly replace any subcontractor rejected by the Government under this clause.

## H.13 CONSTRUCTION PERSONNEL

### H.13.1 REMOVAL OF PERSONNEL

The Contractor shall maintain discipline at the site and at all times take all reasonable precautions to prevent any unlawful, riotous, or disorderly conduct by or among those at the site. The contractor shall ensure the preservation of peace and protection of persons and property in the neighborhood of the project. The Contracting Officer may require, in writing, that the Contractor remove from the work any employee that the Contracting Officer deems incompetent, careless, insubordinate or otherwise objectionable, or whose continued employment on the project is deemed by the Contracting Officer to be contrary to the Government's interests.

### H.13.2 CONSTRUCTION PERSONNEL SECURITY

After award of the contract, the Contractor shall have two days to submit to the Contracting Officer a list of workers and supervisors assigned to this for the Government to conduct all necessary security checks. It is anticipated that security checks will take -- days to perform. For each individual the list shall include:

- Full Name
- Place and Date of Birth
- Passport Copy
- Iqama Copy

Failure to provide any of the above information may be considered grounds for rejection and/or re-submittal of the application. Once the Government has completed the security screening and approved the applicants, the Government will provide a badge to the individual for access to the site. The Government may revoke this badge at any time due to the falsification of data, or misconduct on site.

## H.14 MATERIALS AND EQUIPMENT

### H.14.1 SELECTION AND APPROVAL OF MATERIALS

(a) **STANDARD TO QUALITY.** All materials and equipment incorporated into the work shall be new and for the purpose intended, unless otherwise specified. All workmanship shall be of good quality and performed in a skillful manner that will withstand inspection.

(b) **SELECTION BY CONTRACTOR.** Where the contract permits the Contractor to select products, materials or equipment to be incorporated in the work, or where specific approval is otherwise required by the contract, the Contractor shall furnish a Submittal Register to the Contracting Officer, for approval. The Submittal Register shall include the names of the manufacturer, model number, and source of procurement of each such product, material or equipment, together with other pertinent information concerning the nature, appearance, dimensions, performance, capacity, and rating. To ensure a timely review the Contractor shall provide a submittal register ten days after contract award showing when shop drawings, samples, or submittals shall be made. When directed to do so, the Contractor shall submit samples for approval at the Contractor's expense, with all shipping charges prepaid. Installation or use of any products, materials or equipment without the required approval shall be at the risk of subsequent rejection.

### H.14.2 CUSTODY OF MATERIALS

The Contractor shall be responsible for the custody of all materials received for incorporation into the project, including Government furnished materials, upon delivery

to the Contractor or to any person for whom it is responsible, including subcontractors. The Contractor shall deliver all such items to the site as soon as practicable. If required by the Contracting Officer, the Contractor shall clearly mark in a manner directed by the Contracting Officer all items of which the Contractor has custody but which have not been delivered or secured at the site, clearly indicating the use of such items for the U.S. Government project.

#### H.14.3 BASIS OF CONTRACT PRICE

The contract price is based on the use of the materials, products and equipment specified in the contract, except for substitutions or "Or-Equal" items proposed by the Contractor which have been specifically approved by the Government at the time of execution of the contract. Any substitution approved by the Government after execution of the contract shall be subject to an appropriate adjustment of the contract price.

#### H.14.4 SUBSTITUTIONS

(a) **PRIOR APPROVAL REQUIRED.** The Contractor must receive approval in writing from the Contracting Officer before substitutions (1) proposed by the Contractor but not yet approved at the time of execution of the contract, or (2) proposed by the Contractor after execution of the contract may be used in the project. Sufficient information to permit evaluation by the Government must accompany any substitution request including but not limited to the reasons for the proposed substitution and data concerning the design, appearance, performance, composition, and relative cost of the proposed substitute. The Contractor shall make requests for substitutions in a timely manner to permit adequate evaluation by the Government. If, in the Contracting Officer's opinion, the use of such substitute items is not in the best interests of the Government, the Contractor must obtain the items originally specified with no adjustment in the contract price or completion date.

(b) **APPROVAL THROUGH SHOP DRAWINGS.** The Contractor may propose substitutions of materials in the submittal of shop drawings, provided such substitution is specifically requested in writing in the transmittal of the shop drawings to the Contracting Officer. Such substitution requests must be made in a timely manner and supported by the required information.

(d) **FINAL APPROVAL ON DELIVERY.** Acceptance or approval of proposed substitutions under the contract are conditioned upon approval of items delivered at the site or approval by sample. Approval by sample shall not limit the Government's right to reject material after delivery to the site if the material does not conform to the approved sample in all material respects.

#### H.14.5 "OR-EQUAL CLAUSE"

References in the Specifications/Statement of Work to materials, products or equipment by trade name, make, or catalog number, or to specific processes, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition. The Contractor may propose for approval or rejection by the Contracting Officer the substitution of any material, product, equipment or process that the Contractor believes to be equal to or better than that named in the Specifications/Statement of Work, unless otherwise specifically provided in this contract.

#### H.14.6 USE AND TESTING OF SAMPLES

("Samples" include materials and equipment.)

(a) USE. The Contractor shall send approved samples not destroyed in testing to the Contracting Officer. Those which are in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in the work shall match the approved samples within any specified tolerances. Other samples not destroyed in testing or not approved will be returned to the Contractor at its expense if so requested.

(b) FAILURE OF SAMPLES. If a sample fails to pass the specified tests described in this contract, any further samples of the same brand or make of that material or equipment may not be considered for use in performance under this contract.

(c) TAKING AND TESTING OF SAMPLES. Samples delivered on the site or in place may be taken by the Contracting Officer for additional testing by the Government outside of those required by the Contract documents. Samples failing to meet contract requirements will automatically void previous approvals of the items tested. The Contractor shall replace such materials or equipment found not to have met contract requirements, unless the Contracting Officer determines it to be in the Government's interest to accept the non-conforming materials or equipment with an appropriate adjustment of the Contract price as determined by the Contracting Officer.

(d) COST OF ADDITIONAL TESTING BY THE GOVERNMENT. When additional tests of samples are performed, only one test of each sample proposed for use will be made at the expense of the Government. Samples which do not meet contract requirements will be rejected. Further testing of additional samples, if required, will be made at the expense of the Contractor.

## H.15 IMPORTED MATERIALS, EQUIPMENT, AND PERSONNEL

### H.15.1 SHIPMENT AND CUSTOMS CLEARANCE

(a) Costs to be borne by Contractor. The Contractor is responsible for paying all charges incurred in obtaining materials that must be imported for the project and in transporting the materials from their place or origin to the construction site. Moving costs shall include, but not necessarily be limited to, packing, handling, cartage, overland freight, ocean freight, transshipment, port, unloading, customs clearance and duties (other than customs duties specified below), unpacking, storage, and all other charges including administrative costs in connection with obtaining and transporting the materials from their source to the project site.

(b) Duty-free clearance. The Contractor shall not be responsible for customs duties for which the Government has been able to obtain a customs waiver. The Contractor shall follow the instructions of the Contracting Officer as to the manner of labeling the shipping containers or otherwise processing shipments of imported materials in order to obtain, or continue to receive, duty free clearance through customs. The Contractor shall be responsible for the payment of customs duties, if any, which

(1) are imposed on items which are not labeled and processed in accordance with the Contracting Officer's instructions,

(2) are imposed on the Contractor's tools, construction equipment and machinery imported for use on the project, or

(3) are otherwise ineligible for duty-free entry. The Contractor is responsible for customs duties where the Contractor has failed to give adequate and timely notice to the Contracting Officer of importation on containers or materials which may be eligible for a customs waiver. The Contracting Officer will provide instructions concerning time periods for notification of importation by the Contractor.

(c) Customs Clearance. The Government will be responsible for obtaining customs clearances, and for obtaining exemption certificates or paying customs duties not waived, for imported products, materials and equipment which are labeled and processed in accordance with the Contracting Officer's instructions. The Government shall not be responsible for obtaining customs clearance for the Contractor's tools, construction equipment or machinery, nor for obtaining visas, entry or work permits for the Contractor's personnel.

### H.15.2 SURPLUS MATERIALS

Unless otherwise specified, any surplus materials, fixtures, articles or equipment remaining at the completion of the project shall become the property of the Contractor, except those items furnished by the Government, whose cost is not included in the contract price.

## H.16 SPECIAL WARRANTIES

### H.16.1 SPECIAL WARRANTY OBLIGATIONS

Any special warranties that may be required under the contract shall be subject to the stipulations set forth in 52.246-21, "Warranty of Construction", as long as they do not conflict with the special warranty.

### H.16.2 WARRANTY INFORMATION

The Contractor shall obtain and furnish to the Government all information required in order to make any subcontractor's, manufacturer's, or supplier's guarantee or warranty legally binding and effective. The Contractor shall submit both the information and the guarantee or warranty to the Government in sufficient time to permit the Government to meet any time limit specified in the guarantee or warranty, but not later than completion and acceptance of all work under this contract.

## H.17 EQUITABLE ADJUSTMENTS

### H.17.1 BASIS FOR EQUITABLE ADJUSTMENTS

Any circumstance for which the contract provides an equitable adjustment that causes a change within the meaning of paragraph (a) of the "Changes" clause shall be treated as a change under that clause. The Contractor shall give the Contracting Officer written notice (within 20 days) stating:

(a) the date, circumstances, and applicable contract clause authorizing an equitable adjustment and

(b) that the Contractor regards the event as a changed condition for which an equitable adjustment is allowed under the contract.

### H.17.2 DIFFERING SITE CONDITION NOTICE

The Contractor shall provide written notice of a differing site condition within 10 days of occurrence following FAR 52.236-2, Differing Site Conditions.

### H.17.3 DOCUMENTATION OF PROPOSALS FOR EQUITABLE ADJUSTMENTS

(a) **ITEMIZATION OF PROPOSALS AND REQUESTS.** The Contractor shall submit any request for equitable adjustment in the contract price, including any change proposal submitted in accordance with the "Changes" clause, in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract price in the detail required by the Contracting Officer. The request shall

include all costs and delays related to or arising out of the change or event giving rise to the proposed adjustment, including any delay damages and additional overhead costs.

(b) PROPOSED TIME ADJUSTMENTS. The Contractor shall submit a proposed time extension (if applicable) with any request for an equitable adjustment or change proposal. The request shall include sufficient information to demonstrate whether and to what extent the change will delay the completion of the contract.

(c) RELEASE BY CONTRACTOR. The price and time adjustment made in any contract modification issued as a result of a change proposal or request for an equitable adjustment shall be considered to account for all items affected by the change or other circumstances giving rise to an equitable adjustment. Upon issuance of such contract modification, the Government shall be released from any and all liability under this contract for further equitable adjustments attributable to the facts and circumstances giving rise to the change proposal or request for equitable adjustment.

#### H.18 NONCOMPLIANCE WITH CONTRACT REQUIREMENTS

If the Contractor, after receiving written notice from the Contracting Officer of noncompliance with any requirement of this contract, fails to initiate promptly appropriate action(s) to bring performance/work into compliance with a contract requirement within a reasonable period of time, the Contracting Officer shall have the right to order the Contractor to suspend any or all work under the contract. This order shall be in force until the Contractor has complied or has initiated such action as may be appropriate to comply within a reasonable period of time. The Contractor will not be entitled to any extension of contract time or payment for any costs incurred as a result of being ordered to suspend work for such a cause.

#### H.19 ZONING APPROVALS AND BUILDING PERMITS

The Government is responsible for:

- obtaining proper zoning or other land use control approval for the project,
- obtaining the approval of the Contract Drawings and Specifications,
- paying fees due, and
- obtaining and paying for the initial building permits.

## SECTION I - CONTRACT CLAUSES

### I.1 FAR 52.252-2 CLAUSES INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates one or more clauses by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. Also, the full text of a clause may be accessed electronically at: <http://acquisition.gov/far/index.html> or <http://farsite.hill.af.mil/vffara.htm>. These addresses are subject to change.

If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use the Department of State Acquisition website at <http://www.statebuy.state.gov/> to see the links to the FAR. You may also use Internet "search engines" (for example, Google, Yahoo or Excite) to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation clauses are incorporated by reference (48 CFR CH. 1):

| <u>CLAUSE</u> | <u>TITLE AND DATE</u>   |
|---------------|---|
| 52.202-1      | DEFINITIONS (NOV 2013)  |
| 52.203-3      | GRATUITIES (APR 1984)   |
| 52.203-5      | COVENANT AGAINST CONTINGENT FEES (MAY 2014)   |
| 52.203-6      | RESTRICTIONS ON SUBCONTRACTOR SALES TO THE GOVERNMENT (SEPT 2006)   |
| 52.203-7      | ANTI-KICKBACK PROCEDURES (MAY 2014)   |
| 52.203-8      | CANCELLATION, RECISSION AND RECOVERY OF FUNDS FOR ILLEGAL OR IMPROPER ACTIVITY (MAY 2014)                       |
| 52.203-10     | PRICE OR FEE ADJUSTMENT FOR ILLEGAL OR IMPROPER ACTIVITY (MAY 2014)   |
| 52.203-12     | LIMITATION ON PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (OCT 2010)                                     |
| 52.203-13     | CONTRACTOR CODE OF BUSINESS ETHICS (OCT 2015)   |
| 52.203-17     | CONTRACTOR EMPLOYEE WHISTLEBLOWER RIGHTS AND REQUIREMENT TO INFORM EMPLOYEES OF WHISTLEBLOWER RIGHTS (APR 2014) |

- 52.204-4 PRINTED OR COPIED DOUBLE-SIDED ON POST CONSUMER FIBER CONTENT (MAY 2011)
- 52.204-7 SYSTEM FOR AWARD MANAGEMENT (JULY 2013)
- 52.204-9 PERSONAL IDENTITY VERIFICATION OF CONTRACTOR PERSONNEL (JAN 2011)
- 52.204-10 REPORTING EXECUTIVE COMPENSATION AND FIRST-TIER SUBCONTRACT AWARDS (OCT 2015)
- 52.209-6 PROTECTING THE GOVERNMENT'S INTEREST WHEN SUBCONTRACTING WITH CONTRACTORS DEBARRED, SUSPENDED OR PROPOSED FOR DEBARMENT (OCT 2015)
- 52.209-9 UPDATES OF PUBLICLY AVAILABLE INFORMATION REGARDING RESPONSIBILITY MATTERS (JULY 2013) *Alternate I*
- 52.215-2 AUDIT AND RECORDS – NEGOTIATION (OCT 2010)
- 52.215-8 ORDER OF PRECEDENCE – UNIFORM CONTRACT FORMAT (OCT 1997)
- 52.215-21 REQUIREMENTS FOR CERTIFIED COST OR PRICING DATA AND DATA OTHER THAN CERTIFIED COST OR PRICING DATA – MODIFICATIONS (OCT 2010)
- 52.216-7 ALLOWABLE COST AND PAYMENT (JUN 2013) *Alternate I (FEB 1997)*
- 52.222-1 NOTICE TO THE GOVERNMENT OF LABOR DISPUTES (FEB 1997)
- 52.222-19 CHILD LABOR – COOPERATION WITH AUTHORITIES AND REMEDIES (FEB 2016)
- 52.222-50 COMBATING TRAFFICKING IN PERSONS (MAR 2015)
- 52.223-18 ENCOURAGING CONTRACTOR POLICIES TO BAN TEXT MESSAGING WHILE DRIVING (AUG 2011)
- 52.225-5 TRADE AGREEMENTS (FEB 2016)
- 52.225-13 RESTRICTIONS ON CERTAIN FOREIGN PURCHASES (JUN 2008)
- 52.225-14 INCONSISTENCY BETWEEN ENGLISH VERSION AND TRANSLATION OF CONTRACT (FEB 2000)

- 52.228-2 ADDITIONAL BOND SECURITY (OCT 1997)
- 52.228-4 WORKERS' COMPENSATION AND WAR-HAZARD INSURANCE OVERSEAS (APR 1984)
- 52.228-5 INSURANCE – WORK ON A GOVERNMENT INSTALLATION (JAN 1997)
- 52.228-11 PLEDGES OF ASSETS (JAN 2012)
- 52.228-13 ALTERNATIVE PAYMENT PROTECTION (JULY 2000)
- 52.228-14 IRREVOCABLE LETTER OF CREDIT (NOV 2014)
- 52.229-6 TAXES – FOREIGN FIXED-PRICE CONTRACTS (FEB 2013)
- 52.232-5 PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS (MAY 2014)
- 52.232-17 INTEREST (MAY 2014)
- 52.232-18 AVAILABILITY OF FUNDS (APR 1984)
- 52.232-24 PROHIBITION OF ASSIGNMENT OF CLAIMS (MAY 2014)
- 52.232-27 PROMPT PAYMENT FOR CONSTRUCTION CONTRACTS (MAY 2014)
- 52.232-32 PERFORMANCE-BASED PAYMENTS (APR 2012)
- 52.232-33 PAYMENT BY ELECTRONIC FUNDS TRANSFER – SYSTEM FOR AWARD MANAGEMENT ( JULY 2013)
- 52.232-40 PROVIDING ACCELERATED PAYMENTS TO SMALL BUSINESS SUBCONTRACTORS (DEC 2013)
- 52.233-1 DISPUTES (MAY 2014) *Alternate I (DEC 1991)*
- 52.233-3 PROTEST AFTER AWARD (AUG 1996)
- 52.233-4 APPLICABLE LAW FOR BREACH OF CONTRACT CLAIM (OCT 2004)
- 52.236-2 DIFFERING SITE CONDITIONS (APR 1984)
- 52.236-3 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK (APR 1984)

- 52.236-5 MATERIAL AND WORKMANSHIP (APR 1984)
- 52.236-6 SUPERINTENDENCE BY THE CONTRACTOR (APR 1984)
- 52.236-7 PERMITS AND RESPONSIBILITIES (NOV 1991)
- 52.236-8 OTHER CONTRACTS (APR 1984)
- 52.236-9 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS (APR 1984)
- 52.236-10 OPERATIONS AND STORAGE AREAS (APR 1984)
- 52.236-11 USE AND POSSESSION PRIOR TO COMPLETION (APR 1984)
- 52.236-12 CLEANING UP (APR 1984)
- 52.236-14 AVAILABILITY AND USE OF UTILITY SERVICES (APR 1984)
- 52.236-15 SCHEDULES FOR CONSTRUCTION CONTRACTS (APR 1984)
- 52.236-21 SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FEB 1997)
- 52.236-26 PRECONSTRUCTION CONFERENCE (FEB 1995)
- 52.242-3 PENALTIES FOR UNALLOWABLE COSTS (MAY 2014)
- 52.242-13 BANKRUPTCY (JULY 1995)
- 52.243-4 CHANGES (JUN 2007)
- 52.244-6 SUBCONTRACTOR AND COMMERCIAL ITEMS (FEB 2016)
- 52.245-1 GOVERNMENT PROPERTY (APR 2012)
- 52.243-5 CHANGES AND CHANGED CONDITIONS (APR 1984)
- 52.245-9 USE & CHARGES (APR 2012)
- 52.246-21 WARRANTY OF CONSTRUCTION (MAR 1994)
- 52.247-63 PREFERENCE FOR U.S-FLAG CARRIERS (JUN 2003)
- 52.247-64 PREFERENCE FOR PRIVATELY-OWNED U.S-FLAG COMMERCIAL VESSELS (FEB 2006)

- 52.248-3 VALUE ENGINEERING – CONSTRUCTION (OCT 2010)
- 52.249-2 TERMINATION FOR CONVENIENCE OF THE GOVERNMENT (FIXED-PRICE) (APR 2012) *Alternate I (SEPT 1996)*
- 52.249-14 EXCUSABLE DELAYS (APR 1984)
- 52.249-10 DEFAULT (FIXED-PRICE CONSTRUCTION) (APR 1984)

The following Department of State Acquisition Regulations (DOSAR) are set forth in full text:

I.1 652.204-70 DEPARTMENT OF STATE PERSONAL IDENTIFICATION CARD ISSUANCE PROCEDURES (MAY 2011)

(a) The Contractor shall comply with the Department of State (DOS) Personal Identification Card Issuance Procedures for all employees performing under this contract who require frequent and continuing access to DOS facilities, or information systems. The Contractor shall insert this clause in all subcontracts when the subcontractor's employees will require frequent and continuing access to DOS facilities, or information systems.

(b) The DOS Personal Identification Card Issuance Procedures may be accessed at <http://www.state.gov/m/ds/rls/rpt/c21664.htm>.  
(End of clause)

I.2 652.243-70 NOTICES (AUG 1999)

Any notice or request relating to this contract given by either party to the other shall be in writing. Said notice or request shall be mailed or delivered by hand to the other party at the address provided in the schedule of the contract. The Contracting Officer must make all modifications to the contract in writing.

I.3 652.242-73 AUTHORIZATION AND PERFORMANCE (AUG 1999)

(a) The Contractor warrants the following:

- (1) That it has obtained authorization to operate and do business in the country or countries in which this contract will be performed;
- (2) That it has obtained all necessary licenses and permits required to perform this contract; and,
- (3) That it shall comply fully with all laws, decrees, labor standards, and regulations of said country or countries during the performance of this contract.

(b) If the party actually performing the work will be a subcontractor or joint venture partner, then such subcontractor or joint venture partner agrees to the requirements of paragraph (a) of this clause.

I.4 RESERVED

I.5 THE FOLLOWING CLAUSE IS APPLICABLE, IF CHECKED:

652.229-70 EXCISE TAX EXEMPTION STATEMENT FOR CONTRACTORS  
WITHIN THE UNITED STATES (JULY 1988)

This is to certify that the item(s) covered by this contract is/are for export solely for the use of the U.S. Foreign Service Post identified in the contract schedule.

The Contractor shall use a photocopy of this contract as evidence of intent to export. Final proof of exportation may be obtained from the agent handling the shipment. Such proof shall be accepted in lieu of payment of excise tax.

I.6. 52.228-15 PERFORMANCE AND PAYMENT BONDS—CONSTRUCTION (OCT 2010)

(a) *Definitions.* As used in this clause—

“Original contract price” means the award price of the contract; or, for requirements contracts, the price payable for the estimated total quantity; or, for indefinite-quantity contracts, the price payable for the specified minimum quantity. Original contract price does not include the price of any options, except those options exercised at the time of contract award.

(b) *Amount of required bonds.* Unless the resulting contract price is \$150,000 or less, the successful offeror shall furnish performance and payment bonds to the Contracting Officer as follows:

(1) *Performance bonds (Standard Form 25).* The penal amount of performance bonds at the time of contract award shall be 100 percent of the original contract price.

(2) *Payment Bonds (Standard Form 25-A).* The penal amount of payment bonds at the time of contract award shall be 100 percent of the original contract price.

(3) *Additional bond protection.*

(i) The Government may require additional performance and payment bond protection if the contract price is increased. The increase in protection generally will equal 100 percent of the increase in contract price.

(ii) The Government may secure the additional protection by directing the Contractor to increase the penal amount of the existing bond or to obtain an additional bond.

(c) *Furnishing executed bonds.* The Contractor shall furnish all executed bonds, including any necessary reinsurance agreements, to the Contracting Officer, within the time period specified in the Bid Guarantee provision of the solicitation, or otherwise specified by the Contracting Officer, but in any event, before starting work.

(d) *Surety or other security for bonds.* The bonds shall be in the form of firm commitment, supported by corporate sureties whose names appear on the list contained in Treasury Department Circular 570, individual sureties, or by other acceptable security such as postal money order, certified check, cashier's check, irrevocable letter of credit, or bonds or notes of the United States. Treasury Circular 570 is published in the Federal Register or Department of Treasury, Financial Management Service, Surety Bond Branch, 3700 East West Highway, Room 6F01, Hyattsville, MD 20782, or via the internet at <http://www.fms.treas.gov/c570/c570.html>.

(e) *Notice of subcontractor waiver of protection (40 U.S.C. 3133(c)).* Any waiver of the right to sue on the payment bond is void unless it is in writing, signed by the person whose right is waived, and executed after such person has first furnished labor or material for use in the performance of the contract.”

I.7 652.225-71 SECTION 8(A) OF THE EXPORT ADMINISTRATION ACTS OF 1979, as amended (AUG 1999)

(a) Section 8(a) of the U.S. Export Administration Act of 1979, as amended (50 U.S.C. 2407(a)), prohibits compliance by U.S. persons with any boycott fostered by a foreign country against a country which is friendly to the United States and which is not itself the object of any form of boycott pursuant to United States law or regulation. The Boycott of Israel by Arab League countries is such a boycott, and therefore, the following actions, if taken with intent to comply with, further, or support the Arab League Boycott of Israel, are prohibited activities under the Export Administration Act:

(1) Refusing, or requiring any U.S. person to refuse to do business with or in Israel, with any Israeli business concern, or with any national or resident of Israel, or with any other person, pursuant to an agreement of, or a request from or on behalf of a boycotting country;

(2) Refusing, or requiring any U.S. person to refuse to employ or otherwise discriminating against any person on the basis of race, religion, sex, or national origin of that person or of any owner, officer, director, or employee of such person;

(3) Furnishing information with respect to the race, religion, or national origin of any U.S. person or of any owner, officer, director, or employee of such U.S. person;

(4) Furnishing information about whether any person has, has had, or proposes to have any business relationship (including a relationship by way of sale, purchase, legal or commercial representation, shipping or other transport, insurance, investment, or supply) with or in the State of Israel, with any business concern organized under the laws of the State of Israel, with any Israeli national or resident, or with any person which is known or believed to be restricted from having any business relationship with or in Israel;

(5) Furnishing information about whether any person is a member of, has made contributions to, or is otherwise associated with or involved in the activities of any charitable or fraternal organization which supports the State of Israel; and,

(6) Paying, honoring, confirming, or otherwise implementing a letter of credit which contains any condition or requirement against doing business with the State of

Israel.

(b) Under Section 8(a), the following types of activities are not forbidden "compliance with the boycott," and are therefore exempted from Section 8(a)'s prohibitions listed in paragraphs (a)(1)-(6) above:

- (1) Complying or agreeing to comply with requirements:
  - (i) Prohibiting the import of goods or services from Israel or goods produced or services provided by any business concern organized under the laws of Israel or by nationals or residents of Israel; or,
  - (ii) Prohibiting the shipment of goods to Israel on a carrier of +
- (2) Complying or agreeing to comply with import and shipping document requirements with respect to the country of origin, the name of the carrier and route of shipment, the name of the supplier of the shipment or the name of the provider of other services, except that no information knowingly furnished or conveyed in response to such requirements may be stated in negative, blacklisting, or similar exclusionary terms, other than with respect to carriers or route of shipments as may be permitted by such regulations in order to comply with precautionary requirements protecting against war risks and confiscation;
- (3) Complying or agreeing to comply in the normal course of business with the unilateral and specific selection by a boycotting country, or national or resident thereof, of carriers, insurance, suppliers of services to be performed within the boycotting country or specific goods which, in the normal course of business, are identifiable by source when imported into the boycotting country;
- (4) Complying or agreeing to comply with the export requirements of the boycotting country relating to shipments or transshipments of exports to Israel, to any business concern of or organized under the laws of Israel, or to any national or resident of Israel;
- (5) Compliance by an individual or agreement by an individual to comply with the immigration or passport requirements of any country with respect to such individual or any member of such individual's family or with requests for information regarding requirements of employment of such individual within the boycotting country; and,
- (6) Compliance by a U.S. person resident in a foreign country or agreement by such person to comply with the laws of that country with respect to his or her activities exclusively therein, and such regulations may contain exceptions for such resident complying with the laws or regulations of that foreign country governing imports into such country of trademarked, trade named, or similarly specifically identifiable products, or components of products for his or her own use, including the performance of contractual services within that country, as may be defined by such regulations.

I.8 652.229-71 PERSONAL PROPERTY DISPOSITION AT POSTS ABROAD (AUG 1999)

Regulations at 22 CFR Part 136 require that U.S. Government employees and their families do not profit personally from sales or other transactions with persons who are not themselves entitled to exemption from import restrictions, duties, or taxes. Should the Contractor experience importation or tax privileges in a foreign country because of its contractual relationship to the United States Government, the Contractor shall observe the requirements of 22 CFR Part 136 and all policies, rules, and procedures issued by the chief of mission in that foreign country.

I.9 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 e-mail.

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

- 1) Use an e-mail 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.

SECTION J - LIST OF ATTACHMENTS

| <b>ATTACHMENT NO.</b> | <b>DESCRIPTION OF ATTACHMENT</b>                          | <b>NO. PAGES</b> |
|-----------------------|---|------------------|
| Attachment A          | Breakdown of Proposal price by divisions of specification | 01               |
| Attachment B          | SP-1442 form  | 02               |
| Attachment 1          | Demo Plan   | 01               |
| Attachment 2          | Office Layout   | 03               |
| Attachment 2a         | Electrical  | 01               |
| Attachment 3a         | Package Cooling Unit                                      | 44               |
| Attachment 3b         | Voice and Data Outlets                                    | 01               |
| Attachment 3c         | Voice and Data Labeling                                   | 01               |
| Attachment 3d         | Lockable Cabinet  | 04               |
| Attachment 3e         | CAT 6   | 05               |
| Attachment 3f         | Simplex Mech Lock   | 02               |
| Attachment 3g         | Open Net Routing  | 05               |
| Attachment 3h         | Open Net Fiber  | 01               |
| Attachment 4          | SOW for Window Replacement                                | 01               |
| Attachment 5          | OBO/OM/SHEM Checklist for Mold Prevention                 | 05               |

**ATTACHMENT A**

**UNITED STATES DEPARTMENT OF STATE  
BREAKDOWN OF PRICE BY DIVISIONS OF SPECIFICATIONS**

| (1)<br>DIVISION/DESC<br>RIPTION          | (2)<br>LABOR | (3)<br>MATERI<br>ALS | (4)<br>OVERHE<br>AD | (5)<br>PROFIT | (6)<br>TOTAL |
|--|--------------|----------------------|---------------------|---------------|--------------|
| 1. General Requirements/<br>Mobilization |              |                      |                     |               |              |
| 2. Site Work                             |              |                      |                     |               |              |
| 3. Concrete                              |              |                      |                     |               |              |
| 4. Masonry                               |              |                      |                     |               |              |
| 5. Metals                                |              |                      |                     |               |              |
| 6. Wood and Plastic                      |              |                      |                     |               |              |
| 7. Thermal and Moisture                  |              |                      |                     |               |              |
| 8. Doors and Windows                     |              |                      |                     |               |              |
| 9. Finishes                              |              |                      |                     |               |              |
| 10. Specialties                          |              |                      |                     |               |              |
| 11. Equipment                            |              |                      |                     |               |              |
| 12. Furnishings                          |              |                      |                     |               |              |
| 13. Special Construction                 |              |                      |                     |               |              |
| 14. Conveying Systems                    |              |                      |                     |               |              |
| 15. Mechanical                           |              |                      |                     |               |              |
| 16. Electrical                           |              |                      |                     |               |              |
| <b>TOTAL</b>                             |              |                      |                     |               |              |

*[Note to Contracting Officer: Contracting Officer must identify currency]*

Allowance Items:

**PROPOSAL PRICE TOTAL:** *[Note to Contracting Officer: Contracting Officer must identify currency]*

\_\_\_\_\_  
Alternates (list separately do not total)

\_\_\_\_\_  
*Offeror:*

\_\_\_\_\_  
*Date*

|   |                        |   |                |               |
|---|------------------------|---|----------------|---------------|
| <b>SOLICITATION, OFFER,<br/>AND AWARD</b><br><b>(Construction, Alteration, or Repair)</b> | 1. SOLICITATION NUMBER | 2. TYPE OF SOLICITATION   | 3. DATE ISSUED | PAGE OF PAGES |
|   | SSA20016Q0011          | <input type="checkbox"/> SEALED BID (IFB)<br><input checked="" type="checkbox"/> NEGOTIATED (RFP) | 10/02/2016     | 01 02         |

**IMPORTANT** - The "offer" section on the reverse must be fully completed by offeror.

|                    |  |                   |
|--------------------|--|-------------------|
| 4. CONTRACT NUMBER | 5. REQUISITION/PURCHASE REQUEST NUMBER | 6. PROJECT NUMBER |
|                    | PR # 5700468                           |                   |

|   |      |   |
|---|------|---|
| 7. ISSUED BY  | CODE | 8. ADDRESS OFFER TO   |
| GSO - Procurement<br>American Consulate General<br>Dhahran, Saudi Arabia<br>Tel: +966-13-330-3200<br>Fax: +966-13-3303296 |      | GSO - Procurement<br>American Consulate General<br>Dhahran, Saudi Arabia<br>Tel: +966-13-330-3200<br>Fax: +966-13-3303296 |

|                          |                |  |
|--------------------------|----------------|--|
| 9. FOR INFORMATION CALL: | a. NAME        | b. TELEPHONE NUMBER (Include area code) (NO COLLECT CALLS) |
|                          | Barry R Blades | 013-3303200 Ext 3020                                       |

**SOLICITATION**

**NOTE:** In sealed bid solicitations "offer" and "offeror" mean "bid" and "bidder".

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS (Title, identifying number, date)

Reference to Section-C

11. The contractor shall begin performance within 07 calendar days and complete it within 56 calendar days after receiving  award,  notice to proceed. This performance period is  mandatory  negotiable. (See Section C ).

|  |                    |
|--|--------------------|
| 12a. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS?<br><i>(If "YES", indicate within how many calendar days after award in Item 12b.)</i> | 12b. CALENDAR DAYS |
| <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO  | 05                 |

13. ADDITIONAL SOLICITATION REQUIREMENTS:

a. Sealed offers in original and 01 copies to perform the work required are due at the place specified in Item 8 by 17:00 (hour) local time 11/01/2016 (date). If this is a sealed bid solicitation, offers will be publicly opened at that time. Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

b. An offer guarantee  is,  is not required.

c. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.  
Reference section C

d. Offers providing less than 15 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

**OFFER (Must be fully completed by offeror)**

|  |  |
|--|--|
| 14. NAME AND ADDRESS OF OFFEROR (Include ZIP Code) | 15. TELEPHONE NUMBER (Include area code)                         |
| CODE   | 16. REMITTANCE ADDRESS (Include only if different than Item 14.) |
| FACILITY CODE                                      |  |

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within \_\_\_\_\_ calendar days after the date offers are due. (Insert any number equal to or greater than the minimum requirement stated in Item 13d. Failure to insert any number means the offeror accepts the minimum in Item 13d.)

AMOUNTS

18. The offeror agrees to furnish any required performance and payment bonds.

**19. ACKNOWLEDGMENT OF AMENDMENTS**

*(The offeror acknowledges receipt of amendments to the solicitation – give number and date of each)*

| AMENDMENT NUMBER |  |  |  |  |  |  |  |  |  |
|------------------|--|--|--|--|--|--|--|--|--|
| DATE             |  |  |  |  |  |  |  |  |  |

|  |                |                 |
|--|----------------|-----------------|
| 20a. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN OFFER (Type or print) | 20b. SIGNATURE | 20c. OFFER DATE |
|--|----------------|-----------------|

**AWARD (To be completed by Government)**

21. ITEMS ACCEPTED:

|            |                                       |
|------------|---------------------------------------|
| 22. AMOUNT | 23. ACCOUNTING AND APPROPRIATION DATA |
|------------|---------------------------------------|

|   |   |
|---|---|
| 24. SUBMIT INVOICES TO ADDRESS SHOWN IN (4 copies unless otherwise specified) | 25. OTHER THAN FULL AND OPEN COMPETITION PURSUANT TO<br><input type="checkbox"/> 10 U.S.C. 2304(c) (      ) <input type="checkbox"/> 41 U.S.C. 3304(a) (      ) |
| 26. ADMINISTERED BY   | 27. PAYMENT WILL BE MADE BY   |

**CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE**

|   |   |
|---|---|
| <input type="checkbox"/> 28. NEGOTIATED AGREEMENT (Contractor is required to sign this document and return _____ copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract. | <input type="checkbox"/> 29. AWARD (Contractor is not required to sign this document.) Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consists of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary. |
|---|---|

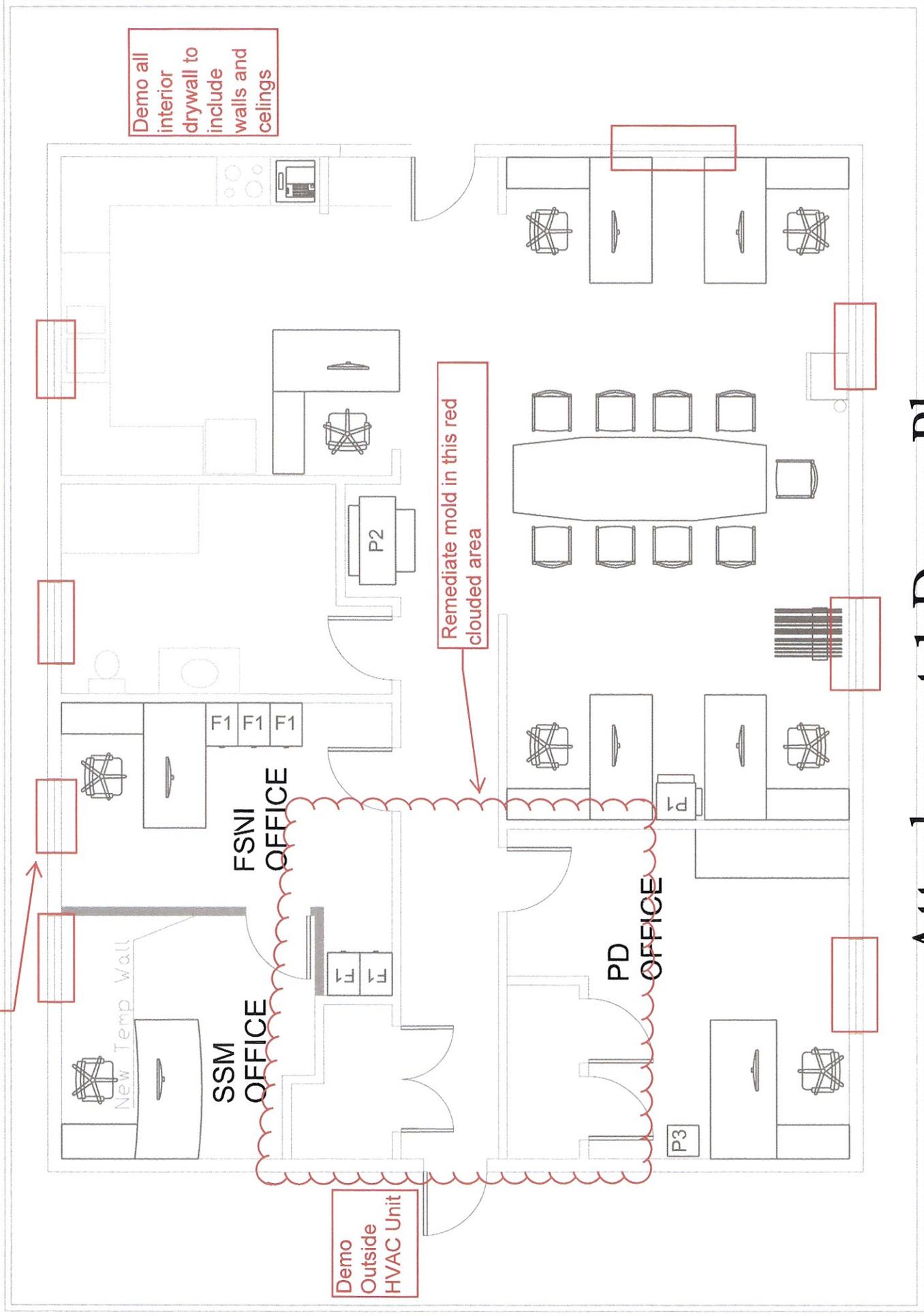
|  |  |                               |           |
|--|--|-------------------------------|-----------|
| 30a. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (Type or print) | 31a. NAME OF CONTRACTING OFFICER (Type or print) |                               |           |
|  | Barry R Blades                                   |                               |           |
| 30b. SIGNATURE   | 30c. DATE  | 31b. UNITED STATES OF AMERICA | 31c. DATE |
|  |  | BY                            |           |

Demo all 8 Windows

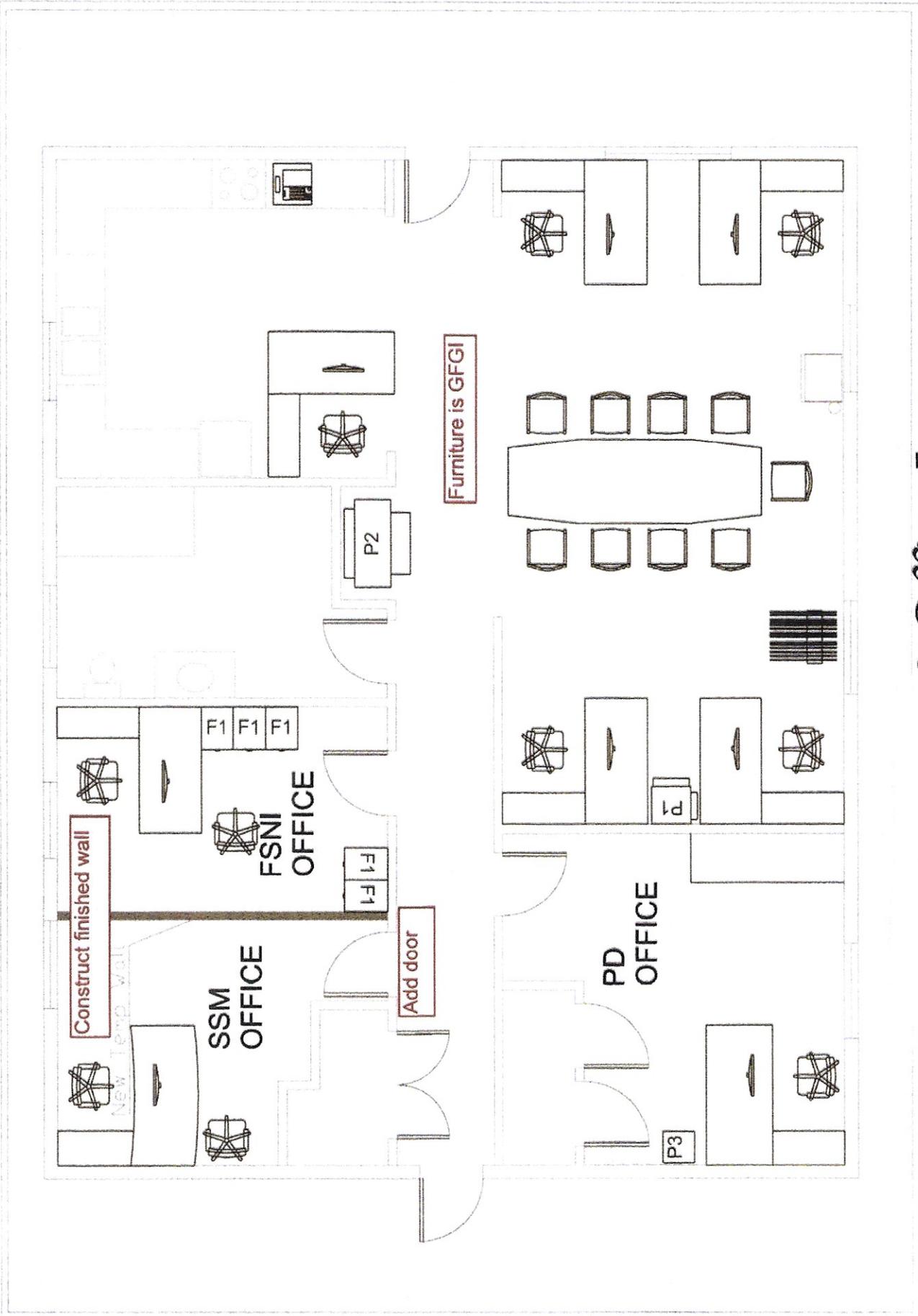
Demo all interior drywall to include walls and ceilings

Remediate mold in this red clouded area

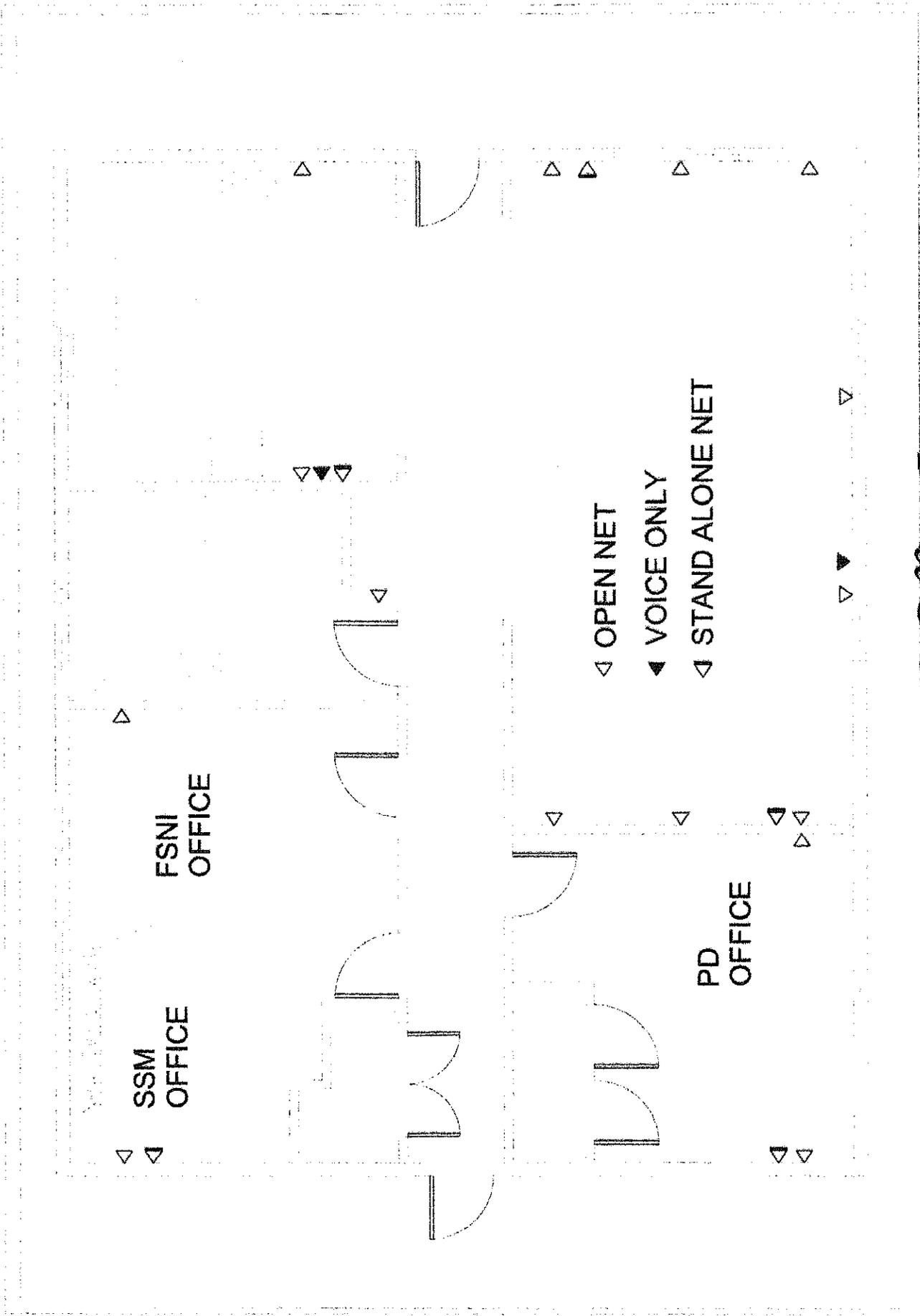
Demo Outside HVAC Unit



# Attachment 1 Demo Plan



Attachment 2 Office Layout



Attachment 2 Office Layout



**DRAWING RACK**  
(1 available)



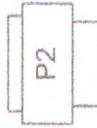
**FILING CABINET**  
(10 available)



**FAX**  
(ITEM: 099267)



**B&W PRINTER**  
(ITEM: 099260)



**PLOTTER**  
(ITEM: 103036)



**B&W PRINTER**  
(4 available)



**PAPER SHREDDER**  
(Two available)



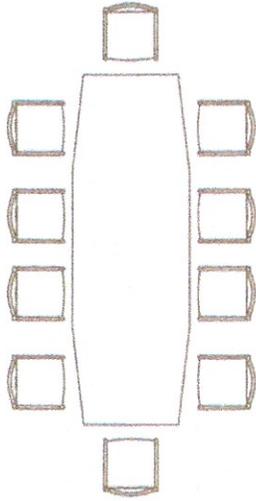
**OPEN NET**



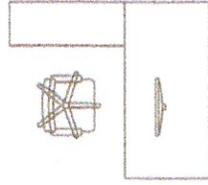
**VOICE ONLY**



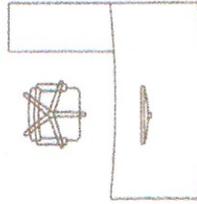
**STAND ALONE NET**



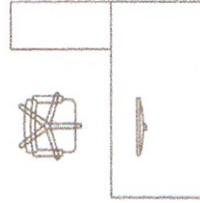
**CONFERENCE ROOM TABLE &  
CHAIRS**  
(1 Table available and 10 Chairs  
available)



**OFFICE DESK - TYPE 1**  
(8 available)

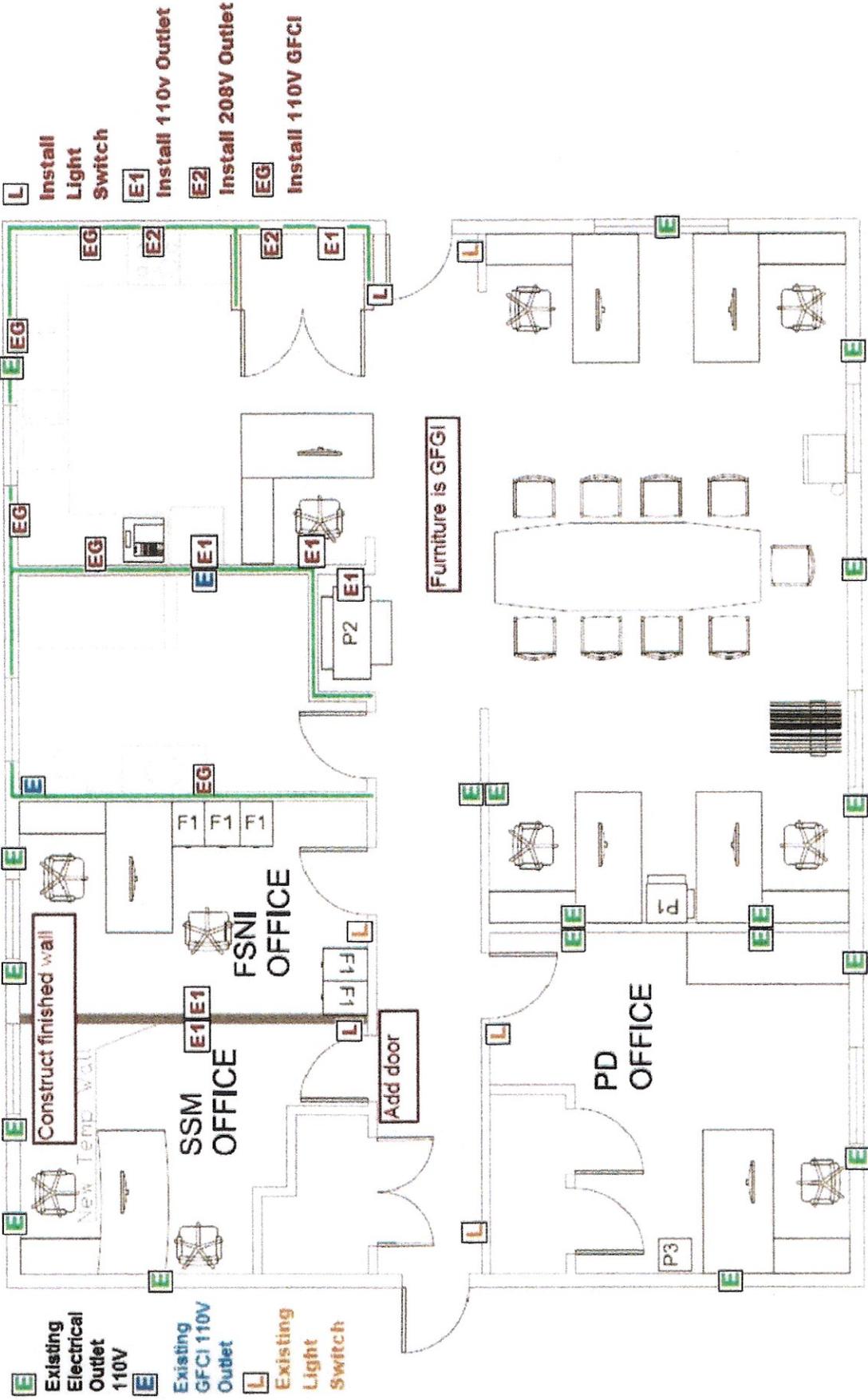


**OFFICE DESK - TYPE 2**  
(1 available)



**OFFICE DESK - TYPE 3**  
(1 available)

# Attachment 2 Office Layout

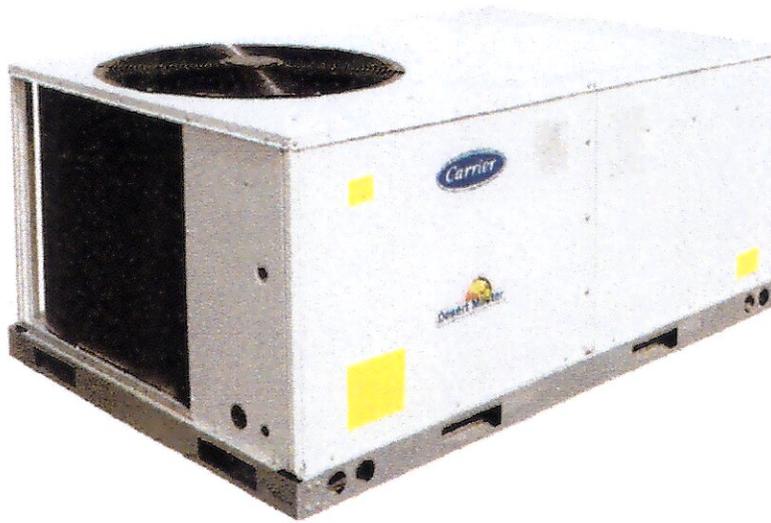


# Attachment 2a Electrical



United Technologies  
turn to the experts

## Package Rooftop Units – 60Hz



Quality Assurance  
Certificate Reg. No:  
04 100 950420



**ASHRAE**  
**90.1**  
**COMPLIANT**

Subject to change without notice  
Manufacturing point: Jeddah, Saudi Arabia  
Nearest port of embarkation: Jeddah Islamic port  
Product classification: Commercial

Product Data Catalog

### **50TCM – 60Hz** **Unit Size 6.5 – 14.0 Tons** **HFC R-410A Refrigerant**

The 50TCM units are single side discharge rooftop cooling unit utilizing electric heat as an option. Units are pre-wired, pre-charged with R-410A refrigerant, and tested at the factory. These units can be placed on the side of a building or can be placed on a roof without roof curbs. Each unit is designed to occupy a minimal space. Piping and drain connections are readily accessible.

Contact your local Carrier representative for additional reference materials.

# Attachment 3a Packaged Cooling Unit

## Table of Contents

|   |    |
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| Features / Benefits.....                          | 2  |
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## Features / Benefits

Every compact one-piece unit arrives fully assembled, charged, tested, and ready to run.

### Durable-Dependable Construction

Designed for durability in any climate, the weather-resistant cabinets are constructed of galvanized steel, bonderized, and all exterior panels are coated with a pre-painted baked enamel finish. The paint finish is non-chalking, and is capable of withstanding ASTM (American Society for Testing and Materials) B117 500-hour Salt Spray Test. All internal cabinet panels are primed, permitting longer life and a more attractive appearance for the entire unit. Totally enclosed condenser-fan motor and permanently lubricated bearings provide additional unit dependability.

### Indoor-Air Quality

Non corrosive sloped condensate pans minimize biological growth in rooftop units in accordance with ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) Standard 62-99 (IAQ). 2"inch filters provide for greater particle reduction in the return air.

### Simple, Electrical Connections

Terminal boards, located in the unit control box, facilitate connections to room thermostat, outdoor thermostat(s) and electric heater. Service panels can be quickly removed, permitting easy servicing. Both power and control connections are made on the same side of the unit to simplify installation. In addition, color-coded wires permit easy tracing and diagnostics.

### Easy Installation

All units feature base rail design with forklift slots and rigging holes for easier maneuvering. Durable packaging protects all units during shipment and storage. Convenient side by side openings permit installation very close to face of buildings or on roof top. The non-corrosive sloped condensate pan minimizes residual condensate in off cycle. An external, field-supplied P-trap is required. Field-installed electric heaters are available up to 45.9 kW.

## Installation Features

- Single point electrical service entry
- Side discharge application
- No roof curb needed
- Side-by-side supply and return air
- Separate panel for control box

## Performance Features

- HFC R-410A non-ozone depleting refrigerant
- ASHRAE 90.1 Compliant
- EER's up to 12.2
- TXV refrigerant metering device
- Two independent refrigerant circuits, each with a scroll compressor
- Low outdoor temperature cooling operation down to 40° F
- Liquid filter drier standard on each circuit
- Fresh air intake capable
- Non-corrosive sloped condensate drain pan in accordance to ASHRAE 62 standard
- Thermally protected and permanently lubricated condenser and evaporator fan motors
- Angle type return air section with washable type filters

## Environmentally Sound Refrigerant Choice

R410A refrigerant is:

- A chlorine-free refrigerant from the HFC group
- Has zero ozone depletion potential
- Thermally efficient and provides high EER (energy efficiency), COP, and part load efficiencies

## Superior Reliability, Efficiency and Safety

- Exceptional endurance tests
  - Painted panels tested to ASTM B-117 500 hours salt spray protection
  - Pre-coated fin condenser coil for extra corrosion protection
- Compressor Protection:
  - High and low pressure cutouts
  - Phase protection relay
  - Crankcase heaters are standard for all units
  - Internal over temperature protection
  - Freeze protection
- Low vibration design:
  - Leak-tight refrigerant circuit
  - Brazed refrigerant connections for increased leak tightness
  - Low-noise scroll compressors with low vibration levels
- Control circuit protected by circuit breaker
- Thermally protected and permanently lubricated condenser and evaporator fan motors
- Angle type return air section with washable type filters
- Transformer for safe 24V control circuit supply included
- High Efficiency, High Static Blower
- State-of-art scroll compressor technology
- Dual, electrically and mechanically independent refrigerant circuit

## Shipping Information

Unit data with Condenser and Evaporator Al/Cu, Condenser Precoat Al/Cu and Evaporator Al/Cu Coils<sup>1</sup>

| Unit Model Number  | EST. WT. (KG) |                   | DIMENSIONS (MM) |       |       |                          |       |       |
|--------------------|---------------|-------------------|-----------------|-------|-------|--------------------------|-------|-------|
|                    |               |                   | Net             |       |       | With Wooden create above |       |       |
|                    | NET           | GROSS (with Skid) | LENGTH          | WIDTH | DEPTH | LENGTH                   | WIDTH | DEPTH |
| 50TCMA07AXX1-0A0A0 | 275           | 285               | 1051            | 1888  | 1187  | 1089                     | 1943  | 1219  |
| 50TCMD08AXX1-0A0A0 | 345           | 360               | 1048            | 2238  | 1510  | 1207                     | 2292  | 1543  |
| 50TCMD09AXX1-0A0A0 | 388           | 403               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |
| 50TCMD12AXX1-0A0A0 | 393           | 408               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |
| 50TCMD14AXX1-0A0A0 | 489           | 504               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |

Unit data with Condenser Only Cu/Cu Coils<sup>1</sup>

| Unit Model Number  | EST. WT. (KG) |                   | DIMENSIONS (MM) |       |       |                          |       |       |
|--------------------|---------------|-------------------|-----------------|-------|-------|--------------------------|-------|-------|
|                    |               |                   | Net             |       |       | With Wooden create above |       |       |
|                    | NET           | GROSS (with Skid) | LENGTH          | WIDTH | DEPTH | LENGTH                   | WIDTH | DEPTH |
| 50TCMA07AXE1-0A0A0 | 310           | 320               | 1051            | 1888  | 1187  | 1089                     | 1943  | 1219  |
| 50TCMD08AXE1-0A0A0 | 379           | 394               | 1048            | 2238  | 1510  | 1207                     | 2292  | 1543  |
| 50TCMD09AXE1-0A0A0 | 430           | 445               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |
| 50TCMD12AXE1-0A0A0 | 434           | 449               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |
| 50TCMD14AXE1-0A0A0 | 530           | 545               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |

Unit data with Condenser and Evaporator Cu/Cu Coils<sup>1</sup>

| Unit Model Number  | EST. WT. (KG) |                   | DIMENSIONS (MM) |       |       |                          |       |       |
|--------------------|---------------|-------------------|-----------------|-------|-------|--------------------------|-------|-------|
|                    |               |                   | Net             |       |       | With Wooden create above |       |       |
|                    | NET           | GROSS (with Skid) | LENGTH          | WIDTH | DEPTH | LENGTH                   | WIDTH | DEPTH |
| 50TCMA07AXF1-0A0A0 | 331           | 341               | 1051            | 1888  | 1187  | 1089                     | 1943  | 1219  |
| 50TCMD08AXF1-0A0A0 | 398           | 413               | 1048            | 2238  | 1510  | 1207                     | 2292  | 1543  |
| 50TCMD09AXF1-0A0A0 | 461           | 476               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |
| 50TCMD12AXF1-0A0A0 | 465           | 480               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |
| 50TCMD14AXF1-0A0A0 | 561           | 576               | 1253            | 2238  | 1510  | 1412                     | 2292  | 1543  |

### Factory Installed Options and Field Installed Accessories

| Category             | Item Description   | Factory Installed Option | Field Installed Accessory |
|----------------------|--|--------------------------|---------------------------|
| Coil Options         | Cu/Cu indoor and/or outdoor coils <sup>1</sup>                 | X                        |                           |
|                      | Pre-coated outdoor coils <sup>1</sup>                          | X                        |                           |
| Indoor Motor & Drive | Multiple motor and drive packages <sup>1</sup>                 | X                        |                           |
| Sight glass          | Refrigerant sight glass installed on each circuit <sup>1</sup> | X                        |                           |
| Condenser Protection | Condenser coil hail guard (louvered design)                    |                          | X                         |
| Controls             | Thermostats, temperature sensors, and subbases                 |                          | X                         |
|                      | PremierLink DDC communicating controller                       |                          | X                         |
|                      | RTU Open – protocol controller                                 |                          | X                         |
|                      | Time Guard II compressor delay control circuit                 |                          | X                         |
|                      | Smoke detector (supply and return)                             |                          | X                         |
| Electric Heat        | Electric Resistance Heaters                                    |                          | X                         |
|                      | Single Point Kit   |                          | X                         |
| Low Ambient Control  | Winter start kit <sup>2</sup>                                  |                          | X                         |
|                      | Motormaster head pressure control                              |                          | X                         |

**NOTES:**

1. Please refer to product nomenclature for ordering information.
2. See application data for assistance.

## Factory Options and Accessories

### RTU Open, Multi-protocol Controller

Connect the rooftop to an existing BAS without complicated translators or adapter modules using the RTU Open controller. This new controller speaks the 4 most common building automation system languages (BACNET, Modbus, Johnson N2, and LonWorks). Use this controller when you have an existing BAS.

### PremierLink

This CCN controller regulates your rooftop's performance to tighter tolerances and expanded limits, as well as facilitates zoning systems and digital accessories. It also unites your Carrier HVAC equipment together on one, coherent CCN network. The PremierLink can be factory-installed, or easily field-installed.

### Time Guard II Control Circuit

This accessory protects your compressor by preventing short-cycling in the event of some other failure, prevents the compressor from restarting for 30 seconds after stopping. Not required with PremierLink, RTU Open, or authorized commercial thermostats.

### Filter or Fan Status Switches

Use these differential pressure switches to detect a filter clog or indoor fan motor failure. When used in conjunction with a compatible unit controller/thermostat, the switches will activate an alarm to warn the appropriate personnel.

### Winter Start Kit

The winter start kit by Carrier extends the low ambient limit of your rooftop to 25°F (-4°C). The kit by-passes the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

### Alternate Motors and Drives

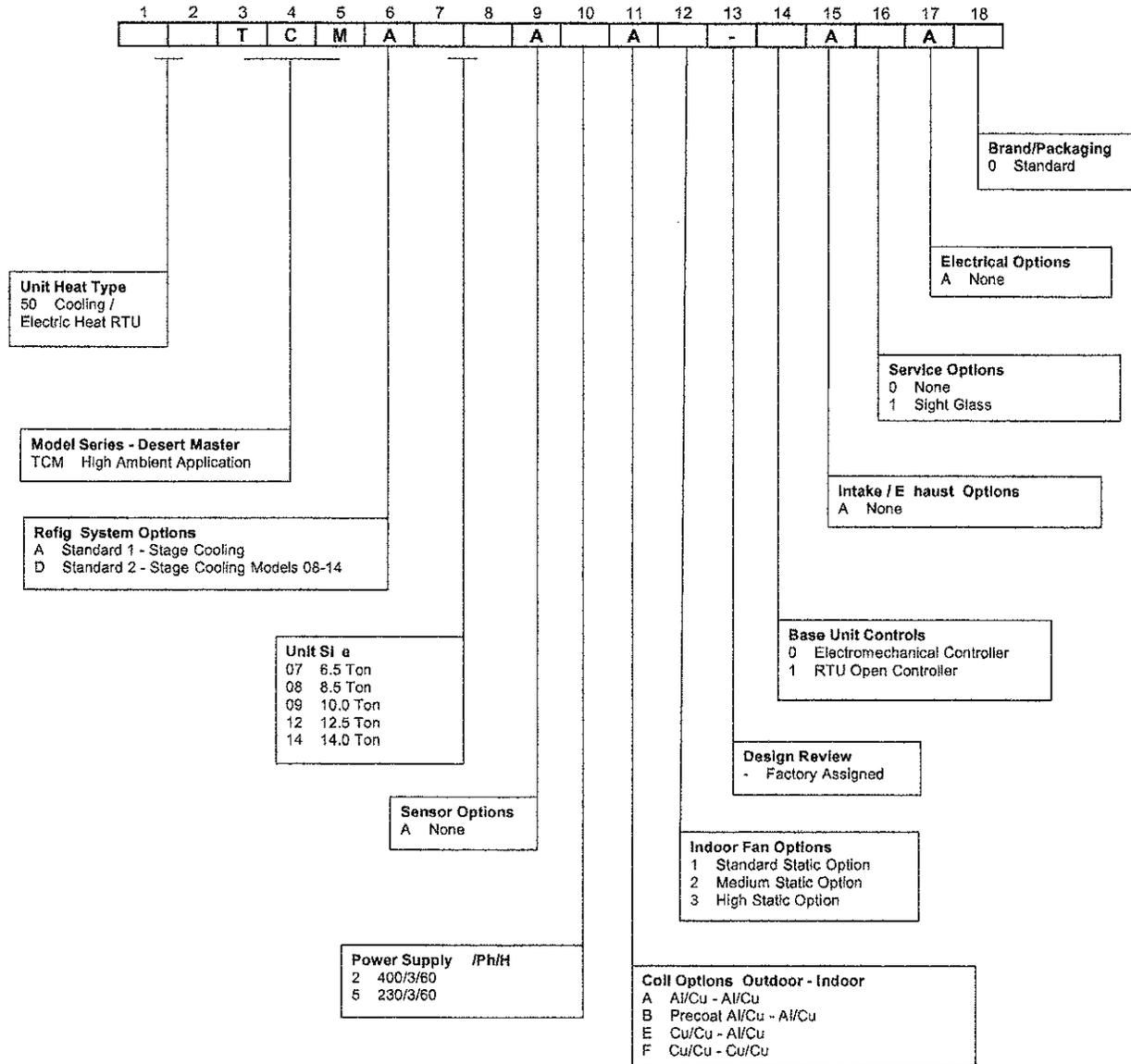
Some applications need larger horsepower motors, some need more airflow, and some need both. Regardless of the case, your Carrier expert has a factory installed combination to meet your application. A wide selection of motors and pulleys (drives) are available, factory installed, to handle nearly any application.

### Electric Heaters

Carrier offers a full-line of field-installed accessory heaters. The heaters are very easy to use, install and are all pre-engineered and certified.



# MODEL NUMBER NOMENCLATURE - TCM - R A SERIES



## AHRI Capacity Rating

| Unit | TCM | Unit Size<br>Ton | Standard Air Flow Rate<br>CFM | Gross Cooling Capacity<br>BTU/hr | EER  | Standard<br>m <sup>3</sup> /hr | Standard<br>L/s |
|------|-----|------------------|-------------------------------|----------------------------------|------|--------------------------------|-----------------|
| A    |     | 6.5              | 2400                          | 75024                            | 11.2 | 4075                           | 1133            |
| D    |     | 8.5              | 3000                          | 96200                            | 12.1 | 5094                           | 1416            |
| D    |     | 10.0             | 3500                          | 112422                           | 12.2 | 5943                           | 1652            |
| D    |     | 12.5             | 4000                          | 131233                           | 11.6 | 6792                           | 1888            |
| D    |     | 14.0             | 4100                          | 161517                           | 11.0 | 6962                           | 1935            |

## Minimum - Maximum Air Flow Rate

| Unit | TCM | Minimum<br>CFM | Maximum<br>CFM | Minimum<br>L/s | Maximum<br>L/s |
|------|-----|----------------|----------------|----------------|----------------|
| A    |     | 1800           | 3000           | 849            | 1416           |
| D    |     | 2250           | 3750           | 1062           | 1770           |
| D    |     | 2550           | 4250           | 1203           | 2006           |
| D    |     | 3000           | 5000           | 1416           | 2360           |
| D    |     | 3700           | 6000           | 1746           | 2831           |

## Minimum Electric Heating Air Flow Rate

| Unit | TCM | Unit Voltage | Heater kW          | Unit Configuration | Minimum | Minimum |
|------|-----|--------------|--------------------|--------------------|---------|---------|
|      |     |              |                    |                    | CFM     | L/s     |
| A    |     | All          | All                | Horizontal         | 1800    | 849     |
| D    |     | All          | All                | Horizontal         | 2250    | 1062    |
| D    |     | All          | All                | Horizontal         | 2250    | 1062    |
| D    |     | All          | All except 42.4 50 | Horizontal         | 3000    | 1416    |
| D    |     | All          | All except 42.4 50 | Horizontal         | 3000    | 1416    |
| D    |     | 230          | 42.4 50            | Horizontal         | 3200    | 1510    |
| D    |     | 230          | 42.4 50            | Horizontal         | 3200    | 1510    |

EER - Energy Efficiency Ratio

CFM - Cubic Feet per Minute

L/s - Liters per Second

BTU - British Thermal Unit

AHRI - Air Conditioning, Heating and Refrigeration Institute.

1. Rated in accordance with AHRI Standards 340/360.
2. Cooling capacities are gross and do not include deductions for indoor fan motor heat.
3. Cooling Standard: 80 F db, 67 wb indoor entering-air temperature and 95 F db air entering outdoor unit.

# Unit Physical Data English

| Unit TCM                                      | A  | D              | D                    | D              | D             |
|---|--|----------------|----------------------|----------------|---------------|
| Unit Dimensions                               | 41.3x74.3x46.7   | 41.2x88.1x59.4 |                      | 49.3x88.1x59.4 |               |
| Unit Operating weight                         | 606  | 761            | 855                  | 866            | 1078          |
| <b>Refrigeration System</b>                   |  |                |                      |                |               |
| Compressor No. / Type                         | 1 / Scroll   |                | 2 / Scroll           |                |               |
| Refrigerant type                              | Puron R410A  |                |                      |                |               |
| Circuits No.                                  | 1  |                | 2                    |                |               |
| Charge per Circuit (1-Down/2-Up) -LBS 230V    | 19.84  | 11.02 / 11.79  | 11.30 / 13.27        | 10.91 / 10.91  | 13.00 / 13.88 |
| Charge per Circuit (1-Down/2-Up) -LBS 400V    | 17.09  | 9.92 / 8.60    | 11.90 / 11.02        | 10.91 / 10.91  | 16.53 / 13.88 |
| Metering Device                               | Acutrol  |                |                      |                |               |
| Filter Drier Qty                              | 1  |                | 2                    |                |               |
| High Pressure Switch (Trip/ Reset)- PSIG      | 630 / 505  |                |                      |                |               |
| Low Pressure Switch (Trip/ Reset)- PSIG       | 54 / 117   |                |                      |                |               |
| <b>Condenser Coil</b>                         |  |                |                      |                |               |
| Coil Type                                     | 3/8 Helical Grooved Copper Tube, 0.75 Aluminum Lance Sine Wave fins. |                |                      |                |               |
| Standard Coil Material                        | Cu/Al  |                |                      |                |               |
| Rows / FPI                                    | 2 / 17   |                | 1 / 20               | 2 / 20         |               |
| Face Area (ft <sup>2</sup> )                  | 21.3   | 20.5           | 25.1                 |                |               |
| Coil test Pressure (PSIG)                     | 450  |                |                      |                |               |
| <b>Condenser Fan &amp; Motor</b>              |  |                |                      |                |               |
| Approx. Air Flow Rate (CFM)                   | 4350   | 7000           | 10900                | 10000          |               |
| Quantity                                      | 1  |                | 2                    |                | 1             |
| Diameter (In) / No. of Blades                 | 26 / 3   |                | 22 / 3               |                | 30 / 3        |
| Motor Type                                    | Induction Motor - Totally Enclosed                                   |                |                      |                |               |
| Motor HP-RPM                                  | 1/3 - 825  | 1/4 - 1100     |                      | 1 - 1140       |               |
| <b>Evaporator Coil</b>                        |  |                |                      |                |               |
| Coil Type                                     | 3/8 Helical Grooved Copper Tube, 0.75 Aluminum Lance Sine Wave fins. |                |                      |                |               |
| Standard Coil Material                        | Cu/Al  |                |                      |                |               |
| Rows / FPI                                    | 4 / 15   | 3 / 15         | 4 / 15               |                |               |
| Face Area (ft <sup>2</sup> )                  | 7.3  | 8.9            | 11.1                 |                |               |
| Coil test Pressure (PSIG)                     | 350  |                |                      |                |               |
| Drain Pan connection Size (In)                | 3/4  |                |                      |                |               |
| Return Air Filter Qty / Size (In)             | 4 / 16x16x2  | 4 / 16x20x2    | 4 / 20x20x2          |                |               |
| <b>Evaporator Fan</b>                         |  |                |                      |                |               |
| Fan Qty - Fan Shaft Size (In) - Fan Size (In) | 1 - 15.9 - 254 x 254   |                | 1 - 25.4 - 381 x 381 |                |               |
| Fan Type                                      | Centrifugal - Forward Blade  |                |                      |                |               |
| Drive Type                                    | Belt   |                |                      |                |               |
| Motor Type                                    | Induction Motor - TEFC   |                |                      |                |               |
| <b>Standard Static Drive</b>                  |  |                |                      |                |               |
| Motor Qty                                     | 1  |                |                      |                |               |
| Maximum HP (230V/400V)                        | 2.4 / 1.7  | 1.7 / 1.7      |                      | 2.4 / 2.5      | 2.9 / 3.0     |
| FLA (230V/400V)                               | 5.2 / 2.8  |                | 5.2 / 4.2            | 7.5 / 5.0      |               |
| Efficiency Full Load (230V/400V)              | 80 / 74  |                | 80 / 75              | 81 / 75        |               |
| RPM Range (230V)                              | 1073 - 1457  | 489 - 747      | 518 - 733            | 591 - 838      | 652 - 843     |
| RPM Range (400V)                              | 728 - 1035   | 489 - 747      | 518 - 733            | 604 - 819      | 652 - 843     |
| Motor Shaft Size (230V-400V) (In)             | 5/8 - 5/8  |                | 5/8 - 7/8            | 7/8 - 7/8      |               |
| Motor Frame Size(230V/400V)                   | 56 / 56  |                | 56 / 56              |                | 56 / 56H      |
| <b>Medium Static Drive</b>                    |  |                |                      |                |               |
| Motor Qty                                     | 1  |                |                      |                |               |
| Maximum HP (230V/400V)                        | 2.9 / 3.0  |                | 2.9 / 3.0            | 3.7 / 4.7      |               |
| FLA (230V/400V)                               | 7.5 / 5.0  |                | 5.2 / 4.2            | 10 / 7.5       |               |
| Efficiency Full Load (230V/400V)              | 81 / 75  |                | 80 / 75              | 81 / 76        |               |
| RPM Range (230V)                              | 1173 - 1518  | 733 - 949      | 690 - 936            | 838 - 1084     |               |
| RPM Range (400V)                              | 1073 - 1457  | 733 - 949      | 690 - 936            | 838 - 1084     |               |
| Motor Shaft Size (230V-400V) (In)             | 7/8 - 7/8  |                | 5/8 - 7/8            | 7/8 - 7/8      |               |
| Motor Frame Size(230V/400V)                   | 56 / 56H   |                | 56 / 56              | 56 / 145T      |               |
| <b>High Static Drive</b>                      |  |                |                      |                |               |
| Motor Qty                                     | 1  |                |                      |                |               |
| Maximum HP (230V/400V)                        | 3.7 / 4.7  | 4.7 / 4.7      | 3.7 / 3.0            | 4.7 / 4.7      |               |
| FLA (230V/400V)                               | 10.0 / 7.5   | 15 / 7.5       | 10.0 / 5.0           | 15 / 7.5       |               |
| Efficiency Full Load (230V/400V)              | 80 / 76  | 81 / 76        | 80 / 75              | 81 / 76        |               |
| RPM Range (230V)                              | 1474 - 1788  | 909 - 1102     | 838 - 1084           | 1022 - 1240    |               |
| RPM Range (400V)                              | 1474 - 1788  | 909 - 1102     | 838 - 1084           | 1013 - 1229    |               |
| Motor Shaft Size (230V-400V) (In)             | 7/8 - 7/8  |                |                      |                |               |
| Motor Frame Size(230V/400V)                   | 56 / 145T  | 145T / 145T    | 56 / 56H             | 145T / 145T    |               |

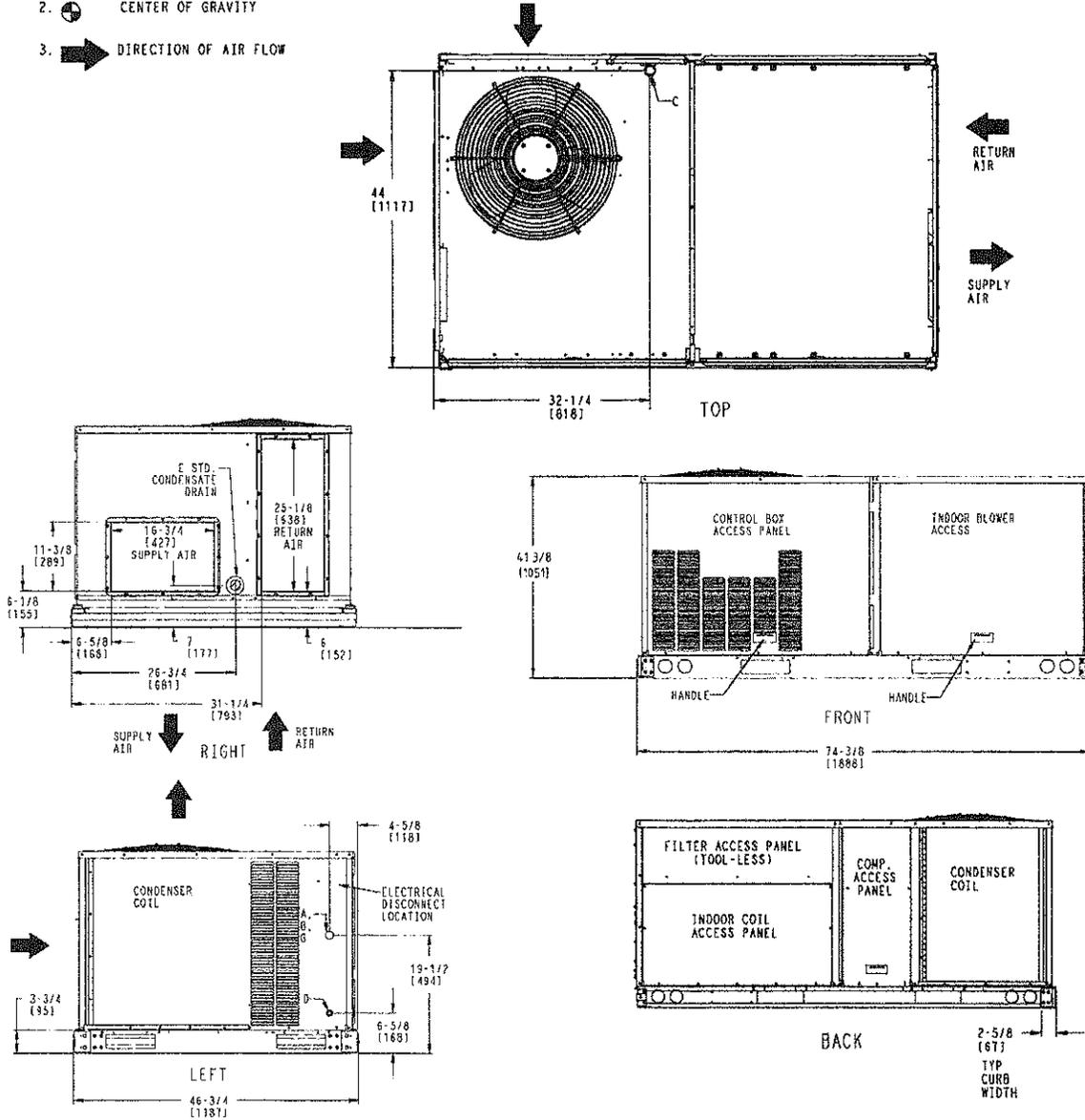
# Unit Physical Data SI

|   |  |                |                      |             |             |
|---|--|----------------|----------------------|-------------|-------------|
| Unit TGM                                      | A  | D              | D                    | D           | D           |
| Unit Dimensions                               | 1051x1888x1187   | 1048x2238x1510 | 1253x2238x1510       |             |             |
| Unit Operating weight                         | 275  | 345            | 388                  | 393         | 489         |
| <b>Refrigeration System</b>                   |  |                |                      |             |             |
| Compressor No. / Type                         | 1 / Scroll   |                | 2 / Scroll           |             |             |
| Refrigerant type                              | Puron R410A  |                |                      |             |             |
| Circuits No.                                  | 1  |                | 2                    |             |             |
| Charge per Circuit (1-Down/2-Up) - kG 230V    | 9.00   | 5.00 / 5.35    | 5.13 / 6.02          | 4.95 / 4.95 | 5.90 / 6.30 |
| Charge per Circuit (1-Down/2-Up) - kG 400V    | 7.75   | 4.50 / 3.90    | 5.40 / 5.00          | 4.95 / 4.95 | 7.50 / 6.30 |
| Metering Device                               | Acutrol  |                |                      |             |             |
| Filter Drier Qty                              | 1  |                | 2                    |             |             |
| High Pressure Switch (Trip/ Reset)- bar       | 43 / 34  |                |                      |             |             |
| Low Pressure Switch (Trip/ Reset)- bar        | 4 / 8  |                |                      |             |             |
| <b>Condenser Coil</b>                         |  |                |                      |             |             |
| Coil Type                                     | 3/8 Helical Grooved Copper Tube, 0.75 Aluminum Lance Sine Wave fins. |                |                      |             |             |
| Standard Coil Material                        | Cu/Al  |                |                      |             |             |
| Rows / FPI                                    | 2 / 17   |                | 1 / 20               | 2 / 20      |             |
| Face Area (m <sup>2</sup> )                   | 1.98   | 1.90           | 2.33                 |             |             |
| Coil test Pressure (bar)                      | 31   |                |                      |             |             |
| <b>Condenser Fan &amp; Motor</b>              |  |                |                      |             |             |
| Approx. Air Flow Rate (m <sup>3</sup> /hr)    | 7388   | 11886          |                      | 18508.2     | 16980       |
| Quantity                                      | 1  | 2              |                      | 1           |             |
| Diameter (mm) / No. of Blades                 | 660 / 3  | 559 / 3        |                      | 762 / 3     |             |
| Motor Type                                    | Induction Motor - Totally Enclosed                                   |                |                      |             |             |
| Motor HP- RPS                                 | 1/3 - 32   | 1/4 - 43       |                      | 1 - 45      |             |
| <b>Evaporator Coil</b>                        |  |                |                      |             |             |
| Coil Type                                     | 3/8 Helical Grooved Copper Tube, 0.75 Aluminum Lance Sine Wave fins. |                |                      |             |             |
| Standard Coil Material                        | Cu/Al  |                |                      |             |             |
| Rows / FPI                                    | 4 / 15   | 3 / 15         | 4 / 15               |             |             |
| Face Area (m <sup>2</sup> )                   | 0.7  | 0.8            | 1.0                  |             |             |
| Coil test Pressure (bar)                      | 23.8   |                |                      |             |             |
| Drain Pan connection Size (mm)                | 19   |                |                      |             |             |
| Return Air Filter Qty / Size (In)             | 4 / 16x16x2  | 4 / 16x20x2    | 4 / 20x20x2          |             |             |
| <b>Evaporator Fan</b>                         |  |                |                      |             |             |
| Fan Qty - Fan Shaft Size (mm) - Fan Size (mm) | 1 - 15.9 - 254 x 254   |                | 1 - 25.4 - 381 x 381 |             |             |
| Fan Type                                      | Centrifugal - Forward Blade  |                |                      |             |             |
| Drive Type                                    | Belt   |                |                      |             |             |
| Motor Type                                    | Induction Motor - TEFC   |                |                      |             |             |
| <b>Standard Static Drive</b>                  |  |                |                      |             |             |
| Motor Qty                                     | 1  |                |                      |             |             |
| Maximum kW (230V/400V)                        | 1.8 / 1.3  | 1.3 / 1.3      |                      | 1.8 / 1.9   | 2.2 / 2.2   |
| FLA (230V/400V)                               | 5.2 / 2.8  |                | 5.2 / 4.2            | 7.5 / 5.0   |             |
| Efficiency Full Load (230V/400V)              | 80 / 74  |                | 80 / 75              | 81 / 75     |             |
| RPM Range (230V)                              | 17.9 - 24.3  | 8.2 - 12.5     | 8.6 - 12.2           | 9.9 - 14.0  | 10.9 - 14.1 |
| RPM Range (400V)                              | 12.1 - 17.3  | 8.2 - 12.5     | 8.6 - 12.2           | 10.1 - 13.7 | 10.9 - 14.1 |
| Motor Shaft Size (230V/400V) (mm)             | 15.9 / 15.9  |                | 15.9 / 22.2          | 22.2 / 22.2 |             |
| Motor Frame Size(230V/400V)                   | 56 / 56  |                |                      | 56 / 56H    |             |
| <b>Medium Static Drive</b>                    |  |                |                      |             |             |
| Motor Qty                                     | 1  |                |                      |             |             |
| Maximum kW (230V/400V)                        | 2.2 / 2.2  |                | 1.8 / 1.9            | 2.8 / 3.5   |             |
| FLA (230V/400V)                               | 7.5 / 5.0  |                | 5.2 / 4.2            | 10 / 7.5    |             |
| Efficiency Full Load (230V/400V)              | 81 / 75  |                | 80 / 75              | 81 / 76     |             |
| RPM Range (230V)                              | 19.6 - 25.3  | 12.2 - 15.8    | 11.5 - 15.6          | 14.0 - 18.1 |             |
| RPM Range (400V)                              | 17.9 - 24.3  | 12.2 - 15.8    | 11.5 - 15.6          | 14.0 - 18.1 |             |
| Motor Shaft Size (230V/400V) (mm)             | 22.2 / 22.2  |                | 15.9 / 22.2          | 22.2 / 22.2 |             |
| Motor Frame Size(230V/400V)                   | 56 / 56H   |                | 56 / 56              | 56 / 145T   |             |
| <b>High Static Drive</b>                      |  |                |                      |             |             |
| Motor Qty                                     | 1  |                |                      |             |             |
| Maximum kW (230V/400V)                        | 2.8 / 3.5  | 3.5 / 3.5      | 2.8 / 2.2            | 3.5 / 3.5   |             |
| FLA (230V/400V)                               | 10.0 / 7.5   | 15 / 7.5       | 10.0 / 5.0           | 15 / 7.5    |             |
| Efficiency Full Load (230V/400V)              | 80 / 76  | 81 / 76        | 80 / 75              | 81 / 76     |             |
| RPM Range (230V)                              | 24.6 - 29.8  | 15.2 - 18.4    | 14.0 - 18.1          | 17.0 - 20.7 |             |
| RPM Range (400V)                              | 24.6 - 29.8  | 15.2 - 18.4    | 14.0 - 18.1          | 16.9 - 20.5 |             |
| Motor Shaft Size (230V/400V) (mm)             | 22.2 / 22.2  |                |                      |             |             |
| Motor Frame Size(230V/400V)                   | 56 / 145T  | 145T / 145T    | 56 / 56H             | 145T / 145T |             |

## CURBS & WEIGHTS DIMENSIONS - 50TCM07

**NOTES:**

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN ( ) ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW

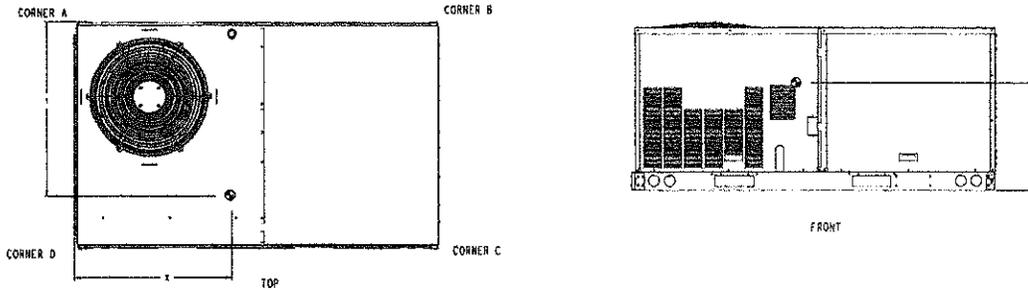


| CONNECTION SIZES |   |
|------------------|---|
| A                | 1 3/8" DIA [35] FIELD POWER SUPPLY HOLE |
| B                | 2" DIA [51] POWER SUPPLY KNOCKOUT       |
| C                | 1 3/4" DIA [44] GAUGE ACCESS PLUG       |
| D                | 7/8" DIA [22] FIELD CONTROL WIRING HOLE |
| E                | 3/4"-14 NPT CONDENSATE DRAIN            |
| G                | 2 1/2" DIA [64] POWER SUPPLY KNOCK-OUT  |

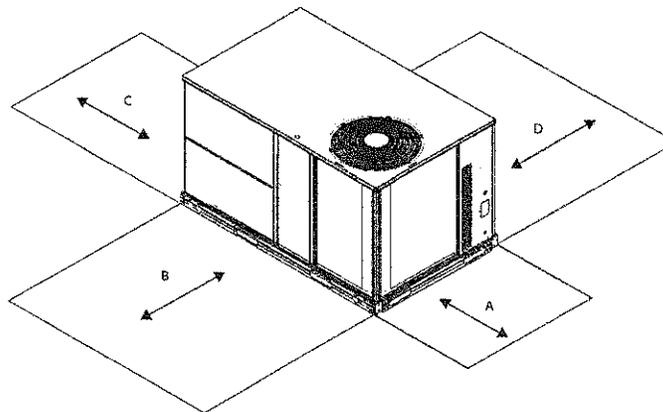
Dimensions 50TCMA07

## CURBS & WEIGHTS DIMENSIONS - 50TCM07 (cont.)

| UNIT     | STD. UNIT WEIGHT |     | CORNER WEIGHT (A) |     | CORNER WEIGHT (B) |     | CORNER WEIGHT (C) |     | CORNER WEIGHT (D) |     | C. G.    |          | HEIGHT       |
|----------|------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|----------|----------|--------------|
|          | LBS.             | KG. | LBS.              | KG. | LBS.              | KG. | LBS.              | KG. | LBS.              | KG. | X        | Y        | Z            |
| 50TCMA07 | 607              | 275 | 150               | 68  | 160               | 73  | 153               | 69  | 144               | 65  | 38 [965] | 22 [559] | 20 3/4 [527] |



**Dimensions 50TCMA07**



**Service Clearance**

| LOC | DIMENSION                 | CONDITION  |
|-----|---------------------------|--|
| A   | 48-in (1219 mm)           | Unit disconnect is mounted on panel  |
|     | 18-in (457 mm)            | No disconnect, convenience outlet option   |
|     | 18-in (457 mm)            | Recommended service clearance  |
|     | 12-in (305 mm)            | Minimum clearance  |
| B   | 42-in (1067 mm)           | Surface behind servicer is grounded (e.g., metal, masonry wall)  |
|     | 36-in (914 mm)<br>Special | Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)<br>Check for sources of flue products within 10-ft of unit fresh air intake hood |
| C   | 36-in (914 mm)            | Side condensate drain is used  |
|     | 18-in (457 mm)            | Minimum clearance  |
| D   | 42-in (1067 mm)           | Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)  |
|     | 36-in (914 mm)            | Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)  |

## CURBS & WEIGHTS DIMENSIONS - 50TCMD08/09

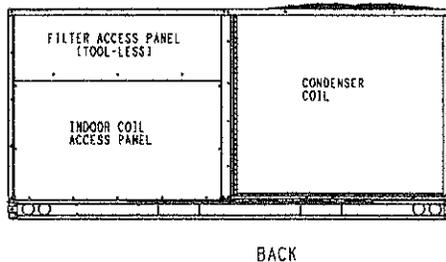
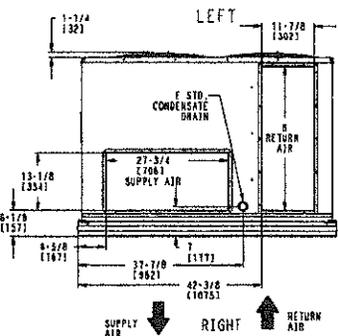
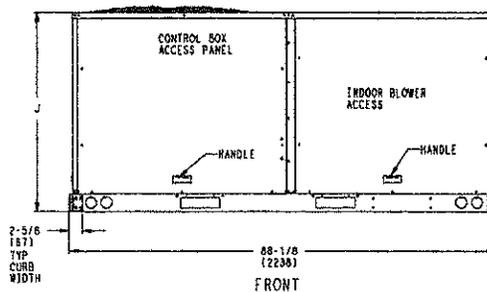
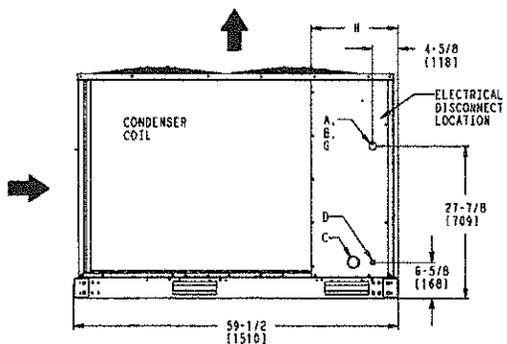
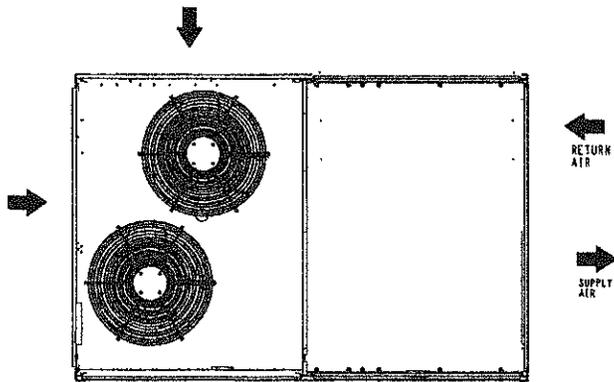
**NOTES:**

1. DIMENSIONS ARE IN INCHES, DIMENSIONS IN ( ) ARE IN MILLIMETERS.

2. CENTER OF GRAVITY

3. DIRECTION OF AIR FLOW

| CONNECTION SIZES |   |
|------------------|---|
| A                | 1 3/8" DIA [35] FIELD POWER SUPPLY HOLE |
| B                | 2 1/2" [64] DIA POWER SUPPLY KNOCKOUT   |
| C                | 1 3/4" DIA [51] GAUGE ACCESS PLUG       |
| D                | 7/8" DIA [22] FIELD CONTROL WIRING HOLE |
| E                | 3/4"-14 NPT CONDENSATE DRAIN            |
| G                | 2" DIA [51] POWER SUPPLY KNOCK-OUT      |



| UNIT     | OUTDOOR COIL TYPE | J             | K            | H            |
|----------|-------------------|---------------|--------------|--------------|
| 50TCMD08 | RTPF              | 41 1/4 [1048] | 33 [858]     | 15 7/8 [403] |
| 50TCMD09 | RTPF              | 49 3/8 [1253] | 37 1/4 [946] | 15 7/8 [403] |

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

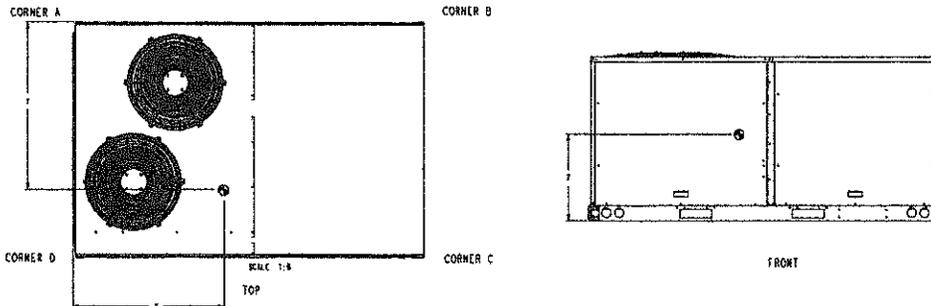
Dimensions 50TCMD08/09

## CURBS & WEIGHTS DIMENSIONS - 50TCMD08/09 (cont.)

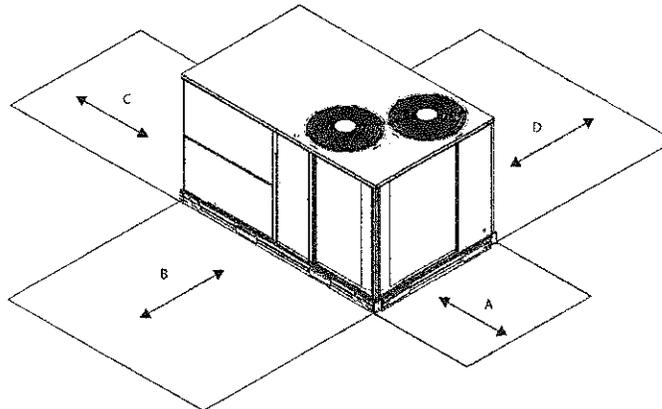
| UNIT     | OUTDOOR COIL TYPE | STD. UNIT WEIGHT *** |       | CORNER WEIGHT (A) |       | CORNER WEIGHT (B) |      | CORNER WEIGHT (C) |       | CORNER WEIGHT (D) |       | C.G.            |              |              |
|----------|-------------------|----------------------|-------|-------------------|-------|-------------------|------|-------------------|-------|-------------------|-------|-----------------|--------------|--------------|
|          |                   | LBS.                 | KG.   | LBS.              | KG.   | LBS.              | KG.  | LBS.              | KG.   | LBS.              | KG.   | X               | Y            | Z            |
| 50TCMD08 | RTPF              | 760                  | 345   | 158               | 71.7  | 155               | 70.4 | 222               | 100.8 | 225               | 102.2 | 43 3/4 (1111.3) | 35 (889)     | 20 (508)     |
| 50TCMD09 | RTPF              | 855                  | 388.2 | 223               | 101.2 | 171               | 77.6 | 200               | 90.8  | 261               | 118.5 | 38 3/8 (975)    | 32 1/8 (816) | 19 1/8 (486) |

RTPF - ROUND TUBE, PLATE FIN (COPPER/ALUM)

\*\*\* STANDARD UNIT WEIGHT IS WITHOUT ELECTRIC HEAT AND WITHOUT PACKAGING. FOR OTHER OPTIONS AND ACCESSORIES, REFER TO THE PRODUCT DATA CATALOG.



Dimensions 50TCMD08/09



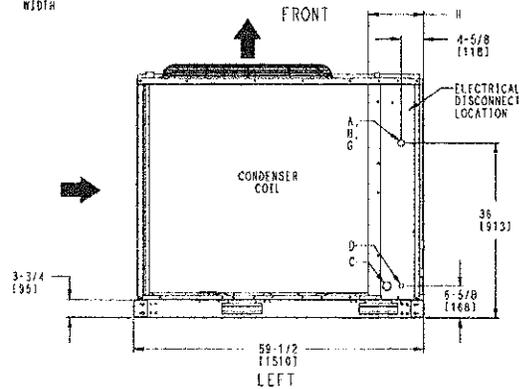
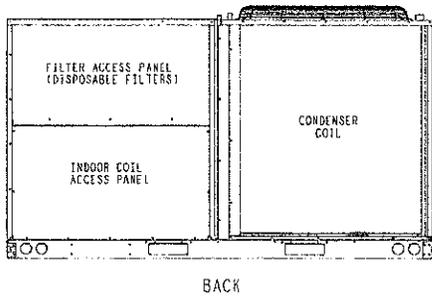
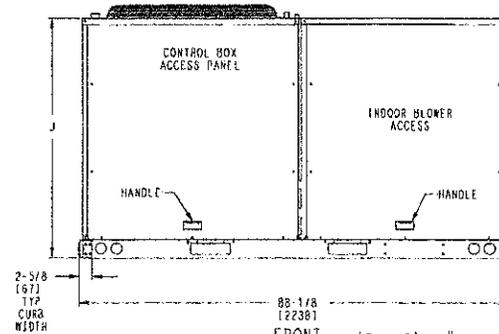
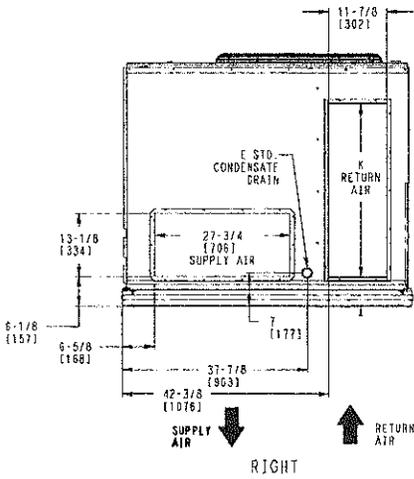
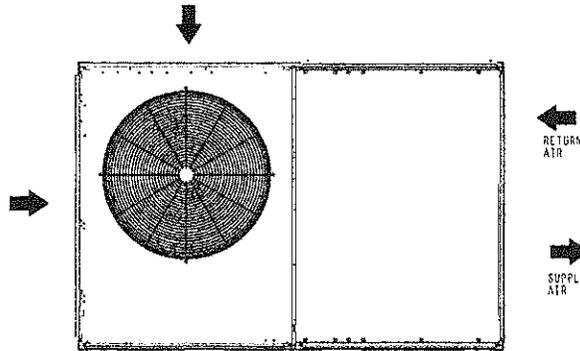
Service Clearance

| LOC | DIMENSION       | CONDITION  |
|-----|-----------------|--|
| A   | 48-in (1219 mm) | Unit disconnect is mounted on panel  |
|     | 36-in (914 mm)  | If dimension-B is 12-in (305 mm)   |
|     | 18-in (457 mm)  | No disconnect, convenience outlet option   |
|     | 12-in (305 mm)  | Recommended service clearance (use electric screwdriver)<br>Minimum clearance (use manual ratchet screwdriver) |
| B   | 12-in (305 mm)  | If dimension-A is 36-in (914 mm)   |
|     | Special         | Check for sources of flue products within 10-ft of unit fresh air intake hood                                  |
| C   | 36-in (914 mm)  | Side condensate drain is used  |
|     | 18-in (457 mm)  | Minimum clearance  |
| D   | 42-in (1067 mm) | Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)                                  |
|     | 36-in (914 mm)  | Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)                                |

## CURBS & WEIGHTS DIMENSIONS - 50TCMD12/14

**NOTES:**

1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN ( ) ARE IN MILLIMETERS.
2. CENTER OF GRAVITY
3. DIRECTION OF AIR FLOW



| CONNECTION SIZES |   |
|------------------|---|
| A                | 1 3/8" [35] DIA FIELD POWER SUPPLY HOLE |
| B                | 2 1/2" [64] DIA POWER SUPPLY KNOCKOUT   |
| C                | 1 3/4" [51] DIA GAUGE ACCESS PLUG       |
| D                | 7/8" [22] DIA FIELD CONTROL WIRING HOLE |
| E                | 3/4"-14 NPT CONDENSATE DRAIN            |
| G                | 2" [51] DIA POWER SUPPLY KNOCK-OUT      |

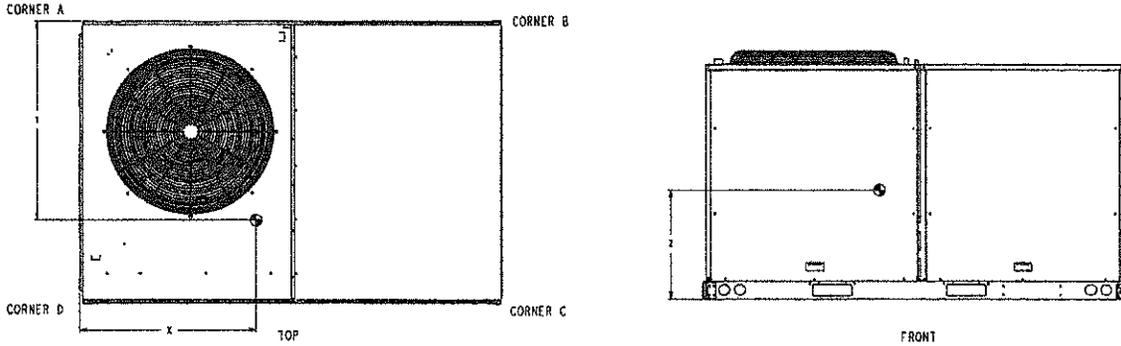
| UNIT     | H            | J             | K            |
|----------|--------------|---------------|--------------|
| 50TCMD12 | 11 3/8 [289] | 49 3/8 [1253] | 35 5/8 [905] |
| 50TCMD14 | 11 3/8 [289] | 49 3/8 [1253] | 35 5/8 [905] |

Dimensions 50TCMD12/14

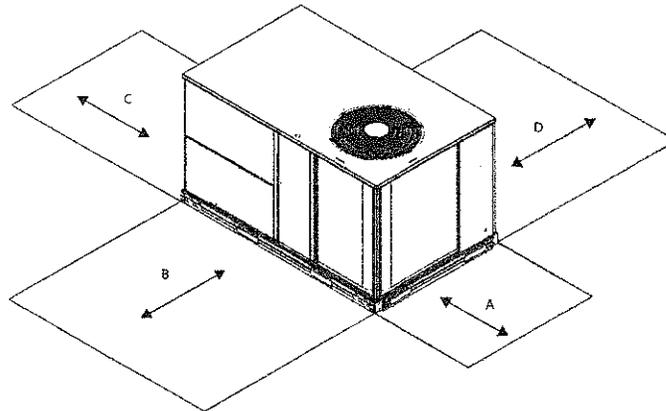
## CURBS & WEIGHTS DIMENSIONS - 50TCMD12/14 (cont.)

| UNIT     | STD. UNIT WEIGHT |     | CORNER WEIGHT (A) |     | CORNER WEIGHT (B) |     | CORNER WEIGHT (C) |     | CORNER WEIGHT (D) |     | CENTER OF GRAVITY (C.G.) |              |              |
|----------|------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|--------------------------|--------------|--------------|
|          | LBS.             | KG. | LBS.              | KG. | LBS.              | KG. | LBS.              | KG. | LBS.              | KG. | X                        | Y            | Z            |
| 50TCMD12 | 1030             | 467 | 294               | 133 | 146               | 66  | 197               | 89  | 395               | 179 | 28 3/8 (721)             | 33 1/8 (841) | 21 3/8 (543) |
| 50TCMD14 | 1030             | 467 | 294               | 133 | 146               | 66  | 197               | 89  | 395               | 179 | 28 3/8 (721)             | 33 1/8 (841) | 21 3/8 (543) |

**NOTE:** The STD. UNIT WEIGHT in the table above is for the unit equipped with NOVATION coils.  
Add 65 lbs (29.5 kg) for units equipped with RTPF coils.



**Dimensions 50TCMD12/14**



**Service Clearance**

C10329

C08337

| LOC | DIMENSION                 | CONDITION  |
|-----|---------------------------|--|
| A   | 48-in (1219 mm)           | Unit disconnect is mounted on panel  |
|     | 18-in (457 mm)            | No disconnect, convenience outlet option   |
|     | 18-in (457 mm)            | Recommended service clearance  |
|     | 12-in (305 mm)            | Minimum clearance  |
| B   | 42-in (1067 mm)           | Surface behind servicer is grounded (e.g., metal, masonry wall)  |
|     | 36-in (914 mm)<br>Special | Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)<br>Check for sources of flue products within 10-ft of unit fresh air intake hood |
| C   | 36-in (914 mm)            | Side condensate drain is used  |
|     | 18-in (457 mm)            | Minimum clearance  |
| D   | 42-in (1067 mm)           | Surface behind servicer is grounded (e.g., metal, masonry wall, another unit)  |
|     | 36-in (914 mm)            | Surface behind servicer is electrically non-conductive (e.g., wood, fiberglass)  |

# Cooling Capacities

| TCM - A - / - English                   |                          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|---|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Temp F<br>Air Entering<br>Condenser Edb | Evaporator Air - CFM/BPF |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
|   | /                        |        |        | /      |        |        | /      |        |        | /      |        |        | /      |        |        |
|   | Evaporator Air - EWB F   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| TC                                      | 73,436                   | 80,152 | 87,140 | 75,864 | 82,185 | 89,426 | 77,642 | 83,689 | 91,032 | 80,618 | 85,240 | 92,706 | 82,799 | 86,524 | 93,952 |
| SHC                                     | 62,983                   | 53,004 | 43,090 | 68,570 | 56,734 | 45,486 | 72,882 | 59,934 | 47,485 | 76,648 | 63,961 | 49,966 | 79,105 | 67,693 | 52,102 |
| kW                                      | 3.78                     | 3.86   | 3.95   | 3.81   | 3.89   | 3.99   | 3.83   | 3.91   | 4.01   | 3.88   | 3.94   | 4.03   | 3.91   | 3.95   | 4.05   |
| TC                                      | 67,658                   | 76,277 | 83,245 | 70,341 | 78,293 | 85,376 | 72,913 | 79,663 | 86,832 | 76,803 | 81,181 | 88,359 | 78,733 | 82,295 | 89,442 |
| SHC                                     | 60,225                   | 51,395 | 41,622 | 65,826 | 55,172 | 44,003 | 70,125 | 58,337 | 45,987 | 73,879 | 62,398 | 48,443 | 76,480 | 66,032 | 50,544 |
| kW                                      | 4.27                     | 4.42   | 4.53   | 4.31   | 4.45   | 4.56   | 4.35   | 4.48   | 4.58   | 4.43   | 4.50   | 4.61   | 4.47   | 4.52   | 4.63   |
| TC                                      | 64,161                   | 71,117 | 80,460 | 66,930 | 73,392 | 82,567 | 69,659 | 75,024 | 84,007 | 72,499 | 77,132 | 85,461 | 74,987 | 79,202 | 86,458 |
| SHC                                     | 58,022                   | 48,656 | 38,973 | 63,058 | 52,825 | 42,391 | 65,711 | 55,939 | 44,380 | 69,017 | 60,417 | 46,825 | 71,384 | 64,225 | 48,904 |
| kW                                      | 4.84                     | 4.94   | 5.14   | 4.88   | 4.98   | 5.18   | 4.93   | 5.02   | 5.20   | 4.97   | 5.06   | 5.23   | 5.02   | 5.13   | 5.25   |
| TC                                      | 59,145                   | 65,511 | 73,196 | 62,310 | 67,385 | 75,467 | 64,832 | 68,907 | 77,042 | 67,552 | 70,287 | 78,744 | 69,635 | 71,356 | 80,071 |
| SHC                                     | 55,526                   | 46,404 | 37,361 | 59,317 | 50,262 | 39,884 | 61,718 | 53,750 | 41,942 | 64,307 | 57,709 | 44,494 | 66,290 | 61,011 | 46,703 |
| kW                                      | 5.45                     | 5.56   | 5.69   | 5.51   | 5.59   | 5.74   | 5.55   | 5.62   | 5.78   | 5.60   | 5.65   | 5.82   | 5.64   | 5.67   | 5.86   |
| TC                                      | 54,541                   | 59,617 | 66,842 | 57,663 | 61,467 | 68,696 | 59,855 | 62,596 | 69,985 | 62,448 | 63,941 | 71,426 | 64,315 | 65,064 | 72,399 |
| SHC                                     | 54,776                   | 46,488 | 37,023 | 57,912 | 50,741 | 39,557 | 60,214 | 54,059 | 41,653 | 62,718 | 58,198 | 44,273 | 64,593 | 61,692 | 46,483 |
| kW                                      | 6.15                     | 6.24   | 6.38   | 6.21   | 6.28   | 6.42   | 6.25   | 6.30   | 6.44   | 6.30   | 6.33   | 6.48   | 6.34   | 6.36   | 6.50   |
| TC                                      | 51,238                   | 55,438 | 62,385 | 54,159 | 57,088 | 64,128 | 56,311 | 58,252 | 65,304 | 58,626 | 59,552 | 66,450 | 60,355 | 60,612 | 67,237 |
| SHC                                     | 51,464                   | 44,314 | 35,114 | 54,399 | 48,443 | 37,586 | 56,560 | 51,690 | 39,611 | 58,085 | 55,805 | 42,079 | 60,622 | 58,718 | 44,161 |
| kW                                      | 6.43                     | 6.52   | 6.65   | 6.49   | 6.55   | 6.69   | 6.54   | 6.58   | 6.72   | 6.59   | 6.60   | 6.74   | 6.62   | 6.63   | 6.76   |
| IC                                      | 47,004                   | 50,407 | 58,766 | 49,673 | 51,775 | 58,326 | 51,591 | 52,820 | 59,365 | 53,295 | 54,123 | 60,388 | 54,296 | 55,162 | 61,233 |
| SHC                                     | 47,212                   | 41,472 | 32,529 | 49,892 | 45,180 | 34,862 | 51,820 | 48,279 | 36,777 | 53,531 | 52,005 | 39,102 | 54,536 | 54,742 | 41,155 |
| kW                                      | 6.86                     | 6.93   | 7.07   | 6.92   | 6.96   | 7.10   | 6.96   | 6.99   | 7.13   | 7.01   | 7.02   | 7.15   | 7.05   | 7.04   | 7.18   |

| TCM - A - / - SI                        |                           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Temp C<br>Air Entering<br>Condenser Edb | Evaporator Air - L/s /BPF |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|   | /                         |      |      | /    |      |      | /    |      |      | /    |      |      | /    |      |      |
|   | Evaporator Air - EWB C    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| TC                                      | 21.5                      | 23.5 | 25.5 | 22.2 | 24.1 | 26.2 | 22.8 | 24.5 | 26.7 | 23.6 | 25.0 | 27.2 | 24.3 | 25.4 | 27.5 |
| SHC                                     | 18.5                      | 16.5 | 12.6 | 20.1 | 16.6 | 13.3 | 21.4 | 17.6 | 13.9 | 22.5 | 18.7 | 14.5 | 23.2 | 19.8 | 15.3 |
| kW                                      | 3.78                      | 3.88 | 3.95 | 3.81 | 3.89 | 3.99 | 3.83 | 3.91 | 4.01 | 3.88 | 3.94 | 4.03 | 3.91 | 3.95 | 4.05 |
| TC                                      | 19.8                      | 22.4 | 24.4 | 20.6 | 22.9 | 26.0 | 21.4 | 23.3 | 25.4 | 22.5 | 23.8 | 25.9 | 23.1 | 24.1 | 26.2 |
| SHC                                     | 17.7                      | 18.1 | 12.2 | 19.3 | 16.2 | 12.9 | 20.6 | 17.1 | 13.5 | 21.7 | 18.3 | 14.2 | 22.4 | 19.4 | 14.8 |
| kW                                      | 4.27                      | 4.42 | 4.53 | 4.31 | 4.45 | 4.56 | 4.35 | 4.48 | 4.58 | 4.43 | 4.50 | 4.61 | 4.47 | 4.52 | 4.63 |
| TC                                      | 18.8                      | 20.8 | 23.6 | 19.6 | 21.5 | 24.2 | 20.4 | 22.0 | 24.6 | 21.2 | 22.6 | 25.0 | 22.0 | 23.2 | 25.3 |
| SHC                                     | 17.0                      | 14.3 | 11.7 | 18.5 | 15.4 | 12.4 | 19.3 | 16.4 | 13.0 | 20.2 | 17.7 | 13.7 | 20.9 | 18.8 | 14.3 |
| kW                                      | 4.84                      | 4.94 | 5.14 | 4.88 | 4.98 | 5.18 | 4.93 | 5.02 | 5.20 | 4.97 | 5.06 | 5.23 | 5.02 | 5.13 | 5.25 |
| IC                                      | 17.3                      | 19.2 | 21.5 | 18.3 | 19.7 | 22.1 | 19.0 | 20.2 | 22.6 | 19.8 | 20.6 | 23.1 | 20.4 | 20.9 | 23.5 |
| SHC                                     | 16.3                      | 13.6 | 10.9 | 17.4 | 14.7 | 11.7 | 18.1 | 15.8 | 12.3 | 18.8 | 16.9 | 13.0 | 19.4 | 17.9 | 13.7 |
| kW                                      | 5.45                      | 5.56 | 5.69 | 5.51 | 5.59 | 5.74 | 5.55 | 5.62 | 5.78 | 5.60 | 5.65 | 5.82 | 5.64 | 5.67 | 5.86 |
| TC                                      | 16.0                      | 17.5 | 19.6 | 16.9 | 18.0 | 20.1 | 17.6 | 18.3 | 20.5 | 18.3 | 18.7 | 20.9 | 18.8 | 19.1 | 21.2 |
| SHC                                     | 15.1                      | 13.6 | 10.9 | 17.0 | 14.9 | 11.6 | 17.6 | 15.8 | 12.2 | 18.4 | 17.1 | 13.0 | 18.9 | 18.1 | 13.6 |
| kW                                      | 6.15                      | 6.24 | 6.38 | 6.21 | 6.28 | 6.42 | 6.25 | 6.30 | 6.44 | 6.30 | 6.33 | 6.48 | 6.34 | 6.36 | 6.50 |
| TC                                      | 15.0                      | 16.2 | 18.3 | 15.9 | 16.7 | 18.8 | 16.5 | 17.1 | 19.1 | 17.2 | 17.5 | 19.5 | 17.7 | 17.8 | 19.7 |
| SHC                                     | 15.1                      | 13.0 | 10.3 | 15.9 | 14.2 | 11.0 | 16.6 | 15.1 | 11.6 | 17.3 | 16.4 | 12.3 | 17.8 | 17.2 | 12.9 |
| kW                                      | 6.43                      | 6.52 | 6.65 | 6.49 | 6.55 | 6.69 | 6.54 | 6.58 | 6.72 | 6.59 | 6.60 | 6.74 | 6.62 | 6.63 | 6.76 |
| TC                                      | 13.8                      | 14.8 | 16.6 | 14.6 | 15.2 | 17.1 | 15.1 | 15.5 | 17.4 | 15.6 | 15.9 | 17.7 | 16.0 | 16.2 | 17.9 |
| SHC                                     | 13.8                      | 12.2 | 9.5  | 14.6 | 13.2 | 10.2 | 15.2 | 14.1 | 10.8 | 15.7 | 15.2 | 11.5 | 16.0 | 16.0 | 12.1 |
| kW                                      | 6.86                      | 6.93 | 7.07 | 6.92 | 6.96 | 7.10 | 6.96 | 6.99 | 7.13 | 7.01 | 7.02 | 7.15 | 7.05 | 7.04 | 7.18 |

**LEGEND**  
 BPF Bypass Factor  
 Edb Entering Dry-Bulb  
 Ewb Entering Wet-Bulb  
 SHC Sensible Heat Capacity (1000 Btu/h) Gross  
 Bold, Italics - Standard Ratings  
 Notes

Ldb Leaving Dry-Bulb  
 Lwb Leaving Wet-Bulb  
 TC Total Capacity (1000 Btu/h) Gross  
 kW Compressor Motor Power Input

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used.

$$t_{db} = t_{edb} \frac{\text{sensible capacity (Btu/h)}}{1.10 \times \text{cfm}}$$

$t_{wb}$  = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (hlwb).

$$hlwb = h_{ewb} \frac{\text{total capacity (Btu/h)}}{4.5 \times \text{cfm}}$$

Where:  $h_{ewb}$  Enthalpy of air entering evaporator coil.

- Cooling capacities are gross and do not include deductions for indoor fan motor heat.
- Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited to edb and ewb conditions.

- The SHC is based on 80 F edb temperature of air entering evaporator coil.

- Below 80 F edb, subtract (corr factor x cfm) from SHC.

- Above 80 F edb, add (corr factor x cfm) to SHC.

| BF | ENTERING AIR DR - BULB TEMP F |      |      |      |      | Use formula shown below.* |
|----|-------------------------------|------|------|------|------|---------------------------|
|    | under                         |      |      |      | over |                           |
|    | Correction Factor             |      |      |      |      |                           |
|    | 1.04                          | 2.07 | 3.11 | 4.14 | 5.18 |                           |
|    | 0.98                          | 1.96 | 2.94 | 3.92 | 4.90 |                           |
|    | 0.87                          | 1.74 | 2.62 | 3.49 | 4.36 |                           |
|    | 0.76                          | 1.53 | 2.29 | 3.05 | 3.82 |                           |

- Interpolation is permissible.

\*Correction Factor = 1.10 x (1 - BF) x (edb - 80).

# Cooling Capacities Continued

| TCM-D - / - English                     |                          |        |         |        |         |         |        |         |         |        |         |         |        |         |         |
|---|--------------------------|--------|---------|--------|---------|---------|--------|---------|---------|--------|---------|---------|--------|---------|---------|
| Temp F<br>Air Entering<br>Condenser Ldb | Evaporator Air - CFM/BPF |        |         |        |         |         |        |         |         |        |         |         |        |         |         |
|   | /                        |        |         | /      |         |         | /      |         |         | /      |         |         | /      |         |         |
|   | Evaporator Air - EWB F   |        |         |        |         |         |        |         |         |        |         |         |        |         |         |
| TC                                      | 91,678                   | 99,721 | 107,544 | 93,488 | 101,531 | 109,045 | 94,807 | 102,556 | 109,708 | 95,815 | 102,875 | 109,851 | 98,274 | 103,888 | 110,759 |
| SHC                                     | 75,057                   | 62,676 | 50,327  | 80,406 | 66,513  | 52,128  | 85,072 | 69,930  | 53,497  | 88,196 | 72,871  | 54,501  | 90,122 | 76,491  | 56,351  |
| kW                                      | 4.43                     | 4.44   | 4.47    | 4.43   | 4.44    | 4.48    | 4.44   | 4.45    | 4.50    | 4.44   | 4.46    | 4.51    | 4.44   | 4.47    | 4.52    |
| TC                                      | 87,335                   | 95,447 | 103,784 | 89,296 | 97,228  | 105,229 | 90,630 | 98,237  | 105,923 | 91,882 | 98,566  | 106,059 | 94,322 | 99,567  | 106,860 |
| SHC                                     | 71,448                   | 59,597 | 47,901  | 76,780 | 63,474  | 49,784  | 80,932 | 66,933  | 51,264  | 83,832 | 69,954  | 52,400  | 85,427 | 73,769  | 54,282  |
| kW                                      | 5.06                     | 5.10   | 5.14    | 5.09   | 5.11    | 5.16    | 5.10   | 5.12    | 5.17    | 5.10   | 5.13    | 5.19    | 5.11   | 5.14    | 5.20    |
| TC                                      | 85,235                   | 93,572 | 102,305 | 87,137 | 95,290  | 103,796 | 89,007 | 96,200  | 104,499 | 90,650 | 96,494  | 104,583 | 92,732 | 97,451  | 105,397 |
| SHC                                     | 74,681                   | 62,261 | 49,811  | 80,380 | 66,470  | 52,083  | 83,867 | 70,247  | 53,799  | 86,052 | 73,622  | 55,132  | 88,696 | 77,837  | 57,320  |
| kW                                      | 5.79                     | 5.86   | 5.90    | 5.83   | 5.87    | 5.92    | 5.85   | 5.88    | 5.94    | 5.85   | 5.89    | 5.95    | 5.87   | 5.90    | 5.96    |
| TC                                      | 76,889                   | 84,901 | 93,226  | 78,959 | 86,336  | 94,603  | 81,070 | 87,122  | 95,211  | 82,562 | 87,265  | 95,227  | 84,639 | 88,122  | 95,916  |
| SHC                                     | 67,145                   | 55,987 | 44,627  | 72,116 | 59,872  | 46,726  | 74,884 | 63,438  | 48,432  | 76,402 | 66,654  | 49,765  | 78,324 | 70,409  | 51,857  |
| kW                                      | 6.38                     | 6.49   | 6.54    | 6.43   | 6.50    | 6.56    | 6.48   | 6.52    | 6.58    | 6.50   | 6.53    | 6.59    | 6.51   | 6.53    | 6.60    |
| TC                                      | 65,832                   | 73,198 | 80,842  | 66,531 | 74,405  | 82,028  | 70,462 | 74,930  | 82,509  | 71,755 | 75,055  | 82,702  | 73,574 | 75,870  | 83,022  |
| SHC                                     | 66,038                   | 55,125 | 43,685  | 69,869 | 59,125  | 45,845  | 72,268 | 62,747  | 47,635  | 73,594 | 65,962  | 49,046  | 75,460 | 69,698  | 51,237  |
| kW                                      | 7.10                     | 7.27   | 7.33    | 7.20   | 7.29    | 7.35    | 7.28   | 7.30    | 7.36    | 7.28   | 7.31    | 7.37    | 7.30   | 7.32    | 7.38    |
| TC                                      | 63,140                   | 70,275 | 77,909  | 65,949 | 71,425  | 79,035  | 68,000 | 71,931  | 79,449  | 69,266 | 72,023  | 79,624  | 71,018 | 72,803  | 79,914  |
| SHC                                     | 63,893                   | 53,844 | 42,539  | 67,641 | 57,852  | 44,711  | 69,744 | 61,536  | 46,485  | 71,043 | 64,622  | 47,912  | 72,840 | 68,343  | 50,120  |
| kW                                      | 7.75                     | 7.97   | 8.03    | 7.88   | 7.99    | 8.05    | 7.96   | 8.00    | 8.07    | 7.99   | 8.01    | 8.08    | 8.01   | 8.02    | 8.09    |
| TC                                      | 60,388                   | 67,263 | 74,973  | 63,380 | 69,392  | 76,002  | 65,483 | 68,987  | 76,377  | 66,711 | 68,959  | 76,617  | 66,436 | 69,611  | 76,780  |
| SHC                                     | 61,596                   | 52,561 | 41,381  | 64,960 | 56,619  | 43,547  | 67,116 | 60,188  | 45,349  | 68,375 | 63,232  | 46,789  | 70,143 | 66,805  | 48,991  |
| kW                                      | 7.94                     | 8.19   | 8.28    | 8.09   | 8.23    | 8.30    | 8.19   | 8.25    | 8.32    | 8.24   | 8.26    | 8.33    | 8.26   | 8.27    | 8.34    |

| TCM-D - / - SI                          |                           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|---|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Temp C<br>Air Entering<br>Condenser Ldb | Evaporator Air - L/s /BPF |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|   | /                         |      |      | /    |      |      | /    |      |      | /    |      |      | /    |      |      |
|   | Evaporator Air - EWB C    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| TC                                      | 26.9                      | 29.2 | 31.5 | 27.4 | 29.8 | 32.0 | 27.8 | 30.1 | 32.2 | 28.1 | 30.2 | 32.2 | 28.8 | 30.4 | 32.5 |
| SHC                                     | 22.0                      | 18.4 | 14.8 | 23.6 | 19.5 | 15.3 | 24.9 | 20.5 | 15.7 | 25.8 | 21.4 | 16.0 | 26.4 | 22.4 | 16.5 |
| kW                                      | 4.43                      | 4.44 | 4.47 | 4.43 | 4.44 | 4.48 | 4.44 | 4.45 | 4.50 | 4.44 | 4.46 | 4.51 | 4.44 | 4.47 | 4.52 |
| TC                                      | 25.6                      | 28.0 | 30.4 | 26.2 | 28.5 | 30.8 | 26.6 | 28.8 | 31.0 | 26.9 | 28.9 | 31.1 | 27.6 | 29.2 | 31.3 |
| SHC                                     | 20.9                      | 17.5 | 14.0 | 22.5 | 18.6 | 14.6 | 23.7 | 18.6 | 15.0 | 24.6 | 20.5 | 15.4 | 25.0 | 21.6 | 15.9 |
| kW                                      | 5.06                      | 5.10 | 5.14 | 5.09 | 5.11 | 5.16 | 5.10 | 5.12 | 5.17 | 5.10 | 5.13 | 5.19 | 5.11 | 5.14 | 5.20 |
| TC                                      | 25.0                      | 27.4 | 30.0 | 25.5 | 27.9 | 30.4 | 26.1 | 28.2 | 30.6 | 26.6 | 28.3 | 30.7 | 27.2 | 28.6 | 30.9 |
| SHC                                     | 21.9                      | 18.2 | 14.6 | 23.6 | 19.5 | 15.3 | 24.6 | 20.6 | 15.8 | 25.2 | 21.6 | 16.2 | 26.0 | 22.8 | 16.8 |
| kW                                      | 5.79                      | 5.86 | 5.90 | 5.83 | 5.87 | 5.92 | 5.85 | 5.88 | 5.94 | 5.85 | 5.89 | 5.95 | 5.87 | 5.90 | 5.96 |
| TC                                      | 22.5                      | 24.9 | 27.3 | 23.1 | 25.3 | 27.7 | 23.8 | 25.5 | 27.9 | 24.2 | 25.6 | 27.9 | 24.8 | 25.8 | 28.1 |
| SHC                                     | 19.7                      | 16.4 | 13.1 | 21.1 | 17.5 | 13.7 | 22.0 | 18.6 | 14.2 | 22.4 | 19.5 | 14.6 | 23.0 | 20.6 | 15.2 |
| kW                                      | 6.38                      | 6.49 | 6.54 | 6.43 | 6.50 | 6.56 | 6.48 | 6.52 | 6.58 | 6.50 | 6.53 | 6.59 | 6.51 | 6.53 | 6.60 |
| TC                                      | 19.3                      | 21.5 | 23.7 | 20.1 | 21.8 | 24.0 | 20.7 | 22.0 | 24.2 | 21.0 | 22.0 | 24.2 | 21.6 | 22.2 | 24.3 |
| SHC                                     | 19.4                      | 16.2 | 12.8 | 20.5 | 17.3 | 13.4 | 21.2 | 18.4 | 14.0 | 21.6 | 19.3 | 14.4 | 22.1 | 20.4 | 15.0 |
| kW                                      | 7.10                      | 7.27 | 7.33 | 7.20 | 7.29 | 7.35 | 7.26 | 7.30 | 7.36 | 7.28 | 7.31 | 7.37 | 7.30 | 7.32 | 7.38 |
| TC                                      | 18.5                      | 20.6 | 22.8 | 19.3 | 20.9 | 23.2 | 19.9 | 21.1 | 23.3 | 20.3 | 21.1 | 23.3 | 20.8 | 21.3 | 23.4 |
| SHC                                     | 18.7                      | 15.8 | 12.5 | 19.8 | 17.0 | 13.1 | 20.4 | 18.0 | 13.6 | 20.8 | 18.9 | 14.0 | 21.3 | 20.0 | 14.7 |
| kW                                      | 7.75                      | 7.97 | 8.03 | 7.88 | 7.99 | 8.05 | 7.96 | 8.00 | 8.07 | 7.99 | 8.01 | 8.08 | 8.01 | 8.02 | 8.09 |
| TC                                      | 17.7                      | 19.7 | 22.0 | 18.6 | 20.0 | 22.3 | 19.2 | 20.2 | 22.4 | 19.6 | 20.2 | 22.5 | 20.1 | 20.4 | 22.5 |
| SHC                                     | 18.1                      | 15.4 | 12.1 | 19.0 | 16.6 | 12.8 | 19.7 | 17.6 | 13.3 | 20.0 | 18.5 | 13.7 | 20.6 | 19.6 | 14.4 |
| kW                                      | 7.94                      | 8.19 | 8.28 | 8.09 | 8.23 | 8.30 | 8.19 | 8.25 | 8.32 | 8.24 | 8.26 | 8.33 | 8.26 | 8.27 | 8.34 |

**LEGEND**

- BPF Bypass Factor
- Edb Entering Dry-Bulb
- Ewb Entering Wet-Bulb
- SHC Sensible Heat Capacity (1000 Btuh) Gross
- TC Total Capacity (1000 Btuh) Gross
- kW Compressor Motor Power Input
- Ldb Leaving Dry-Bulb
- Lwb Leaving Wet-Bulb

Bold, italics - Standard Ratings

**Notes**

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used.

$$t_{dwb} = t_{edb} + \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

$t_{dwb}$  = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil ( $h_{lwb}$ ).

$$h_{lwb} = h_{edb} + \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where:  $h_{edb}$  Enthalpy of air entering evaporator coil.

- Cooling capacities are gross and do not include deductions for indoor fan motor heat.
- Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited to edb and ewb conditions.

- The SHC is based on 80 F edb temperature of air entering evaporator coil.
  - Below 80 F edb, subtract (corr factor x cfm) from SHC.
  - Above 80 F edb, add (corr factor x cfm) to SHC.

| BF | ENTERING AIR DRY - BULB TEMP F |      |      |      |      | Use formula shown below.* |
|----|--------------------------------|------|------|------|------|---------------------------|
|    | 1.04                           | 2.07 | 3.11 | 4.14 | 5.18 |                           |
|    | 0.98                           | 1.96 | 2.94 | 3.92 | 4.90 |                           |
|    | 0.87                           | 1.74 | 2.62 | 3.49 | 4.36 |                           |
|    | 0.76                           | 1.53 | 2.29 | 3.05 | 3.82 |                           |

- Interpolation is permissible.  
\*Correction Factor = 1.10 x (1 - BF) x (edb - 80).

# Cooling Capacities Continued

| TCM-D - / - English                     |                          |         |         |         |         |         |         |         |         |         |         |         |         |         |         |  |
|---|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Temp F<br>Air Entering<br>Condenser Edb | Evaporator Air - CFM/BPF |         |         |         |         |         |         |         |         |         |         |         |         |         |         |  |
|   | /                        |         |         |         | /       |         |         |         | /       |         |         |         | /       |         |         |  |
|   | Evaporator Air - EWB F   |         |         |         |         |         |         |         |         |         |         |         |         |         |         |  |
| TC                                      | 107,731                  | 111,058 | 126,956 | 110,890 | 120,294 | 130,273 | 114,222 | 123,374 | 132,919 | 116,431 | 124,907 | 134,200 | 119,389 | 126,535 | 135,613 |  |
| SHC                                     | 87,679                   | 82,191  | 66,908  | 105,939 | 88,273  | 70,647  | 114,952 | 95,566  | 74,640  | 118,998 | 100,007 | 77,008  | 122,749 | 105,521 | 80,005  |  |
| kW                                      | 5.24                     | 5.26    | 5.30    | 5.26    | 5.27    | 5.33    | 5.25    | 5.28    | 5.37    | 5.26    | 5.29    | 5.38    | 5.27    | 5.30    | 5.40    |  |
| TC                                      | 102,548                  | 112,233 | 122,277 | 106,908 | 116,296 | 125,628 | 109,602 | 118,176 | 128,283 | 111,923 | 119,676 | 129,542 | 114,925 | 121,164 | 130,958 |  |
| SHC                                     | 95,141                   | 80,116  | 65,105  | 103,590 | 86,279  | 69,017  | 111,756 | 93,604  | 73,314  | 114,798 | 98,104  | 75,795  | 118,353 | 103,678 | 78,940  |  |
| kW                                      | 5.96                     | 6.03    | 6.08    | 6.01    | 6.04    | 6.10    | 6.03    | 6.06    | 6.14    | 6.04    | 6.06    | 6.16    | 6.05    | 6.08    | 6.18    |  |
| TC                                      | 96,398                   | 106,782 | 116,796 | 100,139 | 109,715 | 119,918 | 104,776 | 112,422 | 122,690 | 107,185 | 113,745 | 123,931 | 110,143 | 115,236 | 125,172 |  |
| SHC                                     | 92,125                   | 77,769  | 62,935  | 100,603 | 84,010  | 66,835  | 107,987 | 91,458  | 71,361  | 110,271 | 95,931  | 73,985  | 113,543 | 101,459 | 77,247  |  |
| kW                                      | 6.71                     | 6.87    | 6.92    | 6.80    | 6.88    | 6.95    | 6.85    | 6.90    | 6.98    | 6.87    | 6.91    | 6.99    | 6.89    | 6.92    | 7.02    |  |
| TC                                      | 88,622                   | 99,996  | 110,656 | 93,052  | 103,193 | 113,565 | 98,756  | 105,865 | 116,164 | 101,685 | 107,155 | 117,405 | 104,680 | 108,549 | 118,663 |  |
| SHC                                     | 87,763                   | 74,915  | 60,589  | 95,797  | 81,362  | 64,464  | 101,906 | 88,889  | 69,039  | 104,823 | 93,383  | 71,748  | 108,127 | 98,939  | 75,142  |  |
| kW                                      | 7.30                     | 7.57    | 7.68    | 7.40    | 7.63    | 7.70    | 7.55    | 7.65    | 7.73    | 7.62    | 7.66    | 7.75    | 7.64    | 7.67    | 7.76    |  |
| TC                                      | 79,456                   | 89,348  | 101,141 | 84,412  | 92,396  | 103,927 | 89,763  | 95,351  | 106,484 | 92,597  | 96,742  | 107,664 | 95,937  | 98,300  | 108,921 |  |
| SHC                                     | 82,717                   | 71,179  | 57,746  | 89,149  | 77,759  | 61,735  | 94,601  | 85,557  | 66,407  | 97,599  | 90,054  | 69,182  | 101,220 | 95,805  | 72,710  |  |
| kW                                      | 8.11                     | 8.35    | 8.61    | 8.23    | 8.43    | 8.64    | 8.37    | 8.53    | 8.66    | 8.45    | 8.57    | 8.67    | 8.54    | 8.60    | 8.69    |  |
| TC                                      | 77,501                   | 86,725  | 99,071  | 82,700  | 89,720  | 101,951 | 88,036  | 92,523  | 104,318 | 90,804  | 93,995  | 105,507 | 94,024  | 95,650  | 106,816 |  |
| SHC                                     | 80,214                   | 69,307  | 56,180  | 85,594  | 75,917  | 60,218  | 91,026  | 83,615  | 64,914  | 93,973  | 88,171  | 67,722  | 97,315  | 93,861  | 71,328  |  |
| kW                                      | 8.58                     | 8.80    | 9.13    | 8.71    | 8.89    | 9.16    | 8.85    | 8.97    | 9.18    | 8.93    | 9.02    | 9.19    | 9.03    | 9.07    | 9.20    |  |
| TC                                      | 74,133                   | 82,172  | 94,687  | 79,198  | 85,013  | 97,464  | 84,372  | 87,781  | 99,622  | 87,080  | 89,183  | 100,968 | 90,196  | 91,146  | 102,183 |  |
| SHC                                     | 76,728                   | 67,438  | 54,510  | 81,970  | 74,000  | 58,615  | 87,325  | 81,705  | 63,336  | 90,128  | 86,178  | 66,172  | 93,353  | 91,283  | 69,782  |  |
| kW                                      | 9.06                     | 9.27    | 9.63    | 9.19    | 9.35    | 9.69    | 9.34    | 9.44    | 9.71    | 9.42    | 9.48    | 9.72    | 9.52    | 9.55    | 9.73    |  |

| TCM-D - / - SI                          |                           |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|---|---------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Temp C<br>Air Entering<br>Condenser Edb | Evaporator Air - L/s /BPF |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
|   | /                         |      |      |      | /    |      |      |      | /    |      |      |      | /    |      |      |  |
|   | Evaporator Air - EWB C    |      |      |      |      |      |      |      |      |      |      |      |      |      |      |  |
| TC                                      | 31.6                      | 34.3 | 37.2 | 32.5 | 35.3 | 38.2 | 33.5 | 36.2 | 39.0 | 34.1 | 36.6 | 39.3 | 35.0 | 37.1 | 39.7 |  |
| SHC                                     | 28.6                      | 24.1 | 19.6 | 31.0 | 25.9 | 20.7 | 33.7 | 28.0 | 21.9 | 34.9 | 29.3 | 22.6 | 36.0 | 30.9 | 23.4 |  |
| kW                                      | 5.24                      | 5.26 | 5.30 | 5.26 | 5.27 | 5.33 | 5.25 | 5.28 | 5.37 | 5.26 | 5.29 | 5.38 | 5.27 | 5.30 | 5.40 |  |
| TC                                      | 30.1                      | 32.9 | 35.8 | 31.0 | 33.8 | 36.8 | 32.1 | 34.6 | 37.6 | 32.8 | 35.1 | 38.0 | 33.7 | 35.5 | 38.4 |  |
| SHC                                     | 27.9                      | 23.5 | 19.1 | 30.4 | 25.3 | 20.2 | 32.8 | 27.4 | 21.5 | 33.6 | 28.8 | 22.2 | 34.7 | 30.4 | 23.1 |  |
| kW                                      | 5.96                      | 6.03 | 6.08 | 6.01 | 6.04 | 6.10 | 6.03 | 6.06 | 6.14 | 6.04 | 6.06 | 6.16 | 6.05 | 6.08 | 6.18 |  |
| TC                                      | 28.3                      | 31.3 | 34.2 | 29.3 | 32.2 | 35.1 | 30.7 | 32.9 | 36.0 | 31.4 | 33.3 | 36.3 | 32.3 | 33.8 | 36.7 |  |
| SHC                                     | 27.0                      | 22.8 | 18.4 | 29.5 | 24.6 | 19.6 | 31.6 | 26.8 | 20.9 | 32.3 | 28.1 | 21.7 | 33.3 | 29.7 | 22.6 |  |
| kW                                      | 6.71                      | 6.87 | 6.92 | 6.80 | 6.88 | 6.95 | 6.85 | 6.90 | 6.98 | 6.87 | 6.91 | 6.99 | 6.89 | 6.92 | 7.02 |  |
| TC                                      | 26.0                      | 29.3 | 32.4 | 27.3 | 30.2 | 33.3 | 28.9 | 31.0 | 34.0 | 29.8 | 31.4 | 34.4 | 30.7 | 31.8 | 34.8 |  |
| SHC                                     | 25.7                      | 22.0 | 17.8 | 28.1 | 23.8 | 18.9 | 29.8 | 26.1 | 20.2 | 30.7 | 27.4 | 21.0 | 31.7 | 29.0 | 22.0 |  |
| kW                                      | 7.30                      | 7.57 | 7.68 | 7.40 | 7.63 | 7.70 | 7.55 | 7.65 | 7.73 | 7.62 | 7.66 | 7.75 | 7.64 | 7.67 | 7.76 |  |
| TC                                      | 23.3                      | 26.2 | 29.6 | 24.7 | 27.1 | 30.5 | 26.3 | 27.9 | 31.2 | 27.1 | 28.4 | 31.6 | 28.1 | 28.8 | 31.9 |  |
| SHC                                     | 24.2                      | 20.9 | 16.9 | 26.1 | 22.8 | 18.1 | 27.7 | 25.1 | 19.5 | 28.6 | 26.4 | 20.3 | 29.7 | 26.1 | 21.3 |  |
| kW                                      | 8.11                      | 8.35 | 8.61 | 8.23 | 8.43 | 8.64 | 8.37 | 8.53 | 8.66 | 8.45 | 8.57 | 8.67 | 8.54 | 8.60 | 8.69 |  |
| TC                                      | 22.7                      | 25.4 | 29.0 | 24.2 | 26.3 | 29.9 | 25.8 | 27.1 | 30.6 | 26.6 | 27.5 | 30.9 | 27.6 | 28.0 | 31.3 |  |
| SHC                                     | 23.5                      | 20.3 | 16.5 | 25.1 | 22.3 | 17.6 | 26.7 | 24.5 | 19.0 | 27.5 | 25.8 | 19.8 | 28.5 | 27.5 | 20.9 |  |
| kW                                      | 8.58                      | 8.80 | 9.13 | 8.71 | 8.89 | 9.16 | 8.85 | 8.97 | 9.18 | 8.93 | 9.02 | 9.19 | 9.03 | 9.07 | 9.20 |  |
| TC                                      | 21.7                      | 24.1 | 27.8 | 23.2 | 24.9 | 28.6 | 24.7 | 25.7 | 29.3 | 25.5 | 26.1 | 29.6 | 26.4 | 26.7 | 29.9 |  |
| SHC                                     | 22.5                      | 19.8 | 16.0 | 24.0 | 21.7 | 17.2 | 25.6 | 23.9 | 18.6 | 26.4 | 25.3 | 19.4 | 27.4 | 26.8 | 20.5 |  |
| kW                                      | 9.06                      | 9.27 | 9.63 | 9.19 | 9.35 | 9.69 | 9.34 | 9.44 | 9.71 | 9.42 | 9.48 | 9.72 | 9.52 | 9.55 | 9.73 |  |

**LEGEND**

- BPF Bypass Factor
- Edb Entering Dry-Bulb
- Ewb Entering Wet-Bulb
- SHC Sensible Heat Capacity (1000 Btu/h) Gross
- TC Total Capacity (1000 Btu/h) Gross
- kW Compressor Motor Power Input
- Ldb Leaving Dry-Bulb
- Lwb Leaving Wet-Bulb

**Bold, Italics - Standard Ratings**

**Notes**

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used.

$$l_{db} = t_{edb} + \frac{\text{sensible capacity (Btu/h)}}{1.10 \times cfm}$$

t<sub>lwb</sub> = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h<sub>lwb</sub>).

$$h_{lwb} = h_{ewb} + \frac{\text{total capacity (Btu/h)}}{4.5 \times cfm}$$

Where: h<sub>ewb</sub> = Enthalpy of air entering evaporator coil.

4. Cooling capacities are gross and do not include deductions for indoor fan motor heat.
5. Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited to edb and ewb conditions.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
  - Below 80 F edb, subtract (corr factor x cfm) from SHC.
  - Above 80 F edb, add (corr factor x cfm) to SHC.

| BF | ENTERING AIR DRY-BULB TEMP F |      |      |      |      | Use formula shown below.* |
|----|------------------------------|------|------|------|------|---------------------------|
|    |                              |      |      |      |      |                           |
|    | Correction Factor            |      |      |      |      |                           |
|    | 1.04                         | 2.07 | 3.11 | 4.14 | 5.18 |                           |
|    | 0.98                         | 1.96 | 2.94 | 3.92 | 4.90 |                           |
|    | 0.87                         | 1.74 | 2.62 | 3.49 | 4.36 |                           |
|    | 0.76                         | 1.53 | 2.29 | 3.05 | 3.82 |                           |

- Interpolation is permissible.

\*Correction Factor = 1.10 x (1 - BF) x (edb - 80).

# Cooling Capacities Continued

| TCM - D - / - English                   |  | Evaporator Air - CFM/BPF |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|---|--|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Temp F<br>Air Entering<br>Condenser Edb |  | /                        |         |         |         |         | /       |         |         |         |         | /       |         |         |         |         |
|   |  | Evaporator Air - EWB F   |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
|   |  | TC                       | SHC     | kW      | TC      | SHC     | kW      | TC      | SHC     | kW      | TC      | SHC     | kW      | TC      | SHC     | kW      |
|   |  | 125,652                  | 135,720 | 145,622 | 128,777 | 139,070 | 146,363 | 131,678 | 141,510 | 150,551 | 134,948 | 143,338 | 152,324 | 137,891 | 144,845 | 153,784 |
|   |  | 104,119                  | 86,901  | 69,703  | 112,331 | 93,211  | 73,055  | 119,320 | 99,114  | 76,250  | 124,219 | 104,631 | 79,253  | 128,415 | 109,952 | 82,133  |
|   |  | 5.77                     | 5.78    | 5.86    | 5.78    | 5.80    | 5.89    | 5.78    | 5.82    | 5.92    | 5.78    | 5.94    | 5.94    | 5.80    | 5.86    | 5.96    |
|   |  | 121,255                  | 131,235 | 142,103 | 124,484 | 134,381 | 144,904 | 127,489 | 136,865 | 147,044 | 130,822 | 138,787 | 148,728 | 134,207 | 140,281 | 150,090 |
|   |  | 102,388                  | 85,369  | 68,760  | 110,849 | 91,701  | 72,399  | 117,446 | 97,848  | 75,767  | 122,175 | 103,909 | 78,996  | 124,025 | 109,476 | 82,113  |
|   |  | 6.64                     | 6.63    | 6.68    | 6.63    | 6.64    | 6.72    | 6.64    | 6.65    | 6.74    | 6.64    | 6.67    | 6.77    | 6.65    | 6.68    | 6.79    |
|   |  | 114,780                  | 126,004 | 136,795 | 119,010 | 128,954 | 139,805 | 122,763 | 131,223 | 141,986 | 126,578 | 133,090 | 143,594 | 129,297 | 134,573 | 144,919 |
|   |  | 99,609                   | 83,529  | 66,950  | 108,354 | 89,952  | 70,870  | 114,522 | 96,188  | 74,497  | 117,150 | 102,331 | 77,957  | 120,750 | 107,974 | 81,281  |
|   |  | 7.47                     | 7.57    | 7.61    | 7.55    | 7.58    | 7.63    | 7.57    | 7.69    | 7.65    | 7.57    | 7.60    | 7.68    | 7.58    | 7.60    | 7.69    |
|   |  | 106,293                  | 118,899 | 130,530 | 111,396 | 122,301 | 133,492 | 116,381 | 124,559 | 135,694 | 120,629 | 126,320 | 137,357 | 123,746 | 127,730 | 138,580 |
|   |  | 95,996                   | 80,930  | 64,808  | 103,680 | 87,754  | 68,841  | 108,689 | 84,163  | 72,674  | 112,656 | 100,143 | 76,316  | 115,566 | 105,894 | 79,815  |
|   |  | 8.10                     | 8.34    | 8.44    | 8.19    | 8.41    | 8.45    | 8.30    | 8.42    | 8.47    | 8.40    | 8.42    | 8.48    | 8.41    | 8.43    | 8.50    |
|   |  | 91,063                   | 101,619 | 114,535 | 96,419  | 104,659 | 117,275 | 101,058 | 107,242 | 119,335 | 104,983 | 109,169 | 120,942 | 108,310 | 110,849 | 122,204 |
|   |  | 91,062                   | 77,705  | 62,676  | 97,107  | 84,737  | 66,843  | 101,778 | 91,394  | 70,853  | 105,731 | 97,718  | 74,704  | 109,082 | 103,813 | 78,449  |
|   |  | 9.37                     | 9.60    | 9.92    | 9.49    | 9.68    | 9.94    | 9.60    | 9.76    | 9.95    | 9.70    | 9.82    | 9.96    | 9.80    | 9.87    | 9.98    |
|   |  | 87,070                   | 96,572  | 109,882 | 92,412  | 99,547  | 112,886 | 96,992  | 101,968 | 114,894 | 100,818 | 103,873 | 116,465 | 104,098 | 105,694 | 117,712 |
|   |  | 87,691                   | 75,680  | 60,955  | 93,071  | 82,697  | 65,313  | 97,684  | 89,353  | 69,372  | 101,537 | 95,769  | 73,297  | 104,841 | 101,574 | 77,134  |
|   |  | 9.86                     | 10.08   | 10.45   | 9.99    | 10.17   | 10.52   | 10.11   | 10.24   | 10.54   | 10.21   | 10.29   | 10.55   | 10.31   | 10.35   | 10.56   |
|   |  | 82,984                   | 91,114  | 104,678 | 88,251  | 94,056  | 107,715 | 92,589  | 96,346  | 110,008 | 96,456  | 98,424  | 111,542 | 99,679  | 100,272 | 112,748 |
|   |  | 83,592                   | 73,527  | 59,083  | 88,898  | 80,525  | 63,523  | 93,368  | 87,164  | 67,743  | 97,163  | 93,513  | 71,716  | 100,409 | 99,152  | 78,590  |
|   |  | 10.35                    | 10.56   | 10.94   | 10.49   | 10.64   | 11.04   | 10.61   | 10.71   | 11.12   | 10.72   | 10.78   | 11.13   | 10.82   | 10.84   | 11.14   |

| TCM - D - / - SI                        |  | Evaporator Air - L/s/BPF |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---|--|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Temp C<br>Air Entering<br>Condenser Edb |  | /                        |       |       |       |       | /     |       |       |       |       | /     |       |       |       |       |
|   |  | Evaporator Air - EWB C   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|   |  | TC                       | SHC   | kW    | TC    | SHC   | kW    | TC    | SHC   | kW    | TC    | SHC   | kW    | TC    | SHC   | kW    |
|   |  | 36.8                     | 39.8  | 42.7  | 37.7  | 40.8  | 43.5  | 38.6  | 41.5  | 44.1  | 39.6  | 42.0  | 44.6  | 40.4  | 42.5  | 45.1  |
|   |  | 30.5                     | 25.5  | 20.4  | 32.9  | 27.3  | 21.4  | 35.0  | 29.0  | 22.3  | 36.4  | 30.7  | 23.2  | 37.6  | 32.2  | 24.1  |
|   |  | 5.77                     | 5.78  | 5.86  | 5.78  | 5.80  | 5.89  | 5.78  | 5.82  | 5.92  | 5.78  | 5.84  | 5.94  | 5.80  | 5.86  | 5.96  |
|   |  | 35.5                     | 38.5  | 41.6  | 36.5  | 39.4  | 42.5  | 37.4  | 40.1  | 43.1  | 38.3  | 40.7  | 43.6  | 39.3  | 41.1  | 44.0  |
|   |  | 30.0                     | 25.0  | 20.2  | 32.5  | 26.9  | 21.2  | 34.4  | 28.7  | 22.2  | 35.8  | 30.5  | 23.2  | 36.3  | 32.1  | 24.1  |
|   |  | 6.64                     | 6.63  | 6.68  | 6.63  | 6.64  | 6.72  | 6.64  | 6.65  | 6.74  | 6.64  | 6.67  | 6.77  | 6.65  | 6.68  | 6.79  |
|   |  | 33.6                     | 36.9  | 40.1  | 34.9  | 37.8  | 41.0  | 36.0  | 38.5  | 41.6  | 37.1  | 39.0  | 42.1  | 37.9  | 39.4  | 42.5  |
|   |  | 29.2                     | 24.5  | 19.6  | 31.8  | 26.4  | 20.8  | 33.6  | 28.2  | 21.8  | 34.3  | 30.0  | 22.8  | 35.4  | 31.6  | 23.8  |
|   |  | 7.47                     | 7.57  | 7.61  | 7.55  | 7.58  | 7.63  | 7.57  | 7.59  | 7.65  | 7.57  | 7.60  | 7.68  | 7.58  | 7.60  | 7.69  |
|   |  | 31.2                     | 34.8  | 38.3  | 32.6  | 35.6  | 39.1  | 34.1  | 36.5  | 39.8  | 35.4  | 37.0  | 40.3  | 36.3  | 37.4  | 40.6  |
|   |  | 28.1                     | 23.7  | 19.0  | 30.4  | 25.7  | 20.2  | 31.9  | 27.6  | 21.3  | 33.0  | 29.4  | 22.4  | 33.9  | 31.0  | 23.4  |
|   |  | 8.10                     | 8.34  | 8.44  | 8.19  | 8.41  | 8.45  | 8.30  | 8.42  | 8.47  | 8.40  | 8.42  | 8.48  | 8.41  | 8.43  | 8.50  |
|   |  | 26.7                     | 29.8  | 33.6  | 28.3  | 30.7  | 34.4  | 29.6  | 31.4  | 35.0  | 30.8  | 32.0  | 35.4  | 31.7  | 32.5  | 35.8  |
|   |  | 26.7                     | 22.8  | 18.4  | 28.5  | 24.8  | 19.6  | 29.8  | 26.8  | 20.8  | 31.0  | 28.6  | 21.9  | 32.0  | 30.4  | 23.0  |
|   |  | 9.37                     | 9.60  | 9.92  | 9.49  | 9.68  | 9.94  | 9.60  | 9.76  | 9.95  | 9.70  | 9.82  | 9.96  | 9.80  | 9.87  | 9.98  |
|   |  | 25.5                     | 28.3  | 32.2  | 27.1  | 29.7  | 33.1  | 28.4  | 29.9  | 33.7  | 29.5  | 30.4  | 34.1  | 30.5  | 31.0  | 34.5  |
|   |  | 25.7                     | 22.2  | 17.9  | 27.3  | 24.2  | 19.1  | 28.6  | 26.2  | 20.3  | 29.8  | 28.1  | 21.5  | 30.7  | 29.8  | 22.6  |
|   |  | 9.86                     | 10.08 | 10.45 | 9.99  | 10.17 | 10.52 | 10.11 | 10.24 | 10.54 | 10.21 | 10.29 | 10.55 | 10.31 | 10.35 | 10.56 |
|   |  | 24.3                     | 26.7  | 30.7  | 25.9  | 27.6  | 31.6  | 27.2  | 28.2  | 32.2  | 28.3  | 28.8  | 32.7  | 29.2  | 29.4  | 33.0  |
|   |  | 24.5                     | 21.5  | 17.3  | 26.1  | 23.6  | 18.6  | 27.4  | 25.5  | 19.9  | 28.5  | 27.4  | 21.0  | 29.4  | 29.1  | 22.2  |
|   |  | 10.35                    | 10.56 | 10.94 | 10.49 | 10.64 | 11.04 | 10.61 | 10.71 | 11.12 | 10.72 | 10.78 | 11.13 | 10.82 | 10.84 | 11.14 |

## LEGEND

BPF Bypass Factor  
 Edb Entering Dry-Bulb  
 Ewb Entering Wet-Bulb  
 SHC Sensible Heat Capacity (1000 Btuh) Gross  
 Bold, Italics - Standard Ratings  
 Ldb Leaving Dry-Bulb  
 Lwb Leaving Wet-Bulb  
 TC Total Capacity (1000 Btuh) Gross  
 kW Compressor Motor Power Input

## Notes

- Direct interpolation is permissible. Do not extrapolate.
- The following formulas may be used.

$$t_{db} = t_{edb} + \frac{\text{sensible capacity (Btuh)}}{1.10 \times \text{cfm}}$$

hwb = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (hwb).

$$h_{wb} = h_{edb} + \frac{\text{total capacity (Btuh)}}{4.5 \times \text{cfm}}$$

Where: hwb Enthalpy of air entering evaporator coil.

- Cooling capacities are gross and do not include deductions for indoor fan motor heat.
- Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited to edb and ewb conditions.

- The SHC is based on 80 F edb temperature of air entering evaporator coil.
- Below 80 F edb, subtract (corr factor x cfm) from SHC.
- Above 80 F edb, add (corr factor x cfm) to SHC.

| BF | ENTERING AIR DR - BULB TEMP F |      |      |      |      | Use<br>formula<br>shown<br>below.* |
|----|-------------------------------|------|------|------|------|------------------------------------|
|    | Correction Factor             |      |      |      |      |                                    |
|    | 1.04                          | 2.07 | 3.11 | 4.14 | 5.18 |                                    |
|    | 0.98                          | 1.96 | 2.94 | 3.92 | 4.90 |                                    |
|    | 0.87                          | 1.74 | 2.62 | 3.49 | 4.36 |                                    |
|    | 0.76                          | 1.53 | 2.29 | 3.05 | 3.82 |                                    |

\* Interpolation is permissible.

$$\text{*Correction Factor} = 1.10 \times (1 - \text{BF}) \times (\text{edb} - 80).$$

# Cooling Capacities Continued

| TCM-D                                   |         | English                  |         |         |         |         |         |         |         |         |         |         |         |         |         |  |
|---|---------|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| Temp F<br>Air Entering<br>Condenser Edb |         | Evaporator Air - CFM/BPF |         |         |         |         |         |         |         |         |         |         |         |         |         |  |
|   |         | /                        |         |         | /       |         |         | /       |         |         | /       |         |         | /       |         |  |
|   |         | Evaporator Air - EWB F   |         |         |         |         |         |         |         |         |         |         |         |         |         |  |
| TC                                      | 156,424 | 169,175                  | 184,214 | 159,260 | 171,869 | 184,328 | 161,970 | 174,348 | 186,546 | 166,196 | 177,655 | 189,348 | 170,399 | 179,946 | 191,200 |  |
| SHC                                     | 136,012 | 114,016                  | 87,697  | 143,190 | 119,109 | 95,028  | 150,888 | 124,563 | 98,196  | 161,528 | 133,334 | 103,121 | 167,494 | 141,057 | 107,319 |  |
| kW                                      | 8.76    | 8.80                     | 8.90    | 8.77    | 8.81    | 8.90    | 8.77    | 8.82    | 8.92    | 8.78    | 8.85    | 8.96    | 8.78    | 8.87    | 8.98    |  |
| TC                                      | 149,624 | 162,980                  | 176,147 | 152,662 | 165,645 | 178,886 | 155,678 | 168,162 | 181,049 | 160,234 | 171,267 | 183,971 | 164,277 | 173,573 | 185,939 |  |
| SHC                                     | 132,754 | 111,548                  | 90,042  | 140,204 | 116,771 | 93,123  | 148,058 | 122,368 | 96,454  | 157,939 | 131,470 | 101,672 | 164,376 | 139,545 | 106,233 |  |
| kW                                      | 9.76    | 9.84                     | 9.91    | 9.79    | 9.85    | 9.94    | 9.81    | 9.86    | 9.96    | 9.82    | 9.89    | 10.00   | 9.84    | 9.91    | 10.03   |  |
| TC                                      | 144,371 | 158,951                  | 172,547 | 147,846 | 161,517 | 175,176 | 151,252 | 163,887 | 177,445 | 156,691 | 167,138 | 180,431 | 160,644 | 169,321 | 182,446 |  |
| SHC                                     | 128,913 | 108,599                  | 87,444  | 136,485 | 113,833 | 90,652  | 143,681 | 119,621 | 94,039  | 152,679 | 126,903 | 99,442  | 158,902 | 131,514 | 99,721  |  |
| kW                                      | 10.77   | 10.96                    | 11.04   | 10.85   | 10.98   | 11.07   | 10.89   | 10.99   | 11.09   | 10.95   | 11.02   | 11.13   | 10.96   | 11.03   | 11.16   |  |
| TC                                      | 131,597 | 146,195                  | 159,389 | 135,123 | 148,177 | 161,706 | 139,295 | 150,609 | 163,929 | 144,744 | 153,540 | 166,637 | 148,396 | 155,703 | 168,568 |  |
| SHC                                     | 122,514 | 103,438                  | 82,918  | 129,635 | 108,577 | 86,071  | 135,555 | 114,330 | 89,530  | 143,733 | 123,388 | 94,916  | 149,590 | 131,514 | 99,721  |  |
| kW                                      | 11.86   | 12.16                    | 12.25   | 11.95   | 12.18   | 12.28   | 12.06   | 12.20   | 12.31   | 12.14   | 12.22   | 12.34   | 12.16   | 12.24   | 12.37   |  |
| TC                                      | 118,119 | 132,253                  | 145,247 | 121,284 | 134,568 | 147,294 | 125,045 | 136,547 | 149,229 | 130,976 | 139,186 | 151,636 | 136,464 | 141,116 | 153,336 |  |
| SHC                                     | 116,718 | 98,995                   | 79,097  | 123,503 | 104,358 | 82,219  | 126,785 | 110,038 | 85,645  | 136,554 | 119,045 | 91,014  | 139,432 | 127,039 | 95,799  |  |
| kW                                      | 13.01   | 13.46                    | 13.57   | 13.11   | 13.48   | 13.59   | 13.28   | 13.50   | 13.62   | 13.37   | 13.53   | 13.65   | 13.49   | 13.54   | 13.67   |  |
| TC                                      | 113,355 | 127,031                  | 140,390 | 117,055 | 129,459 | 142,346 | 121,650 | 131,510 | 144,176 | 128,000 | 134,091 | 146,493 | 137,161 | 135,945 | 148,071 |  |
| SHC                                     | 112,438 | 96,649                   | 77,141  | 119,474 | 102,115 | 80,262  | 124,584 | 107,841 | 83,672  | 130,669 | 116,869 | 89,043  | 134,908 | 124,740 | 93,829  |  |
| kW                                      | 13.73   | 14.22                    | 14.38   | 13.85   | 14.30   | 14.41   | 14.03   | 14.32   | 14.43   | 14.26   | 14.34   | 14.47   | 14.32   | 14.36   | 14.50   |  |
| TC                                      | 108,260 | 121,323                  | 135,605 | 112,788 | 123,852 | 137,499 | 117,152 | 126,219 | 139,242 | 123,410 | 128,933 | 141,530 | 127,862 | 130,875 | 142,966 |  |
| SHC                                     | 109,243 | 93,899                   | 75,055  | 113,902 | 99,405  | 78,190  | 119,095 | 105,325 | 81,584  | 125,457 | 114,491 | 86,987  | 129,982 | 122,298 | 91,718  |  |
| kW                                      | 14.84   | 15.13                    | 15.42   | 14.80   | 15.24   | 15.44   | 14.98   | 15.33   | 15.46   | 15.23   | 15.37   | 15.50   | 15.35   | 15.39   | 15.53   |  |

| TCM-D                                   |       | SI                       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |
|---|-------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Temp C<br>Air Entering<br>Condenser Edb |       | Evaporator Air - L/s/BPF |       |       |       |       |       |       |       |       |       |       |       |       |       |  |
|   |       | /                        |       |       | /     |       |       | /     |       |       | /     |       |       | /     |       |  |
|   |       | Evaporator Air - EWB C   |       |       |       |       |       |       |       |       |       |       |       |       |       |  |
| TC                                      | 45.8  | 49.6                     | 54.0  | 46.7  | 50.4  | 54.0  | 47.5  | 51.1  | 54.7  | 48.7  | 52.1  | 55.5  | 49.9  | 52.7  | 56.0  |  |
| SHC                                     | 39.9  | 33.4                     | 25.7  | 42.0  | 34.9  | 27.9  | 44.2  | 36.5  | 28.8  | 47.3  | 39.1  | 30.2  | 49.1  | 41.3  | 31.5  |  |
| kW                                      | 8.76  | 8.80                     | 8.90  | 8.77  | 8.81  | 8.90  | 8.77  | 8.82  | 8.92  | 8.78  | 8.85  | 8.96  | 8.78  | 8.87  | 8.98  |  |
| TC                                      | 43.9  | 47.6                     | 51.6  | 44.7  | 48.5  | 52.4  | 45.6  | 49.3  | 53.1  | 47.0  | 50.2  | 53.9  | 48.1  | 50.9  | 54.5  |  |
| SHC                                     | 36.9  | 32.7                     | 26.4  | 41.1  | 34.2  | 27.3  | 43.4  | 35.9  | 28.3  | 46.3  | 38.5  | 29.8  | 48.2  | 40.9  | 31.1  |  |
| kW                                      | 9.76  | 9.84                     | 9.91  | 9.79  | 9.85  | 9.94  | 9.81  | 9.86  | 9.96  | 9.82  | 9.89  | 10.00 | 9.84  | 9.91  | 10.03 |  |
| TC                                      | 42.3  | 46.6                     | 50.6  | 43.3  | 47.3  | 51.3  | 44.3  | 48.0  | 52.0  | 45.9  | 49.0  | 52.9  | 47.1  | 49.6  | 53.5  |  |
| SHC                                     | 37.8  | 31.8                     | 25.6  | 40.0  | 33.4  | 26.6  | 42.1  | 35.1  | 27.6  | 44.7  | 37.8  | 29.1  | 46.6  | 40.2  | 30.5  |  |
| kW                                      | 10.77 | 10.96                    | 11.04 | 10.85 | 10.98 | 11.07 | 10.89 | 10.99 | 11.09 | 10.95 | 11.02 | 11.13 | 10.96 | 11.03 | 11.16 |  |
| TC                                      | 38.6  | 42.8                     | 46.7  | 39.6  | 43.5  | 47.4  | 40.8  | 44.1  | 48.0  | 42.4  | 45.0  | 48.8  | 43.5  | 45.6  | 49.4  |  |
| SHC                                     | 35.9  | 30.3                     | 24.3  | 38.0  | 31.8  | 25.2  | 39.7  | 33.5  | 26.2  | 42.1  | 36.2  | 27.8  | 43.8  | 38.5  | 29.2  |  |
| kW                                      | 11.86 | 12.16                    | 12.25 | 11.95 | 12.18 | 12.28 | 12.06 | 12.20 | 12.31 | 12.14 | 12.22 | 12.34 | 12.16 | 12.24 | 12.37 |  |
| TC                                      | 34.6  | 38.8                     | 42.6  | 35.5  | 39.4  | 43.2  | 36.9  | 40.0  | 43.7  | 38.4  | 40.8  | 44.4  | 40.0  | 41.4  | 44.9  |  |
| SHC                                     | 34.2  | 29.0                     | 23.2  | 36.2  | 30.6  | 24.1  | 37.7  | 32.3  | 25.1  | 40.0  | 34.9  | 26.7  | 40.9  | 37.2  | 28.1  |  |
| kW                                      | 13.01 | 13.46                    | 13.57 | 13.11 | 13.48 | 13.59 | 13.28 | 13.50 | 13.62 | 13.37 | 13.53 | 13.65 | 13.49 | 13.54 | 13.67 |  |
| TC                                      | 33.2  | 37.2                     | 41.1  | 34.3  | 37.9  | 41.7  | 35.7  | 38.5  | 42.3  | 37.5  | 39.3  | 42.9  | 38.7  | 39.8  | 43.4  |  |
| SHC                                     | 33.0  | 28.3                     | 22.6  | 35.0  | 29.9  | 23.5  | 36.6  | 31.6  | 24.5  | 38.3  | 34.3  | 26.1  | 39.5  | 36.6  | 27.5  |  |
| kW                                      | 13.73 | 14.22                    | 14.38 | 13.85 | 14.30 | 14.41 | 14.03 | 14.32 | 14.43 | 14.26 | 14.34 | 14.47 | 14.32 | 14.36 | 14.50 |  |
| TC                                      | 31.7  | 35.6                     | 39.7  | 33.1  | 36.3  | 40.3  | 34.3  | 37.0  | 40.8  | 36.2  | 37.6  | 41.5  | 37.8  | 38.4  | 41.9  |  |
| SHC                                     | 32.0  | 27.5                     | 22.0  | 33.4  | 29.1  | 22.9  | 34.9  | 30.9  | 23.9  | 36.8  | 33.6  | 25.5  | 38.1  | 35.8  | 26.9  |  |
| kW                                      | 14.84 | 15.13                    | 15.42 | 14.80 | 15.24 | 15.44 | 14.98 | 15.33 | 15.46 | 15.23 | 15.37 | 15.50 | 15.35 | 15.39 | 15.53 |  |

**LEGEND**

- BPF Bypass Factor
- Edb Entering Dry-Bulb
- Ewb Entering Wet-Bulb
- SHC Sensible Heat Capacity (1000 Btu/h) Gross
- TC Total Capacity (1000 Btu/h) Gross
- kW Compressor Motor Power Input
- Ldb Leaving Dry-Bulb
- Lwb Leaving Wet-Bulb

Bold, Italics - Standard Ratings

**Notes**

1. Direct interpolation is permissible. Do not extrapolate.
2. The following formulas may be used.

$$tdb = t_{edb} \frac{\text{sensible capacity (Btu/h)}}{1.10 \times \text{cfm}}$$

t<sub>wb</sub> = Wet-bulb temperature corresponding to enthalpy of air leaving evaporator coil (h<sub>wb</sub>).

$$h_{lwb} = h_{ewb} \frac{\text{total capacity (Btu/h)}}{4.5 \times \text{cfm}}$$

Where: h<sub>ewb</sub> Enthalpy of air entering evaporator coil.

4. Cooling capacities are gross and do not include deductions for indoor fan motor heat.
5. Variable Air Volume units will operate down to 70 cfm/ton. Performance at 70 cfm/ton is limited to unloaded operation and may be additionally limited to edb and ewb conditions.

3. The SHC is based on 80 F edb temperature of air entering evaporator coil.
- Below 80 F edb, subtract (corr factor x cfm) from SHC.
- Above 80 F edb, add (corr factor x cfm) to SHC.

| BF | ENTERING AIR DR -BULB TEMP F |      |      |      |      | Use<br>formula<br>shown<br>below.* |
|----|------------------------------|------|------|------|------|------------------------------------|
|    |                              |      |      |      |      |                                    |
|    | Correction Factor            |      |      |      |      |                                    |
|    | 1.04                         | 2.07 | 3.11 | 4.14 | 5.18 |                                    |
|    | 0.88                         | 1.96 | 2.94 | 3.92 | 4.90 |                                    |
|    | 0.87                         | 1.74 | 2.62 | 3.49 | 4.36 |                                    |
|    | 0.76                         | 1.53 | 2.29 | 3.05 | 3.82 |                                    |

- Interpolation is permissible.

\*Correction Factor = 1.10 x (1 - BF) x (edb - 80).

# Fan Performance Table

Unit TCM - A -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   | 822                                      | 0.48 | 0.51 | 927  | 0.62 | 0.66 | 1018 | 0.76 | 0.82 |      |      |      |      |      |      |
|                   | 872                                      | 0.58 | 0.62 | 973  | 0.74 | 0.79 | 1061 | 0.89 | 0.95 |      |      |      |      |      |      |
|                   | 923                                      | 0.70 | 0.75 | 1019 | 0.86 | 0.92 |      |      |      |      |      |      |      |      |      |
|                   | 974                                      | 0.84 | 0.90 | 1067 | 1.01 | 1.08 |      |      |      |      |      |      |      |      |      |
|                   | 1026                                     | 0.99 | 1.06 |      |      |      |      |      |      |      |      |      |      |      |      |
|                   |  |      |      |      |      |      |      |      |      |      |      |      | 1467 | 2.42 | 2.63 |
|                   |  |      |      |      |      |      |      |      |      | 1451 | 2.47 | 2.68 | 1512 | 2.70 | 2.93 |

Unit TCM - A - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   |  |      |      |      |      |      |      |      |      | 1462 | 1.92 | 2.09 | 1517 | 2.12 | 2.30 |
|                   |  |      |      |      |      |      |      |      |      | 1498 | 2.11 | 2.29 | 1552 | 2.34 | 2.51 |
|                   |  |      |      |      |      |      | 1479 | 2.11 | 2.29 | 1534 | 2.34 | 2.51 | 1587 | 2.56 | 2.74 |
|                   |  |      |      | 1460 | 2.13 | 2.31 | 1517 | 2.33 | 2.53 | 1572 | 2.57 | 2.76 | 1624 | 2.79 | 2.99 |
|                   |  |      |      | 1500 | 2.35 | 2.55 | 1557 | 2.60 | 2.79 | 1610 | 2.83 | 3.03 | 1662 | 3.05 | 3.27 |
|                   | 1483                                     | 2.42 | 2.59 | 1541 | 2.64 | 2.83 | 1597 | 2.86 | 3.07 | 1650 | 3.10 | 3.32 | 1701 | 3.33 | 3.57 |
|                   | 1527                                     | 2.68 | 2.87 | 1583 | 2.91 | 3.12 | 1638 | 3.14 | 3.37 | 1690 | 3.38 | 3.63 | -    | -    | -    |
|                   | 1571                                     | 2.97 | 3.18 | 1626 | 3.21 | 3.44 | 1680 | 3.45 | 3.70 | -    | -    | -    | -    | -    | -    |

Unit TCM - A -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   |  |      |      |      |      |      |      |      |      | 1106 | 0.99 | 0.98 | 1180 | 1.13 | 1.13 |
|                   |  |      |      |      |      |      |      |      |      | 1146 | 1.11 | 1.11 | 1219 | 1.29 | 1.28 |
|                   |  |      |      |      |      |      | 1110 | 1.08 | 1.08 | 1188 | 1.27 | 1.26 | 1259 | 1.46 | 1.45 |
|                   |  |      |      |      |      |      | 1155 | 1.25 | 1.24 | 1230 | 1.44 | 1.43 | 1300 | 1.64 | 1.63 |
|                   |  |      |      | 1121 | 1.24 | 1.23 | 1201 | 1.44 | 1.43 | 1274 | 1.64 | 1.63 | 1343 | 1.84 | 1.83 |
|                   | 1084                                     | 1.23 | 1.23 | 1170 | 1.44 | 1.43 | 1247 | 1.65 | 1.64 | 1319 | 1.85 | 1.84 | 1386 | 2.07 | 2.06 |
|                   | 1138                                     | 1.44 | 1.43 | 1220 | 1.65 | 1.64 | 1295 | 1.87 | 1.86 | 1365 | 2.09 | 2.08 | 1429 | 2.32 | 2.30 |
|                   | 1192                                     | 1.67 | 1.66 | 1270 | 1.89 | 1.88 | 1343 | 2.12 | 2.11 | 1411 | 2.35 | 2.34 | 1474 | 2.56 | 2.58 |
|                   | 1246                                     | 1.91 | 1.90 | 1322 | 2.15 | 2.14 | 1392 | 2.39 | 2.38 | 1457 | 2.61 | 2.63 | 1518 | 2.83 | 2.84 |

Unit TCM - A - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   | 1260                                     | 1.31 | 1.30 | 1315 | 1.49 | 1.48 | 1376 | 1.67 | 1.67 | 1434 | 1.87 | 1.86 | 1445 | 2.07 | 2.06 |
|                   | 1287                                     | 1.47 | 1.46 | 1352 | 1.66 | 1.65 | 1412 | 1.85 | 1.84 | 1469 | 2.04 | 2.05 | 1525 | 2.24 | 2.25 |
|                   | 1327                                     | 1.65 | 1.64 | 1389 | 1.84 | 1.83 | 1448 | 2.05 | 2.04 | 1505 | 2.23 | 2.24 | 1560 | 2.40 | 2.46 |
|                   | 1366                                     | 1.84 | 1.83 | 1427 | 2.05 | 2.04 | 1486 | 2.23 | 2.24 | 1542 | 2.40 | 2.46 | 1595 | 2.62 | 2.69 |
|                   | 1407                                     | 2.06 | 2.05 | 1476 | 2.25 | 2.26 | 1525 | 2.47 | 2.48 | 1580 | 2.64 | 2.70 | 1632 | 2.86 | 2.93 |
|                   | 1448                                     | 2.30 | 2.28 | 1508 | 2.49 | 2.50 | 1565 | 2.67 | 2.73 | 1618 | 2.90 | 2.97 | 1670 | 3.13 | 3.20 |
|                   | 1490                                     | 2.55 | 2.54 | 1549 | 2.71 | 2.77 | 1605 | 2.94 | 3.01 | 1658 | 3.18 | 3.25 | 1710 | 3.42 | 3.50 |
|                   | 1535                                     | 2.75 | 2.81 | 1591 | 2.99 | 3.06 | 1646 | 3.23 | 3.30 | 1698 | 3.48 | 3.56 | -    | -    | -    |
|                   | 1579                                     | 3.04 | 3.12 | 1634 | 3.29 | 3.37 | 1688 | 3.54 | 3.63 | -    | -    | -    | -    | -    | -    |

**Legend and Notes**

- Normal Font - Field Installed Drive Package
- Bold Font - Standard Drive Package    Standard Motor.
- Italic Font* - Medium Drive Package    Medium Static Motor.
- Bold, Italic Font** - High Drive Package    High Static Motor.
- RPM - Revolutions Per Minute
- KWI - Kilo Watts Input to Motor
- BHP - Brake Horsepower Input to Fan
- CFM - Cubic Feet per Minute
- In wg - Inch Water Gage

1. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operatin cfm.
2. Static Pressure (i.e Filters) must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters and casing losses.
5. Extensive motor and drive testing on these units ensures that the full brake horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Bold data shows the range of air flow rate for unit management system, other rpms require field-supplied drive.
7. Use of field-supplied motor may affect wiring size. Contact your Carrier representative for details.
8. Conversion - Bhp to KWI  

$$\text{KWI} = \frac{\text{Bhp} \times 0.746}{\text{Motor efficiency}}$$

# Fan Performance Table Continued

Unit TCM - D - - H

| Air flow Rate CFM | Available External Static Pressure In wg |      |      |     |      |      |     |      |      |     |      |      |      |      |      |      |
|-------------------|--|------|------|-----|------|------|-----|------|------|-----|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM  | KWI  | BHP  |      |
|                   |  |      |      |     |      |      |     |      |      |     |      |      |      | 779  | 1.33 | 1.44 |
|                   |  |      |      |     |      |      |     |      |      |     |      |      |      | 799  | 1.46 | 1.59 |
|                   |  |      |      |     |      |      |     |      |      |     | 765  | 1.37 | 1.49 | 819  | 1.62 | 1.76 |
|                   |  |      |      |     |      |      |     |      |      |     | 788  | 1.53 | 1.66 | 841  | 1.79 | 1.94 |
|                   |  |      |      |     |      |      | 756 | 1.46 | 1.58 | 811 | 1.71 | 1.86 | 863  | 1.98 | 2.15 |      |
|                   |  |      |      |     |      |      | 782 | 1.64 | 1.78 | 836 | 1.91 | 2.07 | 886  | 2.19 | 2.38 |      |
|                   |  |      |      | 753 | 1.57 | 1.71 | 809 | 1.84 | 2.00 | 861 | 2.13 | 2.31 | 910  | 2.41 | 2.62 |      |
|                   |  |      |      | 782 | 1.79 | 1.94 | 836 | 2.07 | 2.25 | 887 | 2.36 | 2.56 | 934  | 2.66 | 2.89 |      |
|                   | 755                                      | 1.74 | 1.89 | 811 | 2.03 | 2.20 | 864 | 2.32 | 2.52 | 913 | 2.62 | 2.84 | 959  | 2.93 | 3.18 |      |

Unit TCM - D - - Continued

| Air flow Rate CFM | Available External Static Pressure In wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   | 832                                      | 1.57 | 1.71 | 882  | 1.93 | 1.99 | 928  | 2.11 | 2.29 | 973  | 2.39 | 2.59 | 1015 | 2.69 | 2.92 |
|                   | 851                                      | 1.72 | 1.87 | 899  | 1.99 | 2.16 | 945  | 2.27 | 2.46 | 989  | 2.56 | 2.78 | 1031 | 2.86 | 3.11 |
|                   | 870                                      | 1.88 | 2.04 | 918  | 2.16 | 2.34 | 963  | 2.45 | 2.66 | 1006 | 2.74 | 2.98 | 1048 | 3.06 | 3.32 |
|                   | 890                                      | 2.06 | 2.24 | 937  | 2.35 | 2.55 | 982  | 2.64 | 2.87 | 1024 | 2.96 | 3.21 | 1065 | 3.27 | 3.55 |
|                   | 912                                      | 2.27 | 2.46 | 958  | 2.56 | 2.78 | 1001 | 2.86 | 3.11 | 1043 | 3.18 | 3.45 | 1083 | 3.50 | 3.80 |
|                   | 934                                      | 2.48 | 2.69 | 979  | 2.78 | 3.02 | 1022 | 3.09 | 3.36 | 1063 | 3.43 | 3.72 | 1102 | 3.76 | 4.08 |
|                   | 956                                      | 2.72 | 2.95 | 1000 | 3.03 | 3.29 | 1042 | 3.35 | 3.64 | 1083 | 3.68 | 4.00 | 1122 | 4.03 | 4.38 |
|                   | 980                                      | 2.97 | 3.23 | 1023 | 3.30 | 3.58 | 1064 | 3.63 | 3.94 | 1104 | 3.98 | 4.32 | 1142 | 4.33 | 4.70 |
|                   | 1004                                     | 3.26 | 3.54 | 1046 | 3.59 | 3.90 | 1088 | 3.93 | 4.27 | 1125 | 4.28 | 4.65 | -    | -    | -    |

Unit TCM - D - -

| Air flow Rate CFM | Available External Static Pressure in wg |     |     |     |      |      |     |      |      |     |      |      |      |      |      |      |
|-------------------|--|-----|-----|-----|------|------|-----|------|------|-----|------|------|------|------|------|------|
|                   | RPM                                      | KWI | BHP | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM  | KWI  | BHP  |      |
|                   |  |     |     |     |      |      |     |      |      |     |      |      |      | 769  | 1.18 | 1.19 |
|                   |  |     |     |     |      |      |     |      |      |     |      |      |      | 789  | 1.30 | 1.31 |
|                   |  |     |     |     |      |      |     |      |      |     | 755  | 1.22 | 1.23 | 808  | 1.44 | 1.45 |
|                   |  |     |     |     |      |      |     |      |      |     | 778  | 1.36 | 1.37 | 830  | 1.59 | 1.60 |
|                   |  |     |     |     |      |      |     |      |      |     | 800  | 1.53 | 1.53 | 852  | 1.76 | 1.77 |
|                   |  |     |     |     |      |      | 772 | 1.46 | 1.47 | 825 | 1.70 | 1.71 | 874  | 1.95 | 1.96 |      |
|                   |  |     |     |     |      |      | 798 | 1.64 | 1.65 | 850 | 1.90 | 1.91 | 898  | 2.15 | 2.16 |      |
|                   |  |     |     | 772 | 1.59 | 1.60 | 825 | 1.65 | 1.66 | 875 | 2.10 | 2.11 | 922  | 2.37 | 2.38 |      |
|                   |  |     |     | 800 | 1.81 | 1.82 | 853 | 2.07 | 2.08 | 901 | 2.33 | 2.34 | 947  | 2.56 | 2.62 |      |

Unit TCM - D - - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   | 821                                      | 1.40 | 1.41 | 871  | 1.63 | 1.64 | 916  | 1.88 | 1.89 | 960  | 2.13 | 2.14 | 1002 | 2.35 | 2.41 |
|                   | 840                                      | 1.53 | 1.54 | 887  | 1.77 | 1.78 | 933  | 2.02 | 2.03 | 976  | 2.24 | 2.29 | 1018 | 2.51 | 2.57 |
|                   | 859                                      | 1.67 | 1.68 | 906  | 1.92 | 1.93 | 950  | 2.14 | 2.19 | 993  | 2.40 | 2.46 | 1034 | 2.68 | 2.74 |
|                   | 878                                      | 1.84 | 1.85 | 925  | 2.09 | 2.10 | 969  | 2.31 | 2.37 | 1011 | 2.59 | 2.65 | 1051 | 2.86 | 2.93 |
|                   | 900                                      | 2.02 | 2.03 | 946  | 2.24 | 2.29 | 988  | 2.51 | 2.57 | 1029 | 2.78 | 2.85 | 1069 | 3.06 | 3.14 |
|                   | 922                                      | 2.21 | 2.22 | 966  | 2.43 | 2.49 | 1009 | 2.71 | 2.77 | 1049 | 3.00 | 3.07 | 1088 | 3.29 | 3.37 |
|                   | 944                                      | 2.38 | 2.43 | 987  | 2.65 | 2.71 | 1028 | 2.93 | 3.00 | 1069 | 3.22 | 3.30 | 1107 | 3.53 | 3.61 |
|                   | 967                                      | 2.60 | 2.66 | 1010 | 2.89 | 2.95 | 1050 | 3.16 | 3.25 | 1090 | 3.48 | 3.56 | 1127 | 3.79 | 3.88 |
|                   | 991                                      | 2.85 | 2.92 | 1032 | 3.14 | 3.22 | 1074 | 3.44 | 3.52 | 1110 | 3.75 | 3.84 | -    | -    | -    |

### Legend and Notes

- Normal Font - Field Installed Drive Package
- Bold Font - Standard Drive Package Standard Motor.
- Italics Font* - Medium Drive Package Medium Static Motor.
- Bold, Italics Font*** - High Drive Package High Static Motor.
- RPM - Revolutions Per Minute
- KWI - Kilo Watts Input to Motor
- BHP - Brake Horsepower Input to Fan
- CFM - Cubic Feet per Minute
- In wg - Inch Water Gage

1. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static Pressure (i.e. Filters) must be added to external static pressure before entering fan performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters and casing losses.
5. Extensive motor and drive testing on these units ensures that the full brake horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Bold data shows the range of air flow rate for unit management system, other rpms require field-supplied drive.
7. Use of field-supplied motor may affect wiring size. Contact your Carrier representative for details.
8. Conversion - Bhp to KWI

$$\text{KWI} = \frac{\text{Bhp} \times 0.746}{\text{Motor efficiency}}$$

# Fan Performance Table Continued

Unit TCM - D -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |     |      |      |     |      |      |     |      |      |     |      |      |      |
|-------------------|--|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  |      |
|                   | 477                                      | 0.40 | 0.43 |     |      |      |     |      |      |     |      |      |     | 742  | 0.92 | 0.99 |
|                   | 503                                      | 0.48 | 0.52 |     |      |      |     |      |      |     |      |      |     | 759  | 1.05 | 1.13 |
|                   |  |      |      |     |      |      |     |      |      |     |      |      |     | 777  | 1.19 | 1.28 |
|                   |  |      |      |     |      |      |     |      |      | 744 | 1.17 | 1.26 |     | 796  | 1.34 | 1.44 |
|                   |  |      |      |     |      |      |     |      |      | 765 | 1.33 | 1.43 |     | 816  | 1.51 | 1.62 |
|                   |  |      |      |     |      |      |     |      |      | 787 | 1.50 | 1.61 |     | 836  | 1.69 | 1.81 |
|                   |  |      |      |     |      |      | 757 | 1.50 | 1.61 | 809 | 1.69 | 1.81 |     | 857  | 1.88 | 2.02 |
|                   |  |      |      |     |      |      | 781 | 1.69 | 1.81 | 832 | 1.89 | 2.03 |     | 879  | 2.10 | 2.25 |
|                   |  |      |      | 753 | 1.69 | 1.81 | 806 | 1.90 | 2.04 | 855 | 2.12 | 2.27 | 901 | 2.33 | 2.50 |      |

Unit TCM - D - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |     |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   | 794                                      | 1.06 | 1.14 | 842 | 1.20 | 1.29 | 888  | 1.34 | 1.44 | 932  | 1.48 | 1.59 | 973  | 1.63 | 1.75 |
|                   | 810                                      | 1.19 | 1.28 | 858 | 1.34 | 1.44 | 903  | 1.49 | 1.60 | 946  | 1.65 | 1.77 | 987  | 1.80 | 1.93 |
|                   | 827                                      | 1.34 | 1.44 | 874 | 1.50 | 1.61 | 919  | 1.66 | 1.78 | 961  | 1.82 | 1.95 | 1001 | 1.99 | 2.13 |
|                   | 845                                      | 1.51 | 1.62 | 891 | 1.67 | 1.79 | 935  | 1.85 | 1.98 | 977  | 2.01 | 2.16 | 1017 | 2.18 | 2.34 |
|                   | 864                                      | 1.68 | 1.80 | 909 | 1.86 | 1.99 | 952  | 2.03 | 2.18 | 993  | 2.22 | 2.38 | 1033 | 2.40 | 2.57 |
|                   | 883                                      | 1.87 | 2.01 | 928 | 2.06 | 2.21 | 970  | 2.25 | 2.41 | 1010 | 2.43 | 2.61 | 1049 | 2.63 | 2.82 |
|                   | 903                                      | 2.08 | 2.23 | 947 | 2.28 | 2.44 | 988  | 2.47 | 2.65 | 1028 | 2.68 | 2.87 | 1066 | 2.87 | 3.08 |
|                   | 924                                      | 2.30 | 2.47 | 967 | 2.52 | 2.70 | 1008 | 2.72 | 2.92 | 1047 | 2.93 | 3.14 | 1084 | 3.14 | 3.37 |
|                   | 945                                      | 2.55 | 2.73 | 987 | 2.77 | 2.97 | 1027 | 2.98 | 3.20 | 1066 | 3.20 | 3.43 | 1103 | 3.42 | 3.67 |

Unit TCM - D -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |     |      |      |     |      |      |     |      |      |     |      |      |      |
|-------------------|--|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  | RPM | KWI  | BHP  |      |
|                   | 469                                      | 0.47 | 0.46 |     |      |      |     |      |      |     |      |      |     | 761  | 1.07 | 1.07 |
|                   |  |      |      |     |      |      |     |      |      |     |      |      |     | 778  | 1.22 | 1.22 |
|                   |  |      |      |     |      |      |     |      |      | 742 | 1.21 | 1.20 |     | 796  | 1.38 | 1.38 |
|                   |  |      |      |     |      |      |     |      |      | 763 | 1.36 | 1.36 |     | 816  | 1.55 | 1.56 |
|                   |  |      |      |     |      |      |     |      |      | 784 | 1.54 | 1.54 |     | 836  | 1.75 | 1.75 |
|                   |  |      |      |     |      |      | 751 | 1.54 | 1.53 | 807 | 1.74 | 1.74 |     | 857  | 1.95 | 1.95 |
|                   |  |      |      |     |      |      | 776 | 1.74 | 1.74 | 829 | 1.95 | 1.95 |     | 878  | 2.18 | 2.18 |
|                   |  |      |      | 745 | 1.74 | 1.73 | 801 | 1.95 | 1.95 | 853 | 2.19 | 2.19 |     | 901  | 2.43 | 2.43 |
|                   |  |      |      | 772 | 1.95 | 1.95 | 826 | 2.20 | 2.20 | 876 | 2.45 | 2.45 | 924 | 2.69 | 2.70 |      |

Unit TCM - D - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
|                   | 814                                      | 1.23 | 1.23 | 863  | 1.39 | 1.39 | 910  | 1.55 | 1.56 | 955  | 1.71 | 1.72 | 997  | 1.88 | 1.89 |
|                   | 830                                      | 1.38 | 1.38 | 879  | 1.55 | 1.56 | 926  | 1.73 | 1.73 | 970  | 1.90 | 1.91 | 1012 | 2.07 | 2.08 |
|                   | 848                                      | 1.55 | 1.56 | 896  | 1.74 | 1.74 | 942  | 1.92 | 1.92 | 985  | 2.09 | 2.11 | 1026 | 2.29 | 2.30 |
|                   | 866                                      | 1.75 | 1.75 | 913  | 1.93 | 1.93 | 958  | 2.14 | 2.14 | 1001 | 2.32 | 2.33 | 1042 | 2.51 | 2.53 |
|                   | 886                                      | 1.94 | 1.94 | 932  | 2.15 | 2.15 | 976  | 2.34 | 2.35 | 1018 | 2.56 | 2.57 | 1059 | 2.76 | 2.78 |
|                   | 905                                      | 2.17 | 2.17 | 951  | 2.38 | 2.39 | 994  | 2.59 | 2.60 | 1035 | 2.80 | 2.82 | 1075 | 3.03 | 3.05 |
|                   | 926                                      | 2.41 | 2.41 | 971  | 2.62 | 2.64 | 1013 | 2.85 | 2.86 | 1054 | 3.08 | 3.10 | 1093 | 3.31 | 3.33 |
|                   | 947                                      | 2.65 | 2.67 | 991  | 2.90 | 2.92 | 1033 | 3.14 | 3.15 | 1073 | 3.37 | 3.39 | 1111 | 3.62 | 3.64 |
|                   | 969                                      | 2.93 | 2.95 | 1012 | 3.19 | 3.21 | 1053 | 3.44 | 3.46 | 1093 | 3.68 | 3.70 | 1131 | 3.94 | 3.96 |

Legend and Notes

Normal Font - Field Installed Drive Package

Bold Font - Standard Drive Package Standard Motor.

*Italics Font* - Medium Drive Package Medium Static Motor.

***Bold, Italics Font*** - High Drive Package High Static Motor.

RPM - Revolutions Per Minute

KWI - Kilo Watts Input to Motor

BHP - Brake Horsepower Input to Fan

CFM - Cubic Feet per Minute

In wg - Inch Water Gage

1. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.

2. Static Pressure (i.e Filters) must be added to external static pressure before entering fan performance table.

3. Interpolation is permissible. Do not extrapolate.

4. Fan performance is based on wet coils, clean filters and casing losses.

5. Extensive motor and drive testing on these units ensures that the full brake horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

6. Bold data shows the range of air flow rate for unit management system, other rpms require field-supplied drive.

7. Use of field-supplied motor may affect wiring size. Contact your Carrier representative for details.

8. Conversion - Bhp to KWI

$$\text{KWI} = \frac{\text{Bhp} \times 0.746}{\text{Motor efficiency}}$$

# Fan Performance Table Continued

Unit TCM - D -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
| 556               | 0.61                                     | 0.65 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 590               | 0.71                                     | 0.79 |      |      |      |      |      |      |      |      |      |      |      |      |      |
|                   |  |      |      |      |      |      |      |      |      |      |      |      | 841  | 1.65 | 1.68 |
|                   |  |      |      |      |      |      |      |      |      |      |      |      | 869  | 1.78 | 1.93 |
|                   |  |      |      |      |      |      |      |      |      | 852  | 1.86 | 1.99 | 897  | 2.03 | 2.20 |
|                   |  |      |      |      |      |      |      |      |      | 883  | 2.13 | 2.28 | 926  | 2.29 | 2.49 |
|                   |  |      |      |      |      |      | 869  | 2.17 | 2.36 | 914  | 2.39 | 2.59 | 956  | 2.60 | 2.82 |
|                   |  |      | 856  | 2.26 | 2.45 | 902  | 2.48 | 2.69 | 945  | 2.71 | 2.94 | 986  | 2.93 | 3.18 |      |
|                   | 844                                      | 2.34 | 2.54 | 891  | 2.58 | 2.80 | 936  | 2.82 | 3.06 | 978  | 3.05 | 3.31 | 1018 | 3.29 | 3.57 |

Unit TCM - D - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP |
| 836               | 1.32                                     | 1.42 | 881  | 1.45 | 1.57 | 923  | 1.59 | 1.73 | 963  | 1.74 | 1.89 | 1001 | 1.89 | 2.05 |     |
| 861               | 1.50                                     | 1.63 | 904  | 1.65 | 1.79 | 945  | 1.81 | 1.96 | 985  | 1.96 | 2.13 | 1023 | 2.12 | 2.30 |     |
| 886               | 1.71                                     | 1.86 | 929  | 1.88 | 2.04 | 969  | 2.04 | 2.22 | 1008 | 2.21 | 2.40 | 1045 | 2.38 | 2.58 |     |
| 912               | 1.95                                     | 2.12 | 954  | 2.13 | 2.31 | 994  | 2.30 | 2.50 | 1031 | 2.49 | 2.70 | 1068 | 2.66 | 2.89 |     |
| 940               | 2.21                                     | 2.40 | 980  | 2.40 | 2.61 | 1019 | 2.59 | 2.81 | 1056 | 2.78 | 3.02 | 1092 | 2.97 | 3.22 |     |
| 968               | 2.50                                     | 2.71 | 1007 | 2.70 | 2.93 | 1045 | 2.90 | 3.15 | 1081 | 3.09 | 3.36 | 1117 | 3.30 | 3.58 |     |
| 996               | 2.81                                     | 3.05 | 1035 | 3.02 | 3.28 | 1072 | 3.23 | 3.51 | 1108 | 3.44 | 3.74 | 1142 | 3.66 | 3.97 |     |
| 1026              | 3.15                                     | 3.42 | 1063 | 3.37 | 3.66 | 1100 | 3.60 | 3.91 | 1135 | 3.82 | 4.15 | 1168 | 4.04 | 4.39 |     |
| 1056              | 3.52                                     | 3.82 | 1093 | 3.76 | 4.08 | 1128 | 4.00 | 4.34 | 1162 | 4.23 | 4.59 | -    | -    | -    |     |

Unit TCM - D -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
| 556               | 0.65                                     | 0.65 |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 590               | 0.79                                     | 0.79 |      |      |      |      |      |      |      |      |      |      |      |      |      |
|                   |  |      |      |      |      |      |      |      |      |      |      |      | 841  | 1.64 | 1.68 |
|                   |  |      |      |      |      |      |      |      |      |      |      |      | 869  | 1.89 | 1.93 |
|                   |  |      |      |      |      |      |      |      |      | 852  | 1.99 | 1.99 | 897  | 2.15 | 2.20 |
|                   |  |      |      |      |      |      | 838  | 2.06 | 2.06 | 883  | 2.28 | 2.28 | 926  | 2.43 | 2.49 |
|                   |  |      |      |      |      |      | 869  | 2.31 | 2.36 | 914  | 2.53 | 2.59 | 956  | 2.76 | 2.82 |
|                   |  |      | 856  | 2.39 | 2.45 | 902  | 2.63 | 2.69 | 945  | 2.87 | 2.94 | 986  | 3.11 | 3.18 |      |
|                   | 844                                      | 2.48 | 2.54 | 891  | 2.74 | 2.80 | 936  | 2.99 | 3.06 | 978  | 3.23 | 3.31 | 1018 | 3.49 | 3.57 |

Unit TCM - D - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |      |      |      |      |      |      |      |      |      |      |      |     |
|-------------------|--|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|
|                   | RPM                                      | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP |
| 838               | 1.42                                     | 1.42 | 881  | 1.53 | 1.57 | 923  | 1.69 | 1.73 | 963  | 1.85 | 1.89 | 1001 | 2.00 | 2.05 |     |
| 861               | 1.69                                     | 1.63 | 904  | 1.75 | 1.79 | 945  | 1.92 | 1.96 | 985  | 2.08 | 2.13 | 1023 | 2.25 | 2.30 |     |
| 886               | 1.82                                     | 1.86 | 929  | 1.99 | 2.04 | 969  | 2.17 | 2.22 | 1008 | 2.34 | 2.40 | 1045 | 2.52 | 2.58 |     |
| 912               | 2.07                                     | 2.12 | 954  | 2.26 | 2.31 | 994  | 2.44 | 2.50 | 1031 | 2.64 | 2.70 | 1068 | 2.82 | 2.89 |     |
| 940               | 2.34                                     | 2.40 | 980  | 2.55 | 2.61 | 1019 | 2.75 | 2.81 | 1056 | 2.95 | 3.02 | 1092 | 3.15 | 3.22 |     |
| 968               | 2.65                                     | 2.71 | 1007 | 2.86 | 2.93 | 1045 | 3.08 | 3.15 | 1081 | 3.28 | 3.36 | 1117 | 3.50 | 3.58 |     |
| 996               | 2.98                                     | 3.05 | 1035 | 3.20 | 3.28 | 1072 | 3.43 | 3.51 | 1108 | 3.65 | 3.74 | 1142 | 3.88 | 3.97 |     |
| 1026              | 3.34                                     | 3.42 | 1063 | 3.58 | 3.66 | 1100 | 3.82 | 3.91 | 1135 | 4.05 | 4.15 | 1168 | 4.29 | 4.39 |     |
| 1056              | 3.73                                     | 3.82 | 1093 | 3.99 | 4.08 | 1128 | 4.24 | 4.34 | 1162 | 4.48 | 4.59 | -    | -    | -    |     |

**Legend and Notes**

Normal Font - Field Installed Drive Package

Bold Font - Standard Drive Package Standard Motor.

*Italics Font* - Medium Drive Package Medium Static Motor.

**Bold, Italics Font** - High Drive Package High Static Motor.

RPM - Revolutions Per Minute

KWI - Kilo Watts Input to Motor

BHP - Brake Horsepower Input to Fan

CFM - Cubic Feet per Minute

In wg - Inch Water Gage

1. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.

2. Static Pressure (i.e. Filters) must be added to external static pressure before entering fan performance table.

3. Interpolation is permissible. Do not extrapolate.

4. Fan performance is based on wet coils, clean filters and casing losses.

5. Extensive motor and drive testing on these units ensures that the full brake horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.

6. Bold data shows the range of air flow rate for unit management system, other rpms require field-supplied drive.

7. Use of field-supplied motor may affect wiring size. Contact your Carrier representative for details.

8. Conversion - Bhp to KWI

$$\text{KWI} = \frac{\text{Bhp} \times 0.746}{\text{Motor efficiency}}$$

# Fan Performance Table Continued

Unit TCM - D -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |     |      |      |      |      |      |             |             |             |             |             |             |
|-------------------|--|------|------|-----|------|------|------|------|------|-------------|-------------|-------------|-------------|-------------|-------------|
|                   | RPM                                      | KWI  | BHP  | RPM | KWI  | BHP  | RPM  | KWI  | BHP  | RPM         | KWI         | BHP         | RPM         | KWI         | BHP         |
| 580               | 0.76                                     | 0.82 |      | 642 | 0.91 | 0.99 |      |      |      |             |             |             |             |             |             |
| 621               | 0.95                                     | 1.03 |      |     |      |      |      |      |      |             |             |             |             |             |             |
|                   |  |      |      |     |      |      |      |      |      |             |             |             | 852         | 2.03        | 2.20        |
|                   |  |      |      |     |      |      |      |      |      |             |             |             | 887         | 2.37        | 2.57        |
|                   |  |      |      |     |      |      |      |      |      |             |             |             | 891         | 2.52        | 2.74        |
|                   |  |      |      | 880 | 2.70 | 2.93 | 921  | 2.94 | 3.19 | 961         | 3.17        | 3.44        | 1000        | 3.42        | 3.71        |
|                   | 882                                      | 2.91 | 3.16 | 922 | 3.15 | 3.42 | 961  | 3.39 | 3.68 | 999         | 3.64        | 3.95        | <b>1037</b> | <b>3.90</b> | <b>4.23</b> |
|                   | 926                                      | 3.39 | 3.68 | 964 | 3.65 | 3.96 | 1001 | 3.90 | 4.23 | <b>1038</b> | <b>4.16</b> | <b>4.52</b> | -           | -           | -           |
| <b>6000</b>       | 936                                      | 3.50 | 3.80 | 974 | 3.76 | 4.09 | 1011 | 4.02 | 4.36 | 1049        | 4.29        | 4.66        | -           | -           | -           |

Unit TCM - D - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |             |     |             |             |             |             |             |             |             |             |             |             |             |             |
|-------------------|--|-------------|-----|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                   | RPM                                      | KWI         | BHP | RPM         | KWI         | BHP         | RPM         | KWI         | BHP         | RPM         | KWI         | BHP         | RPM         | KWI         | BHP         |
| 860               | 1.58                                     | 1.72        |     | 910         | 1.77        | 1.92        | 957         | 1.95        | 2.12        | 1003        | 2.14        | 2.32        | 1048        | 2.34        | 2.54        |
| 885               | 1.83                                     | 1.99        |     | 932         | 2.03        | 2.20        | 978         | 2.23        | 2.42        | 1022        | 2.43        | 2.64        | 1065        | 2.63        | 2.86        |
| 912               | 2.13                                     | 2.31        |     | 957         | 2.33        | 2.53        | 1001        | 2.53        | 2.75        | 1043        | 2.74        | 2.98        | 1084        | 2.97        | 3.22        |
| 941               | 2.45                                     | 2.66        |     | 984         | 2.66        | 2.89        | 1026        | 2.88        | 3.13        | 1066        | 3.10        | 3.37        | 1106        | 3.33        | 3.62        |
| 972               | 2.81                                     | 3.05        |     | 1013        | 3.03        | 3.29        | 1053        | 3.26        | 3.54        | 1092        | 3.50        | 3.80        | 1130        | 3.74        | 4.06        |
| 1005              | 3.21                                     | 3.49        |     | <b>1044</b> | <b>3.44</b> | <b>3.74</b> | <b>1082</b> | <b>3.69</b> | <b>4.01</b> | <b>1119</b> | <b>3.93</b> | <b>4.27</b> | <b>1156</b> | <b>4.19</b> | <b>4.55</b> |
| <b>1038</b>       | <b>3.66</b>                              | <b>3.97</b> |     | <b>1076</b> | <b>3.90</b> | <b>4.24</b> | <b>1113</b> | <b>4.16</b> | <b>4.52</b> | -           | -           | -           | -           | -           | -           |
| <b>1073</b>       | <b>4.15</b>                              | <b>4.51</b> |     | -           | -           | -           | -           | -           | -           | -           | -           | -           | -           | -           | -           |
| 6000              | -  | -           | -   | -           | -           | -           | -           | -           | -           | -           | -           | -           | -           | -           | -           |

Unit TCM - D -

| Air flow Rate CFM | Available External Static Pressure in wg |      |      |     |      |      |      |      |      |      |      |      |      |      |      |
|-------------------|--|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP  | RPM | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
| 595               | 0.82                                     | 0.83 |      |     |      |      |      |      |      |      |      |      |      |      |      |
| 637               | 1.03                                     | 1.04 |      |     |      |      |      |      |      |      |      |      | 858  | 1.80 | 1.81 |
|                   |  |      |      |     |      |      |      |      |      |      |      |      | 888  | 2.06 | 2.11 |
|                   |  |      |      |     |      |      |      |      |      |      |      |      | 873  | 2.17 | 2.22 |
|                   |  |      |      |     |      |      |      |      |      |      |      |      | 919  | 2.40 | 2.45 |
|                   |  |      |      |     |      |      |      |      |      |      |      |      | 909  | 2.64 | 2.60 |
|                   |  |      |      |     |      |      |      |      |      |      |      |      | 953  | 2.77 | 2.84 |
|                   |  |      |      | 859 | 2.51 | 2.53 | 903  | 2.70 | 2.77 | 946  | 2.94 | 3.01 | 989  | 3.19 | 3.26 |
|                   |  |      |      | 902 | 2.89 | 2.96 | 944  | 3.15 | 3.22 | 985  | 3.39 | 3.47 | 1025 | 3.66 | 3.75 |
|                   | 904                                      | 3.12 | 3.19 | 945 | 3.38 | 3.45 | 985  | 3.63 | 3.72 | 1024 | 3.90 | 3.99 | 1063 | 4.17 | 4.27 |
|                   | 949                                      | 3.63 | 3.72 | 988 | 3.91 | 4.00 | 1026 | 4.17 | 4.27 | 1064 | 4.46 | 4.57 | -    | -    | -    |
|                   | 959                                      | 3.75 | 3.83 | 998 | 4.03 | 4.13 | 1037 | 4.31 | 4.41 | 1075 | 4.60 | 4.71 | -    | -    | -    |

Unit TCM - D - Continued

| Air flow Rate CFM | Available External Static Pressure in wg |      |     |             |             |             |             |             |             |      |      |      |      |      |      |
|-------------------|--|------|-----|-------------|-------------|-------------|-------------|-------------|-------------|------|------|------|------|------|------|
|                   | RPM                                      | KWI  | BHP | RPM         | KWI         | BHP         | RPM         | KWI         | BHP         | RPM  | KWI  | BHP  | RPM  | KWI  | BHP  |
| 882               | 1.70                                     | 1.74 |     | 933         | 1.89        | 1.94        | 981         | 2.09        | 2.14        | 1028 | 2.29 | 2.34 | 1074 | 2.51 | 2.57 |
| 907               | 1.96                                     | 2.01 |     | 955         | 2.17        | 2.22        | 1002        | 2.39        | 2.44        | 1048 | 2.61 | 2.67 | 1092 | 2.82 | 2.89 |
| 935               | 2.28                                     | 2.33 |     | 981         | 2.50        | 2.56        | 1026        | 2.71        | 2.78        | 1069 | 2.94 | 3.01 | 1111 | 3.18 | 3.25 |
| 965               | 2.63                                     | 2.69 |     | 1009        | 2.85        | 2.92        | 1052        | 3.09        | 3.16        | 1093 | 3.33 | 3.40 | 1134 | 3.57 | 3.66 |
| 996               | 3.01                                     | 3.08 |     | 1038        | 3.25        | 3.32        | 1079        | 3.49        | 3.58        | 1119 | 3.75 | 3.84 | 1158 | 4.01 | 4.10 |
| 1030              | 3.44                                     | 3.52 |     | 1070        | 3.69        | 3.78        | 1109        | 3.96        | 4.05        | 1147 | 4.21 | 4.31 | 1185 | 4.49 | 4.60 |
| 1064              | 3.92                                     | 4.01 |     | <b>1103</b> | <b>4.18</b> | <b>4.28</b> | <b>1141</b> | <b>4.46</b> | <b>4.57</b> | -    | -    | -    | -    | -    | -    |
| -                 | -  | -    |     | -           | -           | -           | -           | -           | -           | -    | -    | -    | -    | -    | -    |
| -                 | -  | -    |     | -           | -           | -           | -           | -           | -           | -    | -    | -    | -    | -    | -    |
| -                 | -  | -    |     | -           | -           | -           | -           | -           | -           | -    | -    | -    | -    | -    | -    |

### Legend and Notes

- Normal Font - Field Installed Drive Package
  - Bold Font - Standard Drive Package Standard Motor.
  - Italics Font* - Medium Drive Package Medium Static Motor.
  - Bold, Italics Font** - High Drive Package High Static Motor.
  - RPM - Revolutions Per Minute
  - KWI - Kilo Watts Input to Motor
  - BHP - Brake Horsepower Input to Fan
  - CFM - Cubic Feet per Minute
  - In wg - Inch Water Gage
1. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operatin cfm.
  2. Static Pressure (i.e Filters) must be added to external static pressure before entering fan performance table.
  3. Interpolation is permissible. Do not extrapolate.
  4. Fan performance is based on wet coils, clean filters and casing losses.
  5. Extensive motor and drive testing on these units ensures that the full brake horsepower and watts range of the motor can be utilized with confidence. Using your fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
  6. Bold data shows the range of air flow rate for unit management system, other rpms require field-supplied drive.
  7. Use of field-supplied motor may affect wiring size. Contact your Carrier representative for details.
  8. Conversion - Bhp to KWI  

$$KWI = \frac{Bhp \times 0.746}{\text{Motor efficiency}}$$

# Fan RPM at Motor Pulley Settings

| Freq. | Unit | TCM | Application     | Drive Package   | MOTOR PULLE TURNS OPEN - ENGLISH |      |             |      |      |      |             |            |             |      |      |
|-------|------|-----|-----------------|-----------------|----------------------------------|------|-------------|------|------|------|-------------|------------|-------------|------|------|
|       |      |     |                 |                 |                                  | /    |             | /    |      | /    |             | /          |             | /    |      |
| 60Hz  | A    |     | 230V            | Standard Static | 1457                             | 1419 | 1380        | 1342 | 1303 | 1265 | <b>1227</b> | 1188       | 1150        | 1111 | 1073 |
|       |      |     | 400V            | Standard Static | -                                | -    | <b>1035</b> | 997  | 958  | 920  | 882         | 843        | 805         | 767  | 728  |
|       |      |     | 230V            | Medium Static   | 1518                             | 1484 | 1449        | 1415 | 1380 | 1346 | <b>1311</b> | 1277       | 1242        | 1208 | 1173 |
|       |      |     | 400V            | Medium Static   | 1457                             | 1418 | 1380        | 1342 | 1303 | 1265 | <b>1227</b> | 1188       | 1150        | 1112 | 1073 |
|       |      |     | All             | High Static     | 1788                             | 1757 | 1725        | 1694 | 1662 | 1631 | <b>1600</b> | 1568       | 1537        | 1505 | 1474 |
|       | D    | All | Standard Static | 747             | 721                              | 695  | 670         | 644  | 618  | 592  | 566         | <b>541</b> | 515         | 489  |      |
|       |      |     | Medium Static   | 949             | 927                              | 906  | 884         | 863  | 841  | 819  | 798         | <b>776</b> | 755         | 733  |      |
|       |      |     | High Static     | 1102            | 1083                             | 1063 | 1044        | 1025 | 1006 | 986  | 967         | <b>948</b> | 928         | 909  |      |
|       | D    | All | Standard Static | 733             | 712                              | 690  | 669         | 647  | 626  | 604  | 583         | <b>561</b> | 540         | 518  |      |
|       |      |     | Medium Static   | 936             | 911                              | 887  | 862         | 838  | 813  | 788  | 764         | <b>739</b> | 715         | 690  |      |
|       |      |     | High Static     | 1084            | 1059                             | 1035 | 1010        | 986  | 961  | 936  | 912         | <b>887</b> | 863         | 838  |      |
|       | D    |     | 230V            | Standard Static | 838                              | 813  | 789         | 764  | 739  | 715  | 690         | 665        | <b>640</b>  | 616  | 591  |
|       |      |     | 400V            | Standard Static | 819                              | 798  | 776         | 755  | 733  | 712  | 690         | 668        | <b>647</b>  | 625  | 604  |
|       |      |     | All             | Medium Static   | 1084                             | 1059 | 1035        | 1010 | 986  | 961  | 936         | 912        | <b>887</b>  | 863  | 838  |
|       |      |     | 230V            | High Static     | 1240                             | 1218 | 1196        | 1175 | 1153 | 1131 | 1109        | 1087       | <b>1066</b> | 1044 | 1022 |
|       |      |     | 400V            | High Static     | 1229                             | 1208 | 1186        | 1164 | 1143 | 1121 | 1100        | 1078       | <b>1057</b> | 1035 | 1013 |
|       | D    | All | Standard Static | 843             | 824                              | 805  | 786         | 767  | 748  | 728  | 709         | <b>690</b> | 671         | 652  |      |
|       |      |     | Medium Static   | 1084            | 1060                             | 1035 | 1010        | 986  | 961  | 936  | 912         | <b>887</b> | 863         | 838  |      |
|       |      |     | 230V            | High Static     | 1240                             | 1218 | 1196        | 1175 | 1153 | 1131 | 1109        | 1087       | <b>1066</b> | 1044 | 1022 |
|       |      |     | 400V            | High Static     | 1229                             | 1208 | 1186        | 1164 | 1143 | 1121 | 1100        | 1078       | <b>1057</b> | 1035 | 1013 |

| Freq. | Unit | TCM | Application     | Drive Package   | MOTOR PULLE TURNS OPEN - SI |      |             |      |      |      |             |             |             |      |      |
|-------|------|-----|-----------------|-----------------|-----------------------------|------|-------------|------|------|------|-------------|-------------|-------------|------|------|
|       |      |     |                 |                 |                             | /    |             | /    |      | /    |             | /           |             | /    |      |
| 60Hz  | D    |     | 230V            | Standard Static | 24.3                        | 23.7 | 23.0        | 22.4 | 21.7 | 21.1 | <b>20.5</b> | 19.8        | 19.2        | 18.5 | 17.9 |
|       |      |     | 400V            | Standard Static | -                           | -    | <b>17.3</b> | 16.6 | 16.0 | 15.3 | 14.7        | 14.1        | 13.4        | 12.8 | 12.1 |
|       |      |     | 230V            | Medium Static   | 25.3                        | 24.7 | 24.2        | 23.6 | 23.0 | 22.4 | <b>21.9</b> | 21.3        | 20.7        | 20.1 | 19.6 |
|       |      |     | 400V            | Medium Static   | 24.3                        | 23.6 | 23.0        | 22.4 | 21.7 | 21.1 | <b>20.4</b> | 19.8        | 19.2        | 18.5 | 17.9 |
|       |      |     | All             | High Static     | 29.8                        | 29.3 | 28.8        | 28.2 | 27.7 | 27.2 | <b>26.7</b> | 26.1        | 25.6        | 25.1 | 24.6 |
|       | D    | All | Standard Static | 12.5            | 12.0                        | 11.6 | 11.2        | 10.7 | 10.3 | 9.9  | 9.4         | <b>9.0</b>  | 8.6         | 8.2  |      |
|       |      |     | Medium Static   | 15.8            | 15.5                        | 15.1 | 14.7        | 14.4 | 14.0 | 13.7 | 13.3        | <b>12.9</b> | 12.6        | 12.2 |      |
|       |      |     | High Static     | 18.4            | 18.1                        | 17.7 | 17.4        | 17.1 | 16.8 | 16.4 | 16.1        | <b>15.8</b> | 15.5        | 15.2 |      |
|       | D    | All | Standard Static | 12.2            | 11.9                        | 11.5 | 11.2        | 10.8 | 10.4 | 10.1 | 9.7         | <b>9.4</b>  | 9.0         | 8.6  |      |
|       |      |     | Medium Static   | 15.6            | 15.2                        | 14.8 | 14.4        | 14.0 | 13.6 | 13.1 | 12.7        | <b>12.3</b> | 11.9        | 11.5 |      |
|       |      |     | High Static     | 18.1            | 17.7                        | 17.3 | 16.8        | 16.4 | 16.0 | 15.6 | 15.2        | <b>14.8</b> | 14.4        | 14.0 |      |
|       | D    |     | 230V            | Standard Static | 14.0                        | 13.6 | 13.2        | 12.7 | 12.3 | 11.9 | 11.5        | 11.1        | <b>10.7</b> | 10.3 | 9.9  |
|       |      |     | 400V            | Standard Static | 13.7                        | 13.3 | 12.9        | 12.6 | 12.2 | 11.9 | 11.5        | 11.1        | <b>10.8</b> | 10.4 | 10.1 |
|       |      |     | All             | Medium Static   | 18.1                        | 17.7 | 17.3        | 16.8 | 16.4 | 16.0 | 15.6        | 15.2        | <b>14.8</b> | 14.4 | 14.0 |
|       |      |     | 230V            | High Static     | 20.7                        | 20.3 | 19.9        | 19.6 | 19.2 | 18.9 | 18.5        | 18.1        | <b>17.8</b> | 17.4 | 17.0 |
|       |      |     | 400V            | High Static     | 20.5                        | 20.1 | 19.8        | 19.4 | 19.0 | 18.7 | 18.3        | 18.0        | <b>17.6</b> | 17.3 | 16.9 |
|       | D    | All | Standard Static | 14.1            | 13.7                        | 13.4 | 13.1        | 12.8 | 12.5 | 12.1 | 11.8        | <b>11.5</b> | 11.2        | 10.9 |      |
|       |      |     | Medium Static   | 18.1            | 17.7                        | 17.3 | 16.8        | 16.4 | 16.0 | 15.6 | 15.2        | <b>14.8</b> | 14.4        | 14.0 |      |
|       |      |     | 230V            | High Static     | 20.7                        | 20.3 | 19.9        | 19.6 | 19.2 | 18.9 | 18.5        | 18.1        | <b>17.8</b> | 17.4 | 17.0 |
|       |      |     | 400V            | High Static     | 20.5                        | 20.1 | 19.8        | 19.4 | 19.0 | 18.7 | 18.3        | 18.0        | <b>17.6</b> | 17.3 | 16.9 |

**Bold, Italics** RPM is the factory setting . In range of - 5 due to different voltage application (230V, 400V and 600V)  
 The standard belt size may not cover all the above range. Other RPMs require field supplied drive package.

## Sound Rating Data

| Unit<br>TCM | Cooling<br>Stages | Unit Sound dB - Based on cooling mode |      |      |      |      |      |      |      |      |  |  |  |  |
|-------------|-------------------|---------------------------------------|------|------|------|------|------|------|------|------|--|--|--|--|
|             |                   | A-Weighted                            |      |      |      |      |      |      |      |      |  |  |  |  |
| A           | 1                 | 91.2                                  | 97.2 | 88.5 | 89.4 | 88.4 | 86.6 | 83.4 | 78.1 | 72.6 |  |  |  |  |
| D           | 2                 | 80.0                                  | 97.2 | 83.9 | 78.1 | 75.5 | 75.3 | 70.3 | 66.5 | 62.1 |  |  |  |  |
| D           | 2                 | 80.3                                  | 97.4 | 84.1 | 78.2 | 75.8 | 75.7 | 70.7 | 66.7 | 62.2 |  |  |  |  |
| D           | 2                 | 91.9                                  | 97.2 | 90.0 | 90.1 | 88.0 | 87.0 | 84.3 | 81.3 | 77.0 |  |  |  |  |
| D           | 2                 | 92.3                                  | 97.5 | 90.2 | 90.4 | 88.6 | 87.6 | 84.6 | 81.6 | 77.3 |  |  |  |  |

dB Decibel

### NOTES

- Measurements are expressed in terms of sound power. Do not compare these values to sound pressure values because sound pressure accounts for specific environment factors which do not match individual applications. Sound power values are independent of the environment and therefore
- A Weighted sound ratings filter out very high and very low frequencies, to better approximate the response of an "average" human ear.

# Electrical Data

| TCM - // H application |                          | Compressor                    |      |          |      | OFM |      |     | IFM |     | Electric Heater |                 |           | MCA            | MOCP  |      |       |     |
|------------------------|--------------------------|-------------------------------|------|----------|------|-----|------|-----|-----|-----|-----------------|-----------------|-----------|----------------|-------|------|-------|-----|
| Unit S i e<br>TCM      | Power Supply<br>/ Ph / H | Drive package<br>Indoor Motor | No   |          | No   |     | Qty  | HP  | FLA | HP  | FLA             | P N<br>CRHEATER | APP<br>KW |                |       | FLA  |       |     |
|                        |                          |                               | RLA  | LRA      | RLA  | LRA |      |     |     |     |                 |                 |           |                |       |      |       |     |
| A                      | //                       | Standard                      | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.4 | 5.2             | -               | -         | -              | 31.8  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.4 | 5.2             | 102A00          | 6.0       | 15.6           | 31.8  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.4 | 5.2             | 104B00          | 9.6       | 25.3           | 38.1  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.4 | 5.2             | 105A00          | 14.7      | 38.5           | 54.6  | 60   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.4 | 5.2             | 104B00, 104B00  | 19.3      | 50.5           | 69.6  | 70   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.4 | 5.2             | 104B00, 105A00  | 24.3      | 63.8           | 86.3  | 90   |       |     |
|                        |                          | Medium                        | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.9 | 7.5             | -               | -         | -              | 34.1  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.9 | 7.5             | 102A00          | 6.0       | 15.6           | 34.1  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.9 | 7.5             | 104B00          | 9.6       | 25.3           | 41.0  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.9 | 7.5             | 105A00          | 14.7      | 38.5           | 57.5  | 60   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.9 | 7.5             | 104B00, 104B00  | 19.3      | 50.5           | 72.5  | 80   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 2.9 | 7.5             | 104B00, 105A00  | 24.3      | 63.8           | 89.1  | 90   |       |     |
|                        |                          | High                          | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 3.7 | 10              | -               | -         | -              | 36.6  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 3.7 | 10              | 102A00          | 6.0       | 15.6           | 36.6  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 3.7 | 10              | 104B00          | 9.6       | 25.3           | 44.1  | 50   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 3.7 | 10              | 105A00          | 14.7      | 38.5           | 60.6  | 70   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 3.7 | 10              | 104B00, 104B00  | 19.3      | 50.5           | 75.6  | 80   |       |     |
|                        |                          |                               | 19   | 123      | -    | -   | 1    | 1/3 | 2.8 | 3.7 | 10              | 104B00, 105A00  | 24.3      | 63.8           | 92.3  | 100  |       |     |
|                        |                          | D                             | //   | Standard | 13.6 | 83  | 13.6 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | -              | -     | -    | 38.6  | 50  |
|                        |                          |                               |      |          | 13.6 | 83  | 13.6 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 117A00         | 9.6   | 25   | 38.6  | 50  |
|                        |                          |                               |      |          | 13.6 | 83  | 13.6 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 110A00         | 14.7  | 38.5 | 54.6  | 60  |
|                        |                          |                               |      |          | 13.6 | 83  | 13.6 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 111A00         | 22.8  | 59.7 | 81.1  | 90  |
|                        |                          |                               |      |          | 13.6 | 83  | 13.6 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 112A00         | 29.4  | 77   | 102.8 | 110 |
|                        |                          |                               |      |          | 13.6 | 83  | 13.6 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 112A00, 117A00 | 38.9  | 102  | 134.0 | 150 |
| Medium                 | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 2.9 | 7.5             | -               | -         | -              | 40.9  | 50   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 2.9 | 7.5             | 117A00          | 9.6       | 25             | 40.9  | 50   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 2.9 | 7.5             | 110A00          | 14.7      | 38.5           | 57.5  | 60   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 2.9 | 7.5             | 111A00          | 22.8      | 59.7           | 84.0  | 90   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 2.9 | 7.5             | 112A00          | 29.4      | 77             | 105.6 | 110  |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 2.9 | 7.5             | 112A00, 117A00  | 38.9      | 102            | 136.9 | 150  |       |     |
| High                   | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 4.7 | 15              | -               | -         | -              | 48.4  | 60   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 4.7 | 15              | 117A00          | 9.6       | 25             | 50.0  | 60   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 4.7 | 15              | 110A00          | 14.7      | 38.5           | 66.9  | 70   |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 4.7 | 15              | 111A00          | 22.8      | 59.7           | 93.4  | 100  |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 4.7 | 15              | 112A00          | 29.4      | 77             | 115.0 | 125  |       |     |
|                        | 13.6                     |                               |      | 83       | 13.6 | 83  | 2    | 1/4 | 1.4 | 4.7 | 15              | 112A00, 117A00  | 38.9      | 102            | 146.3 | 150  |       |     |
| D                      | //                       |                               |      | Standard | 14.5 | 98  | 13.7 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | -              | -     | -    | 39.8  | 50  |
|                        |                          |                               |      |          | 14.5 | 98  | 13.7 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 117A00         | 9.6   | 25   | 39.8  | 50  |
|                        |                          |                               |      |          | 14.5 | 98  | 13.7 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 110A00         | 14.7  | 38.5 | 54.6  | 60  |
|                        |                          |                               |      |          | 14.5 | 98  | 13.7 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 111A00         | 22.8  | 59.7 | 81.1  | 90  |
|                        |                          |                               |      |          | 14.5 | 98  | 13.7 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 112A00         | 29.4  | 77   | 102.8 | 110 |
|                        |                          |                               |      |          | 14.5 | 98  | 13.7 | 83  | 2   | 1/4 | 1.4             | 1.7             | 5.2       | 112A00, 117A00 | 38.9  | 102  | 134.0 | 150 |
|                        |                          | Medium                        | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 2.4 | 5.2             | -               | -         | -              | 39.8  | 50   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 2.4 | 5.2             | 117A00          | 9.6       | 25             | 39.8  | 50   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 2.4 | 5.2             | 110A00          | 14.7      | 38.5           | 54.6  | 60   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 2.4 | 5.2             | 111A00          | 22.8      | 59.7           | 81.1  | 90   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 2.4 | 5.2             | 112A00          | 29.4      | 77             | 102.8 | 110  |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 2.4 | 5.2             | 112A00, 117A00  | 38.9      | 102            | 134.0 | 150  |       |     |
|                        |                          | High                          | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 3.7 | 10              | -               | -         | -              | 44.6  | 50   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 3.7 | 10              | 117A00          | 9.6       | 25             | 44.6  | 50   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 3.7 | 10              | 110A00          | 14.7      | 38.5           | 60.6  | 70   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 3.7 | 10              | 111A00          | 22.8      | 59.7           | 87.1  | 90   |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 3.7 | 10              | 112A00          | 29.4      | 77             | 108.8 | 110  |       |     |
|                        |                          |                               | 14.5 | 98       | 13.7 | 83  | 2    | 1/4 | 1.4 | 3.7 | 10              | 112A00, 117A00  | 38.9      | 102            | 140.0 | 150  |       |     |

# Electrical Data Continued

| TCM - // H application |                       |                            | Compressor |          |      |     | OFM  |     |     | IFM |                | Electric Heater |        |        | MCA   | MOCP |      |    |
|------------------------|-----------------------|----------------------------|------------|----------|------|-----|------|-----|-----|-----|----------------|-----------------|--------|--------|-------|------|------|----|
| Unit Size TCM          | Power Supply / Ph / H | Drive package Indoor Motor | No         |          | No   |     | Qty  | HP  | FLA | HP  | FLA            | P N CRHEATER    | APP KW | FLA    |       |      |      |    |
|                        |                       |                            | RLA        | LRA      | RLA  | LRA |      |     |     |     |                |                 |        |        |       |      |      |    |
| D                      | //                    | Standard                   | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 2.4 | 5.2            | -               | -      | -      | 47.6  | 60   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 2.4 | 5.2            | 117A00          | 9.6    | 25     | 47.6  | 60   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 2.4 | 5.2            | 110A00          | 14.7   | 38.5   | 54.6  | 60   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 2.4 | 5.2            | 112A00          | 29.4   | 77     | 102.8 | 110  |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 2.4 | 5.2            | 112A00, 117A00  | 38.9   | 102    | 134.0 | 150  |      |    |
|                        |                       | 15.9                       | 110        | 15.9     | 110  | 1   | 1    | 6.6 | 2.4 | 5.2 | 112A00, 110A00 | 45.9            | 120.3  | 156.9  | 175   |      |      |    |
|                        |                       | Medium                     | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 3.7 | 10             | -               | -      | -      | 52.4  | 60   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 3.7 | 10             | 117A00          | 9.6    | 25     | 52.4  | 60   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 3.7 | 10             | 110A00          | 14.7   | 38.5   | 60.6  | 70   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 3.7 | 10             | 112A00          | 29.4   | 77     | 108.8 | 110  |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 3.7 | 10             | 112A00, 117A00  | 38.9   | 102    | 140.0 | 150  |      |    |
|                        |                       | High                       | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 3.7 | 10             | 112A00, 110A00  | 45.9   | 120.3  | 162.9 | 175  |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 4.7 | 15             | -               | -      | -      | 57.4  | 70   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 4.7 | 15             | 117A00          | 9.6    | 25     | 57.4  | 70   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 4.7 | 15             | 110A00          | 14.7   | 38.5   | 66.9  | 70   |      |    |
|                        |                       |                            | 15.9       | 110      | 15.9 | 110 | 1    | 1   | 6.6 | 4.7 | 15             | 112A00          | 29.4   | 77     | 115.0 | 125  |      |    |
|                        |                       | D                          | //         | Standard | 19   | 123 | 22.4 | 149 | 1   | 1   | 6.6            | 2.9             | 7.5    | -      | -     | -    | 60.3 | 70 |
|                        |                       |                            |            |          | 19   | 123 | 22.4 | 149 | 1   | 1   | 6.6            | 2.9             | 7.5    | 117A00 | 9.6   | 25   | 60.3 | 70 |
| 19                     | 123                   |                            |            |          | 22.4 | 149 | 1    | 1   | 6.6 | 2.9 | 7.5            | 110A00          | 14.7   | 38.5   | 60.3  | 70   |      |    |
| 19                     | 123                   |                            |            |          | 22.4 | 149 | 1    | 1   | 6.6 | 2.9 | 7.5            | 112A00          | 29.4   | 77     | 105.6 | 110  |      |    |
| 19                     | 123                   |                            |            |          | 22.4 | 149 | 1    | 1   | 6.6 | 2.9 | 7.5            | 112A00, 117A00  | 38.9   | 102    | 136.9 | 150  |      |    |
| 19                     | 123                   |                            |            |          | 22.4 | 149 | 1    | 1   | 6.6 | 2.9 | 7.5            | 112A00, 110A00  | 45.9   | 120.3  | 159.8 | 175  |      |    |
| Medium                 | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 3.7 | 10             | -               | -      | -      | 62.8  | 80   |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 3.7 | 10             | 117A00          | 9.6    | 25     | 62.8  | 80   |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 3.7 | 10             | 110A00          | 14.7   | 38.5   | 62.8  | 80   |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 3.7 | 10             | 112A00          | 29.4   | 77     | 108.8 | 110  |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 3.7 | 10             | 112A00, 117A00  | 38.9   | 102    | 140.0 | 150  |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 3.7 | 10             | 112A00, 110A00  | 45.9   | 120.3  | 162.9 | 175  |      |    |
| High                   | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 4.7 | 15             | -               | -      | -      | 67.8  | 80   |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 4.7 | 15             | 117A00          | 9.6    | 25     | 67.8  | 80   |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 4.7 | 15             | 110A00          | 14.7   | 38.5   | 67.8  | 80   |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 4.7 | 15             | 112A00          | 29.4   | 77     | 115.0 | 125  |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 4.7 | 15             | 112A00, 117A00  | 38.9   | 102    | 146.3 | 150  |      |    |
|                        | 19                    |                            |            | 123      | 22.4 | 149 | 1    | 1   | 6.6 | 4.7 | 15             | 112A00, 110A00  | 45.9   | 120.3  | 169.1 | 175  |      |    |

**Legend and Notes for Electrical Data Table**

- FLA - Full Load Amps
- IFM - Indoor (Evaporator) Fan Motor
- LRA - Locked Rotor Amps
- MCA - Minimum Circuit Amps
- OFM - Outdoor (Condenser) Fan Motor
- RLA - Rated Load Amps
- APP - Application power at rated power supply voltage
- MOCP - Maximum Overcurrent Protection

Minimum Voltage: 360V, Maximum Voltage: 420 on 400V/3Ph/60Hz

For ordering electric heater: Include complete heater part number in the order placement e.g CRHEATER116A00.

**Unbalanced -Phase Supply Voltage**

at a oto as i alanc ins / olta is at tan 2 .

Use the following formula to determine the percentage of voltage imbalance

$$100 \times \frac{\text{Maximum Deviation From Average Voltage}}{\text{Average Voltage}}$$

Determine maximum deviation from average voltage.

- (AB) 397 - 392 5v
- (BC) 404 - 397 7v
- (AC) 457 - 397 2v

Maximum Deviation is 7v.

Determine Percentage Voltage Imbalance.

$$\text{Voltage Imbalance} = 100 \times \frac{7}{397} = 1.76$$

|    |      |                 |      |     |      |
|----|------|-----------------|------|-----|------|
| AB | 392v | Average Voltage | 392  | 404 | 395  |
| BC | 404v |                 | 3    |     |      |
| AC | 395v |                 | 1191 |     | 397V |
|    |      |                 | 3    |     |      |

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2

**IMPORTANT** If the supply voltage phase imbalance is more than 2 contact your local electric utility company

# Electrical Data Continued

| TCM- // H application |                       | Compressor                 |      |          |      | OFM  |      |      | IFM  |                | Electric Heater |                |      | MCA    | MOCP |        |      |      |    |
|-----------------------|-----------------------|----------------------------|------|----------|------|------|------|------|------|----------------|-----------------|----------------|------|--------|------|--------|------|------|----|
| Unit Size TCM         | Power Supply / Ph / H | Drive package Indoor Motor | No   |          | No   |      | Qty  | HP   | FLA  | HP             | FLA             | P N CRHEATER   |      |        |      | APP KW | FLA  |      |    |
| A                     | //                    | Standard                   | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 1.7            | 2.8             | -              | -    | -      | -    | 19.0   | 30   |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 1.7            | 2.8             | 106A00         | 4.2  | 6      | 19.0 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 1.7            | 2.8             | 108A00         | 8    | 11.5   | 19.0 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 1.7            | 2.8             | 109A00         | 9.7  | 14     | 21.0 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 1.7            | 2.8             | 108A00, 109A00 | 16   | 23.1   | 32.4 | 35     |      |      |    |
|                       |                       | 10.7                       | 78.0 | -        | -    | 1    | 1/3  | 2.8  | 1.7  | 2.8            | 108A00, 109A00  | 17.7           | 25.6 | 35.5   | 40   |        |      |      |    |
|                       |                       | Medium                     | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 3              | 5               | -              | -    | -      | -    | 21.2   | 30   |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 3              | 5               | 106A00         | 4.2  | 6      | 21.2 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 3              | 5               | 108A00         | 8    | 11.5   | 21.2 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 3              | 5               | 109A00         | 9.7  | 14     | 23.8 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 3              | 5               | 108A00, 109A00 | 16   | 23.1   | 35.1 | 40     |      |      |    |
|                       |                       | 10.7                       | 78.0 | -        | -    | 1    | 1/3  | 2.8  | 3    | 5              | 108A00, 109A00  | 17.7           | 25.6 | 38.3   | 40   |        |      |      |    |
|                       |                       | High                       | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 4.7            | 7.5             | -              | -    | -      | -    | 23.7   | 30   |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 4.7            | 7.5             | 106A00         | 4.2  | 6      | 23.7 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 4.7            | 7.5             | 108A00         | 8    | 11.5   | 23.8 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 4.7            | 7.5             | 109A00         | 9.7  | 14     | 26.9 | 30     |      |      |    |
|                       |                       |                            | 10.7 | 78.0     | -    | -    | 1    | 1/3  | 2.8  | 4.7            | 7.5             | 108A00, 109A00 | 16   | 23.1   | 38.3 | 40     |      |      |    |
|                       |                       | 10.7                       | 78.0 | -        | -    | 1    | 1/3  | 2.8  | 4.7  | 7.5            | 108A00, 109A00  | 17.7           | 25.6 | 41.4   | 45   |        |      |      |    |
|                       |                       | D                          | //   | Standard | 7.6  | 51.8 | 7.6  | 51.8 | 2    | 1/4            | 1.42            | 1.7            | 2.8  | -      | -    | -      | -    | 22.7 | 30 |
|                       |                       |                            |      |          | 7.6  | 51.8 | 7.6  | 51.8 | 2    | 1/4            | 1.42            | 1.7            | 2.8  | 116A00 | 9.7  | 13.9   | 22.7 | 30   |    |
| 7.6                   | 51.8                  |                            |      |          | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 113A00         | 11.5 | 16.5   | 24.1 | 30     |      |      |    |
| 7.6                   | 51.8                  |                            |      |          | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 114A00         | 19.3 | 27.9   | 38.4 | 40     |      |      |    |
| 7.6                   | 51.8                  |                            |      |          | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 115A00         | 22.9 | 33.1   | 44.9 | 45     |      |      |    |
| 7.6                   | 51.8                  |                            |      |          | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 114A00, 116A00 | 29   | 41.8   | 55.8 | 60     |      |      |    |
| Medium                | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 3              | 5               | -              | -    | -      | -    | 24.9   | 30   |      |    |
|                       | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 3              | 5               | 116A00         | 9.7  | 13.9   | 24.9 | 30     |      |      |    |
|                       | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 3              | 5               | 113A00         | 11.5 | 16.5   | 26.9 | 30     |      |      |    |
|                       | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 3              | 5               | 114A00         | 19.3 | 27.9   | 41.1 | 45     |      |      |    |
| 7.6                   | 51.8                  |                            |      | 7.6      | 51.8 | 2    | 1/4  | 1.42 | 3    | 5              | 115A00          | 22.9           | 33.1 | 47.6   | 50   |        |      |      |    |
| 7.6                   | 51.8                  |                            |      | 7.6      | 51.8 | 2    | 1/4  | 1.42 | 3    | 5              | 114A00, 116A00  | 29             | 41.8 | 58.5   | 60   |        |      |      |    |
| High                  | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 4.7            | 7.5             | -              | -    | -      | -    | 27.4   | 35   |      |    |
|                       | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 4.7            | 7.5             | 116A00         | 9.7  | 13.9   | 27.4 | 35     |      |      |    |
|                       | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 4.7            | 7.5             | 113A00         | 11.5 | 16.5   | 30.0 | 35     |      |      |    |
|                       | 7.6                   |                            |      | 51.8     | 7.6  | 51.8 | 2    | 1/4  | 1.42 | 4.7            | 7.5             | 114A00         | 19.3 | 27.9   | 44.3 | 45     |      |      |    |
|                       | 7.6                   | 51.8                       | 7.6  | 51.8     | 2    | 1/4  | 1.42 | 4.7  | 7.5  | 115A00         | 22.9            | 33.1           | 50.8 | 60     |      |        |      |      |    |
|                       | 7.6                   | 51.8                       | 7.6  | 51.8     | 2    | 1/4  | 1.42 | 4.7  | 7.5  | 114A00, 116A00 | 29              | 41.8           | 61.6 | 70     |      |        |      |      |    |
| D                     | //                    | Standard                   | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | -              | -    | -      | -    | 25.4   | 30   |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 116A00         | 9.7  | 13.9   | 25.4 | 30     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 113A00         | 11.5 | 16.5   | 25.4 | 30     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 114A00         | 19.3 | 27.9   | 38.4 | 40     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 115A00         | 22.9 | 33.1   | 44.9 | 45     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 1.7            | 2.8             | 114A00, 116A00 | 29   | 41.8   | 55.8 | 60     |      |      |    |
|                       |                       | Medium                     | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 2.5            | 4.2             | -              | -    | -      | -    | 26.8   | 35   |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 2.5            | 4.2             | 116A00         | 9.7  | 13.9   | 26.8 | 35     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 2.5            | 4.2             | 113A00         | 11.5 | 16.5   | 26.8 | 35     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 2.5            | 4.2             | 114A00         | 19.3 | 27.9   | 40.1 | 45     |      |      |    |
|                       |                       | 8.8                        | 64   | 8.8      | 64.0 | 2    | 1/4  | 1.42 | 2.5  | 4.2            | 115A00          | 22.9           | 33.1 | 46.6   | 50   |        |      |      |    |
|                       |                       | 8.8                        | 64   | 8.8      | 64.0 | 2    | 1/4  | 1.42 | 2.5  | 4.2            | 114A00, 116A00  | 29             | 41.8 | 57.5   | 60   |        |      |      |    |
|                       |                       | High                       | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 3              | 5               | -              | -    | -      | -    | 27.6   | 35   |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 3              | 5               | 116A00         | 9.7  | 13.9   | 27.6 | 35     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 3              | 5               | 113A00         | 11.5 | 16.5   | 27.6 | 35     |      |      |    |
|                       |                       |                            | 8.8  | 64       | 8.8  | 64.0 | 2    | 1/4  | 1.42 | 3              | 5               | 114A00         | 19.3 | 27.9   | 41.1 | 45     |      |      |    |
| 8.8                   | 64                    |                            | 8.8  | 64.0     | 2    | 1/4  | 1.42 | 3    | 5    | 115A00         | 22.9            | 33.1           | 47.6 | 50     |      |        |      |      |    |
| 8.8                   | 64                    |                            | 8.8  | 64.0     | 2    | 1/4  | 1.42 | 3    | 5    | 114A00, 116A00 | 29              | 41.8           | 58.5 | 60     |      |        |      |      |    |

# Electrical Data Continued

| TCM- // H application |                       |                            | Compressor |          |      |      | OFM  |      |     | IFM |                | Electric Heater |      |        | MCA  | MOCP |      |    |
|-----------------------|-----------------------|----------------------------|------------|----------|------|------|------|------|-----|-----|----------------|-----------------|------|--------|------|------|------|----|
| Unit Size TCM         | Power Supply / Ph / H | Drive package Indoor Motor | No         |          | No   |      | Qty  | HP   | FLA | HP  | FLA            | PN CRHEATER     |      | APP KW |      |      | FLA  |    |
| D                     | //                    | Standard                   | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 2.5 | 4.2            | -               | -    | -      | 25.9 | 30   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 2.5 | 4.2            | 116A00          | 9.7  | 13.9   | 25.9 | 30   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 2.5 | 4.2            | 113A00          | 11.5 | 16.5   | 25.9 | 30   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 2.5 | 4.2            | 115A00          | 22.9 | 33.1   | 46.6 | 50   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 2.5 | 4.2            | 114A00, 116A00  | 29   | 41.8   | 57.5 | 60   |      |    |
|                       |                       | 7.9                        | 66         | 7.9      | 66   | 1    | 1    | 3.9  | 2.5 | 4.2 | 115A00, 113A00 | 34.7            | 50.1 | 67.9   | 70   |      |      |    |
|                       |                       | Medium                     | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | -               | -    | -      | 29.2 | 35   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 116A00          | 9.7  | 13.9   | 29.2 | 35   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 113A00          | 11.5 | 16.5   | 30.0 | 35   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 115A00          | 22.9 | 33.1   | 50.8 | 60   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 114A00, 116A00  | 29   | 41.8   | 61.6 | 70   |      |    |
|                       |                       | 7.9                        | 66         | 7.9      | 66   | 1    | 1    | 3.9  | 4.7 | 7.5 | 115A00, 113A00 | 34.7            | 50.1 | 72.0   | 80   |      |      |    |
|                       |                       | High                       | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | -               | -    | -      | 29.2 | 35   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 116A00          | 9.7  | 13.9   | 29.2 | 35   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 113A00          | 11.5 | 16.5   | 30.0 | 35   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 115A00          | 22.9 | 33.1   | 50.8 | 60   |      |    |
|                       |                       |                            | 7.9        | 66       | 7.9  | 66   | 1    | 1    | 3.9 | 4.7 | 7.5            | 114A00, 116A00  | 29   | 41.8   | 61.6 | 70   |      |    |
|                       |                       | 7.9                        | 66         | 7.9      | 66   | 1    | 1    | 3.9  | 4.7 | 7.5 | 115A00, 113A00 | 34.7            | 50.1 | 72.0   | 80   |      |      |    |
|                       |                       | D                          | //         | Standard | 10.7 | 78.0 | 11.0 | 88.0 | 1   | 1   | 3.9            | 3               | 5    | -      | -    | -    | 33.3 | 40 |
|                       |                       |                            |            |          | 10.7 | 78.0 | 11.0 | 88.0 | 1   | 1   | 3.9            | 3               | 5    | 116A00 | 9.7  | 13.9 | 33.3 | 40 |
| 10.7                  | 78.0                  |                            |            |          | 11.0 | 88.0 | 1    | 1    | 3.9 | 3   | 5              | 113A00          | 11.5 | 16.5   | 33.3 | 40   |      |    |
| 10.7                  | 78.0                  |                            |            |          | 11.0 | 88.0 | 1    | 1    | 3.9 | 3   | 5              | 115A00          | 22.9 | 33.1   | 47.6 | 50   |      |    |
| 10.7                  | 78.0                  |                            |            |          | 11.0 | 88.0 | 1    | 1    | 3.9 | 3   | 5              | 114A00, 116A00  | 29   | 41.8   | 58.5 | 60   |      |    |
| 10.7                  | 78.0                  |                            |            | 11.0     | 88.0 | 1    | 1    | 3.9  | 3   | 5   | 115A00, 113A00 | 34.7            | 50.1 | 68.9   | 70   |      |      |    |
| Medium                | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | -               | -    | -      | 35.8 | 45   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 116A00          | 9.7  | 13.9   | 35.8 | 45   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 113A00          | 11.5 | 16.5   | 35.8 | 45   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 115A00          | 22.9 | 33.1   | 50.8 | 60   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 114A00, 116A00  | 29   | 41.8   | 61.6 | 70   |      |    |
| 10.7                  | 78.0                  |                            |            | 11.0     | 88.0 | 1    | 1    | 3.9  | 4.7 | 7.5 | 115A00, 113A00 | 34.7            | 50.1 | 72.0   | 80   |      |      |    |
| High                  | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | -               | -    | -      | 35.8 | 45   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 116A00          | 9.7  | 13.9   | 35.8 | 45   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 113A00          | 11.5 | 16.5   | 35.8 | 45   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 115A00          | 22.9 | 33.1   | 50.8 | 60   |      |    |
|                       | 10.7                  |                            |            | 78.0     | 11.0 | 88.0 | 1    | 1    | 3.9 | 4.7 | 7.5            | 114A00, 116A00  | 29   | 41.8   | 61.6 | 70   |      |    |
| 10.7                  | 78.0                  |                            |            | 11.0     | 88.0 | 1    | 1    | 3.9  | 4.7 | 7.5 | 115A00, 113A00 | 34.7            | 50.1 | 72.0   | 80   |      |      |    |

**Legend and Notes for Electrical Data Table**

- FLA - Full Load Amps
- IFM - Indoor (Evaporator) Fan Motor
- LRA - Locked Rotor Amps
- MCA - Minimum Circuit Amps
- OFM - Outdoor (Condenser) Fan Motor
- RLA - Rated Load Amps
- APP - Application power at rated power supply voltage
- MOCP - Maximum Overcurrent Protection

Minimum Voltage: 360V, Maximum Voltage: 420 on 400V/3Ph/60Hz

For ordering electric heater: Include complete heater part number in the order placement e.g CRHEATER116A00.

**Unbalanced -Phase Supply Voltage**

to determine the percentage of voltage imbalance

$$100 \times \frac{\text{Maximum Deviation From Average Voltage}}{\text{Average Voltage}}$$

Determine maximum deviation from average voltage.

- (AB) 397 - 392 5v
- (BC) 404 - 397 7v
- (AC) 457 - 397 2v

Maximum Deviation is 7v.

Determine Percentage Voltage Imbalance.

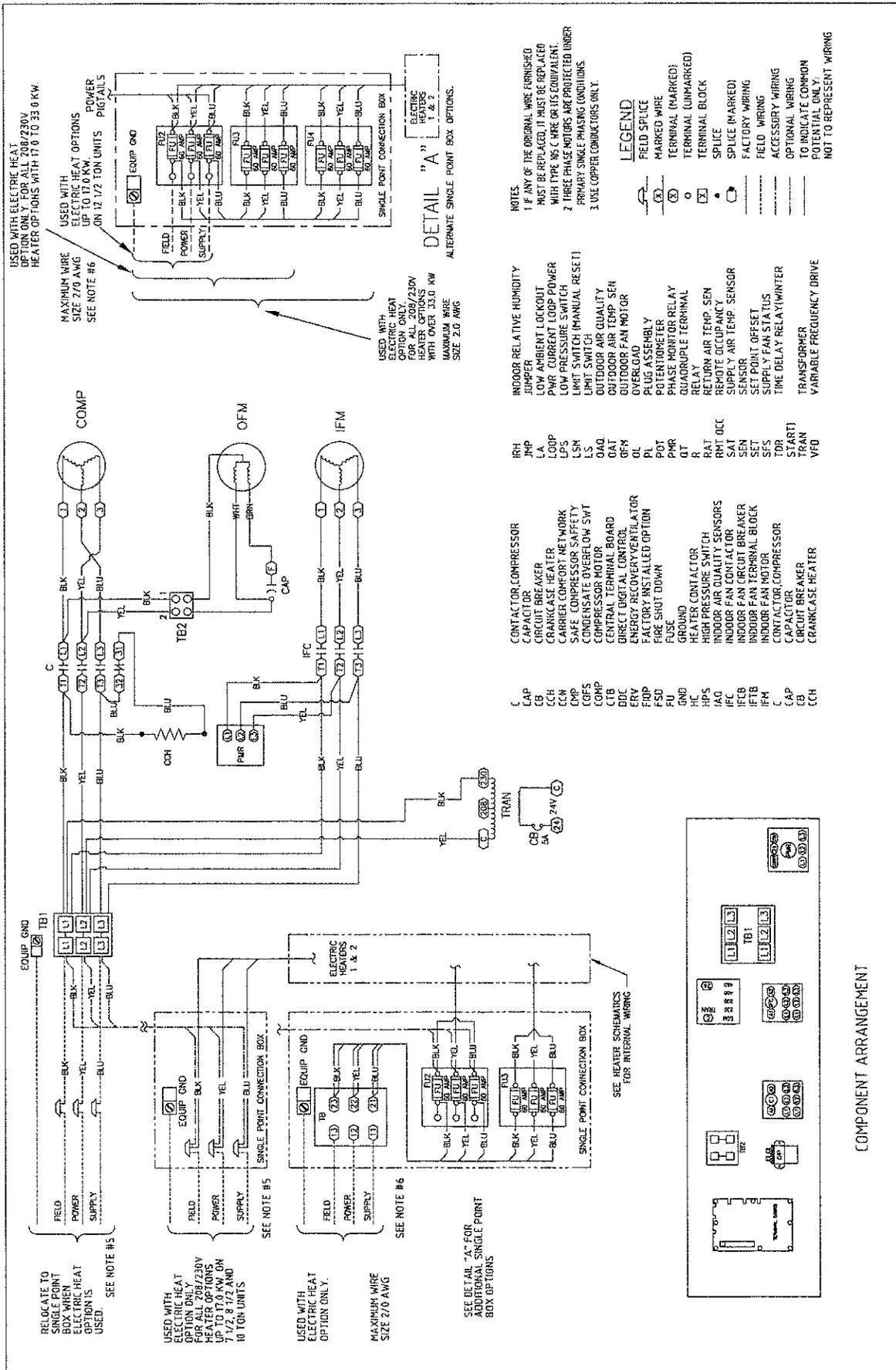
$$\text{Voltage Imbalance} = 100 \times \frac{7}{397} = 1.76$$

|    |      |                 |      |     |      |
|----|------|-----------------|------|-----|------|
| AB | 392v | Average Voltage | 392  | 404 | 395  |
| BC | 404v |                 | 3    |     |      |
| AC | 395v |                 | 1191 |     | 397V |
|    |      |                 | 3    |     |      |

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2

**IMPORTANT** if the supply voltage phase imbalance is more than 2 contact your local electric utility company

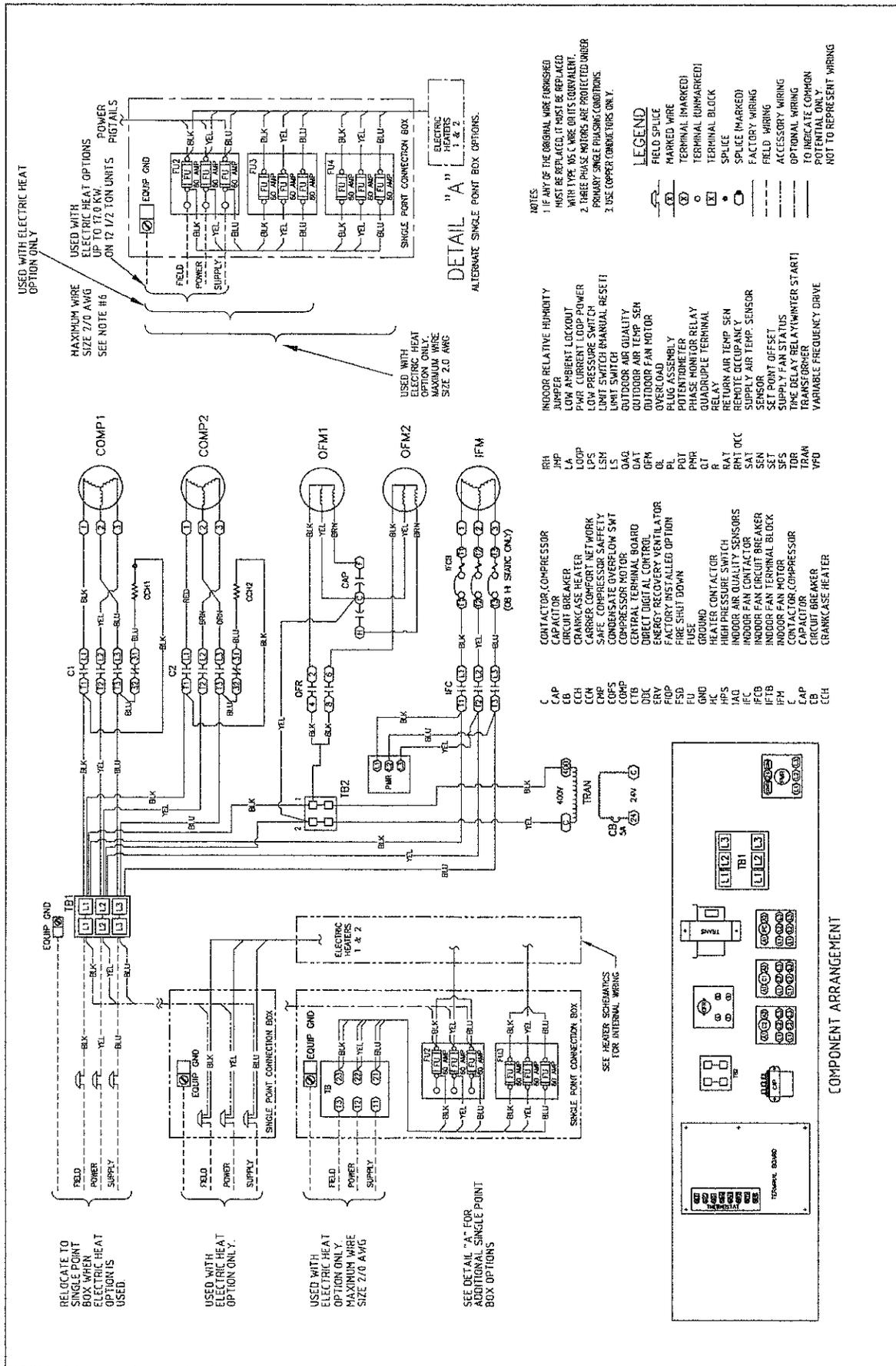
# Typical Wiring Schematic 50TCMA07 230V







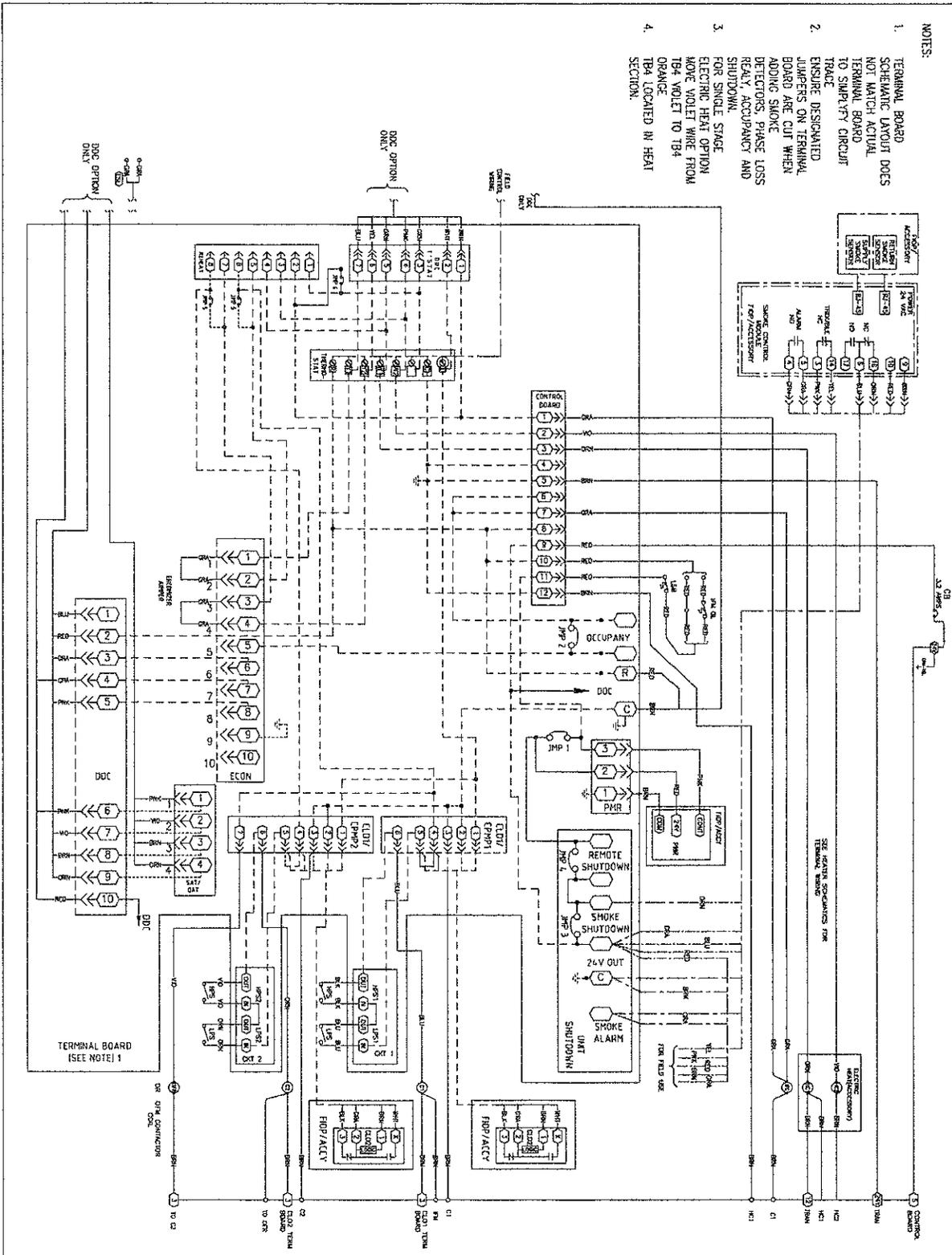
# Typical Wiring Schematic 50TCMD 08/09 400V







# Typical Control Schematic 50TCMD Series



- NOTES:
1. TERMINAL BOARD SCHEMATIC LAYOUT DOES NOT MATCH ACTUAL TERMINAL BOARD TO SUPPLY CIRCUIT TRACE
  2. ENSURE DESIGNATED JUMPS ON TERMINAL BOARD ARE CUT WHEN ADDING SMOKE DETECTORS, PHASE LOSS RELAY, OCCUPANCY AND SHUTDOWN
  3. FOR SINGLE STAGE ELECTRIC HEAT OPTION MOVE VOLET WIRE FROM T84 VOLET TO T84 ORANGE
  4. T84 LOCATED IN HEAT SECTION.

## APPLICATION DATA

### Min operating ambient temp cooling

In mechanical cooling mode, your Carrier rooftop can safely operate down to an outdoor ambient temperature of 40°F (4°C) and 25°F (- 4°C), with an accessory winter start kit.

### Ma operating ambient temp cooling

The maximum operating ambient temperature for cooling mode is 125°F (52°C).

### Airflow

All units are draw-through in cooling mode.

### Motor limits Brake horsepower BHP

Due to Carrier's internal unit design, air path, and specially designed motors, the full horsepower (maximum continuous BHP) band, can be used with the utmost confidence. There is no need for extra safety factors, as Carrier's motors are designed and rigorously tested to use the entire, listed BHP range without either nuisance tripping or premature motor failure.

### Si ing a rooftop

Bigger isn't necessarily better. While an air conditioner needs to have enough capacity to meet the load, it doesn't need excess capacity. In fact, having excess capacity typically results in very poor part load performance and humidity control.

Using higher design temperatures than ASHRAE recommends for your location, adding "safety factors" to the calculated load, and rounding up to the next largest unit, are all signs of oversizing air conditioners. Oversizing can cause short-cycling, and short cycling leads to poor humidity control, reduced efficiency, higher utility bills, drastic indoor temperature swings, excessive noise, and increased wear and tear on the air conditioner.

Rather than oversizing an air conditioner, wise contractors and engineers "right-size" or even slightly undersize air conditioners. Correctly sizing an air conditioner controls humidity better, promotes efficiency, reduces utility bills, extends equipment life, and maintains even, comfortable temperatures.

### Winter start

Carrier's winter start kit extends the low ambient limit of your rooftop to 25°F (- 4°C). The kit bypasses the low pressure switch, preventing nuisance tripping of the low pressure switch. Other low ambient precautions may still be prudent.

## GUIDE SPECIFICATIONS - TCM

### Cooling Only/Electric Heat Packaged Rooftop H AC Guide Specifications Size Range to Nominal Tons



#### System Description

##### Small-Capacity Self-Contained Air Conditioners (50TCM)

Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing hermetic scroll compressor(s) for cooling duty and electric for heating duty.

#### Quality Assurance

1. Unit shall achieve ASHRAE 90.1 minimum efficiency requirements (2010 version).
2. Unit shall be designed to conform to ASHRAE 15, 2001.
3. Unit shall be rated in accordance with AHRI Standards 210/240 and 340/360.
4. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
5. Unit casing shall be capable of withstanding 500-hour salt spray exposure per ASTM B117 (scribed specimen).
6. Unit shall be designed in accordance with ISO 9001:2008, and shall be manufactured in a registered ISO 9001:2008 facility.
7. Unit shall be subjected to a completely automated run test on the assembly line. The data for each unit will be stored at the factory, and must be available upon request.
8. Unit shall be designed in accordance with UL Standard 1995, including tested to withstand rain.

#### Delivery, Storage, and Handling

1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifted by crane requires either shipping top panel or spreader bars.
3. Unit shall only be stored or positioned in the upright position.

#### Product General

1. Factory assembled, single-piece heating and cooling rooftop unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and special features required prior to field start-up.
2. Unit shall use environmentally safe, Puron refrigerant.
3. Unit shall be installed in accordance with the manufacturer's instructions.
4. Unit must be selected and installed in compliance with local, state, and federal codes.
5. Interior cabinet surfaces shall be insulated with closed cell foam minimum  $\frac{1}{2}$ -in. thick, minimum density 3.1lb/ft<sup>3</sup>.

#### Unit Cabinet

1. Unit cabinet shall be constructed of galvanized steel, and shall be bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces.
2. Unit cabinet exterior paint shall be: film thickness, (dry) 76mm minimum, gloss (per ASTM D523, 60°F): 60, Hardness: H-2H Pencil hardness.
3. Evaporator fan compartment interior cabinet insulation shall conform to AHRI Standards 210/240 or 340/360 minimum exterior sweat criteria.
4. Base of unit shall have a minimum of four locations for thru-the-base gas and electrical connections (factory installed or field installed), standard.
5. Base Rail
  - a) Unit shall have base rails on a minimum of 2 sides.
  - b) Holes shall be provided in the base rails for rigging shackles to ease maneuvering and overhead rigging.
  - c) Holes shall be provided in the base rail for moving the rooftop by fork truck.
  - d) Base rail shall be a minimum of 16 gauge thickness.
6. Condensate pan and connections:
  - a) Shall be a sloped condensate drain pan made of a non-corrosive material.
  - b) Shall comply with ASHRAE Standard 62.
  - c) Shall use a 3/4" - 14 NPT drain connection, possible either through the bottom or end of the drain pan. Connection shall be made per manufacturer's recommendations.
7. Top panel:

Shall be a single piece top panel on 07 size, two piece on 08 thru 14 size.
8. Electrical Connections:

All unit power wiring shall enter unit cabinet at a single, factory-prepared, knock out location.

9. Component access panels (standard):
  - a) Cabinet panels shall be easily removable for servicing.
  - b) Unit shall have one factory installed tool-less, removable, filter access panel.
  - c) Panels covering control box, indoor fan, indoor fan motor, and compressors shall have molded composite handles.
  - d) Handles shall be UV modified, composite, permanently attached, and recessed into the panel.
  - e) Screws on the vertical portion of all removable access panels shall engage into heat resistant, molded composite collars.
  - f) Collars shall be removable and easily replaceable using manufacturer recommended parts.

#### Coils

##### Standard Aluminum fin-Copper Tube Coils:

1. Standard evaporator and condenser coils shall have aluminum lanced plate fins mechanically bonded to seam- less internally grooved copper tubes with all joints brazed.
2. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1775 psig.
3. Condenser coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1980 psig.

##### Optional Pre-coated aluminum-fin condenser coils:

1. Shall have a durable epoxy-phenolic coating to provide protection in mildly corrosive coastal environments.
2. Coating shall be applied to the aluminum fin stock prior to the fin stamping process to create an inert barrier between the aluminum fin and copper tube.
3. Epoxy-phenolic barrier shall minimize galvanic action between dissimilar metals.

##### Optional Copper-fin evaporator and condenser coils:

Shall be constructed of copper fins mechanically bonded to copper tubes

#### Refrigerant Components

1. Refrigerant circuit shall include the following control, safety, and maintenance features:
  - a) Fixed orifice metering system shall prevent mal-distribution of two-phase refrigerant by including multiple fixed orifice devices in each refrigeration circuit. Each orifice is to be optimized to the coil circuit it serves.
  - b) Refrigerant filter drier.
  - c) Service gauge connections on suction and discharge lines.
2. There shall be gauge line access, covered cap:
  - a) The plug shall be easy to remove and replace.
  - b) When the plug is removed, the gauge access port shall enable maintenance personnel to route their pressure gauge lines.
  - c) This gauge access port shall facilitate correct and accurate condenser pressure readings by enabling the reading with the compressor access panel on.
  - d) The plug shall be made of a leak proof, UV-resistant, composite material.
3. Compressors:
  - a) Unit shall use one fully hermetic, scroll compressor for each independent refrigeration circuit.
  - b) Compressor motors shall be cooled by refrigerant gas passing through motor windings.
  - c) Compressors shall be internally protected from high discharge temperature conditions.
  - d) Compressors shall be protected from an over-temperature and over-amperage conditions by an internal, motor overload device.
  - e) Compressor shall be factory mounted on rubber grommets.
  - f) Compressor motors shall have internal line break thermal, current overload and high pressure differential protection.
  - g) Crankcase heaters shall not be required for normal operating range, unless provided by compressor manufacturer due to refrigerant charge limits.

#### Evaporator Fan and Motor

##### Evaporator Fan Motor:

1. Shall have permanently lubricated bearings.
2. Shall have inherent automatic-reset thermal overload protection.
3. Shall have a maximum continuous bhp rating for continuous duty operation no safety factors above that rating shall be required.

##### Belt-driven Evaporator Fan:

1. Belt drive shall include an adjustable pitch motor pulley.
2. Shall use sealed, permanently lubricated ball-bearing type.
3. Blower fan shall be double-inlet type with forward-curved blades.
4. Shall be constructed from steel with a corrosion resistant finish and dynamically balanced.

## Condenser Fans and Motors

### Condenser Fan Motors:

1. Shall be a totally enclosed motor.
2. Shall use permanently lubricated bearings.
3. Shall have inherent thermal overload protection with an automatic reset feature.
4. Shall use a shaft-down design on 07 to 09 models and shaft-up design on 12, 14 sizes with rain shield.

### Condenser Fans:

1. Shall be a direct-driven propeller type fan.
2. Shall have aluminum blades riveted to corrosion-resistant steel spiders and shall be dynamically balanced.

## Electric and Electronic Control System for H AC

### General:

1. Shall be complete with self-contained low-voltage control circuit protected by a resettable circuit breaker on the 24V transformer side. Transformer shall have 75VA capability.
2. Shall utilize color-coded wiring.
3. Shall include a central control terminal board to conveniently and safely provide connection points for vital control functions such as: smoke detectors, phase monitor, thermostat, DDC control options, and low and high pressure switches.
4. Unit shall include a minimum of one 8-pin screw terminal connection board for connection of control wiring.

### Safeties:

1. Compressor over-temperature, over current.
2. Low pressure switch:
  - a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross wiring of the safety switches between circuits 1 and 2.
  - b. Low pressure switch shall use different color wire than the high pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
3. High pressure switch:
  - a. Units with 2 compressors shall have different sized connectors for the circuit 1 and circuit 2 low and high pressure switches. They shall physically prevent the cross wiring of the safety switches between circuits 1 and 2.
  - b. High pressure switch shall use different color wire than the low pressure switch. The purpose is to assist the installer and service technician to correctly wire and or troubleshoot the rooftop unit.
4. Automatic reset, motor thermal overload protector.

### Filter Section

1. Filters access is specified in the unit cabinet section of this specification.
2. Filters shall be held in place by a pivoting filter tray, facilitating easy removal and installation.
3. Shall consist of factory-installed, low velocity throw-away 2 -in. thick fiberglass filters with G4 classification.
4. Filters shall be standard, commercially available sizes.
5. Only one size filter per unit is allowed.

### Operating Characteristics

1. Unit shall be capable of starting and running at 125°F (52°C) ambient outdoor temperature, meeting maximum load criteria of AHRI Standard 210/240 or 340/360 at 10 voltage.
2. Compressor with standard controls shall be capable of operation down to 40°F (4°C), ambient outdoor temperatures. Accessory winter start kit is necessary if mechanically cooling at ambient temperatures down to 25°F (- 4°C).
3. Unit shall discharge supply air horizontally as shown on contract drawings.
4. Unit shall be factory configured for horizontal supply and return configurations.

### Thermostats

#### Thermostat must:

1. Energize both W" and G" when calling for heat.
2. Have capability to energize 2 different stages of cooling, and 2 different stages of heating.
3. Include capability for occupancy scheduling.

### Electrical Re uirements

Main power supply voltage, phase, and frequency must match those required by the manufacturer.

## Special Features Options and Accessories

### Open protocol, direct digital controller:

1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-30VAC, 50-60HZ, and consumer 15VA or less power.
3. Shall have an operating temperature range from - 40°F (- 40°C) to 130°F (54°C), 10 - 90 RH (non-condensing).
4. Shall include built-in protocol for BACNET (MS/TP and PTP modes), Modbus (RTU and ASCII), Johnson N2 and LonWorks. LonWorks Echelon processor required for all Lon applications shall be contained in separate communication board.
5. Shall allow access of up to 62 network variables (SNVT). Shall be compatible with all open controllers
6. Baud rate Controller shall be selectable using a dipswitch.
7. Shall have an LED display independently showing the status of serial communication, running, errors, power, all digital outputs, and all analog inputs.
8. Shall accept the following inputs: space temperature, set point adjustment, outdoor air temperature, indoor air quality, outdoor air quality, compressor lock-out, fire shutdown, enthalpy switch, and fan status/filter status/ humidity/ remote occupancy.
9. Shall provide the following outputs: Fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust.
10. Shall have built-in surge protection circuitry through solid state polyswitches. Polyswitches shall be used on in-coming power and network connections. Polyswitches will return to normal when the "trip" condition clears.
11. Shall have a battery backup capable of a minimum of 10,000 hours of data and time clock retention during power outages.
12. Shall have built- in support for Carrier technician tool.
13. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks communications card.
14. Software upgrades will be accomplished by either local or remote download. No software upgrades through chip replacements are allowed.

### PremierLink controller:

1. Shall be ASHRAE 62-2001 compliant.
2. Shall accept 18-32VAC input power.
3. Shall have an operating temperature range from - 40°F (- 40°C) to 158°F (70°C), 10 - 95 RH (non-condensing).
4. Controller shall accept the following inputs: space temperature, set point adjustment, outdoor air temperature, indoor air quality, outdoor air quality, indoor relative humidity, compressor lock-out, fire shutdown, enthalpy, fan status, remote time clock/door switch.
5. Shall accept a CO2 sensor in the conditioned space, and be Demand Control Ventilation (DCV) ready.
6. Shall provide the following outputs: Fan, cooling stage 1, cooling stage 2, heat stage 1, heat stage 2, heat stage 3/ exhaust/ occupied.
7. Unit shall provide surge protection for the controller through a field installed circuit breaker.
8. Shall be Internet capable, and communicate at a Baud rate of 38.4K or faster
9. Shall have an LED display independently showing the status of activity on the communication bus, and processor operation.
10. Shall include an EIA-485 protocol communication port, an access port for connection of either a computer or a Carrier technician tool, an EIA-485 port for network communication to intelligent space sensors and displays, and a port to connect an optional LonWorks plug-in communications card.
11. Shall have built-in Carrier Comfort Network (CCN) protocol, and be compatible with other CCN devices, including ComfortLink and ComfortVIEW controllers.
12. Shall have built-in support for Carrier technician tool.
13. Software upgrades will be accomplished by local download. Software upgrades through chip replacements are not allowed.
14. Shall be shock resistant in all planes to 5G peak, 11ms during operation, and 100G peak, 11ms during storage.
15. Shall be vibration resistant in all planes to 1.5G 20-300 Hz.
16. Shall support a bus length of 4000 ft max, 60 devices per 1000 ft section, and 1 RS-485 repeater per 1000ft sections.

### Manual damper:

Manual damper package shall consist of damper, air inlet screen, and rain hood which can be preset to admit up to 50 outdoor air for year round ventilation.

Head Pressure Control Package:

1. Controller shall control coil head pressure by condenser-fan speed modulation or condenser-fan cycling and wind baffles.
2. Shall consist of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90°F (32°C) and 110°F (43°C) at outdoor ambient temperatures down to -20°F (-29°C).

High/Medium-Static Indoor Fan Motor(s) and Drive(s):

Shall be factory-installed to provide additional performance range.

Smoke detectors:

1. Shall be a Four-Wire Controller and Detector.
2. Shall be environmental compensated with differential sensing for reliable, stable, and drift-free sensitivity.
3. Shall use magnet-activated test/reset sensor switches.
4. Shall have tool-less connection terminal access.
5. Shall have a recessed momentary switch for testing and resetting the detector.
6. Controller shall include:
  - a) One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.
  - b) Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
  - c) One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
  - d) Capable of direct connection to two individual detector modules.
  - e) Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.

Winter start kit:

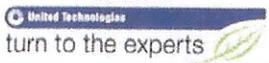
1. Shall contain a bypass device around the low pressure switch.
2. Shall be required when mechanical cooling is required down to 25°F (-4°C).

Time Guard:

1. Shall prevent compressor short-cycling by providing a 5-minute delay ( 2 minutes) before restarting a compressor after shutdown for any reason.
2. One device shall be required per compressor.

Electric Heat:

1. Heater element open coil resistance wire, nickel-chrome alloy, 0.29 inches inside diameter, strung through ceramic insulators mounted on metal frame. Coil ends are staked and welded to terminal screw slots.
2. Heater assemblies are provided with integral fusing for protection of internal heater circuits. Auto reset thermo limit controls, magnetic heater contactors (24V coil) and terminal block all mounted in electric heater control box (minimum 18 ga galvanized steel) attached to end of heater assembly.







# Product Information Sheet

## CUBE-IT™ CABINET ACCESSORIES

- Attaches over the vents in the side of the Cube-iT Plus Cabinet
- Draws air into the cabinet, pressurizing the cabinet and forcing warm air out of the side vents
- 115 VAC, 50/60 Hz, 37 dB Fan with 5'L (1.5 m) attached power cord and NEMA 5-15 plug
- 230 VAC, 50/60 Hz, 37 dB Fan with 5'L (1.5 m) attached power cord and NEMA 6-15P plug
- Includes mounting hardware & cable ties
- Fan Filter Kit reduces dust and can be mounted internally for security or externally for convenience
- Filter kit and filters sold separately



12805-X01

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| Part Number               | Description                            | Shipping Weight |
|---------------------------|--|-----------------|
| 12804-701                 | 100 CFM, 115 VAC, 50/60 Hz, NEMA 5-15P | 4 lb (1.8 kg)   |
| 12804-702                 | 100 CFM, 230 VAC, 50/60 Hz, NEMA 6-15P | 4 lb (1.8 kg)   |
| <b>Filter Kit For Fan</b> |  |                 |
| 12805-201                 | Filter Kit, White                      | 4 lb (1.8 kg)   |
| 12805-701                 | Filter Kit, Black                      | 4 lb (1.8 kg)   |
| 12806-001                 | Filters, Box of 6                      | 1 lb (0.5 kg)   |

## Attachment 3d Lockable Cabinet

800-834-4969 in U.S. & Canada • www.chatsworth.com



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# CUBE-iT PLUS® CABINET SYSTEM

## KEY FEATURES

- Swing-out cabinet body enables easy access to the rear of installed equipment.
- Rear panel is pre-punched with knockouts for 1/2", 3/4", 2-1/2" and 3" conduit, and has interior cable tie points and attachment points for accessory rack-mount brackets.
- Cabinet body includes one pair of adjustable depth 19" EIA threaded equipment mounting rails.
- Cabinet body is vented. Vents will accept an accessory fan.
- Front door has rounded edges and corners and is available solid or with a tinted window.
- The front door and the rear panel lock to provide equipment security.

## APPLICATIONS

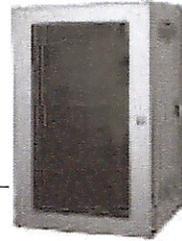
- Store and secure communications equipment — a horizontal cross connect or a consolidation point — within a telecommunications room or a public space.

## USE WITH

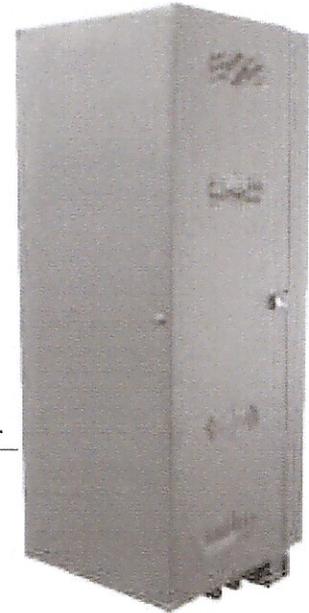
- 45° Mounting Bracket for CUBE-iT PLUS
- 90° Mounting Bracket for CUBE-iT PLUS
- Termination Block Panel for CUBE-iT PLUS
- Vertical Mounting Bracket for CUBE-iT PLUS
- Fan Kit for CUBE-iT PLUS
- Power Strip for CUBE-iT PLUS
- Light for CUBE-iT PLUS
- Rubber Foot Kit for CUBE-iT PLUS
- Horizontal Wire Management Bar for CUBE-iT PLUS
- Vertical Cable Manager for CUBE-iT PLUS

## RELATED ACCESSORIES

- Universal Horizontal Cable Managers
- Double-Sided Universal Horizontal Cable Managers
- Saf-T-Grip® Reusable Cable Management Straps
- Combination Pan Head, Pilot Point, Mounting Screws



**36" High Wall-Mount Cube-iT**



**72" High Wall- and Floor-Supported Cube-iT**

CUBE-iT PLUS® Cabinet System is a series of wall-mounted and floor-supported telecommunications enclosures designed to secure communications equipment for a cross connect. CUBE-iT PLUS Cabinets are copper and fiber ready and feature easy access to the front or the rear of the cabinet.

The cabinet design delivers exceptional strength and rigidity. The cabinet can be attached to the wall to swing open from the right or left. The open and close motion is smooth and the hasp used to secure the cabinet body to the rear panel assists in drawing the body components together during the locking action. Additionally, the door may be attached to open from the right or left. Door and rear panel are keyed alike.

The 5"D (130 mm) rear panel provides a space for terminating cables. The rear panel is pre-punched along the top and bottom with conduit knockouts allowing communications and power cables to be securely routed into the cabinet. Grommets are included to protect cables when conduit is not used. The interior of the rear panel has tie points for cables and attachment points for accessory equipment mounting brackets.

The main cabinet body includes a pair of adjustable depth 19" EIA threaded equipment mounting rails that can be used to support interconnect equipment and/or active components. The sides of the cabinet body are vented and will accept an accessory fan kit to increase air changes in the cabinet. The front door can be solid or have a tinted window. The edges of the front door are rounded to protect passers-by.

CUBE-iT PLUS Cabinets are available in five heights, 18 sizes. There are two basic cabinet styles. The 24"H (610 mm), 36"H (910 mm) and 48"H (1220 mm) cabinets attach directly to the wall, are UL Listed, and are available in four depths and support 200 pounds (90.7 kg) of equipment. The 60"H (1520 mm) and 72"H (1830 mm) cabinets attach directly to the wall and are floor-supported by a wheeled base under the main cabinet body (adds approximately 6" (150 mm) to overall height). The 60"H (1520 mm) and 72"H (1830 mm) cabinets are available in three depths and support 1,000 pounds (453.6 kg) of equipment.

See inside for product selection. Contact CPI for configuration assistance.



**CHATSWORTH PRODUCTS, INC.**

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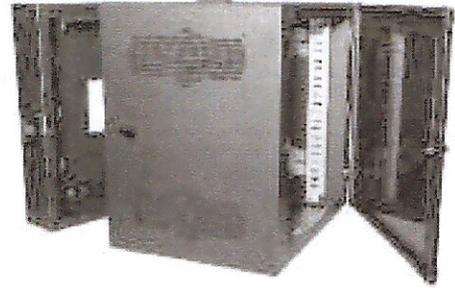
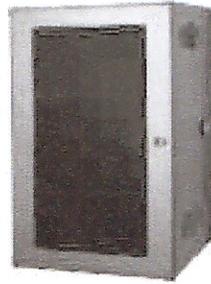
**SPECIFICATIONS**

**24" H (610 mm), 36" H (910 mm), 48" H (1220 mm) CUBE-iT PLUS**

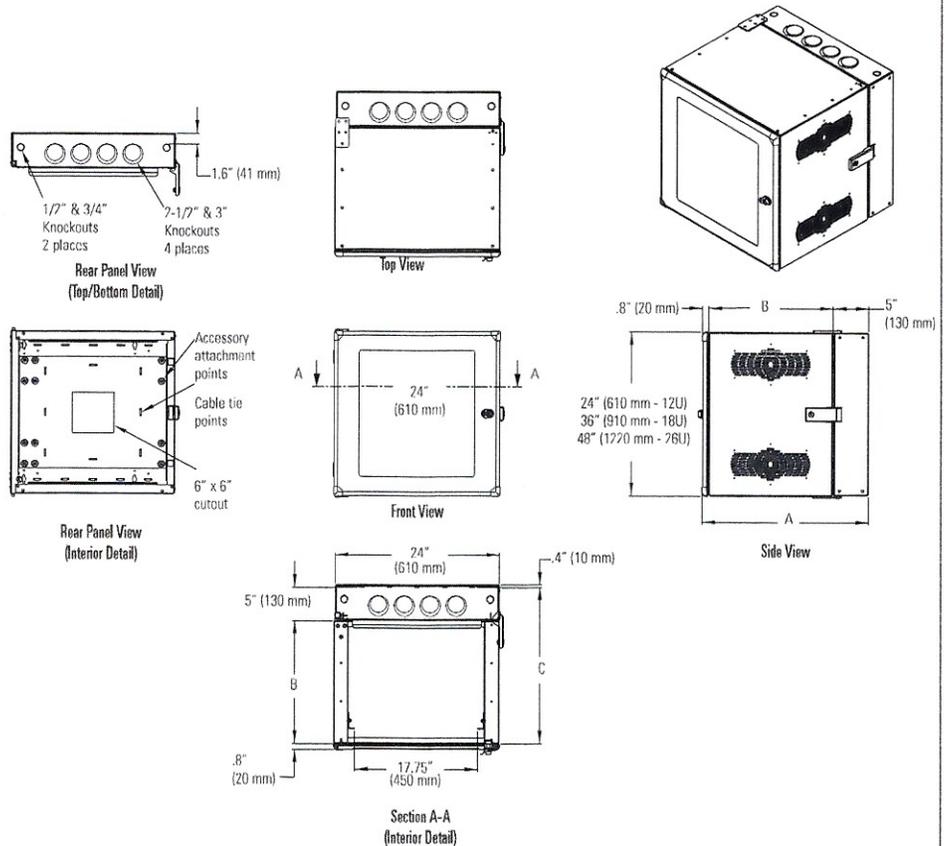
- Wall-mount enclosure with lockable front door and swing-out rear access to equipment
- Patented hinge design allows the installer to remove the rear panel for easier installation on the wall
- For indoor use only, in environmentally controlled areas; may not be used outdoors, in harsh environments, or in air-handling spaces
- Available sizes:  
Heights: 24" (610 mm), 36" (910 mm), 48" (1220 mm)  
Widths: 24" (610 mm); 19" EIA rack-mount  
Depths: 13" (330 mm), 18" (460 mm), 24" (610 mm), 30" (760 mm)
- Usable interior space:  
Heights: 12 RMU, 18 RMU, 26 RMU  
Widths: 19" EIA rack-mount  
Depths: refer to dimensions, at right
- Cable access:  
(4) 1/2" or 3/4" knockouts, 2 top/2 bottom  
(8) 2-1/2" or 3" knockouts, 4 top/4 bottom  
(4) Edge-protection grommets are included for 3" knockouts
- Cable fill:  
Refer to TIA-569-B and NEC for conduit fills  
Estimated cable pass through at 3" knock-through edge-protection grommet:

| Cat 5e<br>(.220" OD) | Cat 6<br>(.275" OD) | Cat 6A<br>(.350" OD) |
|----------------------|---------------------|----------------------|
| 38                   | 25                  | 15                   |

- Equipment support:  
1 pair L-shaped equipment mounting rails in the main cabinet body  
- 19"W, EIA-310-D compliant  
- Universal hole pattern, 5/8"-5/8"-1/2" vertical hole spacing  
- Threaded #12-24 equipment mounting holes  
- Depth-adjustable (bolted in place) 5"D (130 mm) rear panel punched to accept accessory equipment mounting brackets, see dimensions at right, accessories on back page Includes 50 each #12-24 equipment mounting screws
- Vertical cable management:  
Cable lacing points on the side of equipment mounting rails
- Load capacity:  
200 pounds (90.7 kg) of equipment, open or closed
- Certifications:  
EIA-310-D compliant  
UL Listed, NWIN with UL60950
- Material:  
Steel sheet cabinet body, rear panel and door  
Door window is bronze acrylic sheet  
Equipment mounting rails are aluminum sheet
- Construction:  
Riveted & Bolted
- Finish:  
Epoxy-polyester hybrid powder coat paint  
Black or computer white



**DIMENSIONS**



| Overall<br>A | Depth             |                     |
|--------------|-------------------|---------------------|
|              | Cabinet Body<br>B | Max. Equipment<br>C |
| 13" (330 mm) | 7.2" (183 mm)     | 11.8" (300 mm)      |
| 18" (460 mm) | 12.2" (310 mm)    | 16.8" (427 mm)      |
| 24" (610 mm) | 18.2" (462 mm)    | 22.8" (579 mm)      |
| 30" (760 mm) | 24.2" (615 mm)    | 28.8" (732 mm)      |

ORDERING INFORMATION

**24"H (610 mm), 36"H (910 mm), 48"H (1220 mm) CUBE-iT PLUS Cabinets**

- Attaches to the wall with included installation hardware
- Supports 200 pounds of equipment

| 24"H (610 mm) CUBE-iT PLUS Cabinets |  |            |              |                 |
|-------------------------------------|--|------------|--------------|-----------------|
| Part Number & Color                 |  | Door Style | Depth        | Shipping Weight |
| White                               | Black  |            |              |                 |
| 13265-224                           | 13265-724  | Solid      | 13" (330 mm) | 70 lb (31.8 kg) |
| 13275-224                           | 13275-724  | Tinted     | 13" (330 mm) | 67 lb (30.4 kg) |
| 11890-224                           | 11890-724  | Solid      | 18" (460 mm) | 78 lb (35.4 kg) |
| 11901-224                           | 11901-724  | Tinted     | 18" (460 mm) | 75 lb (34.0 kg) |
| 11840-224                           | 11840-724  | Solid      | 24" (610 mm) | 87 lb (39.5 kg) |
| 11900-224                           | 11900-724  | Tinted     | 24" (610 mm) | 84 lb (38.1 kg) |
| 11996-224                           | 11996-724  | Solid      | 30" (760 mm) | 97 lb (44.0 kg) |
| 12419-224                           | 12419-724  | Tinted     | 30" (760 mm) | 94 lb (42.6 kg) |
| Extra Mounting Rails, 1 Pair        |  |            |              |                 |
| 12787-524                           | L-shaped, threaded, 12 RMU                           |            |              | 3 lb (1.4 kg)   |
| Floor-Mount Foot Kit                |  |            |              |                 |
| 13483-001                           | Foot Kit, 24"D (610 m) & 30"D (760 mm) Cabinets Only |            |              | 2 lb (0.9 kg)   |

| 36"H (910 mm) CUBE-iT PLUS Cabinets |  |            |              |                  |
|-------------------------------------|--|------------|--------------|------------------|
| Part Number & Color                 |  | Door Style | Depth        | Shipping Weight  |
| White                               | Black  |            |              |                  |
| 13265-236                           | 13265-736  | Solid      | 13" (330 mm) | 89 lb (40.4 kg)  |
| 13275-236                           | 13275-736  | Tinted     | 13" (330 mm) | 83 lb (37.6 kg)  |
| 11890-236                           | 11890-736  | Solid      | 18" (460 mm) | 99 lb (44.9 kg)  |
| 11901-236                           | 11901-736  | Tinted     | 18" (460 mm) | 93 lb (42.2 kg)  |
| 11840-236                           | 11840-736  | Solid      | 24" (610 mm) | 111 lb (50.3 kg) |
| 11900-236                           | 11900-736  | Tinted     | 24" (610 mm) | 105 lb (47.6 kg) |
| 11996-236                           | 11996-736  | Solid      | 30" (760 mm) | 124 lb (56.2 kg) |
| 12419-236                           | 12419-736  | Tinted     | 30" (760 mm) | 118 lb (53.5 kg) |
| Extra Mounting Rails, 1 Pair        |  |            |              |                  |
| 12787-536                           | L-shaped, threaded, 18 RMU                           |            |              | 4 lb (1.4 kg)    |
| Floor-Mount Foot Kit                |  |            |              |                  |
| 13483-001                           | Foot Kit, 24"D (610 m) & 30"D (760 mm) Cabinets Only |            |              | 2 lb (0.9 kg)    |

| 48"H (1220 mm) CUBE-iT PLUS Cabinets |  |            |              |                  |
|--------------------------------------|--|------------|--------------|------------------|
| Part Number & Color                  |  | Door Style | Depth        | Shipping Weight  |
| White                                | Black  |            |              |                  |
| 13265-248                            | 13265-748  | Solid      | 13" (330 mm) | 108 lb (49.0 kg) |
| 13275-248                            | 13275-748  | Tinted     | 13" (330 mm) | 101 lb (45.8 kg) |
| 11890-248                            | 11890-748  | Solid      | 18" (460 mm) | 121 lb (54.9 kg) |
| 11901-248                            | 11901-748  | Tinted     | 18" (460 mm) | 114 lb (51.7 kg) |
| 11840-248                            | 11840-748  | Solid      | 24" (610 mm) | 135 lb (61.2 kg) |
| 11900-248                            | 11900-748  | Tinted     | 24" (610 mm) | 128 lb (58.1 kg) |
| 11996-248                            | 11996-748  | Solid      | 30" (760 mm) | 151 lb (68.5 kg) |
| 12419-248                            | 12419-748  | Tinted     | 30" (760 mm) | 143 lb (64.9 kg) |
| Extra Mounting Rails, 1 Pair         |  |            |              |                  |
| 12787-548                            | L-shaped, threaded, 26 RMU                           |            |              | 5 lb (2.3 kg)    |
| Floor-Mount Foot Kit                 |  |            |              |                  |
| 13483-001                            | Foot Kit, 24"D (610 m) & 30"D (760 mm) Cabinets Only |            |              | 2 lb (0.9 kg)    |

Note: Floor-Mount Foot Kit allows the front door and rear panel of the cabinet to open when it is placed on the floor, a shelf or table surface (not attached to a wall). Attaches under the 24"D or 30"D cabinets only.

Note: Refer to page 2 for details on these cabinets.

**60"H (1520 mm), 72"H (1830 mm) CUBE-iT PLUS Cabinets**

- Attaches to the wall with included installation hardware
- Cabinet body is supported by a wheeled base, adds 6" (150 mm) to height
- Supports 1,000 pounds of equipment

| 60"H (1520 mm) CUBE-iT PLUS Cabinets |           |                  |              |                   |
|--------------------------------------|-----------|------------------|--------------|-------------------|
| Part Number & Color                  |           | Door Style       | Depth        | Shipping Weight   |
| White                                | Black     |                  |              |                   |
| 13491-260                            | 13491-760 | Solid            | 18" (460 mm) | 201 lb (91.2 kg)  |
| 13494-260                            | 13494-760 | Tinted           | 18" (460 mm) | 192 lb (87.1 kg)  |
| 13492-260                            | 13492-760 | Solid            | 24" (610 mm) | 221 lb (100.2 kg) |
| 13495-260                            | 13495-760 | Tinted           | 24" (610 mm) | 212 lb (96.2 kg)  |
| 13493-260                            | 13493-760 | Solid            | 30" (760 mm) | 246 lb (111.6 kg) |
| 13496-260                            | 13496-760 | Tinted           | 30" (760 mm) | 236 lb (107.0 kg) |
| Extra Mounting Rails, 1 Pair         |           |                  |              |                   |
| 13276-260                            | 13276-760 | L-shaped, 33 RMU |              | 12 lb (5.4 kg)    |

| 72"H (1830 mm) CUBE-iT PLUS Cabinets |           |                  |              |                   |
|--------------------------------------|-----------|------------------|--------------|-------------------|
| Part Number & Color                  |           | Door Style       | Depth        | Shipping Weight   |
| White                                | Black     |                  |              |                   |
| 13491-272                            | 13491-772 | Solid            | 18" (460 mm) | 224 lb (101.6 kg) |
| 13494-272                            | 13494-772 | Tinted           | 18" (460 mm) | 212 lb (96.2 kg)  |
| 13492-272                            | 13492-772 | Solid            | 24" (610 mm) | 247 lb (112.0 kg) |
| 13495-272                            | 13495-772 | Tinted           | 24" (610 mm) | 235 lb (106.6 kg) |
| 13493-272                            | 13493-772 | Solid            | 30" (760 mm) | 274 lb (124.3 kg) |
| 13496-272                            | 13496-772 | Tinted           | 30" (760 mm) | 262 lb (118.3 kg) |
| Extra Mounting Rails, 1 Pair         |           |                  |              |                   |
| 13276-272                            | 13276-772 | L-shaped, 40 RMU |              | 14 lb (6.4 kg)    |

**Vertical Cable Manager**

- Use in 60"H (1520 mm) and 72"H (1830 mm) cabinets only
- Openings align with RMU spaces; fingers manage patch cords
- 2.7"W x 5"D (69 mm x 130 mm) usable interior space
- Adjusts front-to-rear within the cabinet
- Managers must be installed before rack-mount equipment



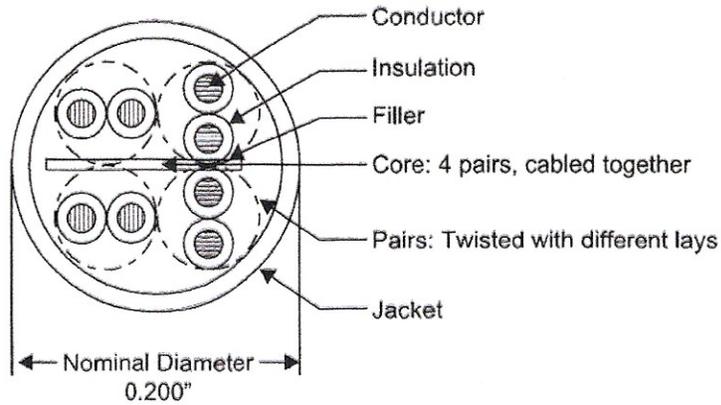
| Vertical Cable Manager |   |                 |
|------------------------|---|-----------------|
| Part Number            | Description                                     | Shipping Weight |
| 13485-760              | Cable Manager for 60"H (1520 mm) Cabinet, Black | 9 lb (4.1 kg)   |
| 13485-772              | Cable Manager for 72"H (1830 mm) Cabinet, Black | 10 lb (4.5 kg)  |

Note: Refer to page 4 for details on these cabinets.

# Attachment 3e CAT 6

## 610 Series Cat 6 UTP Cable Cut Sheet

1933047-X



### Description

Tyco Electronics' AMP NETCONNECT 610 Series Category 6 cables meet ANSI/TIA-568-C.2 Category 6 and ISO/IEC 11801 Class E performance requirements on all parameters. The AMP NETCONNECT Category 6 System complies with all of the performance requirements for current and proposed applications.

610 Series Cat6 UTP cables are available in plenum, with standard colors including white, gray, blue and yellow. Category 6 Cables from AMP NETCONNECT feature lead-free jacketing. Packaging is either on reels or in a pull-box, with standard out-ups being 1000ft splice-free lengths.

### Specification (text in brackets [ ] requires a choice)

Horizontal cabling shall be 24 AWG, 4-pair UTP, NEC/NFPA CMP rated and be independently verified for compliance. Cable jacketing shall be [white, gray, blue or yellow] and shall be lead-free. Individual conductors shall be 100% virgin FEP insulated. Cable shall meet all ANSI/TIA and ISO Category 6/Class E requirements as well as meet the performance requirements listed in the table shown on page 2:

16760 - ITEM 03

Cable shall be supplied [on reels or in a pull-box]. Independent verification for flammability compliance shall be to NEC article 800 and NFPA 70; CMP (NFPA 262). Horizontal cable shall be AMP NETCONNECT part number 1933047-X.

### ORDERING INFORMATION

| Product Description                                    | Packaging        | Part Numbers |             |             |             |
|--|------------------|--------------|-------------|-------------|-------------|
|  |                  | White        | Gray        | Blue        | Yellow      |
| 610 Series Cat 6 UTP Cable, 4-Pair, Plenum (CMP) Rated | 1000 ft Pull-Box | 5-1933047-2  | 5-1933047-4 | 5-1933047-6 | 5-1933047-8 |
|  | 1000 ft Reel     | 1933047-1    | 1933047-3   | 1933047-5   | 1933047-7   |

16760 - ITEM 02

GREEN - 5-1933047-3

16760 - ITEM 01

ORANGE - 5-1933047-0



# 610 Series Cat 6 UTP Cable Cut Sheet

1933047-X

## PERFORMANCE DATA

| Frequency (MHz) | Insertion Loss (Attenuation) dB/100m max | NEXT (dB) min | PSNEXT (dB) min | ACRF (dB) min | PSACRF (dB) min | RL (dB) min | Skew (ns) max | Propagation Delay (ns/100m) max |
|-----------------|--|---------------|-----------------|---------------|-----------------|-------------|---------------|---------------------------------|
| 0.772           | 1.8                                      | 76.0          | 74.0            | 70.0          | 67.0            | 19.4        | 45            | 518                             |
| 1               | 2.0                                      | 74.3          | 72.3            | 67.8          | 64.8            | 20.0        | 45            | 498                             |
| 4               | 3.8                                      | 65.3          | 63.3            | 55.8          | 52.8            | 23.0        | 45            | 484                             |
| 8               | 5.3                                      | 60.8          | 58.8            | 49.7          | 46.7            | 24.5        | 45            | 477                             |
| 10              | 6.0                                      | 59.3          | 57.3            | 47.8          | 44.8            | 25.0        | 45            | 475                             |
| 16              | 7.6                                      | 56.2          | 54.2            | 43.7          | 40.7            | 25.0        | 45            | 473                             |
| 20              | 8.5                                      | 54.8          | 52.8            | 41.8          | 38.8            | 25.0        | 45            | 471                             |
| 25              | 9.5                                      | 53.3          | 51.3            | 39.8          | 36.8            | 24.3        | 45            | 471                             |
| 31.25           | 10.7                                     | 51.9          | 49.9            | 37.9          | 34.9            | 23.6        | 45            | 470                             |
| 62.5            | 15.4                                     | 47.4          | 45.4            | 31.9          | 28.9            | 21.5        | 45            | 468                             |
| 100             | 19.8                                     | 44.4          | 42.3            | 27.8          | 24.8            | 20.1        | 45            | 467                             |
| 200             | 29.0                                     | 39.8          | 37.8            | 21.8          | 18.8            | 18.0        | 45            | 494                             |
| 250             | 32.8                                     | 38.3          | 36.3            | 19.8          | 16.8            | 17.3        | 45            | 563                             |

## SPECIFICATIONS

|   |  |
|---|--|
| <b>Mutual Capacitance:</b>              | 5.6 nF/100 m nominal   |
| <b>Fitted Impedance:</b>                | 100 $\Omega$ $\pm$ 15%, 1 - 250 MHz  |
| <b>Conductor DC Resistance:</b>         | 28.6 $\Omega$ /1000 ft (9.38 $\Omega$ /100 m) maximum  |
| <b>Voltage:</b>                         | 300 VAC or VDC   |
| <b>Delay Skew:</b>                      | 45 ns  |
| <b>Propagation Delay:</b>               | 563 ns/100 m @ 250 MHz   |
| <b>Nominal Velocity of Propagation:</b> | 75%  |
| <b>Operating Temperature:</b>           | -20°C - 60°C (-4°F - 140°F)  |
| <b>Storage Temperature:</b>             | -20°C - 80°C (-4°F - 176°F)  |
| <b>Installation Temperature:</b>        | 5°C - 50°C (41°F - 122°F)  |
| <b>Bend Radius:</b>                     | 4 $\times$ cable diameter  |
| <b>Packaging:</b>                       | 1000ft Pull-box: 24 lbs/kft<br>1000ft Reel: 24 lbs/kft   |
| <b>Materials:</b>                       | Conductors: 24 AWG, Solid Copper<br>Insulation: $\varnothing$ .037 nominal, plenum grade materials<br>Jacket: $\varnothing$ .200 nominal, FR PVC   |
| <b>Compliances:</b>                     | UL Subject 444<br>(UL)-C(UL) Type CMP<br>ICEA S-90-661<br>ETL Verified TIA-568-C.2 Category 6 Horizontal Cable Requirements<br>ISO/IEC 11801 Category 6 Horizontal Cable Requirements<br>2002/95/EC RoHS |



## DATA SHEET



### Contact us:

Greensboro, NC  
USA 27409-8420  
Tel: 1-800-553-0938  
Fax: 1-717-986-7406

[www.te.com](http://www.te.com)  
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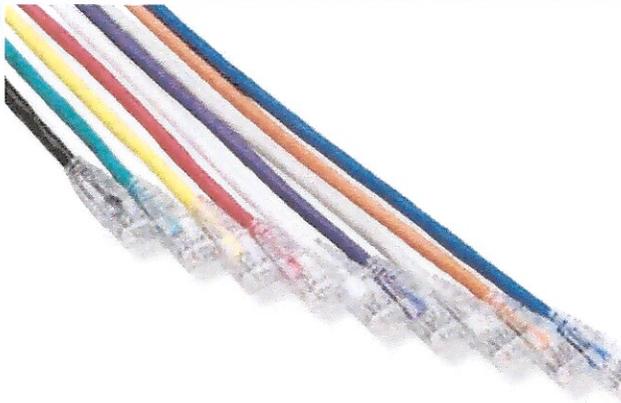
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## Category 6 Slim Line Patch Cable Assemblies

02



16760 - ITEM 08

- Slim plug and boot design provide additional space between adjacent plugs
- Meets or exceeds Category 6 performance standards
- 4-Pair stranded Unshielded 24 AWG conductors
- Non-plenum (CM rated)
- Universal wiring (T568A/T568B)
- Lead-Free (no heavy metals)
- Colors in table are approximate

| Length          | Black       | Blue        | Green       | Red         | White       | Yellow      | Orange      | Violet      |             |
|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 2 ft [0.61 m]   | 1933116-2   | 1933117-2   | 1933118-2   | 1933119-2   | 1933120-2   | 1933121-2   | 1933122-2   | 1933123-2   | 1933124-2   |
| 3 ft [0.91 m]   | 1933116-3   | 1933117-3   | 1933118-3   | 1933119-3   | 1933120-3   | 1933121-3   | 1933122-3   | 1933123-3   | 1933124-3   |
| 4 ft [1.22 m]   | 1933116-4   | 1933117-4   | 1933118-4   | 1933119-4   | 1933120-4   | 1933121-4   | 1933122-4   | 1933123-4   | 1933124-4   |
| 5 ft [1.52 m]   | 1933116-5   | 1933117-5   | 1933118-5   | 1933119-5   | 1933120-5   | 1933121-5   | 1933122-5   | 1933123-5   | 1933124-5   |
| 6 ft [1.83 m]   | 1933116-6   | 1933117-6   | 1933118-6   | 1933119-6   | 1933120-6   | 1933121-6   | 1933122-6   | 1933123-6   | 1933124-6   |
| 7 ft [2.13 m]   | 1933116-7   | 1933117-7   | 1933118-7   | 1933119-7   | 1933120-7   | 1933121-7   | 1933122-7   | 1933123-7   | 1933124-7   |
| 8 ft [2.44 m]   | 1933116-8   | 1933117-8   | 1933118-8   | 1933119-8   | 1933120-8   | 1933121-8   | 1933122-8   | 1933123-8   | 1933124-8   |
| 9 ft [2.74 m]   | 1933116-9   | 1933117-9   | 1933118-9   | 1933119-9   | 1933120-9   | 1933121-9   | 1933122-9   | 1933123-9   | 1933124-9   |
| 10 ft [3.05 m]  | 1-1933116-0 | 1-1933117-0 | 1-1933118-0 | 1-1933119-0 | 1-1933120-0 | 1-1933121-0 | 1-1933122-0 | 1-1933123-0 | 1-1933124-0 |
| 12 ft [3.66 m]  | 1-1933116-2 | 1-1933117-2 | 1-1933118-2 | 1-1933119-2 | 1-1933120-2 | 1-1933121-2 | 1-1933122-2 | 1-1933123-2 | 1-1933124-2 |
| 14 ft [4.27 m]  | 1-1933116-4 | 1-1933117-4 | 1-1933118-4 | 1-1933119-4 | 1-1933120-4 | 1-1933121-4 | 1-1933122-4 | 1-1933123-4 | 1-1933124-4 |
| 15 ft [4.57 m]  | 1-1933116-5 | 1-1933117-5 | 1-1933118-5 | 1-1933119-5 | 1-1933120-5 | 1-1933121-5 | 1-1933122-5 | 1-1933123-5 | 1-1933124-5 |
| 16 ft [4.88 m]  | 1-1933116-6 | 1-1933117-6 | 1-1933118-6 | 1-1933119-6 | 1-1933120-6 | 1-1933121-6 | 1-1933122-6 | 1-1933123-6 | 1-1933124-6 |
| 20 ft [6.10 m]  | 2-1933116-0 | 2-1933117-0 | 2-1933118-0 | 2-1933119-0 | 2-1933120-0 | 2-1933121-0 | 2-1933122-0 | 2-1933123-0 | 2-1933124-0 |
| 25 ft [7.62 m]  | 2-1933116-5 | 2-1933117-5 | 2-1933118-5 | 2-1933119-5 | 2-1933120-5 | 2-1933121-5 | 2-1933122-5 | 2-1933123-5 | 2-1933124-5 |
| 30 ft [9.14 m]  | 3-1933116-0 | 3-1933117-0 | 3-1933118-0 | 3-1933119-0 | 3-1933120-0 | 3-1933121-0 | 3-1933122-0 | 3-1933123-0 | 3-1933124-0 |
| 40 ft [12.19 m] | 4-1933116-0 | 4-1933117-0 | 4-1933118-0 | 4-1933119-0 | 4-1933120-0 | 4-1933121-0 | 4-1933122-0 | 4-1933123-0 | 4-1933124-0 |
| 50 ft [15.24 m] | 5-1933116-0 | 5-1933117-0 | 5-1933118-0 | 5-1933119-0 | 5-1933120-0 | 5-1933121-0 | 5-1933122-0 | 5-1933123-0 | 5-1933124-0 |

## Category 6 Ethernet Crossover Cable Assemblies

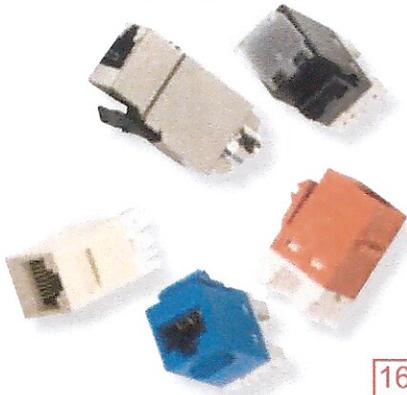
16760 - ITEM 09

- Category 6 crossover cables are compatible with 10/100BASE-T, as well as IEEE 802.3 1000BASE-T
- For other lengths and wiring diagrams, see Customer Drawing
- Lead-Free (no heavy metals)
- Features black plug boots and red cable

| Description                                    | Cable/Boot Color | Length         | Part Number |
|--|------------------|----------------|-------------|
| Category 6 Ethernet Crossover Cable Assemblies | Red/Black        | 3 ft [0.91 m]  | 1499150-3   |
|  |                  | 5 ft [1.52 m]  | 1499150-5   |
|  |                  | 7 ft [2.13 m]  | 1499150-7   |
|  |                  | 10 ft [3.05 m] | 1-1499150-0 |
|  |                  | 12 ft [3.66 m] | 1-1499150-2 |
|  |                  | 15 ft [4.57 m] | 1-1499150-5 |
|  |                  | 25 ft [7.62 m] | 2-1499150-5 |

## SL Series Category 6 Modular Jacks

02



- Thin profile improves outlet density
- Modular Jacks available with integral dust covers
- 180° or 90° cable dress for easy termination
- Universal wiring label permits wiring to T568A or T568B
- Meets or exceeds all TIA and ISO component performance requirements
- Bend-limiting strain relief included with unshielded jacks
- UL Listed: E81956
- 8-Position RJ45 Modular Jacks for 1, 2, 3 and 4-Pair applications
- Can be terminated with either SL Series Modular Jack Termination Tool (1725150-1 or standard 110 punch-down tools, see Chapter 22
- RoHS compliant
- Bulk packaging is 25 jacks per bag, 4 bags per carton
- Colors in table are approximate
- For unloaded patch panels see Chapter 15

16761 - ITEM 01

16761 - ITEM 03

| Description                        | Shielding        | Color       | Without Dust Cover | With Dust Cover | Without Dust Cover Bulk Packaged |   |
|------------------------------------|------------------|-------------|--------------------|-----------------|----------------------------------|---|
| SL Series Category 6 Modular Jacks | Unshielded       | Almond      | 1375055-1          | 1375187-1       | 2-1375055-1                      |   |
|                                    |                  | Black       | 1375055-2          | 1375187-2       | 2-1375055-2                      |   |
|                                    |                  | White       | 1375055-3          | 1375187-3       | 2-1375055-3                      |   |
|                                    |                  | Gray        | 1375055-4          | 1375187-4       | 2-1375055-4                      |   |
|                                    |                  | Orange      | 1375055-5          | 1375187-5       | 2-1375055-5                      |   |
|                                    |                  | Blue        | 1375055-6          | 1375187-6       | 2-1375055-6                      |   |
|                                    |                  | Red         | 1375055-7          | 1375187-7       | 2-1375055-7                      |   |
|                                    |                  | Yellow      | 1375055-8          | 1375187-8       | 2-1375055-8                      |   |
|                                    |                  | Green       | 1375055-9          | 1375187-9       | 2-1375055-9                      |   |
|                                    |                  | Violet      | 1-1375055-0        | 1-1375187-0     | 3-1375055-0                      |   |
|                                    | Electrical Ivory | 1-1375055-1 | 1-1375187-1        | 3-1375055-1     |                                  |   |
|                                    | Alpine White     | 1-1375055-3 | 1-1375187-3        | 3-1375055-3     |                                  |   |
|                                    | Shielded         | 180° (Rear) | Black              | 1375188-1*      | -                                | - |
|                                    |                  | 90° (Side)  | Black              | 1479552-1*      | -                                | - |
|                                    |                  |             | Black              | 1479552-1*      | -                                | - |

\*Note: Shielded jacks are not available in colors, or with dust covers and do not accept strain reliefs. Colors are approximate and for reference only.

16761 - ITEM 02

## SL Series Modular Jack Strain Reliefs



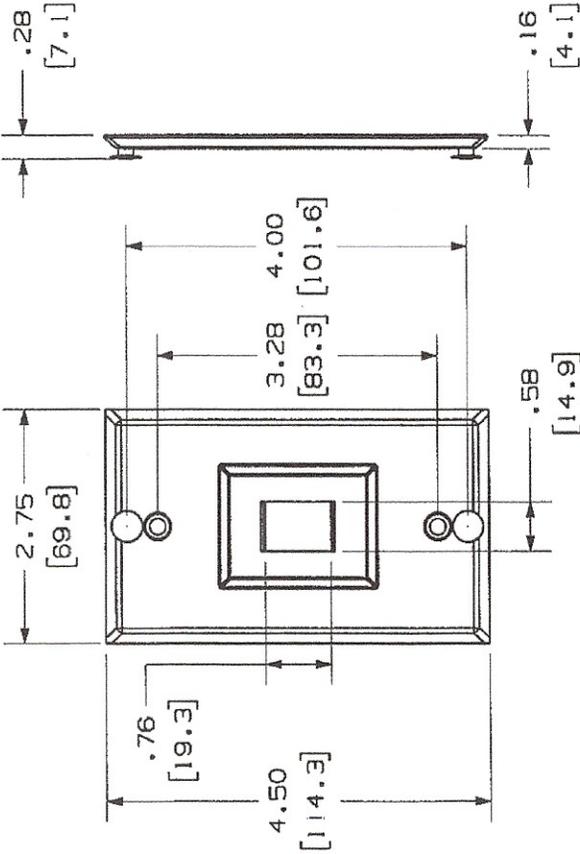
- Provide strain relief for terminated cables in the Work Area
- For use with unshielded SL Series Modular Jacks only

| Description                 | Color       | Figure | Part Number |
|-----------------------------|-------------|--------|-------------|
| Bend-Limiting Strain Relief | Smoked Gray | A      | 1375200-1   |
| Strain Relief               | Clear       | B      | 1375157-1   |

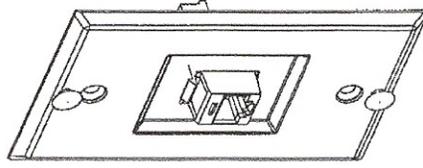
THIS COPY IS PROVIDED ON A RESTRICTED BASIS AND IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO THE INTERESTS OF PANDUIT CORP.

16761 - ITEM 25

| PANDUIT P/N | WEIGHT                             |
|-------------|------------------------------------|
| KWP6PY      | 1.40 LB/10 PCS<br>(635.3 g/10 PCS) |



- NOTES:
- SEE CATALOG FOR COMPLETE LIST OF PARTS APPLICABLE FOR USE WITH THIS PART.
  - DIMENSIONS IN PARENTHESES ARE IN METRIC.
  - KWP6PY CONTAINS:
    - 1- WALL PLATE
    - 1- KEYSTONE TX6 PLUS JACK MODULE
    - 2- MOUNTING SCREW

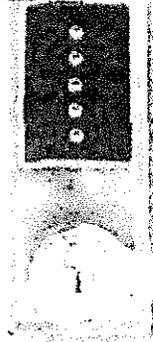


|   |  |   |
|---|--|---|
| DRAWING FILENAME: M02479B0_DC41_00A.PRT   |  | SIZE: A   |
| PHONE PLATE WITH KEYSTONE TX6 PLUS JACK MODULE CUSTOMER DRAWING   |  |   |
| <b>PANDUIT</b> ™<br>TINLEY PARK, ILL 60477  |  | I.I. NUMBER: N/A<br>PRODUCT SPEC: N/A<br>WORK INSTRUCTION: N/A<br>SCALE: NONE<br>PART NO.: KWP6PY<br>DRAWING NO.: 02479-041 |
| ALL DIMENSIONS ARE GIVEN IN INCHES, UNLESS OTHERWISE SPECIFIED.<br>DIMENSIONAL TOLERANCES ARE:<br>(.X) ± .010<br>(.XX) ± .005<br>(.XXX) ± .001<br>ANGLES ± .031 |  |   |
| THRU ANGLE<br>THIRD ANGLE<br>DIMENSIONAL<br>SYSTEM  | DRAWN BY: JSP<br>DATE: 5-3-06<br>CHK'D: <i>[Signature]</i> | MATERIAL:<br>20 AWG 430 STAINLESS STEEL   |

| REV | DATE   | BY  | CHK                | DESCRIPTION            | ECN       | R                  | CUST               | SUP | OTH |
|-----|--------|-----|--------------------|------------------------|-----------|--------------------|--------------------|-----|-----|
| R   | 5-3-06 | JSP | <i>[Signature]</i> | RELEASED TO PRODUCTION | 02479-041 | <i>[Signature]</i> | <i>[Signature]</i> |     |     |

Simplex  
L1000 Series

KABA®



- PIN Access
- Mechanical Pushbutton Lock
- Single Access Code
- Cylindrical
- Lever

|                                   |   |
|-----------------------------------|---|
| <b>Access Control:</b>            | Mechanical pushbutton lock-eliminates problems and costs associated with issuing, controlling, and collecting keys and cards. Provides exterior access by combination, while allowing free egress.  |
| <b>No Battery:</b>                | Fully mechanical lock eliminates the material and labor expense of battery replacements   |
| <b>Locking Device Options:</b>    | Cylindrical latch with 3-hour UL/ULC fire rating on "A" labeled doors   |
| <b>Number of Codes:</b>           | Single access code-one easy to manage code for all users  |
| <b>Programming:</b>               | Lock is easily programmed via keypad without removing lock from the door  |
| <b>Handing:</b>                   | Factory-handed; not field reversible  |
| <b>Key Override (Optional):</b>   | Small format interchangeable cores, large format removable cores  |
| <b>Operation Modes:</b>           | Single credential-access<br>Passage (select models)-Allows access without using the lock entry code<br>Feature activated from the inside with a thumbturn or key (Included with all passage feature models)<br>Privacy (select models)-Disables the lock from the inside so that the entry codes can not be used to gain access. Access is permitted using the key override only when in this mode. |
| <b>Economical:</b>                | A cost effective access control solution  |
| <b>Construction:</b>              | Heavy-duty cylindrical lock housing with cast front housing, unified trim plate, and fixed ADA-compliant levers   |
| <b>Numeric Keypad:</b>            | Vandal resistant, solid metal pushbuttons   |
| <b>Handing:</b>                   | Factory-handed; not field reversible  |
| <b>Standard Finishes:</b>         | Satin Chrome 26D (626), Antique Brass 05 (609)  |
| <b>Optional Finishes:</b>         | Bright Brass 03 (605), Bright Chrome 026 (625)  |
| <b>Backset:</b>                   | 2 1/2" (70 mm), 2 1/4" (60 mm)  |
| <b>Latch:</b>                     | 1/2" (13 mm) throw latch; 1/4" (19 mm) throw latch (optional)   |
| <b>Minimum Stile Recommended:</b> | 5" (127 mm)   |
| <b>Weight:</b>                    | 8.25 lbs. (3.7 kg)  |
| <b>Strike:</b>                    | Standard strike plate; ASA strike plate   |

## Attachment 3f Simplex Mech Lock

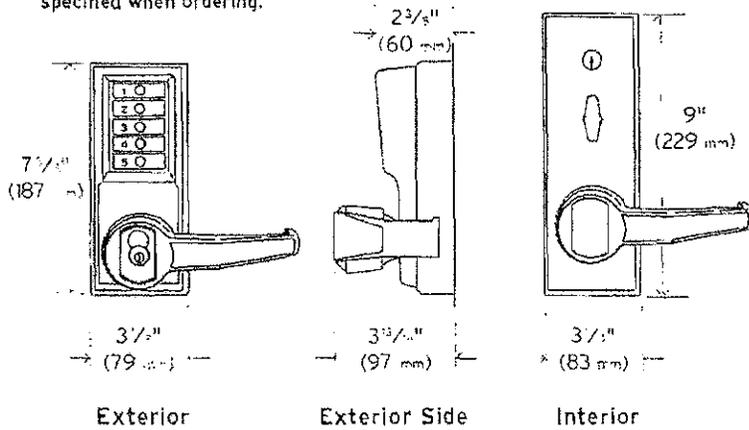


# Simplex

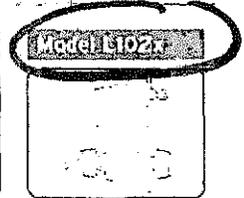
## L1000 Series

|                         |   |
|-------------------------|---|
| Interchangeable Cores:  | Small format—Best and equivalents (6 or 7-pin length)   |
| Removable Cores:        | Large format—Medeco/ASSA/Yale (5 or 6-pin length), Corbin Russwin, Schlage, and Sargent   |
| Door Preparation:       | Easily installs on wood or metal doors. ASA 161 door preparation with additional through holes                                      |
| Door Thickness:         | 1 1/2" (35 mm) to 2 1/2" (57 mm)—Pre-assembled to accommodate 1 1/2" (41 mm) to 2" (51 mm) doors                                    |
| Items Supplied Include: | Lock assembly, installation manual, full-scale template, combination change plug and access key, and required installation hardware |
| Accessibility Standard: | Americans with Disabilities Act (ADA)   |
| Durability:             | Compliance with D.O.D. 5220.22M; highly weather resistant   |
| Fire Rating:            | 3-hour UL/ULC fire rating for "A" labeled doors   |
| Warranty:               | 3-year warranty   |

Door handing must be specified when ordering.



- Combination Entry
- Interior Combination Change



- Combination Entry
- Key Override (not supplied)
- Interior Combination Change



- Combination Entry
- Interior Combination Change
- Passage



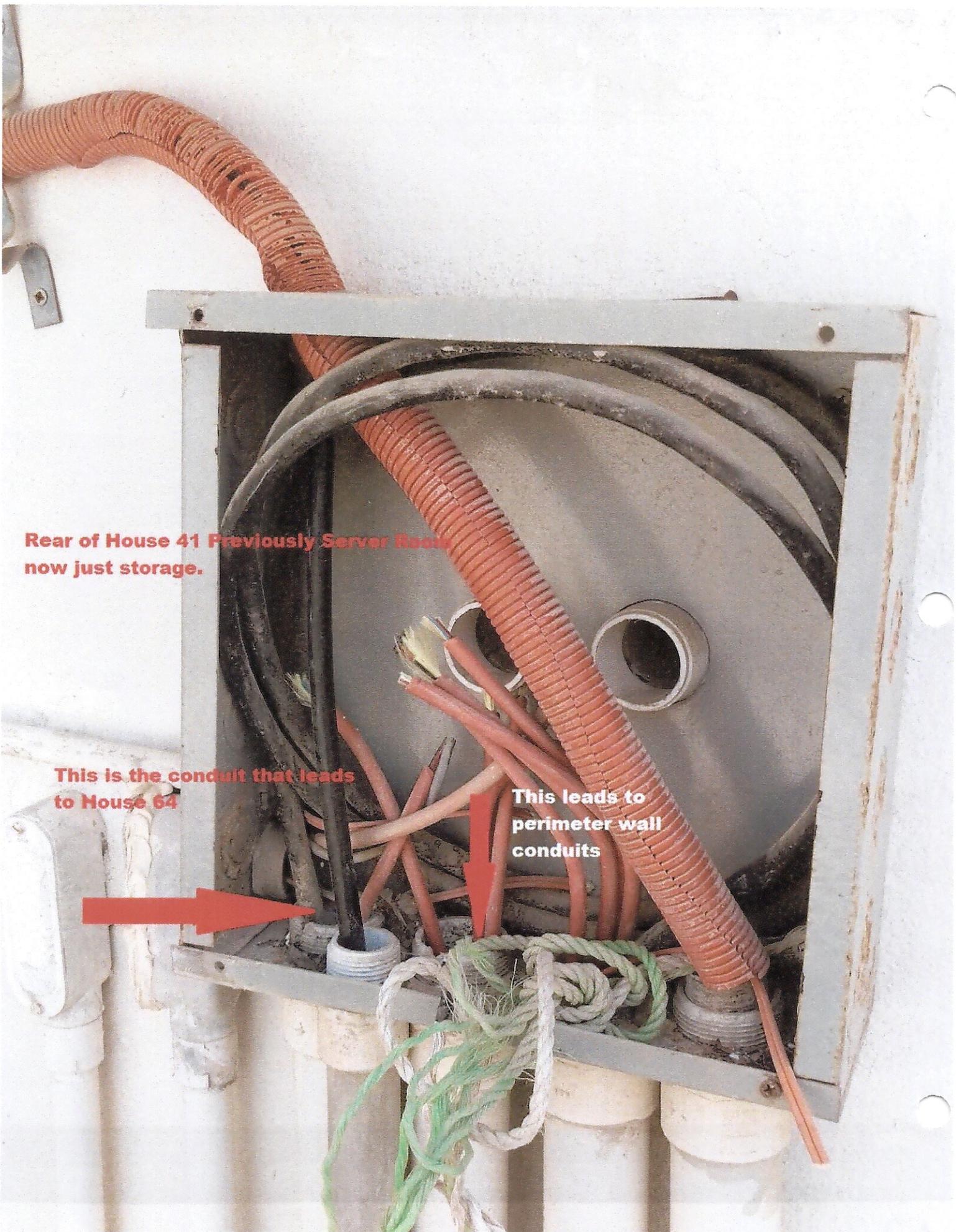
- Combination Entry
- Key Override (not supplied)
- Interior Combination Change
- Passage



- Combination Entry
- Key Override (not supplied)
- Interior Combination Change
- Passage

# Attachment 3g OpenNet Routing



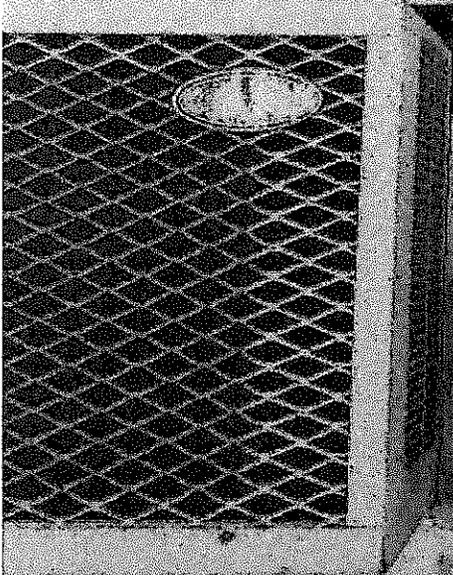


**Rear of House 41 Previously Server Room  
now just storage.**

**This is the conduit that leads  
to House 64**

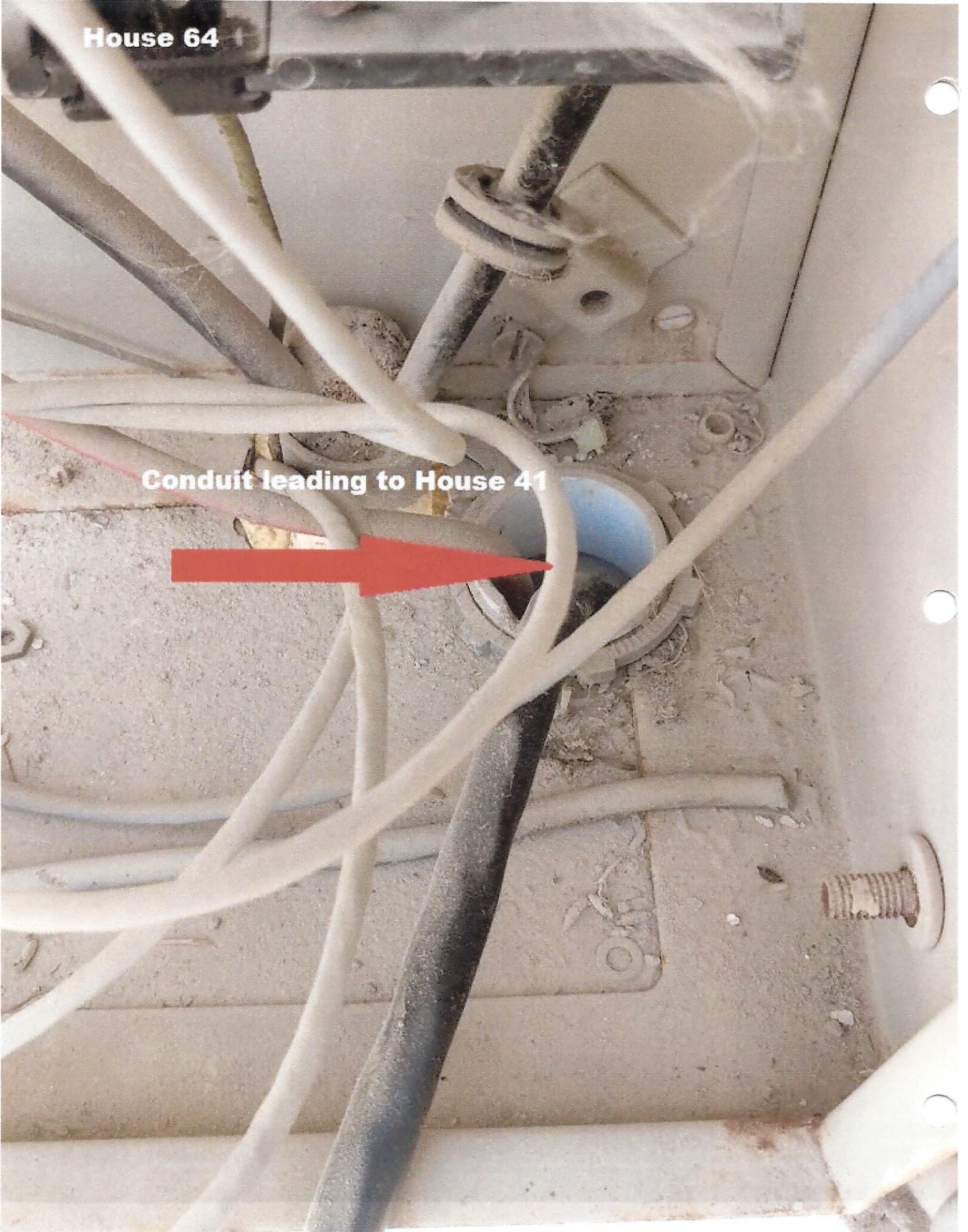
**This leads to  
perimeter wall  
conduits**

**Where Fiber enters  
building to be  
terminated in locked  
cabinet.**



House 64

Conduit leading to House 41



**Where openNET fiber  
comes into the  
Health Unit**





(800) 257-5288

**Superior Essex 130126G01 MM Fiber, 62.5/250M, 12S, Loose Tube, Gel Filled**



Item: 518554    Cat: 130126G01  
Mfr: Superior Essex    UPC: Not Available

**\$1.51** per Ft  
2,860 available

[Catalog Page](#)    [Cut Sheet](#)

Qty:

[Add to Cart](#)

[Details](#)    [Reviews \(0\)](#)

Fiber Optic Cable, Loose Tube, Multimode, 12 Strand, TeraGain® 62.5 Micron/250 Micron, OFNR, Non-Plenum, Riser, Indoor/Outdoor, Jacket Diameter: 0.50", Color: Black, Standard: OM1 \*\*\*Cut to Length at Distribution Center Wire Room\*\*\*

|                    |                         |                  |                                     |
|--------------------|-------------------------|------------------|-------------------------------------|
| <b>Platt Cat:</b>  | ESX130126G01            | <b>Gauge:</b>    | Micron - 62.5                       |
| <b>Platt Item:</b> | 518554                  | <b>Jacket:</b>   | Riser, Non-Plenum                   |
| <b>Cat:</b>        | 130126G01               | <b>Length:</b>   | Cut to Length                       |
| <b>Mfr:</b>        | Superior Essex          | <b>Material:</b> | Fiber                               |
| <b>UPC:</b>        | Not Available           | <b>Type:</b>     | Fiber Optic, Multi-Mode, Loose Tube |
| <b>Category:</b>   | Fiber Optic - Multimode |                  |                                     |
| <b>Color:</b>      | Black                   |                  |                                     |
| <b>Conductors:</b> | Fiber - 12 Strand       |                  |                                     |

- **Category:** Wire, Cables, Cords Voice, Data & Video Cables Fiber Optic Cables Fiber Optic - Multimode
- **Products related to 130126G01 MM Fiber, 62.5/250M, 12S, Loose Tube, Gel Filled** or visit the [Superior Essex](#) site.
- For help with MM Fiber, 62.5/250M, 12S, Loose Tube, Gel Filled from Superior Essex, call **Platt at 800-257-5288** from 4a - midnight (pst) 7 days.
- Click **"Add to Cart"** to buy Superior Essex 130126G01 MM Fiber, 62.5/250M, 12S, Loose Tube, Gel Filled.
- **Also known as:** ESX130126101, ESX130126201, 12S+++, ESX130126G01, Superior Essex, 130126G01, Fiber Optic - Multimode, Fiber Optic Cables, Voice, Data & Video Cables, Wire, Cables, Cords

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# Attachment 3h OpenNet Fiber



## STATEMENT OF WORK

House 64

Replace existing 8 sliding windows with new hinged windows

July 22, 2016

### 1.0 INTRODUCTION

Remove existing window and install new aluminum window as below specification

- 1.1 Remove completely existing 08 sliding aluminum windows
- 1.2 Installed new aluminum alloy double leaves hinged fixed opening system windows as below dimension
  - A- Height 1.65 meters X Width 1.35 meters 1 Each.
  - B- Height 1.10 meters X Width 1.40 meters 4 Each.
  - C- Height 1.10 meters X Width 1.40 meters 3 Each.
- 1.3 65 mm frame depth for all windows
- 1.4 24 mm thick insulation glass unit consisting of 6 mm thick clear tempered tinted interior and exterior glass with 12 – 13 mm air gap
- 1.5 Thermal break door frame thickness not less than 2.2 mm
- 1.6 Install fiber black net screen.
- 1.7 Window panes shall be laminated glass or treated with an application of 8-mil shatter resistant window film.
- 1.8 Install closing device (Handles) with locking mechanism
- 1.9 Exact dimension of all windows are contractor responsibility

### 2.0 GENERAL REQUIREMENTS

- 2.1 Prior to install all hardware sealant, adhesive, gasket rubber must be approved by Facilities Manager
- 2.2 Use the high strength, good quality, strong bearing capacity of hardware

END OF STATEMENT OF WORK

SOW Replace existing 08 sliding windows with new hinged windows at house 64

# Attachment 4 SOW for Window Replacement



## 5. Guidelines for Cleaning Building Materials with Mold Growth Caused by Clean Water

The purpose of cleaning is to physically remove mold from the affected surface - not just kill the surface mold in place. Some materials may have to be discarded and replaced because they cannot be effectively cleaned. Clean up may be labor intensive and may temporarily disrupt the functional use of the affected space.

Table 2 presents remediation guidelines for building materials that have mold growth. These guidelines are designed to control mold spore and particle exposures for occupants and cleanup personnel during remediation. These guidelines are based on the size of the affected area and type of material(s) with mold growth. USEPA developed these guidelines to make it easier for individuals performing remediation to select appropriate techniques, not on the basis of health effects or research showing there is a specific method appropriate at a certain number of square feet. The guidelines have been designed to help construct a remediation plan and are not regulations.

When planning to clean building materials or contents, use Table 2 to:

- Determine which materials can be cleaned.
- Determine if moldy, porous items can't be cleaned and must be discarded.
- Select cleanup methods for moldy surfaces and materials.
- Select the Personal Protection Equipment needed to help protect personnel doing the cleanup.
- Where needed, determine a containment method or other procedures, such as vacating a buffer zone or conducting cleanup during off-hours, to prevent spreading mold and debris to occupied areas.

In addition to the guidelines in Table 2,

- Provide plastic bags that can be sealed for removing moldy materials from the cleanup area.
- Ensure clean up personnel:
  - have the experience and training needed to implement the cleanup plan
  - maintain the containment or isolation, as appropriate
  - know how to use Personal Protection Equipment
  - have received medical approval from Health Unit to wear respiratory protection.
- Communicate the cleanup plan to occupants.

Mold Prevention, Recognition and Cleanup



| Table 2: Guidelines for Cleaning Building Materials with Mold Growth Caused by Clean Water      |                  |  |  |
|---|------------------|--|--|
| Material or Furnishing Affected   | Cleanup Methods* | Personal Protective Equipment†   | Containment‡   |
| <b>SMALL - Total Continuous Surface Area Affected Less Than 10 square feet (ft<sup>2</sup>)</b> |                  |  |  |
| Books and papers  | 3                | <b>Minimum</b>   | <b>None recommended</b>  |
| Carpet and backing  | 1, 3             |  |  |
| Concrete or cinder block  | 1, 3             |  |  |
| Hard surface, porous flooring (linoleum, ceramic tile, vinyl)                                   | 1, 2, 3          |  |  |
| Non-porous, hard surfaces (plastics, metals)  | 1, 2, 3          |  |  |
| Upholstered furniture & drapes  | 1, 3             |  |  |
| Wallboard (drywall and gypsum board)  | 3                |  |  |
| Wood surfaces   | 1, 2, 3          |  |  |
| <b>MEDIUM - Total Continuous Surface Area Affected Between 10 and 100 (ft<sup>2</sup>)</b>      |                  |  |  |
| Books and papers  | 3                | <b>Limited or Full, depending on potential for cleanup personnel exposure and size of contaminated area</b>                | <b>Limited</b><br>Consider potential for cleanup personnel and occupant exposure and size of contaminated area             |
| Carpet and backing  | 1,3,4            |  |  |
| Concrete or cinder block  | 1,3              |  |  |
| Hard surface, porous flooring (linoleum, ceramic tile, vinyl)                                   | 1,2,3            |  |  |
| Non-porous, hard surfaces (plastics, metals)  | 1,2,3            |  |  |
| Upholstered furniture & drapes  | 1,3,4            |  |  |
| Wallboard (drywall and gypsum board)  | 3,4              |  |  |
| Wood surfaces   | 1,2,3            |  |  |
| <b>LARGE - Total Continuous Surface Area Affected Greater Than 100 (ft<sup>2</sup>)</b>         |                  |  |  |
| Books and papers  | 3                | <b>Full</b><br>Consider potential for cleanup personnel exposure and size of contaminated area<br><br>Contact OBO/OM/SHEM* | <b>Full</b><br>Consider potential for cleanup personnel exposure and size of contaminated area<br><br>Contact OBO/OM/SHEM* |
| Carpet and backing  | 1,3,4            |  |  |
| Concrete or cinder block  | 1,3              |  |  |
| Hard surface, porous flooring (linoleum, ceramic tile, vinyl)                                   | 1,2,3,4          |  |  |
| Non-porous, hard surfaces (plastics, metals)  | 1,2,3            |  |  |
| Upholstered furniture & drapes  | 1,2,4            |  |  |
| Wallboard (drywall and gypsum board)  | 3,4              |  |  |
| Wood surfaces   | 1,2,3,4          |  |  |

## Mold Prevention, Recognition and Cleanup



Contact OBO/OM/SHEM to determine prudent levels of Personal Protective Equipment and containment for each situation, particularly as the remediation site size increases and the potential for exposure and health effects rises.

### \* Cleanup Methods

The goal is to remove the mold from the surface. Select the method most appropriate to the situation and the material to be cleaned. Since molds gradually destroy the things they grow on, if mold growth is not addressed promptly, some items may be damaged such that cleaning will not restore their original appearance. If mold growth is heavy and items are valuable or important, a restoration/water damage/remediation expert may need to be contracted.

- **Method 1:** Wet vacuum (in the case of porous materials, some mold spores/fragments will remain in the material but will not grow if the material is completely dried). Steam cleaning may be an alternative for carpets and some upholstered furniture.
- **Method 2:** Damp-wipe surfaces with clean water or with water and detergent solution (except wood—use wood floor cleaner); scrub as needed. Use of bleach or other biocides is not necessary, but may help remove stains and delay new mold growth if the area is not dried out quickly. Since killed mold and spores are still allergenic, removal of the mold is the goal, not just killing it.
- **Method 3:** High-efficiency particulate air (HEPA) vacuum after the material has been thoroughly dried. Dispose of the contents of the HEPA vacuum in well-sealed plastic bags.
- **Method 4:** Discard - remove water-damaged materials and seal in plastic bags while inside of containment, if present. Dispose of as normal waste. HEPA vacuum area after it is dried.

### † Personal Protective Equipment

- **Minimum:** Impermeable gloves, N-95 respirator, goggles/eye protection
- **Limited:** Impermeable gloves, N-95 respirator or half-face respirator with HEPA filter, disposable overalls, goggles/eye protection
- **Full:** Impermeable gloves, disposable full body clothing, head gear, foot coverings, full-face respirator with HEPA filter

### ‡ Containment

- **Limited:** Use polyethylene sheeting from ceiling to floor around affected area with a slit entry and covering flap; maintain area under negative pressure with HEPA filtered fan unit. Block supply and return air vents within containment area.
- **Full:** Use two layers of fire-retardant polyethylene sheeting with one airlock chamber. Maintain area under negative pressure with HEPA filtered fan exhausted outside of building. Block off any supply and return air vents within containment area.

Depending on the location, size and scope of the cleanup task, full containment methods described above may not be needed. Protection of building occupants can also be provided by (1) performing work off-hours, with cleaning of the surrounding areas, or (2) vacating a buffer area around the work area, accompanied by appropriate engineering controls, and cleaning before re-occupancy. Appropriate engineering controls include using dust suppression, removing material from the work area in sealed bags, shutting down or sealing building ventilation, keeping the work area and surrounding area clean and leaving the work area clean and dry.

**About biocides and cleaners:** Biocides and cleaners may be used with Method 2 as long as the surface is still being wiped or scrubbed clean. A mild bleach solution is recommended by US Centers for Disease Control and Prevention's National Center for Environmental Health – 1 cup of bleach per gallon of water. **DO NOT mix this formula with ammonia or any ammonia-containing products.** Some household disinfecting cleaners also contain anti-mold agents, although the disinfecting agents are

## **Mold Prevention, Recognition and Cleanup**

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usually added to kill bacteria. Check the label before assuming that 'disinfecting' means the cleaner can kill mold.

Without removing or scrubbing the mold away, cleaners and biocides alone will not remove the mold spores and mold fragments that are allergenic. Simply spraying with a biocide is not a substitute for damp wiping, scrubbing, or vacuuming.

A number of commercial products are listed as EPA "anti-microbials" which kill bacteria, mold and viruses. Many are intended for Institutional use, not routine cleaning in homes and offices. They may require trained personnel and special handling, and contain substances that are more irritating and corrosive to skin than regular detergents. Never use an EPA-registered fungicide approved for outdoor use, indoors.



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## 6. References and Additional Information

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### Residential Mold Issues

<http://www.cdc.gov/nceh/airpollution/mold/moldfacts.htm>  
Molds in the Environment, US Centers for Disease Control

<http://www.epa.gov/mold/moldguide.html>  
A Brief Guide to Mold, Moisture and Your Home, USEPA

### Building Mold Issues

[http://www.epa.gov/mold/mold\\_remediation.html](http://www.epa.gov/mold/mold_remediation.html)  
Mold Remediation in Schools and Commercial Buildings, USEPA

<http://www.cdc.gov/niosh/pdfs/appenc.pdf>  
Moisture, Mold & Mildew; Appendix C in Building Air Quality: A Guide for Building Owners and Facility Managers, USEPA

<http://www.aiha.org>  
Assessment, Remediation and Post-Remediation Verification of Mold in buildings, American Industrial Hygiene Association Guideline 3-2004

### Moisture Meter Information

<http://www.tramexltd.com/page/moist.html>  
Tramex Moisture Encounter Meter for Non-Destructive Moisture Testing

### Other Health Studies on Mold and Indoor Dampness

<http://www4.nationalacademies.org/news.nsf/isbn/0309091934?OpenDocument>  
The National Academies Press Release on Indoor Mold, Building Dampness

**SECTION K - REPRESENTATIONS, CERTIFICATIONS AND OTHER  
STATEMENTS OF OFFERORS OR QUOTERS**

**K.1 52.203-2 CERTIFICATE OF INDEPENDENT PRICE DETERMINATION (APR 1985)**

(a) The offeror certifies that-

(1) The prices in this offer have been arrived at independently, without, for the purpose of restricting competition, any consultation, communication, or agreement with any other offeror or competitor relating to-

- (i) Those prices;
- (ii) The intention to submit an offer,; or
- (iii) The methods or factors used to calculate the prices offered.

(2) The prices in this offer have not been and will not be knowingly disclosed by the offeror, directly or indirectly, to any other offeror or competitor before bid opening (in the case of a sealed bid solicitation) or contract award (in the case of a negotiated solicitation) unless otherwise required by law; and

(3) No attempt has been made or will be made by the offeror to induce any other concern to submit or not to submit an offer for the purpose of restricting competition.

(b) Each signature on the offer is considered to be a certification by the signatory that the signatory-

(1) Is the person in the offeror's organization responsible for determining the prices being offered in this bid or proposal, and that the signatory has not participated and will not participate in any action contrary to subparagraph (a)(1) through (a)(3) above; or

(2) (i) Has been authorized, in writing, to act as agent for the following principals in certifying that those principals have not participated, and will not participate in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(ii) As an authorized agent, does certify that the principals named in subdivision (b)(2)(i) above have not participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above; and

(iii) As an agent, has not personally participated, and will not participate, in any action contrary to subparagraphs (a)(1) through (a)(3) above.

(c) If the offeror deletes or modifies subparagraph (a)(2) above, the offeror must furnish with its offer a signed statement setting forth in detail the circumstances of the disclosure.

K.2 52.203-11 CERTIFICATION AND DISCLOSURE REGARDING PAYMENTS TO INFLUENCE CERTAIN FEDERAL TRANSACTIONS (SEP 2007)

(a) Definitions. As used in this provision – “Lobbying contact” has the meaning provided at 2 USC 1602(8). The terms “agency”, “influencing or attempting to influence”, “officer or employee of an agency”, “person”, “reasonable compensation”, and “regularly employed” are defined in the FAR clause of this solicitation entitled Limitation on Payments to Influence Certain Federal Transactions (52.203-12).

(b) Prohibition. The prohibition and exceptions contained in the FAR clause of this solicitation entitled “Limitation on Payments to Influence Certain Federal Transactions” (52.203-12) are hereby incorporated by reference in this provision.

(c) Certification. The offeror, by signing its offer, hereby certifies to the best of his or her knowledge and belief that no Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress on its behalf in connection with the awarding of this contract.

(d) Disclosure. If any registrants under the Lobbying Disclosure Act of 1995 have made a lobbying contract on behalf of the offeror with respect to this contract, the offeror shall complete and submit, with its officer, OMB Standard Form LLL, Disclosure of Lobbying Activities, to provide the name of the registrants. The offeror need not report regularly employed officers or employees of the offeror to whom payments of reasonable compensation were made.

(e) Penalty. Submission of this certification and disclosure is a prerequisite for making or entering into this contract imposed by 31 USC 1352. Any persons who makes an expenditure prohibited under this provision or who fails to file or amend the disclosure required to be filed or amended by this provision, shall be subject to a civil penalty of not less than \$10,000, and not more than \$150,000, for each failure.

K.3 52.204-3 TAXPAYER IDENTIFICATION (OCT 1998)

(a) Definitions:

“Common parent”, as used in this provision, means that corporate entity that owns or controls an affiliated group of corporations that files its Federal income tax returns on a consolidated basis, and of which the offeror is a member.

“Taxpayer Identification Number (TIN)”, as used in this provision, means the number required by the IRS to be used by the offeror in reporting income tax and other returns. The TIN may be either a Social Security Number or an Employer Identification Number.

(b) All offerors must submit the information required in paragraphs (d) through (f) of this provision in order to comply with debt collection requirements of 31 U.S.C. 7701(c) and 3325 (d), reporting requirements of 26 USC 6041, 6041A, and 6050M and implementing regulations issued by the Internal Revenue Service (IRS). If the resulting contract is subject to the reporting requirements described in FAR 4.904, the failure or refusal by the offeror to furnish

the information may result in a 31 percent reduction of payments otherwise due under the contract.

(c) The TIN may be used by the Government to collect and report on any delinquent amounts arising out of the offeror's relationship with the Government (31 USC 7701( c)(3)). If the resulting contract is subject to the payment reporting requirements described in FAR 4.904, the TIN provided hereunder may be matched with IRS records to verify the accuracy of the offeror's TIN.

(d) Taxpayer Identification Number (TIN)

|                          |   |
|--------------------------|---|
| TIN:                     |   |
| <input type="checkbox"/> | TIN has been applied for  |
| <input type="checkbox"/> | TIN is not required because:  |
| <input type="checkbox"/> | Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not have income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S. |
| <input type="checkbox"/> | Offeror is an agency or instrumentality of a foreign government   |
| <input type="checkbox"/> | Offeror is an agency or instrumentality of the Federal Government   |

(e) Type of Organization

|                          |  |
|--------------------------|--|
| <input type="checkbox"/> | Sole Proprietorship                            |
| <input type="checkbox"/> | Partnership                                    |
| <input type="checkbox"/> | Corporate Entity (not tax exempt)              |
| <input type="checkbox"/> | Corporate Entity (tax exempt)                  |
| <input type="checkbox"/> | Government entity (Federal, State or local)    |
| <input type="checkbox"/> | Foreign Government                             |
| <input type="checkbox"/> | International organization per 26 CFR 1.6049-4 |
| <input type="checkbox"/> | Other:   |

(f) Common Parent

|                          |   |
|--------------------------|---|
| <input type="checkbox"/> | Offeror is not owned or controlled by a common parent as defined in paragraph (a) of this clause. |
| <input type="checkbox"/> | Name and TIN of common parent   |
| Name                     |   |
| TIN                      |   |

K.4 52.204-8 -Annual Representations and Certifications. (Apr 2016)

(a)(1) The North American Industry classification System (NAICS) code for this acquisition is 236118, 236220, 237110, 237310 and 237990.

(2) The small business size standard is \$36.5M.

(3) The small business size standard for a concern which submits an offer in its own name, other than on a construction or service contract, but which proposes to furnish a product which it did not itself manufacture, is 500 employees.

(b) (1) If the provision at 52.204-7, System for Award Management, is included in this solicitation, paragraph (d) of this provision applies.

(2) If the provision at 52.204-7 is not included in this solicitation, and the offeror is currently registered in the System for Award Management (SAM), and has completed the Representations and Certifications section of SAM electronically, the offeror may choose to use paragraph (d) of this provision instead of completing the corresponding individual representations and certification in the solicitation. The offeror shall indicate which option applies by checking one of the following boxes:

(i) Paragraph (d) applies.

(ii) Paragraph (d) does not apply and the offeror has completed the individual representations and certifications in the solicitation.

(c) (1) The following representations or certifications in SAM are applicable to this solicitation as indicated:

(i) 52.203-2, Certificate of Independent Price Determination. This provision applies to solicitations when a firm-fixed-price contract or fixed-price contract with economic price adjustment is contemplated, unless—

(A) The acquisition is to be made under the simplified acquisition procedures in Part 13;

(B) The solicitation is a request for technical proposals under two-step sealed bidding procedures; or

(C) The solicitation is for utility services for which rates are set by law or regulation.

- (ii) 52.203-11, Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions. This provision applies to solicitations expected to exceed \$150,000.
- (iii) 52.204-3, Taxpayer Identification. This provision applies to solicitations that do not include the provision at 52.204-7, System for Award Management.
- (iv) 52.204-5, Women-Owned Business (Other Than Small Business). This provision applies to solicitations that—
  - (A) Are not set aside for small business concerns;
  - (B) Exceed the simplified acquisition threshold; and
  - (C) Are for contracts that will be performed in the United States or its outlying areas.
- (v) 52.209-2, Prohibition on Contracting with Inverted Domestic Corporations—Representation.
- (vi) 52.209-5; Certification Regarding Responsibility Matters. This provision applies to solicitations where the contract value is expected to exceed the simplified acquisition threshold.
- (vii) 52.209-11, Representation by Corporations Regarding Delinquent Tax Liability or a Felony Conviction under any Federal Law. This provision applies to all solicitations.
- (viii) 52.214-14, Place of Performance--Sealed Bidding. This provision applies to invitations for bids except those in which the place of performance is specified by the Government.
- (ix) 52.215-6, Place of Performance. This provision applies to solicitations unless the place of performance is specified by the Government.
- (x) 52.219-1, Small Business Program Representations (Basic & Alternate I). This provision applies to solicitations when the contract will be performed in the United States or its outlying areas.

(A) The basic provision applies when the solicitations are issued by other than DoD, NASA, and the Coast Guard.

(B) The provision with its Alternate I applies to solicitations issued by DoD, NASA, or the Coast Guard.

(xi) 52.219-2, Equal Low Bids. This provision applies to solicitations when contracting by sealed bidding and the contract will be performed in the United States or its outlying areas.

(xii) 52.222-22, Previous Contracts and Compliance Reports. This provision applies to solicitations that include the clause at 52.222-26, Equal Opportunity.

(xiii) 52.222-25, Affirmative Action Compliance. This provision applies to solicitations, other than those for construction, when the solicitation includes the clause at 52.222-26, Equal Opportunity.

(xiv) 52.222-38, Compliance with Veterans' Employment Reporting Requirements. This provision applies to solicitations when it is anticipated the contract award will exceed the simplified acquisition threshold and the contract is not for acquisition of commercial items.

(xv) 52.223-1, Biobased Product Certification. This provision applies to solicitations that require the delivery or specify the use of USDA-designated items; or include the clause at 52.223-2, Affirmative Procurement of Biobased Products Under Service and Construction Contracts.

(xvi) 52.223-4, Recovered Material Certification. This provision applies to solicitations that are for, or specify the use of, EPA-designated items.

(xvii) 52.225-2, Buy American Certificate. This provision applies to solicitations containing the clause at 52.225-1.

(xviii) 52.225-4, Buy American--Free Trade Agreements--Israeli Trade Act Certificate. (Basic, Alternates I, II, and III.) This provision applies to solicitations containing the clause at 52.225-3.

(A) If the acquisition value is less than \$25,000, the basic provision applies.

(B) If the acquisition value is \$25,000 or more but is less than \$50,000, the provision with its Alternate I applies.

(C) If the acquisition value is \$50,000 or more but is less than \$77,533, the provision with its Alternate II applies.

(D) If the acquisition value is \$79,507 or more but is less than \$100,000, the provision with its Alternate III applies.

(xix) 52.225-6, Trade Agreements Certificate. This provision applies to solicitations containing the clause at 52.225-5.

(xx) 52.225-20, Prohibition on Conducting Restricted Business Operations in Sudan--Certification. This provision applies to all solicitations.

(xxi) 52.225-25, Prohibition on Contracting with Entities Engaging in Certain Activities or Transactions Relating to Iran—Representation and Certification. This provision applies to all solicitations.

(xxii) 52.226-2, Historically Black College or University and Minority Institution Representation. This provision applies to solicitations for research, studies, supplies, or services of the type normally acquired from higher educational institutions.

(2) The following representations or certifications are applicable as indicated by the Contracting Officer:

[Contracting Officer check as appropriate.]

\_\_\_ (i) 52.204-17, Ownership or Control of Offeror.

\_\_\_ (ii) 52.204-20, Predecessor of Offeror.

\_\_\_ (iii) 52.222-18, Certification Regarding Knowledge of Child Labor for Listed End Products.

\_\_\_ (iv) 52.222-48, Exemption from Application of the Service Contract Labor Standards to Contracts for Maintenance, Calibration, or Repair of Certain Equipment--Certification.

\_\_\_ (v) 52.222-52 Exemption from Application of the Service Contract Labor Standards to Contracts for Certain Services--Certification.

\_\_\_ (vi) 52.223-9, with its Alternate I, Estimate of Percentage of Recovered Material Content for EPA-Designated Products (Alternate I only).

\_\_\_ (vii) 52.227-6, Royalty Information.

\_\_\_ (A) Basic.

\_\_\_ (B) Alternate I.

\_\_\_ (viii) 52.227-15, Representation of Limited Rights Data and Restricted Computer Software.

(d) The offeror has completed the annual representations and certifications electronically via the SAM Web site accessed through <https://www.acquisition.gov> . After reviewing the SAM database information, the offeror verifies by submission of the offer that the representations and certifications currently posted electronically that apply to this solicitation as indicated in paragraph (c) of this provision have been entered or updated within the last 12 months, are current, accurate, complete, and applicable to this solicitation (including the business size standard applicable to the NAICS code referenced for this solicitation), as of the date of this offer and are incorporated in this offer by reference (see FAR 4.1201); except for the changes identified below [*offeror to insert changes, identifying change by clause number, title, date*]. These amended representation(s) and/or certification(s) are also incorporated in this offer and are current, accurate, and complete as of the date of this offer.

| FAR Clause | Title | Date | Change |
|------------|-------|------|--------|
|            |       |      |        |
|            |       |      |        |

Any changes provided by the offeror are applicable to this solicitation only, and do not result in an update to the representations and certifications posted on SAM.

(End of Provision)

K.5 52.209-2 PROHIBITION ON CONTRACTING WITH INVERTED DOMESTIC CORPORATIONS—REPRESENTATION (MAY 2011)

(a) *Definition*. “Inverted domestic corporation” and “subsidiary” have the meaning given in the clause of this contract entitled Prohibition on Contracting with Inverted Domestic Corporations (52.209-10).

(b) *Relation to Internal Revenue Code*. An inverted domestic corporation as herein defined does not meet the definition of an inverted domestic corporation as defined by the Internal Revenue Code at 26 U.S.C. 7874.

(c) *Representation*. By submission of its offer, the offeror represents that—

- (1) It is not an inverted domestic corporation; and
- (2) It is not a subsidiary of an inverted domestic corporation.

(End of provision)

K.6 52.209-5 CERTIFICATION REGARDING RESPONSIBILITY MATTERS (OCT 2015)

(a) (1) The Offeror certifies, to the best of its knowledge and belief, that --

(i) The Offeror and/or any of its Principals --

(A) Are  are not  presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have  have not , within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) contract or subcontract; violation of Federal or State antitrust statutes relating to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, violating Federal criminal tax laws, or receiving stolen property (if offeror checks “have”, the offeror shall also see 52.209-7, if included in this solicitation); and

(C) Are  are not  presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in paragraph (a)(1)(i)(B) of this provision; and

(D) Have , have not , within a three-year period preceding this offer, been notified of any delinquent Federal taxes in an amount that exceeds \$3,500 for which the liability remains unsatisfied.

(1) Federal taxes are considered delinquent if both of the following criteria apply:

(i) *The tax liability is finally determined*. The liability is finally determined if it has been assessed. A liability is not finally determined if there is a pending administrative or judicial challenge. In the case of a judicial challenge to the liability, the liability is not finally determined until all judicial appeal rights have been exhausted.

(ii) *The taxpayer is delinquent in making payment*. A taxpayer is delinquent if the taxpayer has failed to pay the tax liability when full payment was due and required. A taxpayer is not delinquent in cases where enforced collection action is precluded.

(2) Examples.

(i) The taxpayer has received a statutory notice of deficiency, under I.R.C. §6212, which entitles the taxpayer to seek Tax Court review of a proposed tax deficiency. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek Tax Court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(ii) The IRS has filed a notice of Federal tax lien with respect to an assessed tax liability, and the taxpayer has been issued a notice under I.R.C. §6320 entitling the taxpayer to request a hearing with the IRS Office of Appeals contesting the lien filing, and to further appeal to the Tax Court if the IRS determines to sustain the lien filing. In the course of the hearing, the taxpayer is entitled to contest the underlying tax liability because the taxpayer has had no prior opportunity to contest the liability. This is not a delinquent tax because it is not a final tax liability. Should the taxpayer seek tax court review, this will not be a final tax liability until the taxpayer has exercised all judicial appeal rights.

(iii) The taxpayer has entered into an installment agreement pursuant to I.R.C. §6159. The taxpayer is making timely payments and is in full compliance with the agreement terms. The taxpayer is not delinquent because the taxpayer is not currently required to make full payment.

(iv) The taxpayer has filed for bankruptcy protection. The taxpayer is not delinquent because enforced collection action is stayed under 11 U.S.C. 362 (the Bankruptcy Code).

(i) The Offeror has  has not , within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

(2) "Principal," for the purposes of this certification, means an officer; director; owner; partner; or a person having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a division or business segment; and similar positions).

This Certification Concerns a Matter Within the Jurisdiction of an Agency of the United States and the Making of a False, Fictitious, or Fraudulent Certification May Render the Maker Subject to Prosecution Under Section 1001, Title 18, United States Code.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this solicitation. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this solicitation for default.

(End of provision)

K.7. 52.225-18 PLACE OF MANUFACTURE (SEPT 2006)

(a) *Definitions.* As used in this clause—

“Manufactured end product” means any end product in Federal Supply Classes (FSC) 1000-9999, except—

- (1) FSC 5510, Lumber and Related Basic Wood Materials;
- (2) Federal Supply Group (FSG) 87, Agricultural Supplies;
- (3) FSG 88, Live Animals;
- (4) FSG 89, Food and Related Consumables;
- (5) FSC 9410, Crude Grades of Plant Materials;
- (6) FSC 9430, Miscellaneous Crude Animal Products, Inedible;
- (7) FSC 9440, Miscellaneous Crude Agricultural and Forestry Products;
- (8) FSC 9610, Ores;
- (9) FSC 9620, Minerals, Natural and Synthetic; and
- (10) FSC 9630, Additive Metal Materials.

“Place of manufacture” means the place where an end product is assembled out of components, or otherwise made or processed from raw materials into the finished product that is to be provided to the Government. If a product is disassembled and reassembled, the place of reassembly is not the place of manufacture.

(b) For statistical purposes only, the offeror shall indicate whether the place of manufacture of the end products it expects to provide in response to this solicitation is predominantly—

- (1)  In the United States (Check this box if the total anticipated price of offered end products manufactured in the United States exceeds the total anticipated price of offered end products manufactured outside the United States); or
- (2)  Outside the United States.

K.8 52.225-20 PROHIBITION ON CONDUCTING RESTRICTED BUSINESS OPERATIONS IN SUDAN—CERTIFICATION (AUG 2009)

(a) *Definitions.* As used in this provision—

“Business operations” means engaging in commerce in any form, including by acquiring, developing, maintaining, owning, selling, possessing, leasing, or operating equipment, facilities, personnel, products, services, personal property, real property, or any other apparatus of business or commerce.

“Marginalized populations of Sudan” means—

- (1) Adversely affected groups in regions authorized to receive assistance under section 8(c) of the Darfur Peace and Accountability Act (Pub. L. 109-344) (50 U.S.C. 1701 note); and

(2) Marginalized areas in Northern Sudan described in section 4(9) of such Act.

“Restricted business operations” means business operations in Sudan that include power production activities, mineral extraction activities, oil-related activities, or the production of military equipment, as those terms are defined in the Sudan Accountability and Divestment Act of 2007 (Pub. L. 110-174). Restricted business operations do not include business operations that the person conducting the business can demonstrate—

- (1) Are conducted under contract directly and exclusively with the regional government of southern Sudan;
- (2) Are conducted pursuant to specific authorization from the Office of Foreign Assets Control in the Department of the Treasury, or are expressly exempted under Federal law from the requirement to be conducted under such authorization;
- (3) Consist of providing goods or services to marginalized populations of Sudan;
- (4) Consist of providing goods or services to an internationally recognized peacekeeping force or humanitarian organization;
- (5) Consist of providing goods or services that are used only to promote health or education; or
- (6) Have been voluntarily suspended.

(b) *Certification.* By submission of its offer, the offeror certifies that it does not conduct any restricted business operations in Sudan.

(End of provision)

#### K.9 AUTHORIZED CONTRACT ADMINISTRATOR

If the offeror does not fill-in the blanks below, the official who signed the offer will be deemed to be the offeror's representative for Contract Administration, which includes all matters pertaining to payments.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone No.: \_\_\_\_\_

#### K.10 652.225-70 ARAB LEAGUE BOYCOTT OF ISRAEL (AUG 1999)

(a) Definitions. As used in this provision:

“Foreign person” means any person other than a United States person as defined below.

“United States person” means any United States resident or national (other than an individual resident outside the United States and employed by other than a United States

person), any domestic concern (including any permanent domestic establishment of any foreign concern), and any foreign subsidiary or affiliate (including any permanent foreign establishment) of any domestic concern which is controlled in fact by such domestic concern, as provided under the Export Administration Act of 1979, as amended.

- (b) Certification. By submitting this offer, the offeror certifies that it is not:
- (1) Taking or knowingly agreeing to take any action, with respect to the boycott of Israel by Arab League countries, which Section 8(a) of the Export Administration Act of 1979, as amended (50 U.S.C. 2407(a)) prohibits a United States person from taking; or,
  - (2) Discriminating in the award of subcontracts on the basis of religion.

K.11 652.228-70 DEFENSE BASE ACT – COVERED CONTRACTOR EMPLOYEES  
(JUN 2006)

(a) Bidders/offerors shall indicate below whether or not any of the following categories of employees will be employed on the resultant contract, and, if so, the number of such employees:

| Category   | Yes/No | Number   |
|--|--------|--|
| (1) United States citizens or residents  |        |  |
| (2) Individuals hired in the United States, regardless of citizenship  |        |  |
| (3) Local nationals or third country nationals where contract performance takes place in a country where there are no local worker's compensation laws |        | Local Nationals:<br><br>Third Country Nationals: |
| (4) Local nationals or third country nationals where performance takes place in a country where there are local worker's compensation laws             |        | Local Nationals:<br><br>Third Country Nationals: |

(b) The Contracting Officer has determined that for performance in the country of Saudi Arabia.

- Workers' compensation laws exist that will cover local nationals and third country nationals.
- Workers' compensation laws do not exist that will cover local nationals and third country nationals.

(c) If the bidder/offeror has indicated "yes" in block (a)(4) of this provision, the bidder/offeror shall not purchase Defense Base Act insurance for those employees. However, the bidder/offeror shall assume liability toward the employees and their beneficiaries for war-hazard injury, death, capture, or detention, in accordance with the clause at FAR 52.228-4.

(d) RESERVED

(End of provision)

The following DOSAR is provided in full text:

652.209-79 REPRESENTATION BY CORPORATION REGARDING AN UNPAID DELINQUENT TAX LIABILITY OR A FELONY CRIMINAL CONVICTION UNDER ANY FEDERAL LAW (SEPT 2014) (DEVIATION per PIB 2014-21)

(a) In accordance with section 7073 of Division K of the Consolidated Appropriations Act, 2014 (Public Law 113-76) none of the funds made available by that Act may be used to enter into a contract with any corporation that –

(1) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency has direct knowledge of the conviction, unless the agency has considered, in accordance with its procedures, that this further action is not necessary to protect the interests of the Government; or

(2) Has any unpaid Federal tax liability that has been assessed for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability, where the awarding agency has direct knowledge of the unpaid tax liability, unless the Federal agency has considered, in accordance with its procedures, that this further action is not necessary to protect the interests of the Government.

For the purposes of section 7073, it is the Department of State's policy that no award may be made to any corporation covered by (1) or (2) above, unless the Procurement Executive has made a written determination that suspension or debarment is not necessary to protect the interests of the Government.

(b) Offeror represents that—

(1) It is [ ] is not [ ] a corporation that was convicted of a felony criminal violation under a Federal law within the preceding 24 months.

(2) It is [ ] is not [ ] a corporation that has any unpaid Federal tax liability that has been assessed for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability.

(End of provision)

**SECTION L - INSTRUCTIONS, CONDITIONS, AND NOTICES  
TO OFFERORS OR QUOTERS**

L.1 52.252-1 SOLICITATION PROVISIONS INCORPORATED BY REFERENCE (FEB 1998)

This contract incorporates the following provisions by reference, with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make their full text available. The offeror is cautioned that the listed provisions may include blocks that must be completed by the offeror and submitted with its quotation or offer. In lieu of submitting the full text of those provisions, the offeror may identify the provision by paragraph identifier and provide the appropriate information with its quotation or offer. Also, the full text of a solicitation provision may be accessed electronically at: <http://acquisition.gov/far/index.html> or <http://farsite.hill.af.mil/vffara.htm>. These addresses are subject to change.

If the Federal Acquisition Regulation (FAR) is not available at the locations indicated above, use of the Department of State Acquisition website at <http://www.statebuy.state.gov/> or an Internet "search engine" (for example, Google, Yahoo or Excite) is suggested to obtain the latest location of the most current FAR.

The following Federal Acquisition Regulation provision(s) is/are incorporated by reference (48 CFR CH. 1):

| <u>PROVISIONS</u> | <u>TITLE AND DATE</u>                                       |
|-------------------|---|
| 52.204-7          | SYSTEM FOR AWARD MANAGEMENT (JULY 2013)                     |
| 52.204-16         | COMMERCIAL AND GOVERNMENT ENTITY CODE REPORTING (JUL 2015)  |
| 52.209-7          | INFORMATION REGARDING RESPONSIBILITY MATTERS (JULY 2013)    |
| 52.214-34         | SUBMISSION OF OFFERS IN THE ENGLISH LANGUAGE (APR 1991)     |
| 52.215-1          | INSTRUCTIONS TO OFFERORS—COMPETITIVE ACQUISITION (JAN 2004) |
| 52.222-56         | CERTIFICATION REGARDING TRAFFICKING IN PERSONS (MAR 2015)   |
| 52.236-28         | PREPARATION OF PROPOSALS – CONSTRUCTION (OCT 1997)          |

## L.2 SOLICITATION PROVISIONS IN FULL TEXT

### 52.216-1 TYPE OF CONTRACT (APR 1984)

The Government contemplates award of a firm fixed price contract resulting from this solicitation. The contract will be awarded based on the lowest price technically acceptable offer.

(End of provision)

### 52.233-2 SERVICE OF PROTEST (SEPT 2006)

- (a) Protests, as defined in section 33.101 of the Federal Acquisition Regulation, that are filed directly with an agency, and copies of any protests that are filed with the General Accounting Office (GAO), shall be served on the Contracting Officer (addressed as follows) by obtaining written and dated acknowledgment of receipt from Facility Manager Mr. Alex Dunagan at American Consulate General, Dhahran.
- (b) The copy of any protest shall be received in the office designated above within one day of filing a protest with the GAO.

(End of provision)

## L.3 QUALIFICATIONS OF OFFERORS

Offerors must be technically qualified and financially responsible to perform the work described in this solicitation. At a minimum, each Offeror must meet the following requirements:

- (1) Be able to understand written and spoken English;
- (2) Have an established business with a permanent address and telephone listing;
- (3) Be able to demonstrate prior construction experience with suitable references for company and Project manager;
- (4) List of clients over the past one (1) years, demonstrating prior experience with relevant past performance information and references (provide dates of contracts, places of performance, value of contracts, contact names, telephone and fax numbers and email addresses). If the offeror has not performed comparable services in Saudi Arabia then the offeror shall provide its international experience. Offerors are advised that the past performance information requested above may be discussed with the client's contact person. In addition, the client's contact person may be asked to comment on the offeror's:
  - Quality of services provided under the contract;
  - Compliance with contract terms and conditions;
  - Effectiveness of management;
  - Willingness to cooperate with and assist the customer in routine matters, and when confronted by unexpected difficulties; and

- Business integrity / business conduct. The Government will use past performance information primarily to assess an offeror's capability to meet the solicitation performance requirements, including the relevance and successful performance of the offeror's work experience. The Government may also use this data to evaluate the credibility of the offeror's proposal. In addition, the Contracting Officer may use past performance information in making a determination of responsibility.

- (5) Evidence that the offeror/quoter can provide the necessary personnel, equipment, and financial resources needed to perform the work;
- (6) The offeror shall address its plan to obtain all licenses and permits required by local law (see DOSAR 652.242-73 in Section 2). If offeror already possesses the locally required licenses and permits, a copy shall be provided. Submit the copy of Commercial registration.
- (7) The offeror's strategic plan for Construction/Renovation\_services to include but not limited to:
  - (a) A work plan taking into account all work elements in Section 1, Performance Work Statement.
  - (b) Identify types and quantities of equipment, supplies and materials required for performance of services under this contract. Identify if the offeror already possesses the listed items and their condition for suitability and if not already possessed or inadequate for use how and when the items will be obtained;
  - (c) Plan of ensuring quality of services including but not limited to contract administration and oversight; and
  - (d) (1) if insurance is required by the solicitation, a copy of the Certificate of Insurance(s), **or** (2) a statement that the Contractor will get the required insurance, and the name of the insurance provider to be used.
- (8) Have the ability to obtain a performance and guarantee bond and a payment bond, or to post adequate performance security, such as irrevocable letters of credit or guarantees issued by a reputable financial institution;
- (9) Have no adverse criminal record; and
- (10) Have no political or business affiliation which could be considered contrary to the interests of the United States.

#### L.4 REVIEW OF DOCUMENTS

Each Offeror is responsible for:

- (1) Obtaining a complete set of contract drawings and specifications;
- (2) Thoroughly reviewing such documents and understanding their requirements;

(3) Visiting the project site and becoming familiar with all working conditions, local laws and regulations; and

(4) Determining that all materials, equipment and labor required for the work are available.

L.5 SUBMISSION OF OFFERS

L.5.1 SUMMARY OF INSTRUCTIONS

Each offer shall consist of the following physically separate volumes:

| Volume | Title   | No. of Copies* |
|--------|---|----------------|
| I      | Executed Standard Form 1442, <i>Solicitation, Offer and Award (Construction, Alteration, or Repair)</i> , and completed Section K   | 02             |
| II     | Price Proposal and Completed Section B. The price proposal shall include a completed Section J, Attachment 4, "Breakdown of Proposal Price by Divisions of Specifications". | 02             |

Submit the complete offer to the address indicated at Block 7 of Standard Form (SF) 1442, if mailed, or if hand-delivered, the address set forth below (if this is left blank, the address is the same as that in Block 7 of SF-1442):

The offeror shall identify and explain/justify any deviations, exceptions, or conditional assumptions taken with respect to any of the instructions or requirements of this solicitation in the appropriate volume of the offer.

L.5.2 DETAILED INSTRUCTIONS

L.5.2.1 Volume I: Standard Form (SF) 1442 and Section K. Complete blocks 14 through 20C of the SF-1442 and all of Section K.

L.5.2.2 Volume II: Price proposal and Section B. The price proposal shall consist of completion of Section B and Section J, Attachment 4, "BREAKDOWN OF PROPOSAL PRICE BY DIVISIONS OF SPECIFICATIONS. Complete all applicable portions of this form in each relevant category (such as., labor, materials, etc.).

L.5.2.3 Volume III: Performance schedule and Business Management/Technical Proposal.

(a) Present the performance schedule in the form of a "bar chart" indicating when the various portions of the work will be commenced and completed within the required

contract completion schedule. This bar chart shall be in sufficient detail to clearly show each segregable portion of work and its planned commencement and completion date.

(b) The Business Management/Technical Proposal shall be in two parts, including the following information:

PROPOSED WORK INFORMATION - Provide the following:

- (1) A list of the names, addresses and telephone numbers of the owners, partners, and principal officers of the Offeror;
- (2) The name and address of the Offeror's field superintendent for this project; and
- (3) A list of the names, addresses, and telephone numbers of subcontractors and principal materials suppliers to be used on the project, indicating what portions of the work will be performed by them.

EXPERIENCE AND PAST PERFORMANCE - List all contracts and subcontracts your company has held over the past three years for the same or similar work. Provide the following information for each contract and subcontract:

- (1) Customer's name, address, and telephone numbers of customer's lead contract and technical personnel;
- (2) Contract number and type;
- (3) Date of the contract award place(s) of performance, and completion dates;
- (4) Contract dollar value;
- (5) Brief description of the work, including responsibilities;
- (6) Comparability to the work under this solicitation;
- (7) Brief discussion of any major technical problems and their resolution;
- (8) Method of acquisition (fully competitive, partially competitive, or noncompetitive), and the basis for award (cost/price, technical merit, etc.);
- (9) Cost/price management history, including any cost overruns and under runs, and cost growth and changes;
- (10) Percent turnover of contract key technical personnel per year; and
- (11) Any terminations (partial or complete) and the reason (convenience or default)
- (12) Identify any accidents or safety concerns that occurred and resolution.

L.6 52.236-27 SITE VISIT (FEB 1995)

(a) The clauses at 52.236-2, Differing Site Conditions, and 52.236-3, Site Investigations and Conditions Affecting the Work, will be included in any contract awarded as a result of this solicitation. Accordingly, offerors or quoters are urged and expected to inspect the site where the work will be performed.

- (b) A site visit has been scheduled for October 12<sup>th</sup>, 2016 at 10:00 am.
- (c) Participants will meet at American Consulate General, Dhahran.

L.7 652.206-70 COMPETITION ADVOCATE/OMBUDSMAN (AUG 1999)  
(DEVIATION)

(a) The Department of State's Competition Advocate is responsible for assisting industry in removing restrictive requirements from Department of State solicitations and removing barriers to full and open competition and use of commercial items. If such a solicitation is considered competitively restrictive or does not appear properly conducive to competition and commercial practices, potential offerors are encouraged to first contact the contracting office for the respective solicitation.

If concerns remain unresolved, contact the Department of State Competition Advocate on (703) 516-1696, by fax at (703) 875-6155, or by writing to:

Competition Advocate  
U.S. Department of State  
A/OPE  
SA-15, Room 1060  
Washington, DC 20522-1510.

(b) The Department of State's Acquisition Ombudsman has been appointed to hear concerns from potential offerors and contractors during the pre-award and post-award phases of this acquisition. The role of the ombudsman is not to diminish the authority of the Contracting Officer, the Technical Evaluation Panel or Source Evaluation Board, or the selection official. The purpose of the ombudsman is to facilitate the communication of concerns, issues, disagreements, and recommendations of interested parties to the appropriate Government personnel, and work to resolve them. When requested, and appropriate, the ombudsman will maintain strict confidentiality as to the source of the concern. The ombudsman does not participate in the evaluation of proposals, the source selection process, or the adjudication of formal contract disputes.

Interested parties are invited to contact the contracting activity ombudsman, Mr. Barry R. Blades, at fax; 013-3303296 or by email: [DhahranContractingOfficers@state.gov](mailto:DhahranContractingOfficers@state.gov). For a U.S. Embassy or overseas post, refer to the numbers below for the Department Acquisition Ombudsman.

Concerns, issues, disagreements, and recommendations which cannot be resolved at a contracting activity level may be referred to the Department of State Acquisition Ombudsman at (703) 516-1696, by fax at (703) 875-6155, or by writing to:

Acquisition Ombudsman  
U.S. Department of State  
A/OPE  
SA-15, Room 1060  
Washington, DC 20522-1510.

(End of provision)

L.8 MAGNITUDE OF CONSTRUCTION PROJECT

It is anticipated that the range in price of this contract will be:  
\$150,000.00 to \$220,000.00

L.9 FINANCIAL STATEMENT

If asked by the Contracting Officer, the offeror shall provide a current statement of its financial condition, certified by a third party that includes:

Income (profit-loss) Statement that shows profitability for the past one (1) years;

The Government will use this information to determine the offeror's financial responsibility and ability to perform under the contract. Failure of an offeror to comply with a request for this information may cause the Government to determine the offeror to be nonresponsible.

## SECTION M - EVALUATION FACTORS FOR AWARD

### M.1 EVALUATION OF PROPOSALS

M.1.1 GENERAL. To be acceptable and eligible for evaluation, proposals must be prepared in accordance with Section L - INSTRUCTIONS, CONDITIONS AND NOTICES TO OFFERORS, and must meet all the requirements set forth in the other sections of this solicitation.

#### M.1.2 BASIS FOR AWARD

The Government intends to award a contract resulting from this solicitation to the lowest priced, technically acceptable offeror who is a responsible contractor. The evaluation procedures are set forth below:

(a) INITIAL EVALUATION. The Government will evaluate all proposals received to ensure that each proposal is complete in terms of submission of each required volume, as specified in Section L. The Government may reject proposals which are missing a significant amount of the required information.

(b) TECHNICAL EVALUATION. After the Initial Evaluation, the Government will review those proposals remaining for consideration to determine technical acceptability. The Government will consider the following evaluation criteria in determining the acceptability of the technical proposal. To be considered technically acceptable, the technical proposal must provide the information requested in Section L and conform to the requirements of the solicitation.

- The Proposed Work Information described in L.5.2.3(b).
- The qualifications and experience of the offeror's proposed project superintendent and subcontractors.
- Experience and Past Performance (L.5.2.3.(b)). The Government may contact references to verify the quality of the past performance.
- Responses to all other technical requirements contained in the solicitation.

(c) The Government will make a responsibility determination by analyzing whether the apparent successful offeror complies with the requirements of FAR 9.1, including:

- adequate financial resources or the ability to obtain them;

- ability to comply with the required performance period, taking into consideration all existing commercial and governmental business commitments;
- satisfactory record of integrity and business ethics;
- necessary organization, experience, and skills or the ability to obtain them;
- necessary equipment and facilities or the ability to obtain them; and
- be otherwise qualified and eligible to receive an award under applicable laws and regulations.

The Government reserves the right to reject proposals that are unreasonably low or high in price. Unsuccessful offerors will be notified in accordance with FAR 15.5.

#### M.1.3 AWARD SELECTION

The Government will review the prices of all technically acceptable firms and award the contract to the lowest priced, technically acceptable, responsible offeror.

#### M.2 AWARD WITHOUT DISCUSSIONS

Under FAR provision 52.215-1 (included in Section L of this RFP), award of this contract may be made based on initial proposals and without holding discussions, following FAR 15.306(a) (3).

#### M.3 SEPARATE CHARGES

Separate charges, in any form, are not solicited. For example, any charges for failure to exercise an option are unacceptable.