
PART 1 - GENERAL

1.1 WORK OF THIS SECTION

- A. This section of the specifications details the components to be provided by the BMCS subcontractor relating to the following:
1. Coordination Drawings.
 2. Shop Drawings and Equipment Submittals.
 3. Record Documentation.

1.2 DOCUMENTATION - GENERAL

- A. The primary purpose of the shop drawing and equipment documentation submittals is to give instruction and information to those responsible for providing a turnkey BMCS which is compliant with the BMCS specifications in all respects. The Consultant shall review the shop drawings and equipment documentation submittals with the intent of identifying as many potential areas of non-compliance as possible, but the review of shop drawings and equipment documentation submittals by the Owner, Architect, Engineer and Consultant, shall not relieve the subcontractor of the responsibility for complete compliance with the specifications. Identification of some errors by the Owner, Architect, Engineer and Consultant but overlooking others does not relieve the subcontractor of his responsibilities nor does it allow him to proceed based on erroneous shop drawings and equipment documentation submittals.
- B. Approval of shop drawings or submittal data by the Architect, Engineer or Consultant shall not constitute an order to fabricate, purchase, ship to the site or undertake any other action. The sole responsibility for the timely purchase and/or fabrication of components, obtaining approval on shop drawings and equipment documentation submittals, and delivery of components to the project to comply with the requirements of the project schedule is that of the subcontractor.
- C. The intent of the record documentation is to provide the Owner with complete information on the BMCS provided. The record documentation shall be in such detail that a person familiar with installations of this nature shall be able to perform any operating, maintenance or engineering functions with respect to this BMCS without having to contact the BMCS subcontractor or obtain any additional documentation.
- D. Shop drawings and submittals shall comply with the requirements of the Construction Contract and Division 1 Specification Sections.

1.3 COORDINATION DRAWINGS

- A. Participate in the development of coordinated drawings with the Mechanical and Electrical Subcontractors. The Mechanical Subcontractor shall indicate all mechanical, plumbing and fire protection work on the drawings. The Mechanical subcontractor shall then add the electrical and fire detection, alarm and communication system work to the drawings. The BMCS subcontractor shall indicate the required BMCS work on the drawings. Assist and cooperate with the other trades to ensure a complete and coordinated set of drawings has been generated.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS AND EQUIPMENT SUBMITTALS

- A. Prepare all shop drawings, diagrams, equipment and device schedules, equipment technical data sheets and software information necessary to ensure compliance with the Specifications.
- B. The following information shall be included on the cover page for each shop drawing and equipment documentation submittal:
1. Project name.
 2. Date.
 3. Submittal number and re-submittal number, as appropriate.
 4. Name and address of BMCS and MEP Consultant.
 5. Name and address of General Contractor.
 6. Name and address of BMCS subcontractor.
 7. Reference to the applicable Specification Section by name and number.
 8. Stamped and signed coordination certification stamp.
- C. Equipment submittals shall include design, performance and installation details for all aspects of the system to be installed. Equipment submittals shall be submitted as a complete package for the entire project subdivided individually on a section-by-section basis. All literature pertaining to a particular item, piece of equipment or installation shall be specifically prepared for this project. General sales information brochures shall not be acceptable. Each equipment documentation submittal shall be properly marked with service or function. Any options available that are not to be provided shall be crossed out and options that will be provided shall be highlighted. At minimum, the equipment documentation submittals shall include:
1. Compliance Review in accordance with the BMCS General Requirements section of these specifications for the relevant section of the specifications. Any submission without a compliance review shall not be reviewed and be stamped as RESUBMIT by the Consultant.
 2. Equipment technical data sheets with mounting and installation details.
 3. Details of networks/communications equipment and protocols proposed.
 4. Warning notice sample.
 5. Details of piping and/or tubing proposed.
 6. Schedule of cabling including details of proposed cable types for each type of application for the entire BMCS installation.
 7. Conduit and fittings specification sheets.
 8. Operator interface software specifications.
 9. Testing/commissioning verification sheets formats.
- D. Shop drawings shall be CAD generated, minimum page size of 11 x 17 inches. Drawings shall include diagrams, mounting instructions, installation details and software descriptions for all aspects of the system to be installed. At minimum, the shop drawings shall include:
1. BMCS overall architecture schematic indicating MLAN, FLAN, NDS, OIW, CCP, DCP, UC and software interfaces.
 2. Proposed graphics.
 3. CCP, DCP, UC and other panel layouts, including floor plan location and interconnection drawings.
 4. Field instrumentation and panel locations on floor plan drawings.
 5. Details of each system monitored and controlled including, at minimum, the following:
 - a. Schematic of systems indicating instrumentation locations.
 - b. Installation drawings and schedules for all devices.
 - c. Composite wiring diagrams of all motor starter terminal strips, damper terminal strips, and interfaces to other equipment indicating all wiring by

- all subcontractors on the terminal strips.
 - d. Details of sequence or operation and other appropriate control algorithms written in plain English language.
 - e. Panel enclosure layouts.
 - 6. Installation details for all components and devices.
 - 7. Damper and actuator schedules.
 - 8. Valve and actuator schedules.
- E. Provide composite wiring diagrams for equipment where there is a joint responsibility for the wiring by other Divisions. Composite wiring diagrams shall meet the following requirements:
 - 1. Provide composite wiring diagrams for, at minimum, the following:
 - a. Motor starters.
 - b. Automatic dampers.
 - c. Fire/smoke dampers.
 - d. Local equipment control panels.
 - 2. The Mechanical and Electrical contractors shall furnish the standard wiring and interlock diagrams from the equipment shop drawings to the BMCS subcontractor for those items of equipment where there is a joint responsibility for the wiring. The standard diagrams furnished to the BMCS subcontractor shall indicate those terminals which have been provided for the use of the BMCS subcontractor.
 - 3. The BMCS subcontractor shall create a composite wiring diagram indicating those connections required for the control and/or monitoring of the motors, dampers, etc. The completed diagram shall include all line and low voltage wiring between temperature control items, motor start/stop and/or HOA stations, control relays, pumps, controllers, switches, differential pressure switches, actuators, fire alarm system, etc.
 - 4. The intent is that a single composite drawing shall be available for each item of equipment indicating the wiring in its entirety including safety interlocks. Any omission or errors noticed by the subcontractor shall be brought to the attention of the relevant consultant.
 - 5. Identify each conductor termination by a termination number or symbol. In addition, each conductor termination shall be suitably indexed to identify the termination location of the other end of the wire.
 - 6. All internal wiring of panels (in detail) shall be included in the composite wiring diagram. For items such as motor starters, all jumpers added or removed shall be clearly indicated as being "added" or "removed".
 - 7. The composite wiring diagrams shall include descriptions of the hardwired interlock sequences. The description shall include complete identification of each item shown and each item's exact operation and shall be related to the interlock sequence.
 - 8. The BMCS subcontractor shall complete his work on the diagrams and shall return them to the Mechanical and Electrical subcontractors who shall verify that the wiring added to the drawings is correct. If necessary, corrections shall be made by the BMCS subcontractor. This process shall be completed prior to the commencement of work.
 - 9. The composite wiring diagrams shall be included within the shop drawing submittals.
- F. Inadequate or incomplete Shop Drawings, Equipment Submittal and/or Samples will not be reviewed by the Architect and/or the Consultant and will be returned to the Contractor for re-submittal.
- G. Comply with the requirements of the specifications. Deviations from the specifications

will not be permitted. Submittals not in accordance with the specification requirements shall be rejected. Before equipment, devices and materials are installed the submittal shall have been reviewed and marked FINAL REVIEW. Submittals containing errors and/or omissions shall not relieve the subcontractor from the requirements to comply with the complete requirements of the Contract Documents. Corrections or modifications to the work because of errors and/or omissions shall be at the Subcontractors expense.

- H. Each submittal shall be reviewed, stamped and certified by the contractor and subcontractor prior to submission to the Consultant. The certification shall state:

CONTRACTOR/SUBCONTRACTOR CERTIFICATION (CCA)	
The Subcontractor and the Contractor named below hereby certify that this Shop Drawing, Equipment Submittal and/or Sample has been checked prior to submittal and that it complies in all respects with the requirements of the Contract Documents and physical space limitations for this Project.	
The person signing on behalf of the Subcontractor and the Contractor certifies that he/she is duly authorized to sign binding agreements for and in behalf of the Subcontractor and the Contractor.	
_____ (Printed Name of the Subcontractor)	
Signed: _____	(Authorized Employee)
_____ (Printed Name of Authorized Employee)	
Position: _____	
Date: _____	
_____ (Printed Name of the Contractor)	
Signed: _____	(Authorized Employee)
_____ (Printed Name of Authorized Employee)	
Position: _____	
Date: _____	

- I. Submit eight copies of each submittal and shop drawing. The Architect and Consultant shall each retain one printed copy of the reviewed shop drawings and equipment documentation submittals.
- J. Submittal and shop drawing data will be reviewed and returned marked "FINAL REVIEW", "FINAL REVIEW - EXCEPTIONS NOTED" or "RESUBMIT".
1. If marked "FINAL REVIEW" no additional submittal shall be required.
 2. If marked "FINAL REVIEW - EXCEPTIONS NOTED", the subcontractor shall forward a written response to the items noted within two weeks of the Consultant's review date on the submittal. Upon receipt of a satisfactory response, the status of the submittal will be revised to "FINAL REVIEW" by a written document to the subcontractor prepared by the Consultant. If the response is not received by the Consultant within two weeks of the Consultant's

- review date on the submittal, the "FINAL REVIEW – EXCEPTIONS NOTED" status will be automatically rescinded and shall be required to be resubmitted for review.
3. If marked "RESUBMIT", the submittal shall be corrected in accordance with the Contract Documents and resubmitted in whole for review within two weeks of the original submission date. If the submittal is returned to the Contractor marked "RESUBMIT" only one additional submission will be permitted.
- K. If the submittal or shop drawing data marked "FINAL REVIEW" is altered for any reason after they have been marked, the "FINAL REVIEW" will automatically be voided.
- L. All Work shall be done in accordance with submittal and shop drawings stamped "FINAL REVIEW" insofar as these are in agreement with the Contract Documents. Where differences occur between the Equipment Submittal and Contract Documents, the Contract Documents shall govern the Work.
- M. If more than two reviews are required for any shop drawing or equipment documentation submittal, the subcontractor shall reimburse the Owner for any additional fees and expenses that the Architect, Engineer or Consultant require to perform the additional reviews.

2.2 RECORD DOCUMENTATION

- A. Submit a list of all record documentation that will be provided. At minimum, the record documentation shall include all submittals made at the shop drawing stage up-dated to reflect the actual installation and the manuals outlined below.
- B. Submit two copies of the draft version of the record documentation to the Owner and Consultant for review and compliance.
- C. Submit final copies of the record documentation to the Owner and Consultant prior to final acceptance testing. Following the acceptance testing and, if necessary, the subsequent rechecking of deficiencies, the BMCS subcontractor shall re-submit the record documentation incorporating all changes resulting from the acceptance testing and any other changes requested by the Consultant as a result of the Consultant's review of the draft version of the record documentation. The Certificate of Substantial Completion shall not be granted until the final approved record documentation has been received.
- D. Update all documentation to indicate any changes made during the Warranty Period.
- E. Provide record documentation in manuals as indicated below:
1. Operators' Manuals - 4 copies each and PDF copy on OIW.
 2. Hardware Manuals - 4 copies each and PDF copy on OIW.
 3. Record shop drawings and one soft copy of CAD files on digital medium acceptable to the Owner.
 4. Test/checkout component and system verification forms – 4 copies.
- Manuals shall be placed in hardcover binders with index page and indexing tabs.
- F. Provide Operators' Manuals with, at minimum, the following information:
1. Details of all features and functions available to the Operators.
 2. Details of all alarm, diagnostic, error and other messages. Detail the Operator action to be taken for each instance.
 3. Detail special programs provided and provide a complete programming

- instruction manual. Provide detailed operation of all software applications.
4. Detailed list of the database for all installed devices.
 5. Details of all data base management functions and features.
 6. All details and descriptions shall be in a step-by-step format such that an Operator/ Manager would be able to undertake the respective actions solely on the basis of information provided in the manuals and drawings.
- G. Provide hardware manuals, which shall include, at minimum, the following:
1. Specifications, maintenance requirements and installation requirements for all hardware components.
 2. Record drawings and schedules of the completed installation including location of devices, mounting details, and cabling details.
 3. Operating sequences and interlocks.
 4. Names and addresses of spare parts suppliers.
- H. Record drawings shall be produced in CAD and shall include, at minimum, the following:
1. Details required by the shop drawings.
 2. Final locations and point ID for each monitored and controlled device.
- I. Provide cabling diagrams at each field panel enclosure showing all wiring terminations, relays, interlocks, power supplies, etc. Cabling diagrams shall be laminated and affixed to the interior of the panel door or within a permanently affixed protective sleeve on the inside of the panel door.

END OF SECTION