

Professional Services M/E/P/F

21 00 00/22 00 00/23 00 00/26 00 00 Purpose

- A. The general purpose of each Facilities Standard is to provide minimal criteria for construction materials at University facilities regarding code compliance, warranty, approved products, execution and uniformity.
- B. Construction safety is the responsibility of the contractor in accordance with the regulations and codes of the agency having jurisdiction, and according to the guidelines adapted by OSHA.
- C. The Professional Services Mechanical Facilities Standard establishes a series of guidelines for specifying this particular item on Construction Projects at the University. This Facilities Standard is not to be regarded as a Specification.

21 00 00/22 00 00/23 00 00/26 00 00 General

- A. Design services work performed for the University shall be by an Engineer registered in the State of Alabama or, as a minimum, by an Engineer directly supervised by an Engineer registered in the State of Alabama. All drawings submitted to the University for construction shall be stamped with an Engineer's Seal. The Design Engineer is responsible for developing a set of plans and specifications for systems that meet the needs of the applicable program and that fit available space requirements. The designed systems shall be systems that can be maintained by UAB staff without the need for specialized tools or training and the designed systems shall not require excessive maintenance. At times when the Designer needs to deviate from UAB Standards due to space requirements, existing system interface requirements, etc., the Design Engineer should document the deviation and submit this documentation to UAB for approval. As required by contract, the Design Engineer is responsible and liable for re-design and re-work of systems that do not meet code or UAB Standards or for re-design and re-work of systems due to deficiencies in the plans and specifications.
- B. Contract Documents shall utilize electronic data format. Drawings shall be 100% compatible with AutoCAD DWG files. Specifications shall be 100% compatible with Microsoft Word DOCX files.
- C. The Design Engineer shall visit the project site to acquire information and to verify all field conditions. The Design Engineer shall not rely only on information provided by the Owner. The Design Engineer is responsible for accurately depicting new or existing systems and equipment on plans. The Design Engineer is responsible for acquiring existing plans, making field surveys, and taking field measurements in order that equipment, piping and duct

systems, and control devices are shown on plans in their correct locations and to the correct scale. In cases where inaccessibility to equipment or a piping or duct system is encountered then the Design Engineer shall utilize existing drawings and information provided by the Owner to best identify equipment type, control type and device locations and piping and duct sizes and routing.

- D. The Design Engineer shall, during the field survey, consider interferences when preparing renovation plans. The plans shall show pipe and duct routing around known existing interferences.
- E. The method and path for delivering equipment to an existing equipment room shall be a part of the Designer’s plan or specifications. The University must approve removal of existing louvers, doors or windows for the purpose of bringing equipment into an existing building.
- F. Refer to the UAB Facilities Standard “Utility Coordination Above Ceiling” 16001 for Utility Coordination above ceiling details required by the Architects and Engineers.

21 00 00/22 00 00/23 00 00/26 00 00 Deliverables

- A. The Design Engineer shall produce drawings and specifications that describe completely the scope of work, the specified systems and the materials involved. The specifications should only include work and material specific to the job. General specifications shall be edited to remove sections that are not applicable to the scope of the job. The UAB project number and project name shall be displayed on each drawing sheet.
- B. The Design Engineer shall forward copies of all submittals, at appropriate times, to UAB for review and approval.
- C. A complete list of Deliverables, specific to the project, shall be developed by the UAB Project Manager and Consultant. This List of Deliverables shall be made a part of the Consultant’s Proposal for a specific project.

21 00 00/22 00 00/23 00 00/26 00 00 Execution

- A. Specifications shall cover completely the design, installation and testing of all HVAC, Electrical, Piping, Plumbing and Fire Protection systems and equipment. A written specific scope of work shall be included in the specifications or plans that detail what is included or excluded in the project. Design conditions, type of areas, and applicable Codes and Standards for each area shall be stated in the specifications. System materials, methods of installation, equipment specifications, and approved manufacturers shall be described in the specifications.
- B. Plans and/or specifications shall include Work Instructions providing direction on

installation methods to be used and timing of installation relative to UAB operations. Additionally, the plans and/or specifications shall designate the Mechanical Contractor as being responsible for coordinating above ceiling issues when multiple disciplines are involved in a job.

C. Design Methods:

1. 23 00 00: HVAC calculations or design methods employed for determining heating and cooling loads, duct sizing, and pipe sizing shall be based on methods found in the ASHRAE Fundamentals book. Computer programs may be used to aid in designing systems. However, the computer program must use equations or methods approved by ASHRAE. Ventilation systems shall be designed in accordance with ASHRAE Standards and applicable code requirements. Ventilation systems for specialized areas such as labs, research areas, and animal areas shall be designed in accordance with accepted standards. Duct construction and installation specifications shall comply with SMACNA standards. System designs shall meet or exceed the energy utilization requirements of ASHRAE 90.1 and/or the International Energy Conservation Code edition as specified by the State of Alabama. The plans and/or specifications shall demonstrate compliance to ASHRAE 90.1 and/or the International Energy Conservation Code. Access requirements for equipment shall meet or exceed OSHA state and local code requirements. Piping systems shall be designed in accordance with ASME B31.9 Building Services Piping.
2. 26 00 00: Electrical systems shall be designed in accordance with the guidelines set forth by the National Electrical Code. Fire alarm systems shall be designed in accordance with the guidelines set forth by NFPA 72 Life Safety Code, NFPA 72 and all applicable additional NFPA codes. All specified new and modified power distribution systems shall include a short circuit study, arc flash hazard study, protective device evaluation study, and a protective device coordination study. Arc flash studies shall be performed in accordance with IEEE 1584 and NFPA 70E.
3. 22 00 00: Plumbing systems shall be designed in accordance with the guidelines set forth by the International Plumbing Code. Fuel Gas distribution piping and equipment shall be designed in accordance with the International Fuel Gas Code. Medical Gas and Vacuum Systems shall be designed in accordance with NFPA 99C. Storm and sewer water systems shall be coordinated with and shall meet the requirements of Jefferson County. Food service systems shall meet the Jefferson County Department of Public Health requirements. Swimming Pools shall be designed in accordance with the Rules and Regulations Governing the Design, Construction, and Operation of Public Swimming Pools and Spas, established by the Jefferson County Department of Health.
4. 21 00 00: Fire Protection systems shall be designed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems; NFPA 14,

Standard for the Installation of Standpipe and Hose Systems; and NFPA 20, Standard for the Installation of Centrifugal Fire Pumps. Fire Protection systems with a typical or unusual conditions shall be designed in accordance with an applicable NFPA Standard.

D. Plans:

1. A Cover Sheet shall be provided which satisfies the requirements stipulated by the City of Birmingham. Generally the requirements are as follows but the designer should verify what the city is requiring at the time the drawings are submitted for permit and include those items as a minimum in the drawings. The cover sheet shall include the project title, UAB project number, building street address, Design Engineer's firm name, address and phone number, a list of all applicable standards and codes used in the design, building code review data which includes the building occupancy type, building construction type and statement of whether the building is equipped with sprinklers, a location map indicating the building location by city streets which includes a North arrow, a location plan indicating the project location on a floor plan of the building, a brief project description which includes the project square footage, and a drawing index.
2. A Schedule Sheet or sheets shall be provided which includes all pertinent information for the equipment included in the design. All equipment used in the design shall be identified in an equipment schedule. Ventilation calculations, air handlers, chillers, cooling towers, fans, pumps, steam traps, heat exchangers, vav units, heaters, registers, and louvers are examples of typical HVAC equipment that is required to be included on the schedule sheet. A fixture schedule shall be included for plumbing drawings that include fixture manufacturer, model number, connection sizes, flow requirements and any power requirements as a minimum.
3. Plan Sheets must have an accurate background and shall properly identify the areas where demolition work or new work is to be performed. The limits of demolition work for mechanical, plumbing and fire protection systems shall be identified along with identifying items to be removed. When work is to be performed in phases the architectural and engineering plans shall clearly define the areas and systems affected by each phase of work. All tie-ins to existing utilities and systems shall be identified. Existing and new isolation valve locations shall be shown or identified on plans as an aid to the contractor. HVAC ductwork shall be drawn as double line and shall show all fittings, transitions and offsets. HVAC ceiling device locations shall be coordinated with the ceiling grid plan, lighting device locations, sprinkler head locations, etc. Duct systems shall be identified as to the type of system they are a part of (supply, return, outside air, general exhaust, bath exhaust, fume hood exhaust, etc.) and information shall be provided as to which air handler or fan the duct is associated with. Piping systems

shall be clearly identified as to system type and routing. All piping system valves, alarm panels, steam traps, etc. shall be shown. Piping risers shall be shown for drain, waste, vent, and water supply systems. Isometric drawings shall be shown for plumbing waste and vent piping. Isometric drawings shall be shown for plumbing gas piping. Single line drawings shall be shown for power systems. Fire protection system type and requirements shall be identified and device locations shall be coordinated with the ceiling grid plan and other ceiling devices. Mechanical rooms shall be drawn at a minimum ¼ scale with all equipment identified and drawn to scale and shown in its proper location. The required space around equipment needed for maintenance activities shall be identified on the plans.

4. A Detail Sheet or sheets shall be provided to show the contractor the necessary requirements for installing specified equipment in a manner that meets UAB standards and the designer's specifications. A coordination detail shall be provided which shows relative elevations for routing duct, hydronic piping, plumbing system piping, medical gas piping systems, conduit, etc.
5. A Control Sheet or sheets shall be provided for any system where the existing control system is modified or where a new control system is installed. The control drawings shall have a Control Points List or equipment diagram showing all control points. The control drawing shall have a written sequence of operation that completely describes how the control system will control the equipment. The control drawing shall specify acceptable manufacturers for supplying new control devices and shall specify the manufacturer and tie-in points of an existing control system, if any devices are to interface with an existing control system. Control drawings or specifications may specify control devices by model number or may specify control devices by performance requirements. Typical performance requirements for control devices include span, range, accuracy, output, input, materials, power requirement, mounting requirement, etc. Workstation hardware and software requirements shall be completely described in the specifications.

E.

DELIVERABLES CHECKLIST:

Project Name:

UAB Project No.:

Project Manager:

Date:

Req'd	Task	Comments
<input type="checkbox"/>	SCHEMATIC DESIGN	
<input type="checkbox"/>	Narrative-Initial	
	Code Analysis - Initial	
<input type="checkbox"/>	Estimate - Ballpark Construction Costs- Initial	
<input type="checkbox"/>	Plans-pdf Locate/Size Mechanical/Electrical/Fire Eqpt Rooms. Locate major equipment. Identify Hazard Type by Location. Riser Diagrams/Single Lines	
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>	DESIGN DEVELOPMENT (50%)	
<input type="checkbox"/>	Outline Specifications	
<input type="checkbox"/>	Narrative Updated	
<input type="checkbox"/>	Estimate-Ballpark Construction Costs-Updated	
<input type="checkbox"/>	Code Analysis-Updated	
<input type="checkbox"/>	Energy Code Analysis-Initial	
<input type="checkbox"/>	HVAC Cooling/Heating Loads Report-Initial	
<input type="checkbox"/>	HVAC Eqpt-Catalog Info/Specs	
<input type="checkbox"/>	Electrical Switchgear-Catalog Info/specs	
<input type="checkbox"/>	Lighting Fixture-Catalog Info/Specs	
<input type="checkbox"/>	Plumbing Fixture-Catalog Info/Specs	
<input type="checkbox"/>	Sprinkler Heads/Eqpt-Catalog Info/specs	
<input type="checkbox"/>	Sprinkler Flow Test Report	
<input type="checkbox"/>	Fire Alarm Devices-Catalog Info/Specs	
<input type="checkbox"/>	Plans-pdf Equipment located & drawn to scale. Riser Diagrams. Major Duct/Conduit/Fire Piping shown. Lighting & Fire Alarm devices shown. Equipment Schedule Sheets	
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>	DESIGN DEVELOPMENT (75%)	
<input type="checkbox"/>	Specifications	
<input type="checkbox"/>	Estimate Construction Costs - Initial	
<input type="checkbox"/>	Energy Model Data/Report-Initial	
<input type="checkbox"/>	Noise/Acoustics Data/Report-Initial	
<input type="checkbox"/>	Utility Coordination Info/Report	
<input type="checkbox"/>	Plans-pdf Equipment located & drawn to scale. Access Requirements for Major Eqpt Shown. Complete Duct/Elec. Circuits/Lighting Systems/Fire Piping & Devices Shown. Riser Diagrams Shown for All Systems. Equipment Schedule Sheets. Details Sheets Included.	
<input type="checkbox"/>	Schedule Construction Estimate - Initial	

Req'd	Task	Comments
<input type="checkbox"/>	CONSTRUCTION DOCUMENTS (90%)	
<input type="checkbox"/>	Specifications-PDF&Word Complete	
<input type="checkbox"/>	Estimate Construction Costs - Detailed/Itemized	
<input type="checkbox"/>	Noise/Acoustics Report-Complete	
<input type="checkbox"/>	Short Circuit study / Protective Devices Study-Complete	
<input type="checkbox"/>	Arc Flash Study Data/Report-Complete	
<input type="checkbox"/>	Energy Code Statement of Conformance	
<input type="checkbox"/>	Energy Model Data/Report-Complete	
<input type="checkbox"/>	Plans-pdf & AutoCad Complete	
<input type="checkbox"/>	Schedule Construction Estimate - Final	
<input type="checkbox"/>		
<input type="checkbox"/>	BID DOCUMENTS	
<input type="checkbox"/>	Specifications-PDF&Word Complete	
<input type="checkbox"/>	Plans-pdf & AutoCad Complete	
<input type="checkbox"/>	Addendum-pdf/Word/AutoCAD	
<input type="checkbox"/>	Plan Revisions-pdf&AutoCAD	
<input type="checkbox"/>	Specification Revisions-pdf&Word	
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<input type="checkbox"/>	CONSTRUCTION ADMINISTRATION	
<input type="checkbox"/>	Submittals-pdf	
<input type="checkbox"/>	RFI-pdf&Word	
<input type="checkbox"/>	Plan Revisions-pdf&AutoCAD	
<input type="checkbox"/>	Inspection Reports-pdf&Word	
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