GENERAL NOTES

A. CONSTRUCTION

1. The Contractor is to ensure all work performed is in accordance with the approved plans and specifications. If any work is not in accordance with the approved plans and specifications, the Contractor shall be responsible for any changes in the approved plans or specifications.

2. The Contractor is responsible for providing all necessary labor, materials, and equipment, including but not limited to, excavation, demolition, and construction work.

3. The Contractor is responsible for maintaining a safe and healthful workplace for all employees and shall comply with all applicable health and safety regulations.

4. The Contractor is responsible for ensuring that all work performed is in accordance with all applicable laws and regulations, including but not limited to, building codes, environmental regulations, and labor laws.

5. The Contractor is responsible for ensuring that all work performed is in accordance with the approved plans and specifications. If any work is not in accordance with the approved plans and specifications, the Contractor shall be responsible for any changes in the approved plans or specifications.

6. The Contractor is responsible for ensuring that all work performed is in accordance with all applicable laws and regulations, including but not limited to, building codes, environmental regulations, and labor laws.

B. SUBMITTAL LIST AND SCHEDULE

1. The Contractor shall prepare a detailed list and schedule of all submittal items to be reviewed by the Project Engineer. All submittals shall be submitted to the Project Engineer at least seven days prior to the date of submission.

2. The submittal list and schedule shall include, but not be limited to, the following:

   a. Shop drawings
   b. Material submittals
   c. Test results
   d. Progress reports
   e. Change orders

C. SUBMITTAL REQUIREMENTS

1. All submittals shall be submitted in accordance with the approved plans and specifications. If any submittal is not in accordance with the approved plans and specifications, the Contractor shall be responsible for any changes in the approved plans or specifications.

2. All submittals shall be submitted in accordance with all applicable laws and regulations, including but not limited to, building codes, environmental regulations, and labor laws.

D. GENERAL NOTES

1. The Contractor is responsible for ensuring that all work performed is in accordance with all applicable laws and regulations, including but not limited to, building codes, environmental regulations, and labor laws.

2. The Contractor is responsible for ensuring that all work performed is in accordance with the approved plans and specifications. If any work is not in accordance with the approved plans and specifications, the Contractor shall be responsible for any changes in the approved plans or specifications.

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7. The Contractor is responsible for ensuring that all work performed is in accordance with all applicable laws and regulations, including but not limited to, building codes, environmental regulations, and labor laws.
NOTES:
1. COORDINATE LOCATIONS AND SIZES OF OPENINGS WITH MEP DRAWINGS.
2. COORDINATE LOCATION OF MOUNTED GADGETS WITH MEP DRAWINGS.
3. FIELD VERIFY EXISTING DIMENSIONS AND CONDITIONS.
4. COORDINATE PHASING WITH MEP DRAWINGS.
NOTES:
1. COORDINATE LOCATIONS AND SIZES OF OPENINGS WITH MEP DRAWINGS.
2. COORDINATE LOCATION OF HOLD DOWNS WITH MEP DRAWINGS.
3. FIELD VERIFY EXISTING DIMENSIONS AND CONDITIONS.
4. COORDINATE PHASING WITH MEP DRAWINGS.
CURB FOR NEW PLENUM SUPPORT

EXISTING 7" CONCRETE SLAB

NEW OPENING IN EXISTING SLAB FOR AHU 8 PLENUM
NEW OPENING IN EXISTING SLAB FOR AHU 7 PLENUM

8'-0" 5'-0"

S200 TYP

2'-1" 4'-0"

S200 TYP

EXISTING BEAM

CURB FOR NEW PLENUM OPENING

EXISTING METAL DECK

NEW L5x3x1/4

NEW OPENING IN EXISTING METAL DECK FOR AHU CURB FOR NEW PLENUM OPENING, SEE DETAIL 1/S200

EXISTING JOIST

EXISTING DECK

EXISTING JOISTS

5'-0" (TYP) (F.V.)

SECTION "A-A" (NO SCALE)

SEE PLAN

COORDINATE WITH MEP EXISTING METAL DECK

NOTES:
1. COORDINATE OPENING SIZE WITH MEP DRAWINGS.
2. COORDINATE LOCATION OF CURB WITH MEP DRAWINGS AND APPROVED EQUIPMENT SHOP DRAWINGS. CURB MAY BE SETBACK FROM OPENING EDGE.
3. DO NOT DAMAGE OR DISTURB THE EXISTING OPENING OR THE EXISTING DUCT.
4. FOR INFILL OF SLAB OPENING REFER TO DETAIL 7/S200.
5. DO NOT OVERCUT OPENINGS. CORE CORNERS, FIRST BEFORE SAW CUTTING OPENINGS.

1/4" = 1'-0"

PARTIAL PLAN - PENTHOUSE 1

PARTIAL PLAN - PENTHOUSE 2

PARTIAL PLAN - PENTHOUSE 3

WALTER P. MOORE AND ASSOCIATES, INC
1301 McKINNEY STREET, SUITE 1100
HOUSTON, TEXAS 77010.3064
PHONE: 713.630.7300
FAX: 713.630.7396
ENSURE VENTS ARE CLEAR FOR RELIEF OF BUILDING.
ON TO PLENUM FARTHER SOUTH.
TAKE BOTTOM DUCTS OFF FOR CONNECTION TO PLENUM.  RUN TOP DUCTS
NEW MANIFOLD AS DETAILED IN M901 & M902.
EXISTING STRUCTURAL TIE-DOWNS.
COLD DUCT.
HOT DUCT.
FLEX TO RUN UNDER MANIFOLDS.
DRAWING NOTES:
FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT
DRAWINGS.
STRUCTURAL HOLD-DOWN LOCATIONS.RE: DETAIL 8 M901 & STRUCTURAL
WILL NEED TO BE NEW DUE TO DAMAGE.
STORED BY UTHSC-H.  REUSE APPROXIMATELY 25%, THE ADDITIONAL
282-500-825.  FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE
FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT
DRAWINGS.
STRUCTURAL HOLD-DOWN LOCATIONS.RE: DETAIL 8 M901 & STRUCTURAL
WILL NEED TO BE NEW DUE TO DAMAGE.
STORED BY UTHSC-H.  REUSE APPROXIMATELY 25%, THE ADDITIONAL
282-500-825.  FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE
FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT
DRAWINGS.
VERIFY VENTS ARE CLEAR FOR RELIEF OF BUILDING.
LADDER UP FROM ONE OF THE OUTSIDE AIR INTAKE PITS.
AND OVER THE DUCTS WHERE THEY TAP OUT OF THE WALL OR PROVIDE A LADDER TO THE HIGH ROOF AND ANOTHER BACK DOWN TO GET UP PROVIDE A TEMPORARY SHIPS LADDER FOR THE OTHER SIDE OF THE ROOF, BLOCK ACCESS TO MANY AREAS FROM THE EXISTING SHIPS LADDER. EITHER PROVIDE A MEATHOD TO TRANSVERSE THE ROOF. THE TEMPORARY DUCTS WILL MATCH EXISTING.
REMOVE EXISTING CHASE EXHUAST VENT HOOD AND PATCH THE ROOF TO THE ROOF.
ENSURE THE NEW PLENUM DOES NOT BLOCK ACCESS FROM THE SHIPS LADDER ON TO PLENUM FARTHER SOUTH.
TAKE BOTTOM DUCTS OFF FOR CONNECTION TO PLENUM. RUN TOP DUCTS NEW MANIFOLD AS DETAILED IN M901 & M902.
EXISITNG STRUCTURAL TIE-DOWNS.
COLD DUCT.
HOT DUCT.
FLEX TO RUN UNDER MANIFOLDS.
CHECK B/W.
FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT DRAWING NOTES:
STORED BY UTHSC-H. REUSE APPROXIMATELY 25%, THE ADDITIONAL 282-500-825. FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT DRAWING NOTES:
STORED BY UTHSC-H. REUSE APPROXIMATELY 25%, THE ADDITIONAL 282-500-825. FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT...
MECHANICAL PENTHOUSE - RENOVATION PLAN

1. ELBOW TERMINATED IN BUGSCREEN TO SEMI-CONDITION THE PENTHOUSE. RECONNECT TO EXISTING UNIT.

2. ENSURE FANS ARE LOCATED WITH CLEARANCE UNDER FOR ACCESS. INSTALL NEW VFD FOR EACH FAN.

3. MOTORIZED DAMPERS SHALL BE ACCESSIBLE FROM THE ROOF THROUGH THE RELIEF VENTS.

4. NEW CONDENSATE RETURN TO BE ROUTED AS TO PENETRATE THE FLOOR IN THE EXISTING LOCATION.

5. REPIPE THE NEW UNIT AS NOTED ON M900 - MECHANICAL DETAILS AND AS REQUIRED FOR LOCATION OF THE PIPING. POUR NEW PADS 3" LARGER THAN THE AHU FOOTPRINT ON EACH SIDE AND 6" TALL. REFER TO STRUCTURAL.

6. INSTALL NEW SMOKE DETECTORS IN THE RETURN AIR RISERS NEAR THE EXISTING ACCESS DOOR. SPRINKLER HEADS AS NEEDED. TRY TO MAINTAIN AS MUCH HEAD HEIGHT AS POSSIBLE CLOSE TO THE UNIT AND TRANSITION DOWN TO THE EXISTING FIRE DAMPER. RELOCATE.

7. PROVIDE NEW DUCT AS NOTED FROM THE AHU TO THE CHASE CONNECTION. DUCT SHALL BE AS HIGH AS POSSIBLE OUT FROM THE UNIT AND TRANSITION DOWN TO THE EXISTING FIRE DAMPER. RELOCATE.

8. CONTROL SEQUENCE FOR THE NEW AHU SHALL BE AS NOTED ON DRAWING M990 & M991 - CONTROL DIAGRAMS.

9. INSTALL NEW VSD. RECONNECT TO ELEC AS NEEDED.

10. AIR, ECONOMIZER MODE OUTSIDE AIR AND RELIEF AIR DUCT AND PLENUMS AS WELL AS RELIEF/RETURN COMMISSIONED WITH A MEMBER OF THE UTHSC-H STAFF IN ATTENDANCE.

11. NEW AHU SHALL BE STARTED UP WITH A REPRESENTATIVE FROM THE FACTORY AND AT THE UNITS AS NOTED. REINSTALL THE SMOKE DETECTOR INTO THE NEW DUCTWORK.

12. OPENINGS AS NECESSARY TO PROVIDE PIPING TO NEW UNITS. ALL CONTROL VALVING SHALL BE PIPED MATCH EXISTING.

13. NEW COILS WILL BE IN DIFFERENT LOCATIONS. ROUTE PIPE THROUGH STRUCTURAL THE TEMPORARY UNIT AND REMOVE THE TEMPORARY DUCT FROM THE PLENUM TO THE RISERS AND CAP TO THE TEMPORARY UNIT. ONCE THE AHU HAS BEEN REPLACED, TIE BACK INTO THE CHILLED WATER, STEAM AND DUCTWORK.
REMOVE THE EXISTING CONCRETE PAD AND REPOUR. REFER TO STRUCTURAL DRAWINGS FOR ALLOW FOR MOVEMENT TO WHERE THE CUTTING IS TAKING PLACE. COORDINATE ANY NEEDED EXISTING UNITS. PROVIDE A 12"~ MANUAL BALANCING DAMPER (LOW LEAK) WITH FLEXIBLE DUCT TO PROVIDE A TAP INTO THE EXHAUST DUCT AS NOTED FOR VENTILLATION DURING CUTTING OF THE REMOVE EXISTING VSD. REPLACE WITH NEW VSD. REFER TO ELECTRICAL DRAWINGS. BE SHUT TO THE AHU AND THE AHU SHALL BE REPLACED AS DETAILED ON M700. TURN OVER ALL BE BASED ON CONSTRUCTABILITY AND CONFIRMED WITH UTHSC-H. ALL ISOLATION VALVES SHALL BOTH AHUS TO SERVICE BOTH LAB AHUS. THE SEQUENCE OF THE UNITS TO BE REPLACED SHALL SHALL BE ENERGIZED AND THE AHU SHALL BE DE-ENERGIZED. THE BYPASS AHUS ARE SIZED FOR DUCT HAS CONNECTED THE TEMPORARY BYPASS AHUS TO THE RISERS, THE TEMPORARY AHUS ONCE THE DUCTWORK AT THE ROOF HAS BEEN CONNECTED TO THE RISERS AND THE FLEXIBLE DUCTWORK IN THE CHASE NECESSARY TO MAKE CONNECITONS. FLEX MAY BE USED. REFER TO M903 & M904 FOR ISOMETRICS OF DUCT CONNECTIONS. REMOVE ANY TEMPORARY BYPASS UNIT SHALL BE CONNECTED TO THE RISERS AS NOTED ON THE ROOF PLAN. TEMPORARY BYPASS AHU, REMOVE EXISTING PIPING AS REQUIRED TO INSTALL NEW PIPE TO THE NEW UNITS PER THE FIELD VERIFY ACTUAL INTERNAL FREE AREA DUCT SIZES. DUCT SIZE SHOWN IS AN ESTIMATE REMOVE DUCTWORK AS NOTED FOR REPLACEMENT. EXISTING FIRE DAMPERS TO REMAIN. FURTHER INFO.
ON TOP PLENUM FARTHER EAST.
TAKE BOTTOM DUCTS OFF FOR CONNECTION TO PLENUM. RUN TOP DUCTS NEW MANIFOLD AS DETAILED IN M901 & M902.
COLD DUCT.
HOT DUCT.
FLEX TO RUN UNDER MANIFOLDS.
DRAWINGS.
STRUCTURAL HOLD-DOWN LOCATIONS. RE: DETAIL 8 M901 & STRUCTURAL WILL NEED TO BE NEW DUE TO DAMAGE.
STORED BY UTHSC-H. REUSE APPROXIMATELY 25%, THE ADDITIONAL 282-500-825. FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT DRAWING NOTES:
05/24/18
ADDENDUM #1

THE SHIPS LADDER TO THE REST OF THE ROOF. SHOULD BE APPLICABLE FOR ALL PHASES WHERE THE PATH IS BLOCKED FROM LADDER UP FROM ONE OF THE OUTSIDE AIR INTAKE PITS. THIS SOLUTION PROVIDE A TEMPORARY SHIPS LADDER FOR THE OTHER SIDE OF THE ROOF, PROVIDE A METHOD TO TRANSVERSE THE ROOF. THE TEMPORARY DUCTS WILL TAKE BOTTOM DUCTS OFF FOR CONNECTION TO PLENUM. RUN TOP DUCTS NEW MANIFOLD AS DETAILED IN M901 & M902. COLD DUCT. HOT DUCT. STRUCTURAL HOLD-DOWN LOCATIONS. RE: DETAIL 8 M901 & STRUCTURAL STORED BY UTHSC-H. REUSE APPROXIMATELY 25%, THE ADDITIONAL 282-500-825. FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT DRAWING NOTES.
REMOVED FOR WHAT WILL NEED TO BE REROUTED AND WHERE. LIKELY, MOST PIPE WILL INTO THE PENTHOUSE AND TO ALLOW THE DUCT PLENUM TO BE INSTALLED. TANK IS RELIEF HOOD ON THE ROOF. TWO 20"~1M FLEX DUCTS PER RELIEF FAN TO CONNECT. REMOVE EXISTING OUTSIDE AIR PRETREATMENT UNIT, CONTROLS, PIPING, VFD, ETC. REMOVE EXISTING SMOKE DETECTOR IN THE DUCTWORK. SAVE FOR REPLACEMENT INTO THE BASED OFF OF FIELD MEASUREMENTS WHERE THE DUCT COULD BE REACHED AND ORIGINAL EXISINTG LOUVER SERVING THE UNITS. VACUUM, CLEAN AND REPLACE THE BIRDSCREENS. REMOVE DUCTWORK AS NOTED FOR REPLACEMENT. EXISTING FIRE DAMPERS TO REMAIN. CONTROLLERS AND VFDS TO THE OWNER.

SHALL BE SHUT TO THE AHU AND THE AHU SHALL BE REPLACED AS DETAILED ON M700. TURN OVER CONDUCTED TO DETERMINE IF BOTH OF THESE UNITS CAN BE REPLACED AT THE SAME TIME. SHALL BE ENERGIZED AND THE AHU SHALL BE DE-ENERGIZED. THE BYPASS AHUS ARE SIZED FOR ONCE THE DUCTWORK AT THE ROOF HAS BEEN CONNECTED TO THE RISERS AND THE FLEXIBLE TEMPORARY BYPASS UNIT SHALL BE CONNECTED TO THE RISERS AS NOTED ON THE ROOF PLAN.
AND 4 HOT DECK FLEX CONNECTIONS. EACH UNIT WILL REQUIRE CONNECTIONS OF 8 COLD DECK (FOUR PER RISER)
ONCE THE FIRST UNIT IS COMPLETE, THE SECOND UNIT MAY BEGIN. ENSURE VENTS ARE CLEAR FOR RELIEF OF BUILDING.
TO THE ROOF. ENSURE THE NEW PLENUM DOES NOT BLOCK ACCESS FROM THE SHIPS LADDER ON TO PLENUM FARTHER EAST.
TAKE BOTTOM DUCTS OFF FOR CONNECTION TO PLENUM. RUN TOP DUCTS NEW MANIFOLD AS DETAILED IN M901 & M902.
EXISTING STRUCTURAL TIE-DOWNS. COLD DUCT. HOT DUCT. FLEX TO RUN UNDER MANIFOLDS. WILL NEED TO BE NEW DUE TO DAMAGE.
STORED BY UTHSC-H. REUSE APPROXIMATELY 25%, THE ADDITIONAL 282-500-825. FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT DRAWING NOTES:
AND 4 HOT DECK FLEX CONNECTIONS. EACH UNIT WILL REQUIRE CONNECTIONS OF 8 COLD DECK (FOUR PER RISER) ONCE THE FIRST UNIT IS COMPLETE, THE SECOND UNIT MAY BEGIN. ENSURE VENTS ARE CLEAR FOR RELIEF OF BUILDING. MATCH EXISTING.

REMOVE EXISTING CHASE EXHUST VENT HOOD AND PATCH THE ROOF TO ON TO PLENUM FARTHER NORTH. TAKE BOTTOM DUCTS OFF FOR CONNECTION TO PLENUM. RUN TOP DUCTS NEW MANIFOLD AS DETAILED IN M901 & M902. EXISTING STRUCTURAL TIE-DOWNS. COLD DUCT. HOT DUCT. FLEX TO RUN UNDER MANIFOLDS. DRAWINGS. STRUCTURAL HOLD-DOWN LOCATIONS RE: DETAIL 8 M901 & STRUCTURAL WILL NEED TO BE NEW DUE TO DAMAGE. STORED BY UTHSC-H. REUSE APPROXIMATELY 25%, THE ADDITIONAL 282-500-825. FLEX TO BE 20"~. FLEX FROM PREVIOUS PROJECT WILL BE FLEX DUCTS SIMILAR TO MASTERDUCT MD ALL-WEATHER FLEXIBLE DUCT DRAWING NOTES:

THE SEAL APPEARING ON THIS DRAWING WAS AUTHORIZED BY:

E&C Engineers & Consultants Inc.
Texas Firm Registration No: F-003068

Digitally signed by Heather Camden
Date: 2018.05.24 12:40:58-05'00'

STATE OF TEXAS
PROFESSIONAL ENGIN EER

Digitally signed
by Heather
Camden
Date: 
2018.05.24 
12:40:58-05'00'
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<th>CASE MATERIAL</th>
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**RETURN AIR FAN SCHEDULE**

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**COIL SCHEDULE - CONDENSATE**

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**PUMP SCHEDULE - CONDENSATE**

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<tr>
<td>23 05 29</td>
<td>Sleeves, Flashings, Supports and Anchors</td>
</tr>
<tr>
<td>23 05 48</td>
<td>Vibration Isolation</td>
</tr>
<tr>
<td>23 05 53</td>
<td>Mechanical Identification</td>
</tr>
<tr>
<td>23 05 93</td>
<td>Testing, Adjusting and Balancing</td>
</tr>
<tr>
<td>23 05 93A</td>
<td>Preparation for System Testing, Adjusting and Balancing</td>
</tr>
<tr>
<td>23 06 20</td>
<td>Hydronic Specialties</td>
</tr>
<tr>
<td>23 07 13</td>
<td>Ductwork Insulation</td>
</tr>
<tr>
<td>23 07 16</td>
<td>Equipment Insulation</td>
</tr>
<tr>
<td>23 07 19</td>
<td>Piping Insulation</td>
</tr>
<tr>
<td>23 09 23</td>
<td>Direct Digital Control Systems</td>
</tr>
<tr>
<td>23 20 00A</td>
<td>Piping, Valves and Fittings</td>
</tr>
<tr>
<td>23 21 00</td>
<td>Hydronic Piping</td>
</tr>
<tr>
<td>23 22 00</td>
<td>Steam and Steam Condensate Piping</td>
</tr>
<tr>
<td>23 22 00A</td>
<td>Steam and Steam Condensate Specialties</td>
</tr>
<tr>
<td>23 29 23</td>
<td>Variable Speed Drives</td>
</tr>
<tr>
<td>23 31 00</td>
<td>Ductwork</td>
</tr>
<tr>
<td>23 33 00</td>
<td>Ductwork Accessories</td>
</tr>
<tr>
<td>23 34 00</td>
<td>Fans</td>
</tr>
<tr>
<td>23 41 00</td>
<td>Filters</td>
</tr>
<tr>
<td>23 73 23</td>
<td>Air Handling Units and Outside Air Handling Units</td>
</tr>
<tr>
<td>23 82 16</td>
<td>Air Coils</td>
</tr>
</tbody>
</table>

### INDEX: Division 26-Electrical

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 00 00</td>
<td>Basic Electrical Requirements</td>
</tr>
<tr>
<td>26 00 00.01</td>
<td>Electrical Demolition</td>
</tr>
<tr>
<td>26 05 00</td>
<td>Basic Electrical Materials and Method</td>
</tr>
<tr>
<td>26 05 19</td>
<td>Cable, Wire and Connectors, 600 Volts</td>
</tr>
<tr>
<td>26 05 26</td>
<td>Grounding</td>
</tr>
<tr>
<td>26 05 29</td>
<td>Securing and Supporting Methods</td>
</tr>
<tr>
<td>26 05 33</td>
<td>Raceways, Conduit and Boxes</td>
</tr>
<tr>
<td>26 05 53</td>
<td>Electrical Identification</td>
</tr>
<tr>
<td>26 05 73</td>
<td>Short Circuit Analysis and Coordination Studies</td>
</tr>
<tr>
<td>26 24 16</td>
<td>Panelboards</td>
</tr>
</tbody>
</table>
26 25 01  Feeder and Plug-in Busway
26 27 26  Wiring Devices and Floor Boxes
26 51 00  Interior and Exterior Lighting
28 31 00  Fire Alarm and Smoke Detection

For Construction
E&C Engineers & Consultants, Inc.
TX Firm Registration No: F-003068
Date: 05/24/2018
Engineer of Record: Heather Camden
State: Texas
License no: 86883
PART 1 GENERAL

1.00 The following sections are to be included as if written herein:
   A. Section 23 00 00 – Basic Mechanical Requirements
   B. Section 23 05 29 – Sleeves, Flashings, Supports and Anchors
   C. Section 23 05 53 – Mechanical Identification

1.01 SECTION INCLUDES
   A. Packaged air handling units.
   B. Factory installed fans.
   C. Dampers.
   D. Filters.
   E. Coils.
   F. Drives.

1.02 RELATED SECTIONS
   A. Section 23 00 00- Basic Mechanical Requirements.
   B. Section 23 05 13 - Motors.
   C. Section 21 05 48 - Vibration Isolation.
   D. Section 23 07 13 - Ductwork Insulation.
   E. Section 23 82 16 - Air Coils.
   F. Section 23 41 00 - Filters.
   G. Section 23 31 00 - Ductwork.
   H. Section 23 33 00 - Ductwork Accessories: Flexible duct connections.

1.03 REFERENCES
   A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
   B. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
D. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
E. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
G. AMCA 500 - Test Methods for Louver, Dampers, and Shutters.
I. ARI 435 - Application of Central-Station Air-Handling Units.
J. ARI 610 - Central System Humidifiers.
K. NEMA MG1 - Motors and Generators.
L. NFPA 70 - National Electrical Code.
M. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
N. UL 900 - Test Performance of Air Filter Units.

1.04 SUBMITTALS

A. Submit under provisions of Section 23 00 00.

B. Include with the initial submittal a letter signed by the manufacturer’s national sales manager (or any corporate officer) and the production manager, acknowledging that this equipment is intended for a University of Texas facility and that all specification requirements shall be complied with. Submit copy of letter to OFPC engineer/UTHSC-H Construction manager.

C. Shop Drawings: Indicate assembly, unit dimensions, weight loading, required clearances, construction details, field connection details, electrical characteristics, connection requirements, and .

D. Product Data:
   1. Provide literature that indicates dimensions, weights, capacities, ratings, fan performance, gauges and finishes of materials, electrical characteristics and connection requirements.
   2. Provide data of filter media, filter performance data, filter assembly, and filter frames as tested and certified per ASHRAE standards.
   3. Provide fan curves with specified operating point clearly plotted, as tested and certified per AMCA standards. Ratings to include system effects. Bare fan ratings will not satisfy this requirement, but shall be submitted for comparison purposes.
   4. Submit sound power level data for both fan outlet and casing radiation at rated capacity, as tested and certified per AMCA standards.
   5. Provide data on all coils as tested and certified per ARI standards.
6. Submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

7. All materials shall have NFPA-90 rating of 25/50 or better.

E. Manufacturer's Installation Instructions.

1.05 OPERATION AND MAINTENANCE DATA
A. Submit under provisions of Section 23 00 00.

B. Maintenance Data: Include instructions for lubrication, filter replacement, motor and drive replacement, spare parts lists, and wiring diagrams.

1.06 QUALIFICATIONS
A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience, who issues complete catalog data on total product.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Deliver, store, protect and handle products to site under provisions of Section 23 00 00.

B. Accept products on site in factory-fabricated protective containers, with factory-installed shipping skids and lifting lugs. For panelized units, components may come palletized, in crates or on skids. Inspect for damage.

C. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.08 ENVIRONMENTAL REQUIREMENTS
A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation of the Owner’s RCM.

1.09 EXTRA MATERIALS
A. Furnish under provisions of Section 23 00 00.

B. Provide one year of filters for each unit (start-up filters, plus 4 additional sets of MERV 8 for change-out each 3 months, and one additional set of MERV 13 for change-out one year from turn-over). One set of filters is to be installed when unit is started up, and shall be protected from construction debris with additional media either at the first bank of filters, or covering each air intake (outside air and return air). The other sets shall be scheduled for delivery at the times noted for change-out, one MERV 8 at 3 months from start-up, one MERV 8 at 6 months from start-up, one MERV 8 at 9 months from start-up and a MERV 8 and MERV 13 at 12 months from start-up. Coordinate exact delivery date with UTHSC-H personnel.

1.11 SCHEDULES ON DRAWINGS:
A. In general, all capacities of equipment, and motor and starter characteristics are shown in schedules on the Drawings. Reference shall be made to the schedules for such information.
The capacities shown are minimum capacities. Variations in the capacities of the scheduled equipment supplied under this contract will be permitted only with the written direction of the owner. All equipment shall be shipped to the job with not less than a prime coat of paint or as specified hereinafter. Insofar as is possible, all items of the same type (i.e., pumps, fans, etc.) shall be by the same manufacturer. Where installation instructions are not included in these Specifications or on the Drawings, the manufacturer’s instructions shall be followed. All equipment affected by altitude shall be rated to operate at the altitude where it is installed.

1.12 WARRANTY:

A. Unit shall have a 5-year warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Laboratory Units:
   a. Climate Craft only per UTHSC-H Agreement. Price shall be submitted as a separate price from the base bid.

B. Office Units – These units shall also be provided as a separate price from the base bid:
   a. Climate Craft
   b. Temtrol
   c. Thermal
   d. JCI
   e. Trane

B. NOTE: Units must meet the size restrictions. In addition, each manufacturer must verify the shipping and delivery sizes of the components and coordinate exactly how the units will get to the building’s penthouse and ultimately get to the location of the replacement.

C. Substitutions: Under provisions of Section 23 00 00. The equipment as supplied by any of the acceptable manufacturers or an approved equal shall comply with all of the provisions of this specification.

2.02 GENERAL DESCRIPTION

A. Configuration: Fabricate with fan and coil sections as scheduled plus accessories, including sections as detailed per unit.

B. Performance Base: Sea level conditions.

C. Fabrication: Conform to AMCA 99 and ARI 430 in the absence of direction in this specification.

D. Performance: Refer to schedule in drawings.

2.03 AIR HANDLER CASING AND GENERAL CONSTRUCTION:

A. Unit casing exterior (walls and roof) shall be a minimum 18-gauge thickness galvanized steel insulated internally, throughout (double wall construction with no thru metal). Internal insulation shall have an R-value of at least 10, with foil facing, neoprene or anti-microbial hardcoat protected unless specifically noted otherwise, and shall be fire and fungus proof. Foam may be used as an alternate as long as it is also anti-microbial protected and fire and
fungus proof. All internal insulation shall be protected with solid galvanized sheet metal, of a minimum of 20-gauge thickness. All sheet metal joints throughout the air handler, and between panelized sections, shall be gasketed with closed cell, soft rubber gaskets, fabricated from neoprene, EPDM, or other approved sealant material. Internal walls and roof outside shall be sealed such that there is no passage of air from inside the unit to the outer casing.

B. Individual panels of the fan section shall be removable without compromising the integrity of the unit. Casing assembly shall be configured to eliminate all thru-metal in portions of the unit subject to below ambient temperatures. Where fasteners are used in the assembly of the unit components, they shall not extend from the outside of the unit into the air stream. If all components of the fan section can be removed through the door, removable panels will not be necessary.

C. Drain pan liners shall be constructed of No. 16-gauge 316-L-L stainless steel or heavier as standard with the manufacturer, and shall be non-skid or be provided with protective grating. Drain pan shall be non-skid and extend up to the fan section on draw-thru units. Entire drain pan, and shall be insulated with R-8 rigid insulation. Drain pans shall be sloped to the outside edge of the unit. On units over six feet wide, slope to each side of the unit. The insulation shall be installed and sealed as is appropriate for the equipment construction.

D. Unit shall have a complete perimeter channel base of at least 6” galvanized steel, 8” tube steel or 6” carbon steel with marine quality primer. The unit manufacturer shall provide a condensate drain trap calculation that ensures there will be ample trapping height when the unit is sitting on a 5-1/2” concrete pad. Base channels shall be sized no less than 6”, but shall be extended to provide proper trapping. All floors shall be insulated with R-10 insulation with 14-gauge non-skid galvanized floor (or equivalent aluminum). An 18-gauge galvanized sheet shall enclose and form a vapor barrier for the insulation on the bottom of the unit. If a foamed-in-place closed cell insulation is used, the lower metal enclosure may be eliminated. All points of contact between the floor, vapor barrier and structure shall be thermally isolated with gasketing of closed cell soft rubber or EPDM.

E. Access doors shall be provided to allow access to both sides (upstream and downstream) of the filter racks, into the fan section, and both sides of all coils. Access doors shall be double wall, insulated the same as wall panels, and the opening framed with thermal break construction. Door size shall be at least 18” wide and full height of the panel up to 5’ 0” tall. The construction of the access doors shall equal or exceed the quality and quantity of the air handler casing materials as specified herein. Each door shall have a minimum of an 8-inch by 6-inch double-glazed view window, capable of withstanding the total developed pressure of the unit. The doors shall be hinged using either heavy-duty stainless butt hinges, adjustable cast aluminum hinges, or a continuous stainless steel piano hinge, extending along the entire edge of the door, except for a maximum of two inches at each end. If butt hinges are used, provide two per door for up to 36” high doors and three per door for longer doors. There shall be a minimum of two latches on doors longer than 18,” and three latches in doors over 36” long. Latches shall be Ventlok 310, heavy-duty latch, or approved equal. All access doors shall open against air pressure.

F. Coils in the air-handling units shall be individually removable from within the unit so that they may be removed through the access doors without removing any unit panels or piping exterior to the unit and shall not be used to provide structural stability for the casing. All coils shall be arranged for and piped to provide counterflow operation. The coils shall be completely enclosed within the coil housing of the air unit casing. All penetrations of the air
handler casing shall be neatly sealed using a resilient sealant. Hinged gasketed quick access doors of adequate size for a man to enter shall be provided for each space between coils, filters and other components. Stacked coils shall have intermediate drain pans with at least 1" rigid drain piping and pipe supports to main drain pan.

G. Panels shall be reinforced with sufficient internal bracing to prevent excessive deflection of the panels. Maximum deflection at any joint on the unit casing shall be limited to L/250th of the overall panel width or height.

H. Panel construction shall provide the following acoustical performance.

a. Sound Transmission Loss (dB) per ASTM E-90 & E-413

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<th>3</th>
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<th>6</th>
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</thead>
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</tr>
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</table>

b. Sound Absorption Coefficients per ASTM C-423 & E-795

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<td>.95</td>
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<tr>
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<td>1.06</td>
<td>1.06</td>
<td>1.04</td>
<td>.78</td>
<td>1.00</td>
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The above ratings represent minimum performance. Unit manufacturer shall submit full sound performance data to the project sound consultant for evaluation.

I. Provide a unit housing, including joints, seams, and access doors, that will not condense moisture on the external surfaces of this housing when subjected to a surrounding ambient environment of 82°F dry-bulb/75°F dew-point temperature air.

J. Equivalent aluminum material may be used where galvanized steel panel components are called for.

K. Provide sealable test ports on either side of each filter bank and each coil section, in inlet plenum and discharge plenum, and suction and discharge side of all fans. Ports shall be equal to Ventfabrics test port Model 699-2.

2.04 FANS:

A. Shall be both dynamically and statically balanced. Housed fans shall be equipped with quick opening access doors in the fan scroll. Motors shall be high efficiency type per Section 23 05 13. The motor mounting for each unit shall be an integral part of the fan support frame. The fan/motor unit shall be mounted on spring isolators within the air handler casing. Housed fans shall have an appropriately designed fabric duct vibration isolator installed within the air handler casing. The unit shall be supplied with a factory installed and sealed flange for connection to ductwork. Units shall be direct drive only.

B. The fan unit bearings shall be of the antifriction type, either ball or roller, lubricated at the factory, and shall be equipped with means for lubrication with a grease fitting on the outside of the bearing housing. Both inboard and outboard bearings shall be the same, identical
size. The bearings shall be a catalogued type as manufactured by Fafnir, SKF, Sealmaster, or approved equal, and stocked locally. Bearings shall have an L-10 minimum life of 200,000 hours. Intermediate bearings will not be acceptable. Grease fittings for bearings shall be remotely mounted within line of sight of the bearing, where possible. Where it is not possible, then the fitting shall be mounted where it is most easily accessible for service. The tubing used for remoting the fitting shall be stainless steel. Provide AEGIS bearing protection on all shafts.

C. After assembly, the unit manufacturer shall balance the fan (per ANSI/AMCA 204-96 fan application category BV-3) at design fan speed with belts and drives in place to a vibration velocity less than or equal to 0.157 inches (0.100 inches for direct-drive applications) per second measured on horizontal, vertical, and axial planes at each bearing pad. Vibration amplitudes are in inches/second peak velocity. All values recorded are to be filter-in at the fan speed.

D. Plug fans installed in walk-in units shall be provided with a safety cage around the wheel or with a fan shut down switch in the access door. Cage shall be large enough to allow working room for wheel and bearing service and shall have removable sections to allow wheel removal.

E. Direct drive fans shall have fan wheels cut to provide proper matching of the motor and fan rpm.

F. Multiple Fan/Motor VFD Control: The fan array shall consist of multiple fan and motor “cubes”, spaced in the air way tunnel cross section to provide uniform airflow and velocity profile across the entire airway tunnel section and components contained therein. Each fan cube shall be individually wired to a control panel containing power lock-disconnects for individual motors and a single VFD controlling all fan motors in the fan array. Refer to Specifications Section 23 2923 – “Variable Frequency Drives” for requirements. Controls on laboratory units (AHU-L1, 2, 3 & 4) shall allow the unit to reduce to no less than 15% of the design flow and remain stable. This shall be provided by the balance stream option. Office units (AHU-O1, 2, 3, 4, 5, 6, 7 & 8) shall allow the unit to reduce to no less than 30% of design flow and remain stable.

2.05 DAMPERS

A. Damper Leakage: Section with factory built, factory mounted outside and return air dampers of galvanized steel and edge seals in galvanized frame, with galvanized steel axles in self-lubricating nylon bearings, in opposed blade arrangement with damper blades positioned across short air opening dimension. Maximum 4 CFM/Sq. Ft. at 4 inch WG differential pressure. Dampers shall be sized for 2000 fpm maximum face velocity.

B. Isolation Dampers: Factory mounted isolation dampers downstream or backdraft dampers upstream of the fan section shall be governed by the low-leakage damper specification in section 23 33 00.

C. Face and Bypass Dampers (Heat Recovery Units): Factory mounted in casing field mounted with access doors, of galvanized steel blades, and edge seals, galvanized steel frame, and axles in self-lubricating nylon bearings, arranged to match coil face with bypass, blank-off and division sheets, external linkage, access doors, and adjustable resistance plate. Dampers shall be low-leakage type.
2.06 DRIVES:

B. Variable speed drives: See Section 23 29 23. Drive shall be supplied by the VFD manufacturer and shall be connected in the field. The AHU manufacturer shall coordinate with the drive manufacturer to ensure the motor will not over-amp in bypass mode.

2.07 COILS:

G. Refer to Section 23 82 16 - Air Coils, and Unit Schedules for requirements.

2.08 FILTERS:

A. Units shall have a MERV 8 and MERV 13 filter bank. Refer to Section 23 41 00 - Filters, and Unit Schedules for requirements.

2.10 ELECTRICAL

A. Fan motors shall be factory mounted and wired to an external disconnect switch adjacent to the motor access door. Fan motors shall be interlocked with fan access door to shut down when door is opened. For units with one VFD, the disconnects shall be in the fan array overload panels.

B. Vapor proof lights (mounted at 88" above floor or as high as possible for units shorter than 88") shall be provided in each compartment. Lights shall have a switch at each door into the compartment with access doors. Provide two GFI convenience outlets evenly spaced on the long dimension of the unit. Wire lights and outlets to two external 120v, 20a power connections (one for each service) for connection by Division 26.

C. UV lights shall be provided in each outside air cooling coil compartment downstream of the coil. This includes all cooling coils on laboratory units and only the pretreated outside air path in the office units. Lights shall have a switch at each door into the compartment with access doors along with an automatic door switch that will shut off the UV lights when the access door is open. Provide warning stickers for the doors. The lights shall provide a minimum of 5W/sqft of the coil. Wire lights and outlets to external 120v, 20a power connections for connection by Division 26. Provide a comprehensive wiring diagram for the light fixtures showing number of 20A circuits required, how the door switches are to be wired and verify the door switch is installed in such a way as to not exceed the switch’s rated amperage.

D. All wiring shall be 600v rated type MTW/THWN stranded copper in EMT or LiquidTite conduit (max 3 feet). All junction boxes shall be UL approved and gasketed.

E. Motors – Motors shall be provided to match the direct-drive requirements of the AHU without overamping in bypass mode. See Section 23 05 13 for additional requirements.

F. Motor/VFD/Fan – The fan wheel shall be cut so that maximum motor/fan rpm does not exceed the motor rated horsepower when the variable frequency drive is placed into bypass.

2.11 FINISH

A. All external parts of the unit shall be Brite G-90 galvanized. No painting will be required.
PART 3 EXECUTION

3.01 INSTALLATION

A. Field assembly of the unit shall be the responsibility of the contractor and shall be supervised by the manufacturer.

B. Install in conformance with ARI 435.

C. Assemble high pressure units by bolting sections together.

3.02 TESTING

A. Units with cabinet mounted fans shall be tested and certified at rated conditions using AMCA 210 and AMCA 300 test procedures with fan mounted in the cabinet. Bare fan data will not be accepted.

B. Casing Deflection Test

1. Deflection limit of L/250 shall be demonstrated in the field after installation and witnessed by a representative of the Owner’s Test and Balance Consultant.

2. ‘L’ is defined as the height of the largest panel on the sides, width across the top of the largest panel on the unit, and the smaller of width or height of the largest panel for the ends. These are known as the governing panels.

3. That portion of the unit after the fan discharge shall be tested at positive pressure. The remainder of the unit shall be tested at negative pressure.

4. Measurements shall be taken at mid point of ‘L’ using dial indicators reading in 1/1000ths. Mounting of dial indicators shall be independent of the unit casing. Multiple measurements shall be made. Dial indicator shall be mounted at mid point of ‘L’. Measurements shall then be spaced along the sides, ends and top at mid point and quarter points of the negative section and the positive section. Spacing shall be adjusted to fall on nearest flange or panel joint. Any section of less than five feet shall require only one measurement at the center.

5. Unit shall be furnished with proper blank offs to facilitate the pressure testing.

6. In order to reduce the number of pressure cycles, it is recommended that multiple dial indicators be used at the measurement points. Separate set-ups will be required for the positive pressure tests and the negative pressure tests.

C. Casing Leakage Test. With unit set in place, leveled and ready to receive duct work connections, unit shall be tested for casing leakage by sealing all openings and pressurizing to 2.5 times rated pressure (defined as total static pressure of unit) or 10" WG, whichever is smaller. Maximum allowable leakage rate is 1.5% of rated unit flow. Test is to be performed by the manufacturer using flow measurement devices and shall be witnessed by a representative of the Owner’s Test & Balance firm.
D. Fan/Motor Vibration Test. With the unit set in place, leveled, and ductwork attached, the manufacturer shall perform a final dynamic vibration trim balance to verify the fan/motor vibration velocity limit over the following operating speed range: Fans with VFDs shall be checked from 40 to 110% of the rated fan speed. Constant speed fans shall be checked at 100% of rated fan speed. ‘Lock-out’ ranges may be used to correct up to two ranges of excess vibration. The span of each ‘lock-out’ range shall be limited to an effective fan speed of 50 RPM. Any ‘lock-out’ range used shall be clearly identified in the test report and shall be prominently displayed on a typed, laminated legend mounted inside the VFD controller cabinet. This testing shall be witnessed by a representative of the Owner’s Test and Balance firm.

E. Failure of the leakage and/or deflection test shall require sealing and bracing of the unit and retesting until criteria is met. Failure of the trim balance to confirm vibration limit shall require rebalancing and re-testing until criteria is met. Contractor shall bear all costs involved in the modifications, balancing, and re-testing, including travel and hourly costs associated with the representatives of the Owner’s Test and Balance firm.

END OF SECTION
- o 0 o -
SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDED
   A. Distribution panelboards.
   B. Branch circuit panelboards.

1.2 REFERENCES
   A. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
   B. NAME KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
   C. NEMA PB 1 - Panelboards.
   D. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
   F. NEMA AB 3 – Molded Case Breakers and Their Application
   G. ANSI/UL 67 – Electric Panelboards
   H. ANSI/UL 50 – Cabinets and Boxes
   I. ANSI/UL 508 – Industrial Control Equipment

1.3 SUBMITTALS
   A. Provide submittals in accordance with and in additional to Section 26 00 00.UT, Basic Electrical Requirements, and Division 01 for submittal requirement.
   B. Submit dimensioned drawings showing size, circuit breaker arrangement and equipment ratings including, but not limited to, voltage, main bus ampacity, integrated short circuit ampere rating, and temperature rating of circuit breaker terminations.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING
   A. Deliver distribution panelboards in factory-fabricated water-resistant wrapping.
   B. Handle panelboards carefully to avoid damage to material component, enclosure and finish.
   C. Store in a clean, dry space and protected from the weather.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS
   A. Square D Company
   B. General Electric Company
   C. Other manufacturers equal in design and function will be considered upon A/E approval following substitution procedure in 26 00 00, and Division 01 for substitution requirement.

2.2 PANELBOARD CONSTRUCTION
   A. General: Provide flush or surface mounted, or surface mounted deadfront circuit breaker type distribution or branch circuit panelboards with electrical ratings and configurations, as
indicated on the drawings and schedules. Load center type of panelboards are not acceptable.

B. Enclosure:

1. Enclosure shall be proper NEMA type as shown on the drawings.

2. NEMA 1
   a. Back box shall be galvanized steel for flush mounted branch circuit panelboards. Back box shall have gray enamel electro-deposited finish over cleaned phosphatized steel for all other type panelboards.
   b. Provide panelboard fronts with screw cover and hinged door with flush lock.
   c. Where power monitors or metering are specified on the Drawings, the manufacturer shall cut the doors for field mounting of the unit.

3. NEMA 3R, 3S and 12
   a. Enclosure and doors shall have gray enamel electro-deposited finish over cleaned phosphatized steel.
   b. Doors shall be gasketed and equipped with tumbler type vault lock and two trunk latches where required by UL standard. Interior trim shall consist of four pieces, each covering one gutter top, bottom and both sides.

4. Construct cabinet in accordance with UL 50. Use not less than 16-guage galvanized sheet steel, with all cut edge galvanized. Provide a minimum 4-inch gutter wiring space on each side. Provide large gutter where required to accommodate the size and quantity of conductors to be terminated in the panel, and where required by code.

5. Exterior and interior steel surfaces shall be cleaned and finished with gray enamel over rust inhibiting phosphatized coating. Color shall be ANSI 61 gray.

6. Doors shall be equipped with flush-type combination catch and key lock. All locks shall be keyed alike.

7. Branch circuit panelboards shall be 5 ¾ inches deep.

8. A directory holder with heavy plastic plate, metal frame, and index card shall be mounted inside of each door.

9. Reinforce enclosure and securely support bus bars and overcurrent devices to prevent vibration and breakage in handling.

10. Rating: Minimum integrated short-circuit rating, voltage and current rating as shown on drawings.

11. Labeling: The Contractor shall furnish and install engraved, laminated plastic nameplates on the trim per Section 26 05 53.UT, Electrical Identification

C Bus:

1. Provide panelboards with rounded edge phase, neutral and ground buses, rated full capacity as scheduled on drawings. Buses shall be full-length copper and braced for the maximum available fault current as shown on drawings. Neutral bus shall be 200% rated for those panels feeding non-linear loads.

2. Phase bussing shall be stacked front-to-back, A-B-C.

3. The neutral and ground bus bars shall have termination locations for each of the individual feeders and the lugs sized appropriately. In addition, space shall be provided to terminate the neutrals and grounds in two feeders equal to the largest size
circuit breaker that can be installed in the panelboard. The ground bus shall be mounted in the panelboard, opposite the incoming line and neutral lugs and shall be accessible to allow easy installation of bolts, nuts and lock washers used to attach ground lugs. The neutral and ground buses in branch circuit panelboards shall have spaces to terminate 42 neutral and 42 ground wires.

4. Where isolated ground buses are specified or indicated, provide copper grounding bus bars mounted in the panelboard on insulated standoff to ensure isolation from equipment ground potential. Isolated ground buses shall be drilled and tapped as appropriate for connection of the individual isolated grounding conductors.

5. All lugs for phase, neutral, and ground buses shall be tin-plated copper.

6. Panelboard shall be rated SE where required for service Entrance duty.

2.3 SWITCHING AND OVERCURRENT PROTECTIVE DEVICES

A. Provide molded case circuit breakers with manufacturer's standard construction, bolt on type, with integral inverse time delay thermal and instantaneous magnetic trip in each pole. Circuit breakers shall be constructed using glass reinforced polyester insulating material providing superior dielectric strength. Provide circuit breakers UL listed as Type HACR for air-conditioning equipment branch circuits.

B. Circuit breakers shall have an over center, trip-free, toggle operating mechanism that will provide a quick-make, quick-break contact action.

C. Provide handle padlock attachments on circuit breakers where indicated on drawings. Device shall be capable of accepting a single padlock. All circuit breakers shall be capable of being individually padlocked in the off position.

D. The circuit breakers shall be connected to the bus by means of solidly bolted connection. In multi-pole breakers, the phase connections on the bussing shall be made simultaneously without additional connectors or jumpers. Multi-pole breakers shall be two or three pole as specified. Handle ties are not permitted. The circuit breaker shall have common tripping for all poles.

E. All circuit breakers shall be provided with visible ON and OFF indications.

F. Provide GFI circuit breakers as indicated on drawing or per NEC requirement.

G. Breaker voltage and trip rating shall be per drawings. Breaker faceplate shall indicate UL certificate standards with applicable voltage systems and corresponding short current rating as per drawings.

H. Molded Case Circuit Breakers:

   1. Breakers 400 ampere frame and less shall be manufacturer's standard industrial construction, bolt-on type, integral inverse time delay thermal and instantaneous magnetic trip. Breakers 225 ampere through 400 ampere shall have continuously adjustable magnetic pick-ups of approximately five to ten times trip rating.

   2. Breakers 600 ampere frame and above shall be equipped with solid-state trip complete with built-in current transformers, solid-state trip unit and flux transfer shunt trip.

I. Current Limiting Molded Case Circuit Breakers:

   1. Breakers 100 ampere frame shall be inverse time delay thermal and instantaneous magnetic trip.

   2. Breakers 250 ampere and 400 ampere frame shall be solid-state trip with built-in current transformers, solid-state trip unit and flux transfer shunt trip.
3. Current limiting breakers shall protect downstream molded case breakers. Submit manufacturer's test data proving the protection, from both peak currents and $I^2T$ energy of downstream devices.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with manufacturer's written instructions and the applicable requirements of the NEC, NEMA, ANSI and the National Electrical Contractors Association's "Standard of Installation".

B. Anchor enclosed firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secured. Direct attachment to dry wall is not permitted. Freestanding panelboards shall be installed on a concrete housekeeping pad with anchors per manufacturer's recommendation.

C. Mounting height:
   1. Distribution Panelboards: As per Drawings, but such that highest operating handle is no greater than 79 inches above finished floor.
   2. Branch Circuit Panelboards: As per Drawings, but such that highest operating handle is no greater than 79 inches above finished floor.
   3. Where panelboards occur in groups, the tops shall be aligned if it can be done without exceeding items 1 and 2 above.

D. Install panelboards plumb. Adjust trim to cover all openings. Seal all conduit openings and cap all used knockout holes.

E. Provide blank plates for unused open spaces in panelboards. Keep the front door closed after work to protect from damage, dirt, and debris at all times.

F. Install identification nameplates in accordance with Section 26 05 53.UT, Electrical Identification.

3.2 FIELD QUALITY CONTROL

A. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers and lugs.

B. Provide testing and start-up as indicated in Section 26 08 00 – Commissioning of Electrical Systems.

3.3 PANELBOARD SCHEDULE

A. The Contractor shall provide engraved, laminated plastic nameplates for circuit identification as indicated on the Drawings for distribution panelboards.

B. The Contractor shall fill the index directory inside the front door of branch circuit panelboards identifying each circuit as shown on Panel Schedule drawings. Where changes are made, the schedule shall reflect the changes. At the end of the job, these schedules shall reflect as-built record conditions.

END OF SECTION