SECTION 23 05 00

BASIC MECHANICAL REQUIREMENTS

PART 1: GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 **LESSONS LEARNED AND DESIGN CONSIDERATIONS**

A. Supports for mechanical/plumbing equipment will be accounted for in the design documents to ensure proper clearance is maintained for equipment maintenance after supports are installed.

B. Dielectric fittings should be inspected for proper installation on a percentage basis. Ensure the plastic insulator and gaskets are installed.

C. When connecting to existing facilities or working in existing facilities all dimensional information will be verified with actual measurements on site. Do not only use as built/design drawings.

D. Any comments on submittals or RFI's by the Owner are not directives and should be discussed if the engineer/contractor have any disagreements with the comments.

E. Mechanical equipment such as AHU's that will need to be disassembled to bring into the building will be designed such that it can be fully erected at the factory and tested then disassembled for shipment to the site.

F. Final location of access doors shown on the design drawings in ceilings and walls will be approved by UTA prior to installation. This should be done after all trades are done above ceiling in that area and a location determined on site.

G. **Campus chilled water supply temperature set point is 42 degrees Fahrenheit. Design chilled water coils for 16 degrees Fahrenheit differential temperature.**

H. **Campus steam supply leaving the thermal plant is saturated steam at 80 psia and 324 degrees Fahrenheit.**

I. All existing equipment/material to be returned to the owner will be noted on the design drawings prior to the contractor bid. All material transfers to the owner will have a letter of transmittal associated with it.

J. Concrete equipment pads will be specified for each piece of equipment. All equipment pad height should be thought out for each equipment to accommodate piping, equipment etc. that will hang over of below the equipment pad. All should be at least 4 inches in height.

K. For new construction Energy Valves on all major coils should be considered similar to the Belimo Energy Valve to maintain building delta T back to the thermal plant.

L. Confirm the largest piece of equipment will fit in the designated area and a clearance zone is shown on the drawings around each piece of equipment. Submittals will be rejected on this basis alone.

M. A closeout documents meeting should be specified for at least 3 months prior to substantial completion to start tracking these documents.

1.3 Substitution of Materials

A. **Any substitution request must be submitted far enough in advance that the schedule will not be affected due to the length of the substitution process.**

B. **Approved equal means quality, performance, size/orientation and local representation/parts are equal to the manufacturers listed. UTA will have the final decision whether a product is equal to the design specifications.**

C. Samples may be required to determine if a substitution is an approved equal.

D. If a substitution is accepted and the substitution is found to be defective or unsatisfactory within the guarantee period the contractor will replace the substitution at no cost to the Owner.

1.4 Manufacturers Recommendations

A. **Manufacturer's recommendations on transport, storage, installation and operation will be followed by the contractor unless specifically directed by the engineer/UTA in writing.**

B. Contractor will bear all costs associated with remedying an installation that is not per the manufacturer's instructions.

PART 2 - PRODUCTS

2.1 GENERAL

A. This product section is intended to inform the PSP on the minimum standard of quality that should be incorporated in new designs. The PSP should evaluate these standards and incorporate or make additional requirements per project specific requirements. Where the PSP considers any requirement listed not to be applicable or incompatible with the project design intent should be discussed with UTA Office of Facilities Management.

B. Sleeves:

1. Galvanized steel sheet. 22 gauge minimum thickness.

2. Steel pipe: ASTM A53, Schedule 40 galvanized plain ends.

C. Escutcheons

1. ID to closely fit around pipe, tube, insulation that completely covers opening.

2. One piece cast brass with set screw, polished chrome plated.

3. Split casting with concealed hinge and set screw. Polished chrome plated.

PART 3 - EXECUTION

3.1 Installation Methods

A. All pipes, conduits etc. will be concealed in pipe chases, walls furred spaces or above ceilings unless otherwise indicated

B. Items in mechanical rooms, janitor's closets or storage spaces can be exposed and installed in an orderly manner. All piping and ducts 10 feet or lower will be protected with a jacket.

C. All equipment/piping/duct will be adequately supported from the building structure. Hanging from an existing equipment/duct/pipe is not allowed.

D. **All ductwork and piping with insulation that runs through walls will be protected by a metal sleeve. See section two for requirements**

E. Basic Drawing Requirements

1. Mechanical drawings shall be drawn at 1/8"=1' - 0" scale or larger for floor plans. Mechanical rooms will have a partial plan using a minimum scale of ¼" = 1' – 0".

2. Mechanical drawings should show the following information at a minimum:

a. Room/space numbers will be shown on the mechanical plans.

b. The location and arrangement of all mechanical equipment with unique labels. This includes all space sensors such as temperature and humidity.

c. The area around mechanical equipment that is required for maintenance will be shown.

d. A north arrow, scale, visible scale and key plan will be on each mechanical floor plan.

e. Column lines will be shown on each mechanical drawing with column labels for each line.

f. Keyed notes will be on the sheet they are related to, not a separate sheet for keyed mechanical notes.

g. All ductwork shall be drawn to actual scale, do not use single line drawings. It will be indicated on the drawing whether the ductwork dimensions includes insulation or no insulation.

h. Mechanical piping will be drawn as single line for pipe sizes 4" and under and two line for piping 6" and over. It will be indicated on the drawing whether the piping dimensions includes insulation or no insulation.

i. The following details are required:

1) Connection to air devices showing the flexible duct and proper support.

2) Transfer air duct detail showing dimensions and arrangement.

3) Return boot details showing dimensions and arrangement.

4) Supports for piping, ductwork, and equipment.

5) Steam trap and dirt leg detail.

6) Cooling and heating coil connections with instrumentation.

7) Pump connections with instrumentation.

8) Condensate trap for blow through or draw through designs with dimension for each air handling unit.

9) Expansion tank connections with instrumentation.

10) Utility meter installation for each utility.

11) Terminal box detail showing instrumentation.

12) Fan coil unit detail showing instrumentation.

13) Exhaust hoods with control instrumentation.

14) Penetrations through walls, roofs and floors.

15) Exhaust fan installation.

16) Piping and instrumentation that connect to major equipment.

17) Expansion loop details.

18) Steam components such as steam traps and driplegs.

j. One line diagrams of each system including:

1) Dimensions of piping/ductwork.

2) Labels for equipment.

3) Valve and accessory locations.

4) Utility meter locations.

5) Indicate which floor each piece of equipment is located.

k. Control diagrams for each system/component will include:

1) One line diagram of the system with all instruments and devices.

2) A complete sequence of operations for the system.

3) A complete points list corresponding to the one line diagram indicating what type of point it is.

3.2 General Material and Equipment Requirements

A. Site storage: The contractor will not receive material on the site unless there is suitable space and ambient conditions to properly store the equipment. Storage will be per manufacturer's instructions.

B. **All equipment will have a manufacturers nameplate with name, address, model number, serial number and date installed securely attached to the equipment. Removable insulation will be provided over the nameplate if required.**

C. The contractor will take precautions at all times to properly protect the equipment/material from damage due to mechanical damage, weather, humidity, dust, corrosion etc.

3.3 Records for Owner

A. **The contractor shall maintain a set of drawings in the Field Office for the purpose of recording installed conditions. All inspections will be recorded in the drawings or in a separate log kept with the drawings that clearly identifies what was inspected and the date of the inspection.**

B. The contractor at the completion of the project will turn over to the Owner the following:

1. All warranties and guarantees from the equipment manufacturers.

2. One set of operating and maintenance manual for each system/equipment installed. Electronically or in print form. At a minimum this will include:

a. Handling, storage and installation instructions.

b. Detailed description of the function of each principle component or the system.

c. Piping and wiring diagrams.

d. Operating procedures:

1) Prestart up activities.

2) Startup.

3) Normal operation.

4) Emergency shutdown.

5) Normal shutdown.

6) Trouble shooting guide.

e. Maintenance:

1) Lubrication requirements including type of lubricant and intervals.

2) Preventative maintenance requirements.

3) Spare parts list with original manufacturers part numbers.

f. Control and alarm features:

1) Schematic of control systems

2) Operating set points list.

3) Alarm set points and shutdowns.

4) Operating curves for pumps, fans, chillers etc.

3. Approved wiring diagrams.

4. Shop drawings.

5. Repair part information for each piece of equipment including contact information of local supplier.

6. A full set of approved submittals in electronic pdf format.

7. **Document with the equipment tag number, size and vendor contact information for each filter in the project. All filters during construction will have a log associated with it**