PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. The requirements of the General Conditions, Supplementary Conditions and all Division 26 specification sections apply to the Work of this Division.

1.2 SUMMARY

A. Division 26 of the Specifications requires the furnishing and installing of all items, including every article, device or accessory (whether or not specifically called for by item) reasonably necessary to facilitate each system's functioning as indicated by the design and the equipment specified. Elements of the Work include, but are not limited to, materials, labor, supervision, supplies, equipment, transportation, hoisting/rigging, storage, utilities and all required permits and licenses.

B. Definitions:
1. For purposes of these Specifications the following definitions apply:
   a. "Engineer" - the Engineer of record.
   b. "provide" - to "furnish" and "install".
   c. "install" - to join; unite; fasten; link; attach; set up or otherwise connect together; complete, tested and ready for normal satisfactory operation.
   d. "furnish" - to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.
   e. "as directed" - as directed by the Architect or the Engineer.
   f. "concealed" - embedded in masonry or other construction, installed behind wall furring or within double partitions or installed within hung ceilings.
   g. "submit" - submit to the Architect and/or the Engineer for review.
   h. "AutoCAD" - AutoCAD 2007 or later compatible format.
   i. "Mechanical"- all work, systems, or equipment associated with Division 21 – Fire Suppression, Division 22 – Plumbing, or Division 23 – HVAC.

C. Abbreviations:
1. For purposes of these Specifications the following abbreviations apply:
   a. AABC - American Association of Balancing Contractors
   b. ABMA - American Boilers Manufacturers Association
   c. ADA - Americans with Disabilities Act
   d. ADC - Air Diffusion Council
   e. AGA - American Gas Association
   f. AISC - American Institute of Steel Construction
   g. AMCA - Air Movement and Control Association
   h. ANSI - American National Standards Institute
   i. ARI - Air Conditioning and Refrigeration Institute
   j. ASA - Acoustical Society of America
   k. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
   l. ASME - American Society of Mechanical Engineers
   m. ASPE - American Society of Plumbing Engineers
   n. ASTM - American Society for Testing and Materials
   o. AWS - American Welding Society
   p. AWWA - American Water Works Association
   q. BMCS - Building Management and Control System
   r. CEC – California Electrical Code
   s. CDA - Copper Development Association
   t. CISPI - Cast Iron Soil Pipe Institute
   u. CTI - Cooling Tower Institute
   v. EPA - Environmental Protection Agency
   w. ETL - Electric Testing Laboratory
   x. FDAC - Fire Detection, Alarm and Communication
   y. FM - Factory Mutual
   z. FS - Federal Specification (General Services Administration)
   aa. IEEE - Institute of Electrical and Electronic Engineers

bb. IRI - Industrial Risk Insurers
cc. MCAA - Mechanical Contractors Association of America
dd. MIL - Military Standardization Documents
ee. MSDS - Materials Safety Data Sheet
ff. MSS - Manufacturers' Standardization Society Standards
gg. NEBB - National Environmental Balancing Bureau
hh. NEC - National Electrical Code (NFPA 70)
ii. NEMA - National Electrical Manufacturers Association
jj. NFPA - National Fire Protection Association
kk. NUSIG - National Uniform Seismic Installation Guidelines
ll. OSHA - Occupational Safety Health Administration
mm. PDI - Plumbing and Drainage Institute
nn. SAE - Society of Automotive Engineers
oo. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
pp. TEMA - Tubular Exchangers Manufacturers Association
qq. UL - Underwriters Laboratories
rr. UPS - Uninterruptible Power System

1.3 REFERENCE STANDARDS

A. All rules and regulations of the Fire Insurance Regulatory Body, City of San Francisco, Underwriters Laboratories, IRI, ETL and the National Electrical Code, shall be complied with whether indicated in the Drawings and Specifications or not.

B. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

1.4 SUBMITTALS

A. The following submittal data shall be furnished according to the General Conditions and this Section of the Division 26 Specifications and shall include, but not be limited to:
1. Coordination Drawings.
2. Composite Wiring Diagrams.
3. Schedule of Completion and Testing of Systems.
4. Schedule of Owner Instruction and Training.
5. Project Record Documents.
6. Operating and Maintenance Books.
7. Firestop Materials including all UL assembly installation details for all applications.

B. All items or equipment listed with asterisks (*) shall be certified by the manufacturer using Manufacturer Certification "MCA" as set forth in Section 26 00 10. See Section 26 00 10 for certification requirements.

1.5 WARRANTY

A. Comply with the requirements of the General Conditions and Section 26 00 10.

1.6 COMPLETE PERFORMANCE OF WORK

A. Work shall be executed in strict accordance with the best practice of the trades in thorough, substantial, workmanlike manner by competent skilled technicians and trade personnel.

B. The Electrical Subcontractor shall provide a competent, experienced, full time Superintendent who is authorized to make decisions on behalf of the Electrical Subcontractor.

C. All labor, materials, apparatus and appliances essential to the complete and proper functioning of the system described and/or indicated herein or which may be reasonably implied as essential, whether mentioned in the Drawings and Specifications or not, shall be furnished and installed by the Subcontractor.

D. The Subcontractor shall coordinate the Work specified herein and shown on the Drawings with all other trades.

1.7 PRECONSTRUCTION CONFERENCE PRIOR TO START OF WORK

A. Prior to commencing any Work, the Contractor together with designated major Subcontractors shall confer with the Architect and Engineer concerning the Work under the Construction Contract.

B. The pre-construction conference will be conducted under the leadership of the Contractor and will occur soon after the Contractor notifies the Subcontractors of contract award. The pre-construction conference will focus on items such as the expedited submittal review procedure, interface and coordination between Subcontractor work scope, the Contractor's project site rules and requirements, temporary utility requirements, Contractor's construction schedule, etc.

1.8 DRAWINGS

A. The Drawings show the general layout of the various items of equipment. However, layout of equipment, accessories, specialties, ductbanks and conduit systems are diagrammatic unless specifically dimensioned and do not necessarily indicate every required fitting, support or similar items required for a complete installation. Consult the Architectural Drawings and details for exact locations of fixtures and equipment. Where same is not definitively located, obtain the information from the Architect before proceeding. Any reasonable changes in locations indicated shall be made by the Subcontractor without additional cost to the Owner, if such changes are ordered prior to performance of the affected Work.

B. The Subcontractor shall follow the Drawings in laying out the Work and check Drawings of all trades to verify spaces in which Work will be installed. Maintain maximum headroom and where space conditions appear inadequate, the Architect shall be notified before proceeding with the installation.

C. Equipment shown on the Drawings with particular manufacturers identified has been coordinated for structural penetrations, electrical connection, operating and service (maintenance) requirements and physical size with regard to the space where the equipment is shown. If they comply with the Specifications, these and the other specified manufacturers of this equipment will be acceptable contingent on the Subcontractor providing a complete installation and maintaining full responsibility to provide at no additional cost, any modifications to the Architectural, Structural, HVAC, Plumbing, Fire Suppression, FDAC, or Electrical systems that are required to properly install, operate and service the equipment being used. These modifications shall not include additional area for equipment unless approved by the Architect.
   1. The Subcontractor shall note these changes on the equipment submittals and the Compliance Reviews and shall show all differences in equipment being supplied from that specified and shown on the Drawings. Failure of the Subcontractor to provide this information with the submittal will indicate the submitted equipment meets or exceeds the requirements of equipment shown on the Drawings in performance and is physically no larger in housing size.
      a. Failure of the Subcontractor to comply with the above and any discrepancies found shall result in the Subcontractor providing equipment equal to that specified at the Subcontractor's expense.

1.9 SUBMITAL PROCEDURES - SHOP DRAWINGS, PRODUCT DATA, SAMPLES, TEST PROCEDURES, TEST REPORTS, AND CERTIFICATIONS

A. In accordance with the Subcontractor Scheduling Procedures in Section 26 00 20 titled "Scope of Work", the Subcontractor shall submit to the Engineer for review a complete, typed list of all equipment manufacturers and suppliers for the equipment intended to be furnished and installed on this Project.

B. The Subcontractor shall prepare a Log of all Division 26 submittals for the Project. The Log shall include a submittal identification number, an item description and a cross-reference to the Specification Section or Drawing number and an item description. The submittal identification number shall be fixed by the applicable Specification Section (e.g. 26 24 16 Panelboards). Each submittal shall bear the submittal identification number in addition to the other data specified. All consultants, the Owner and all Subcontractors will utilize the assigned submittal identification number. This Log will be used to track the status of all Division 26 submittals, will include information regarding date of submission and review, and will be reviewed and updated continually at construction meetings. Refer to Section 26 00 20 titled "Scope of Work" Paragraph 3.02 "Subcontractor Scheduling Procedures" for additional information.

C. Upon receipt of the approved manufacturers and material suppliers list (paragraph 1.09A), the Subcontractor shall immediately obtain complete Shop Drawings, Product Data, Samples, and Certifications from the manufacturers, suppliers, vendors and all Subcontractors, for all materials and equipment as specified herein in various sections of the Specifications and shall submit data and details of such materials and equipment for review by the Architect and Engineer.

D. The Subcontractor shall check all materials and equipment upon their arrival on the Project Site and verify their condition and compliance with the Contract Documents. Any Work that proceeds prior to receiving "Final Review" Shop Drawings shall be modified as required to comply with the Contract Documents and the "Final Review" Shop Drawings. A minimum period of ten (10) Working days, exclusive of transmittal time, will be required in the Engineer's office each time a Shop Drawing, Product Data, Sample, Test Procedure, Test Report, and/or Certification is submitted or resubmitted for review. This time period shall be considered by the Subcontractor when scheduling his Work.

E. The review of Shop Drawings, Product Data, Samples, Test Procedures, Test Reports, and Certifications by the Architect and Engineer shall not relieve the Subcontractor of the responsibility for dimensions or errors that may be contained therein or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Subcontractor permission to proceed in error. Regardless of any information contained in the Shop Drawings, Product Data, Samples, Test Procedures, Test Reports, and Certifications, the Contract Documents shall govern the Work and are neither waived nor superseded in any way by the review of Shop Drawings, Product Data and Samples.

F. Before submitting Shop Drawings, Product Data, and Samples, the Subcontractor shall certify that data and details set forth on each Shop Drawing, Product Data, or Sample for each item of equipment and materials complies with the Contract Documents for this Project. Such certification shall be made by a person duly authorized to sign binding agreements for the Contractor and Subcontractor. Unless certified as set forth hereinafter, Shop Drawings, Product Data and Samples will not be reviewed and will be returned unchecked to the Contractor for resubmittal.
The Subcontractor and Contractor certification shall be similar to the following:

CONTRACTOR/SUBCONTRACTOR CERTIFICATION
"CCA"

The Subcontractor and the Contractor named below hereby certify that this Shop Drawing, Product Data 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: _____

G. Prior to submission, Shop Drawings, Product Data and Samples for all items of equipment as specified herein in various sections of the Specifications and denoted with an asterisk (*) shall be certified by the manufacturer as to performance and compliance with the Contract Documents using the manufacturer certification form as set forth hereinafter. Such certification shall be made by a person duly authorized to sign binding agreements for the manufacturer. Unless certified as set forth hereinafter, Shop Drawings, Product Data and/or Samples will not be reviewed and will be returned unchecked to the Contractor for resubmittal.
The manufacturer certification shall be similar to the following:

MANUFACTURER'S CERTIFICATE
"MCA"

The manufacturer named below hereby certifies that the equipment shown on this Shop Drawing, Product Data and/or Sample complies in all respects with the requirements of the Project Specifications for this equipment. The manufacturer further certifies that all data shown hereon as to performance, dimensions, construction, materials and other pertinent items is true and correct. The person signing on behalf of the manufacturer certifies that he/she is duly authorized to sign binding agreements for and in behalf of the manufacturer.

_____
(Printed Name of the Manufacturer)

Signed: _____
(Authorized Employee)

_____
(Printed Name of Authorized Employee)

Position: _____

Date: _____

H. Inadequate or incomplete Shop Drawings, Product Data, Samples, Test Procedures, Test Reports, and/or Certifications will not be reviewed by the Architect and/or the Engineer and shall be returned to the Contractor for resubmittal.

I. The Subcontractor shall observe the following procedures when submitting Shop Drawings, Product Data, Samples, Test Procedures, Test Reports, and Certifications:
   1. Each Shop Drawing shall indicate in the lower right hand corner and each Product Data, Sample, Test Procedure, Test Report, and Certification submittal shall indicate on the front cover the following: the submittal identification number; title of the sheet or brochure; name and location of the Project; names of the Architect and Engineer, Contractor, Subcontractor, manufacturer, supplier, vendor; the date of submittal and the date of each correction and revision. All pages and Drawings in Product Data, Sample, Test Procedure, Test Report, and Certification submittals shall be numbered consecutively from beginning to end. So far as is practical, each Shop Drawing, Product Data, Sample, Test Procedure, Test Report, and/or Certification submittal shall bear a cross-reference note to the page number or numbers of the sheet of the Drawings and/or Specifications showing the Work. Unless the above information is included, the submittal will be returned for resubmittal.
   2. Shop Drawings shall be done in an easily legible scale and shall contain sufficient plans, elevations, sections and schematics to clearly describe the Work. Drawings shall be prepared by a drafter or CAD technician skilled in this type of Work. All bus duct layouts and similar Shop Drawings shall be drawn to at least 1/8" = 1'-0" scale. The Subcontractor shall submit Shop Drawings as described below. Shop Drawings, which do not comply with these requirements, will be returned for resubmittal.
      a. The submittal shall consist of five (5) hard copies of each Shop Drawing. The Architect and Engineer will each review the Shop Drawings. After review, the Shop Drawings will be processed as described herein.
      b. If the Shop Drawing(s) is marked "FINAL REVIEW" by the Engineer, the following action shall be taken:
         1) The Owner, Architect and Engineer will each retain one (1) copy of the processed Shop Drawing.
         2) Two (2) copies of the processed Shop Drawing will be returned to the Contractor.

3) No additional submittal is required for the “FINAL REVIEW” Shop Drawing.

c. If the Shop Drawing(s) is marked “FINAL REVIEW - EXCEPTIONS NOTED”, the following action shall be taken:
   1) The Owner, Architect and Engineer will each retain one (1) copy of the processed Shop Drawing including all comments, mark-ups, and stamps.
   2) Two (2) copies from the processed Shop Drawing including all comments, mark-ups, and stamps will be returned to the Contractor.
   3) The Subcontractor shall forward a written response to the items noted within fourteen (14) days of the Engineer's review date stamped on the Shop Drawing. Upon receipt of a satisfactory response, the status of the submittal will be revised to “FINAL REVIEW” by a written document to the Contractor prepared by the Engineer. If the response is not received by the Engineer within fourteen (14) days of the Engineer's review date stamped on the submittal, the “FINAL REVIEW” status will be rescinded and the submittal will be given a “RESUBMIT” status.

d. If the Shop Drawing(s) is marked “RESUBMIT”, the following action shall be taken:
   1) The Owner, Architect and Engineer will each retain one (1) copy of the processed Shop Drawing including all comments, mark-ups, and stamps.
   2) Two (2) copies of the processed Shop Drawings including all comments, mark-ups, and stamps will be returned to the Contractor.
   3) The submittal shall be corrected in accordance with Contract Documents and resubmitted in whole for review. Note: The returned submitted Shop Drawing stamped “RESUBMIT” may not be resubmitted.
   4) If the submittal is returned to the Contractor marked “RESUBMIT”, only one (1) additional submittal will be permitted without the Subcontractor incurring charges for the additional resubmittals. The Owner shall be reimbursed by the Subcontractor for any expense in connection with any necessary submission in addition to the two (2) submissions set forth hereinbefore.
   5) Subsequent submittals of any Shop Drawing previously marked “RESUBMIT” shall have all corrections or other revisions clearly identified.

e. If the copy stamped “FINAL REVIEW” is altered for any reason after it has been stamped, the “FINAL REVIEW” shall automatically be voided.

f. All Work shall be done in accordance with Shop Drawings stamped “FINAL REVIEW” insofar as these are in agreement with the Contract Documents. The “FINAL REVIEW” Shop Drawings shall be used in conjunction with the preparation of the Coordination Drawings specified hereinafter. Wherever differences occur between the Shop Drawings and the Contract Documents, the Contract Documents shall govern the Work.

3. Product Data shall include published manufacturer data and shall contain complete and detailed engineering and dimensional information. The Subcontractor shall submit Product Data as described below. Product Data, which does not comply with these requirements, will be returned for resubmittal.

   a. Product Data submittals shall contain only information relevant to the particular equipment or materials to be furnished. The Subcontractor shall not submit catalog information which describes several different items in addition to those items to be furnished and installed on this Project unless all irrelevant information is marked out or relevant information is clearly marked. Product Data from different manufacturers shall be identified and submitted separately. Where applicable, equipment Product Data shall include wiring and interlock diagrams using standard wiring diagrams with all terminals, which have been provided for use by the Division 21, 22, 23, 25, 26 and/or Division 28 Subcontractors, clearly indicated.

   b. Product Data will be returned marked “FINAL REVIEW”, “FINAL REVIEW - EXCEPTIONS NOTED” or “RESUBMIT”.
      1) If marked “FINAL REVIEW” no additional submittal will be required.
      2) If marked “FINAL REVIEW - EXCEPTIONS NOTED” the Subcontractor shall forward a written response to the items noted within fourteen (14) days of the Engineer's review date stamped 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 Contractor prepared by the Engineer. If the response is not received by the Engineer within fourteen (14) days of the Engineer's review date stamped on the submittal, the “FINAL REVIEW” status will be rescinded by a written document to the Contractor prepared by the Engineer and the submittal will be given a “RESUBMIT” status.
      3) If marked “RESUBMIT”, the submittal shall be corrected in accordance with the Contract Documents and resubmitted in whole for review. The resubmittal shall be complete and shall

include a cover letter summarizing the corrections made in response to the review comments and the submittal page numbers which were revised.

4) If the submittal is returned to the Contractor marked “RESUBMIT”, only one (1) additional submission will be permitted. The Owner shall be reimbursed by the Subcontractor for any expense in connection with any necessary submission in addition to the two (2) submissions set forth herein.

c. If the Product Data submittal stamped “FINAL REVIEW” is altered for any reason after it has been stamped, the “FINAL REVIEW” will automatically be voided.

d. All Work shall be done in accordance with Product Data stamped “FINAL REVIEW” insofar as these are in agreement with the Contract Documents. Where differences occur between the Product Data and Contract Documents, the Contract Documents shall govern the Work.

e. The Subcontractor shall submit [nine (9)] copies of each Product Data brochure. The Architect and Engineer will each retain one (1) copy of the submittal and the remaining copies will be returned to the Contractor. If the Product Data is marked “FINAL REVIEW” or “FINAL REVIEW - EXCEPTIONS NOTED” the Owner will retain one (1) copy of the submittal in addition to those retained by the Architect and Engineer and the remaining copies will be returned to the Contractor.

4. Samples shall be submitted as described below for all equipment and material where required within the various specification sections. Samples which do not comply with these requirements will be returned for resubmittal.

a. Samples shall match in all respects the equipment or material to be furnished.

b. After review by the Architect and Engineer, notification will be provided to the Subcontractor as to the status of the Sample submission:

1) If marked “FINAL REVIEW” no additional Sample will be required.

2) If marked “FINAL REVIEW – EXCEPTIONS NOTED”, the Subcontractor shall forward a written response to the items noted within fourteen (14) days of the Engineer's review date stamped on the Sample. Upon receipt of a satisfactory response, the status of the Sample will be revised to “FINAL REVIEW” by a written document to the Contractor prepared by the Engineer. If the response is not received by the Engineer within fourteen (14) days of the Engineer's review date stamped on the Sample, the “FINAL REVIEW” status will be rescinded by a written document to the Contractor prepared by the Engineer and the Sample will be given a “RESUBMIT” status.

3) If marked “RESUBMIT”, the Sample shall be corrected in accordance with the Contract Documents and resubmitted in whole for review. The resubmittal shall be complete and shall include a cover letter summarizing the corrections made in response to the review comments.

4) If the Sample is returned to the Contractor marked “RESUBMIT”, only one (1) additional submission will be permitted. The Owner shall be reimbursed by the Subcontractor for any expense in connection with any necessary submission in addition to the two (2) submissions set forth herein.

c. All Work shall be done in accordance with Samples stamped “FINAL REVIEW” insofar as these are in agreement with the Contract Documents. Where differences occur between the Samples and Contract Documents, the Contract Documents shall govern the Work.

5. Certifications shall be submitted as described below for all equipment, material, personnel, and/or Work where required within the various specification sections. Certifications which do not comply with these requirements will be returned for resubmittal.

a. Certifications shall include all specific information, personnel qualifications, reports, procedures, samples, and referenced standards documentation as required by the particular equipment on material specification section.

b. After review by the Architect and Engineer, notification will be provided to the Subcontractor as to the status of the Certification submission:

1) If marked “FINAL REVIEW” no additional Certification submittal will be required.

2) If marked “FINAL REVIEW – EXCEPTIONS NOTED”, the Subcontractor shall forward a written response to the items noted within fourteen (14) days of the Engineer's review date stamped on the Certification. Upon receipt of a satisfactory response, the status of the Certification will be revised to “FINAL REVIEW” by a written document to the Contractor prepared by the Engineer. If the response is not received by the Engineer within fourteen (14) days of the Engineer's review date stamped on the Certification, the “FINAL REVIEW” status will be rescinded by a written document to the Contractor prepared by the Engineer and the Certification will be given a “RESUBMIT” status.

3) If marked “RESUBMIT”, the Certification shall be corrected in accordance with the Contract Documents and resubmitted in whole for review. The resubmittal shall be complete and shall include a cover letter summarizing the corrections made in response to the review comments.

4) If the Certification submitted is returned to the Contractor marked “RESUBMIT”, only one (1) additional submission will be permitted. The Owner shall be reimbursed by the Subcontractor for any expense in connection with any necessary submission in addition to the two (2) submissions set forth herein.

c. All Work shall be done in accordance with Certifications stamped “FINAL REVIEW” insofar as these are in agreement with the Contract Documents. Where differences occur between the Certifications and Contract Documents, the Contract Documents shall govern the Work.

6. Test Procedures and Test Reports shall be submitted as described below for all equipment systems and material where required within the various specification sections. Test Procedures and Test Reports which do not comply with these requirements will be returned for resubmittal.
   a. Test Procedures shall include details of the testing to be performed including recording forms, test equipment, applicable test standards, and testing personnel qualifications as required by the particular equipment or material specification section.
   b. Test Reports shall include the date and time of the testing and verification, a description of the test performed, and the final test values, in addition to the required information described by the particular equipment or material specification section.
   c. After review by the Architect and Engineer, notification will be provided to the Subcontractor as to the status of the Test Procedure and Test Report submission:
      1) If marked “FINAL REVIEW” no additional Test Procedure or Test Report submittal will be required.
      2) If marked “FINAL REVIEW – EXCEPTIONS NOTED”, the Subcontractor shall forward a written response to the items noted within fourteen (14) days of the Engineer's review date stamped on the Test Procedure and Test Report. Upon receipt of a satisfactory response, the status of the Test Procedure and Test Report will be revised to “FINAL REVIEW” by a written document to the Contractor prepared by the Engineer. If the response is not received by the Engineer within fourteen (14) days of the Engineer's review date stamped on the Test Procedure and Test Report, the “FINAL REVIEW” status will be rescinded by a written document to the Contractor prepared by the Engineer and the Test Procedure and Test Report will be given a “RESUBMIT” status.
      3) If marked “RESUBMIT”, the Test Procedure and Test Report shall be corrected in accordance with the Contract Documents and resubmitted in whole for review. The resubmittal shall be complete and shall include a cover letter summarizing the corrections made in response to the review comments.
      4) If the Test Procedure or Test Report is returned to the Contractor marked “RESUBMIT”, only one (1) additional submission will be permitted. The Owner shall be reimbursed by the Subcontractor for any expense in connection with any necessary submission in addition to the two (2) submissions set forth herein.
   d. All Work shall be done in accordance with Test Procedures and Test Reports stamped “FINAL REVIEW” insofar as these are in agreement with the Contract Documents. Where differences occur between the Test Procedures and Test Reports and Contract Documents, the Contract Documents shall govern the Work.

1.10 MANUFACTURER’S RECOMMENDATIONS

A. With exceptions as specified and/or indicated on the Drawings or in the Specifications, the Subcontractor shall apply, install, connect, erect, use, clean, commission and condition manufactured articles, materials and equipment in accordance with manufacturer's current printed instructions and recommendations. Copies of such printed recommendations shall be kept at the Project site and made available as required.

B. Where the manufacturer's recommendations conflict with the Contract Documents, the conflict shall be brought to the Engineer's attention immediately.

1.11 SPACE LIMITATIONS

A. In the preparation of the Drawings, reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access and proper fit rests with the Subcontractor (see paragraph 1.12). The Contractor and all Subcontractors shall be responsible to contact local authorities having jurisdiction to determine local interpretations of applicable codes and code access and to fully comply with local requirements. Adequate

space shall be allowed by the Subcontractor for clearance in accordance with Code requirements and the requirements of the local authorities having jurisdiction and the equipment manufacturer's recommendations.

B. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

C. The Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cables, cable tray, air terminal equipment, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping, cable tray, air terminal equipment, or cable is found to be in conflict with the architecture, structure or other trade Work, which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping, cable tray, air terminal equipment, or cable shall be relocated without additional cost to the Owner.

D. No conduit, equipment, busway, etc., shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

1.12 CONTRACTOR'S COORDINATION DRAWINGS

A. The Contractor shall coordinate the efforts of all trades and shall furnish (in writing with copies to the Architect and the Owner) any information necessary to permit the Work of all trades to be installed satisfactorily and with the least possible interference or delay.

B. The Contractor and all Subcontractors shall prepare a complete set of construction coordination drawings (“Coordination Drawings”) indicating the equipment actually purchased and the exact routing and elevations for all lines such as piping, busway, conduit, ductwork, etc., including conduit embedded in concrete and openings, sleeves, etc. required in the structure, walls, partitions, etc. The Coordination Drawings shall be submitted complete for review to the Architect, Engineer and Owner in accordance with the Subcontractor Scheduling Procedures in Section 26 00 20 titled “Scope of Work”.

C. The Subcontractor shall submit a Log of each Coordination Drawing detailing the area of the Work included and a timeline for submission and approval. This Log shall be a part of the Shop Drawing, Product Data, Sample, Test Procedure, Test Report, and Certification Log required in accordance with the Subcontractor Scheduling Procedures in Section 26 00 20 titled “Scope of Work”. The Coordination Drawing preparation and completion shall comply with the requirements of the Schedule.

D. Prior to commencing the Work, the Subcontractor shall obtain from the Architect or Engineer a set of AutoCAD Architectural and Engineering Drawings on compact disks, to be used to produce the Coordination Drawings. The Subcontractor shall give to the Architect and Engineer a written release acceptable to the Architect and Engineer signed by a corporate officer of the Subcontractor, prior to receipt of the compact disks.

E. The sheet metal drawings, prepared on electronic media at a scale not less than 1/8" = 1'-0", shall serve as the base Drawings to which all other Subcontractors will overlay and add their Work. The HVAC Subcontractor shall be designated as the lead contractor in the development of the composite layering process and shall be responsible for electronically restacking the various trade layers into the final composite drawings. Each trade shall draw their Work on separate layers represented by individual colors.

F. Each Coordination Drawing shall be completed and signed off by the other Subcontractors and the Contractor prior to the installation of the Work in the area covered by the specific Coordination Drawing. The Subcontractor's Work shall be installed in accordance with the Shop Drawings and the Coordination Drawings and shall include the required maintenance access space and the code clearance space. If the Contractor allows one trade to install their Work before coordinating with the Work of other trades, the Contractor shall make necessary changes to correct the condition without extra cost to the Owner.

G. The Coordination Drawings shall indicate piping, conduit, busway and equipment support points and loads exceeding 1,000 lb. imposed on the building structure and shall be submitted to the Architect for review and approval. The elevation, location, support points, static, dynamic and expansion forces and loads imposed on the structure at support and anchor points and the size of all lines shall be indicated. All beam

penetrations, slab penetrations and sleeves shall be indicated, sized and shall be coordinated with all other Work. All required code clearance space and required maintenance access space shall be indicated and coordinated with all other Work. All Work routed underground or embedded in concrete shall be indicated by dimension to column and building lines and shall be coordinated. All conduit larger than 1" trade size shall be indicated.

H. This requirement for Coordination Drawings shall not be construed as authorization for the Contractor or Subcontractor to make any unauthorized changes to the Drawings. All space allocations shown on the Drawings shall be maintained, such as ceiling height, eight (8) inch high zone directly above the ceiling reserved for tenant build out and flexibility, chase walls, equipment room size, etc. unless prior written authorization is received from the Architect to change them.

I. Prior to final acceptance of the Work of this Division, the Contractor shall give the Drawing files in AutoCAD on CD-RW Recordable Rewrite Compact Discs, containing the Contractor's coordination documentation, to the Owner.

1.13 COMPOSITE WIRING DIAGRAMS

A. The Division 26 Subcontractor shall furnish the standard wiring and interlock diagrams from the equipment Shop Drawings to the Division 25 and Division 28 FDAC Subcontractors in accordance with the Subcontractor Scheduling Procedures in Section 26 00 20 titled "Scope of Work" for those items of equipment where there is joint responsibility for the wiring. Such items shall include the motor starters, inverter speed drives, motor operated dampers, water chilling units, electric heating coils, cooling towers, pumping systems, etc. The standard wiring diagrams furnished to the Division 25 and Division 28 FDAC Subcontractors shall indicate those terminals, which have been provided for the use of the Division 25 and Division 28 FDAC Subcontractors. Refer to the Contract Drawings for additional information. One (1) diagram shall be provided for each item. Drawings shall be suitable for insertion in a three-ring binder.

B. The Division 25 and Division 28 FDAC Subcontractors shall add to these Drawings, those connections to be made for the control and/or monitoring of the motors, dampers, fire alarm system and other items of equipment. The completed composite wiring diagram ("Composite Wiring Diagram") shall include all line and low voltage wiring between temperature control items, motor start stop and/or H-O-A stations, control relays, pumps, controllers, switches, differential pressure switches, actuators, fire alarm system, etc.

C. The intent of this requirement is that a single Composite Wiring Diagram shall be available for each item of equipment indicating the wiring in its entirety including interlocks. Any omissions or errors noticed by the Subcontractor shall be brought to the attention of the Architect and the relevant consultants immediately.

D. Each conductor termination shall be suitably identified 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.

E. All internal wiring of panels (in detail) shall be included in the Composite Wiring Diagrams. For such items as motor starters, etc., all jumpers added or removed shall be clearly indicated as being "added" or "removed".

F. The Composite Wiring Diagrams shall include description of the interlock sequence of operation. The description shall include complete identification of each item shown (relay, motor controller, etc.) and each item's exact operation shall be related to the interlock sequence.

G. The Division 25 and Division 28 FDAC Subcontractors shall complete its Work on the Composite Wiring Diagrams and shall return them within two (2) months of receiving them to the Division 21, 22, 23, and 26 Subcontractors who shall verify that the wiring added to the Drawings is correct. If necessary, corrections shall be made by the Division 25 and Division 28 FDAC Subcontractors.

H. The Division 26 Subcontractor shall coordinate the requirements of the Division 25 and Division 28 FDAC Subcontractors for all electrical equipment as to the need for terminal strips, etc.

1.14 EQUIPMENT AND SYSTEM SOFTWARE INTERFACES TO THE BMCS

A. The Division 26 Subcontractor shall coordinate with the Division 25 BMCS Subcontractor to determine all monitoring and control points that are required to be mapped from the Division 26 equipment and systems to the BMCS. The Division 26 Subcontractor shall provide details of the method of integration and the information to be transferred between the systems as part of the equipment or systems submittal package.

B. The Division 26 Subcontractor shall provide the necessary software communication ports specifically for the interfacing of the systems to the BMCS.

C. If the Division 26 Subcontractor cannot document that the exact same interface has been successfully performed between the selected BMCS and the equipment and/or system, then the interfaces shall be tested prior to installations at an offsite location. The equipment shall not be installed at the project location until all software interfaces to the BMCS have been successfully demonstrated or documented.

D. Documentation regarding the software interfaces shall be provided in sufficient detail as to enable a person reasonably skilled in the writing of real time software applications to add/delete points mapped from one system to the other. The documentation shall include a detailed description of each protocol used and the model, version, and firmware details of any protocol converter (gateway) that is used.

E. Refer to 25 00 30 for coordination and testing requirements.

1.15 SLEEVES, CUTTING, PATCHING AND FIRESTOP

A. The Subcontractor shall be responsible for the timely placing of sleeves as detailed on the Drawings and the Coordination Drawings for all conduit passing through walls, partitions, beams, floors and roofs as noted below, while the same are under construction:
   1. All concrete or masonry construction.
   2. Wall construction where the penetration must be sealed air tight. Patches for penetrations through drywall for Work installed prior to finish application shall be provided by others.
   3. Fire rated wall construction.
   4. Where indicated on the Drawings.
      a. A conduit sleeve shall be at least one (1) size larger than the size of conduit including the insulation where applicable, it serves except where “Link Seal” casing seals are used in sleeves through walls below grade. Sleeves shall be sized such that the annular space between the sleeve and the conduit will not be less than 1/2" or more than 1" unless otherwise required by the firestop system. All conduit passing through concrete or masonry walls above grade shall have at least 18 gauge galvanized steel sleeves. Sleeves shall be set flush with finished wall. All sleeves in floors shall extend a minimum of two inches above the finished floor. Sleeves installed in fire rated construction shall be of suitable length and diameter to accommodate the fire safing system used. Sleeves set in concrete floor construction shall be at least 16 gauge galvanized steel. Where the conduit passes through a sleeve, no point of the conduit shall touch the sleeve and the conduit shall be centered in the sleeve.

B. Seal all busway, conduit, conductor, cable or cable tray penetrations of fire rated construction with factory built devices or with manufactured fill, void or cavity materials “Classified” by Underwriters Laboratories, Inc. for use as a Through Penetration Firestop. All firestop devices and systems shall be approved for such use by the authorities having jurisdiction. The firestop system used shall maintain the fire resistance rating of the building component that is penetrated. Firestop systems and devices shall comply with ASTM E-814 (UL 1479), NEC 300-21, and NEC 800-52(b) for all types of penetrations being sealed. Submittal data for fire-stop systems shall include the UL System Numbers listed in the UL Building Materials Directory under which the material was tested in accordance with ASTM E 814 (UL 1479) for use in a “Through Penetration Firestop System”. The firestop system or device used shall not require derating the ampacity of electrical conductors or busway. Excessive shrinkage of the firestop materials, which would permit the transmission of smoke or water prior to exposure to a fire condition, is unacceptable. Where a mastic is used to seal the surface of the firestop, the mastic shall be nonhardening. The firestop system used shall accommodate expansion and contraction of the electrical raceway systems and busways without damaging the firestop or reducing its effectiveness as a smoke barrier or water seal. The firestop manufacturer's representatives shall instruct the Subcontractor's representatives in the proper installation procedure so that the penetrations on the Project will be installed in accordance with the UL listing and the manufacturer's recommendations. If

it complies with these Specifications, firestop sealing component/system as manufactured by one of the following manufacturers will be acceptable:

1. Tremco Fire Resistive Joint System using Dymeric sealant and Cerablanket-FS mineral filler.
2. Specified Technologies, Inc. Spec Seal Systems.
3. 3M Fire Barrier Penetration Sealing Systems.
4. GE Pensil Firestop Sealant by General Electric.
5. International Protective Coatings Corp. Flame Safe Systems.
6. Thermal Ceramics FireMaster Firestop Fire Protection Systems.
7. Hilti FS - 601 Systems

C. Except as may be required by any utility company, sleeves penetrating walls below grade shall be standard weight black steel pipe with 1/4" thick steel plate water seal secured to the conduit with continuous fillet weld. The water seal plate shall be located in the middle of the wall and shall be two (2) inches wider all around than the sleeve it encircles. The entire assembly shall be hot dipped galvanized after fabrication. Seal off annular openings between conduit and sleeve with a through wall type casing seal similar to “Link Seal” as manufactured by Thunderline Corporation, Innerlynx, or OZ Gedney. The conduit sleeve shall be sized to accommodate the Thunderline casing seal. Casing seals shall be Series 300 for conduit sizes 3/4" through 4" and Series 400 for conduit 5" and larger.

D. If holes and/or sleeves are not properly installed and cutting and patching becomes necessary, it shall be done at no additional expense to the Owner. The Subcontractor shall undertake no cutting or patching without first securing the Architect's written approval.

E. All unused sleeves shall be sealed with firestop devices and systems to maintain the fire rating of the construction penetrated.

1.16 MISCELLANEOUS STRUCTURAL SUPPORT MEMBERS

A. Where bus duct, conduit, cable tray, etc. are routed vertically through shafts, the Subcontractor shall furnish and install all necessary miscellaneous structural members to support the loads imposed by the risers.

B. Where equipment (transformers, busducts, conduit racks, etc.) is supported from structural slabs, the Subcontractor shall provide all miscellaneous structural members to support the loads plus a 250lb. live load.

C. The Subcontractor shall submit Shop Drawings of the riser and/or equipment support system to the Project Structural Engineer for approval, including details of how the riser and/or equipment support structure is to be attached to the building structure.

D. The Subcontractor shall provide all miscellaneous support members required to support horizontal conduit and cable tray.

E. Miscellaneous structural support members installed in central plants, mechanical rooms and where exposed to public view shall be galvanized.

1.17 ESCUTCHEONS

A. Furnish and install heavy chrome plated or nickel plated escutcheons of approved pattern on all conduit passing through walls and ceilings in finished areas. Escutcheons shall be B&C No. 10 or approved equal chrome plated or nickel plated steel plates with concealed hinges. Unless finished areas are specifically indicated on the Drawings, they are areas that are normally accessible to either the Tenant or the public.

1.18 EXCAVATION AND BACKFILL

A. The Subcontractor shall make all necessary excavations, cutting of paving, concrete, etc. removal of unusable spoil material, do all backfilling with stabilized fill and do temporary patch type paving repairs necessary for the proper execution of the Work. Remove all dirt and debris out of and away from the building as directed. Backfill shall be mechanically compacted to a density of ninety-five (95%) percent of

the maximum dry density at optimum moisture content as determined by the Standard Proctor Compaction Test.

B. Backfill shall be compacted and repairs to paving or concrete shall be accomplished to the satisfaction of the Architect and the local authorities having jurisdiction.

C. See the various sections of the Specifications for additional excavation and backfill requirements.

1.19 PAINTING

A. Painting, except as specified herein or indicated otherwise, shall be done under another Division. The Subcontractor shall cooperate with the other Division Subcontractors to determine size of equipment, sizes and lengths of conduit, etc., to be painted.

B. Equipment furnished under this Division shall be factory finished. If the factory finish is damaged during shipment, storage, installation, etc., it shall be repainted by the Subcontractor subject to the Engineer's approval. Touchup painting is acceptable only for minor finish damage.

1.20 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new and in good condition. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the Work.

B. Materials and equipment, which are found to have factory defects, shall be replaced or repaired in a manner acceptable to the Owner and Engineer at no additional cost to the Owner. The Subcontractor shall be responsible for all costs associated with testing, replacement or repair, including but not limited to, all replacement or repair costs, preparations prior to testing, all testing costs, extended warranties, recommissioning of the equipment, etc.

C. The Subcontractor shall take the steps necessary to ensure that all materials and equipment can be delivered and installed in sections sufficiently small to fit within construction openings in the building and that the weight and size of all equipment pieces do not exceed the capacity of the construction hoisting and/or elevator system.

1.21 DELIVERY, DRAYAGE AND HAULING

A. Include all drayage, hauling, hoisting, shoring and placement in the building of equipment and materials specified herein. The Subcontractor shall be responsible for the timely delivery and introduction of equipment to the Project as required by the Schedule. If any item of equipment is received prior to the time required, the Subcontractor shall be responsible for its proper storage and protection until such time as it may be required. The Subcontractor shall pay all costs of demurrage or storage in a bonded warehouse.

B. If any item of equipment is not delivered to or installed at the Project site in a timely manner as required by the Schedule, the Subcontractor shall be solely responsible for disassembly, reassembly, manufacturer's supervision, shoring, general construction modifications, delays, overtime costs, etc. No additional costs or delays shall be incurred by the Owner.

1.22 EQUIPMENT AND MATERIAL PROTECTION

A. The Subcontractor shall protect the Work, equipment and material of all other trades from damage by its Work or its personnel and shall correct all damage thus caused without additional costs to the Owner.

B. The Subcontractor shall be responsible for all Work, materials and equipment until finally inspected, tested and accepted. The Subcontractor shall protect its Work against theft, injury or damage and carefully store material and equipment received on the Project Site, which is not immediately installed. The Subcontractor shall close open ends of Work with temporary covers or plugs acceptable to the Engineer and/or Owner during the construction period to prevent entry of dust, dirt and obstructing material. The Subcontractor shall

cover and protect, in an acceptable manner to the Engineer and/or Owner, all his equipment and materials from damage due to water, spray on fireproofing, construction debris, etc.

1.23 IDENTIFICATION OF CIRCUITS AND EQUIPMENT

A. Electrical equipment shall be identified by means of nameplates permanently attached to the equipment. Nameplates shall be black surface, white core laminated bakelite with engraved letters. Plates shall be a minimum of 3" long by 1" wide with engraved white letters 1/4" high. Provide nameplates for the following equipment:
   1. Switchgear and Switchboards;
   2. Transformers;
   3. Panelboards and distribution panelboards;
   4. Individual motor controllers;
   5. Busplugs;
   6. Contactors and relay control panels;
   7. Automatic transfer switches;
   8. Engine/generator set;
   9. Electrical cabinets and enclosures;
   10. Disconnect switches;
   11. Enclosed circuit breakers;
   12. Push button stations;
   13. Remote control switches;
   14. Battery racks or cabinets.
   15. Tenant metering (multi-metering) cabinets;
   16. Lighting relay cabinets and dimming racks.

B. Cardholders and directory cards shall be provided for circuit identification in panel boards. Cardholder shall be located and permanently attached on the inside of panel door and shall be plastic frame with clear plastic front. Directory cards shall be typewritten. Circuit descriptions shall include specific floor and unit designations as indicated on floor plans and schedules for all equipment served.

C. Circuits and pull wires in empty conduits shall have tags attached to wiring at points where runs are interrupted at junction boxes or terminated in panels, boxes, etc. Feeder or branch circuit numbers shall be indicated. Tags shall be made of pressure sensitive tape or embossed self-attached ribbon.

D. Nameplates and tag symbols shall correspond to the identification on the Drawings, the Project Record Documents.

1.24 EQUIPMENT PADS AND MOUNTING

A. Concrete pads for various pieces of equipment will be furnished by the Contractor under another Division and as follows:
   1. Pads shall be provided in main equipment rooms. This shall include floor mounted equipment and equipment mounted on legs and/or support stands. Equipment pads shall generally conform to the shape of the piece of equipment it serves with a minimum 3" margin around the equipment and supports. Pads shall be a minimum of 3-1/2" high, with all external corners bullnosed to a tooled radius. Shop Drawings stamped “Final Review” shall be used for dimensional guidance in sizing pads, anchor bolts, locations, etc.
   2. Concrete waterproof curbs shall be provided around all vertical bus floor penetrations. These curbs shall be a 4" high and shall be poured as part of the floor slab. Coordinate exact dimensions of slab penetration and curb with the bus duct manufacturer.

B. Furnish and install galvanized anchor bolts for all equipment placed on concrete equipment pads, inertia blocks or on concrete slabs. Bolts shall be the size and number recommended by the manufacturer of the equipment and as required for seismic restraint. Anchor bolts shall be located by means of suitable templates. When equipment is placed on vibration isolators, the equipment shall be secured to the isolator and the isolator secured to the floor, pad or supported as recommended by the vibration isolation manufacturer.

C. Equipment pads for switchboards shall have level mounting channels embedded in the concrete as specified in Section 26 24 13 titled “Switchboards – 600 Volts”.

D. Where equipment is mounted on gypsum board partitions, the mounting screws shall pass through the gypsum board and be securely attached to the partition studs or framework. At the Subcontractor's option, the mounting screws may pass through the gypsum board and be securely attached to 6" square, 18 gauge galvanized metal backplates, which are attached to the gypsum board with an approved nonflammable adhesive. Toggle bolts installed in gypsum board partitions will not be acceptable.

1.25 EQUIPMENT NOISE AND VIBRATION

A. It is the intention to specify and for the Subcontractor to provide equipment and systems that shall be quiet and free of apparent noise and vibration while in operation.

B. It is intended that vibration shall not be apparent to the senses in occupied areas of the building. To this end, both the balancing of rotating machinery and the installation of vibration isolation at various locations are required.

C. It shall be the responsibility of the Subcontractor to obtain equipment that is quiet in operation as compared to the other available equipment of its size, capacity, type and to install equipment so that a minimum amount of noise and/or vibration is transmitted to the building.

D. Any additional precautions deemed necessary to provide a quiet installation shall be done as part of the Work of this Division, subject to review by the Engineer and Architect and without additional cost to the Owner. After the system is in operation, it shall be the responsibility of the Subcontractor to make any changes to equipment or Work installed that may be required to provide a system which complies with the acoustic requirements as specified herein.

E. Except in various special areas listed herein, the system noise level, in the tenant occupied spaces, shall be equal to or less than the “lowest value in the range” of the room criteria curves for the particular space in accordance with Table 2 in Chapter 42 of the 1991 edition of Applications Edition of the ASHRAE Guide and Data Book. The room criteria curves shall be based on ANSI Standard S1.6-1984 (R-1990) octave bands and a sound pressure level in decibels referenced to 0.002 microbars. Sound levels within the occupied spaces must meet the design goals specified in the Division 23 Section entitled “Design Conditions” and the criteria described above and with all building, wall partition, floor and ceiling construction in place as they exist for the individual spaces. The attenuation through boundary construction of equipment rooms must be considered in selecting equipment for acceptable noise level as described herein-.

F. The system noise level in the tenant occupied space shall be equal to or less than NC 40 unless otherwise specified herein. This shall include all areas occupied by the Tenant, including areas adjacent to the electric closets. See Section 26 22 13 titled “Low-Voltage Dry-Type Distribution Transformers”, Section 26 22 14 titled “Harmonic Mitigating Transformers (HMT)”, and Section 26 51 13 titled “Lighting Fixtures and Lamps”.

1.26 DATE OF COMPLETION AND TESTING OF ELECTRICAL SYSTEMS

A. The date for the final performance acceptance testing shall comply with the Schedule and shall be sufficiently in advance of the Time(s) of Completion to permit the execution of the testing by the Subcontractor prior to occupancy and the close out of the Construction Contract. Any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper and satisfactory functioning of all equipment and systems shall be completed prior to the close out of the Construction Contract. Retests shall not relieve the Subcontractor of completion date responsibility. See Section 26 08 13 titled “Testing” and the individual Specification sections for the extent of testing required.

B. The Contractor shall provide in the Schedule dates when each system is to be completed and outlining when tests will be performed.

1.27 OWNER OPERATING INSTRUCTIONS AND OWNER TRAINING

A. The Subcontractor shall provide the services of factory trained specialists to supervise the commissioning, startup and initial operation of the respective equipment specified herein. The Subcontractor shall, in addition to startup services, provide factory trained specialists to instruct the Owner's operators during a five (5) day operating instruction period at or near the Project Site. The operating instruction and training period shall be defined as straight time working hours and shall not include nights, weekends or travel time to and/or from the Project. See individual Sections for additional instructions by manufacturer's trained specialists.

B. The Owner shall be notified in writing at least two (2) weeks before each operator instruction and training period begins. The Subcontractor shall commence no instruction period until the Owner has issued his written acceptance of the starting time and schedules.

C. Submit a detailed schedule of all proposed training and instruction sessions to the Architect and Engineer for review no later than six (6) months prior to Substantial Completion. The schedule shall be coordinated with and adjusted to accommodate the Owner training and instructions for all Division 21, 22, 23, 25, 26, and 25 Work and the Owner’s personnel.

1.28 OPERATION AND MAINTENANCE MANUALS

A. The Subcontractor shall provide operating instructions and maintenance data books for all equipment and materials furnished under this Division.

B. Deliver two (2) initial copies of the operation and maintenance data manuals in accordance with the Subcontractor Scheduling Procedures in Section 26 00 20 titled “Scope of Work” to the Owner and Engineer for review. The initial copies shall include all information in Subparagraph 1.28.E below, except Item 1.28.E.4.

C. Submit four (4) final copies of operation and maintenance manuals to the Owner and Engineer. Assemble all data in a completely indexed volume or volumes in three-ring binders and identify the size, model and features indicated for each item. The binders shall have the Project name and logo printed on the outside of the binders. Resubmittals of these final four (4) copies of the “Final Review” operation and maintenance books shall include the “Final Review” submittals and shall be delivered to the Owner upon Substantial Completion of the Project.

D. Operation and maintenance manuals shall include complete cleaning and servicing data compiled in clearly and easily understandable form. Data shall show serial numbers and model numbers of each piece of equipment, complete lists of replacement parts, motor ratings and actual loads.

E. Include the following information where applicable:
1. Identifying name and mark number.
2. Locations of major equipment (when several similar items are used, provide a list).
3. Complete nameplate data.
4. “Final Review” Submittals.
5. Parts lists.
6. Performance curves and data.
7. Wiring diagrams.
8. Lubrication charts.
9. Factory Test Reports.
10. Field Test Reports.
11. Certifications.
12. Manufacturer’s recommended operation and maintenance instructions with all nonapplicable information deleted.
13. List of spare parts recommended for normal service requirements.
14. Assembly and disassembly instructions with exploded view Drawings where available.
15. Trouble shooting diagnostic instructions where available.

1.29 PROJECT RECORD DOCUMENTS

A. The Subcontractor shall maintain on a daily basis at the Project Site a complete set of Project Record Documents. The Project Record Documents shall consist of continuously updated AutoCAD files of the Coordination Drawings for this Division. The AutoCAD files shall be electronically updated by the Subcontractor's technician during the construction period to show the precise location of all buried or concealed Work and equipment, including embedded conduit and junction boxes and all changes and deviations in the Electrical Work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Subcontractor to make changes in the layout or Work without definite instructions from the Architect or Engineer. Prior to commencing Work, the Subcontractor shall obtain from the Architect or Engineer a set of AutoCAD Drawings on compact disks to be used only to produce the Coordination Drawings. The continuously updated Coordination Drawings shall be used to produce the final Project Record Documents, which shall be delivered to the Owner in AutoCAD on CD-RW Recordable Rewrite Compact Discs upon Final Completion of the Project. The Subcontractor shall give to the Architect and Engineer a written release acceptable to the Architect and Engineer signed by a corporate officer of the Subcontractor prior to receipt of the Architect's and Engineer's compact disks.

B. Record dimensions shall clearly and accurately delineate the Work as installed; locations shall be suitably identified by at least two (2) dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all Project Record Documents on the front lower right hand corner with a rubber stamp impression or an AutoCAD image that states the following:

PROJECT RECORD DOCUMENT
(3/8" high letters)

To be used for recording Field Deviations and Dimensional Data Only
(5/16" high letters)

D. Upon completion of the Work, the Contractor and the respective Subcontractors shall certify all Project Record Documents on the front lower right hand corner adjacent to the above marking with a rubber stamp impression or an AutoCAD image that states the following:

PROJECT RECORD DOCUMENT
CERTIFIED CORRECT
(3/8" high letters)

(Printed Name of the Contractor)
(5/16" high letters)
Date: _____

(Printed Name of the Subontractor)
(5/16" high letters)
Date: _____

E. Prior to final acceptance of the Work of this Division, the Subcontractor shall submit properly certified Project Record Documents to the Architect and Engineer for review and shall make changes, corrections or additions as the Architect and/or Engineer may require to the Project Record Documents. After the Architect's and Engineer's review and any required Subcontractor revisions, the Project Record Documents shall be delivered to the Owner on CD-RW Recordable Rewrite Compact Disks in AutoCAD.

1.30 CERTIFICATION

A. Any certifications required by the Specifications, in addition to those required for Shop Drawings, Product Data, equipment and other items, shall be so certified by the owner, a partner or a corporate officer of the firm required to provide the certification or by another person duly authorized to sign binding agreements for and in behalf of the owner, partner or corporation of the firm required to provide the certification.

1.31 FINAL REVIEW

A. At a time designated, the entire system shall be reviewed for compliance with the Drawings and Specifications. The Subcontractor shall be available at all times during this Final Review.

B. The Subcontractor shall demonstrate prior to the Final Review that all systems and all equipment have been properly balanced and adjusted and are in compliance with the requirements of the Contract Documents. After these demonstration tests are completed satisfactorily, but prior to the Final Review field visit by the Engineer, the Subcontractor shall submit to the Architect and Engineer the completed Project QC Checksheets with copies of all test reports and a written certification that 1) Attests to Contract Document compliance for this Project prior to the Engineer's Final Review field visit and 2) Certifies that the equipment and materials installed in this Project under this Division 26 contain no asbestos or PCB.

C. The entire system shall be operating properly with all systems balanced and all controls adjusted. All shipping labels shall be removed and all switchgear, panel boards, switches, equipment, etc. shall be clean and in operating condition.

D. Certificates and Documents required herein shall be in order and presented to the Architect and Engineer at least two (2) weeks prior to Final Review.

E. The removal of panel covers, junction box covers, etc., for visual observation of the wire, busbars, etc. will not be required at the time of the Final Review if prior interim review of panel interiors, junction box wiring, etc. during the construction phase is acceptable to the Engineer.

F. Each item in the the Project Quality Control Checksheets shall be reviewed with the Engineer for the Engineers acceptance during Final Review.

G. After the Final Review, any changes or corrections noted as necessary for the Work to comply with the Specifications and Drawings shall be accomplished without delay in order to secure final acceptance of the Work.

1.32 WARRANTY PERIOD

A. The warranty period shall be no less than two (2) full years, unless specified otherwise hereinafter.

B. During the warranty period, the Subcontractor shall guarantee the following in a form satisfactory to the Owner:
   1. All Work installed will be free from any and all defects in Workmanship and/or materials.
   2. All apparatus will develop capacities and performance characteristics specified.
   3. The systems shall operate without malfunction.

C. The Subcontractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such Work done and charge all costs to the Subcontractor.

D. The start of the Subcontractor's warranty period, as defined in the General Conditions, shall commence on the issue of a “Certificate of Substantial Completion”, by the Owner or the Owner's Representative for each item of material, equipment or system.

E. The Subcontractor shall confer with the Contractor prior to the bid date concerning the Schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to “Substantial Completion”. All required extended warranty costs for equipment, materials and systems shall be included in the Subcontractor’s proposal and clearly designated with a breakout price.

1.33 EARLY OCCUPANCY

A. The Contractor and Subcontractors are responsible for completing those systems, which are necessary to allow partial occupancy of the Project even if systems in the unoccupied areas are incomplete. Refer to the

General Conditions and the Schedule for this Project for the completion dates assigned to the various portions of the Project.

B. Requirements for temporary occupancy shall be verified by the Contractor with the authorities having jurisdiction.

1.34 PROHIBITED LABELS AND IDENTIFICATIONS

A. Prohibited Markings: In all public areas, tenant areas and similar locations exposed to view within the Project, the inclusion or installation of any item, element or assembly, which bears on any exposed surface any name, trademark or other insignia, which is intended to identify the manufacturer, the vendor or other source(s) from which such object has been obtained, is prohibited. Also prohibited is the inclusion or installation of any article, which bears visible evidence that an insignia, name, label or other device has been removed.
Exception: Required labels for Underwriters Laboratories, ETL, FM or any other required testing agency shall not be removed nor shall identification specifically required under the various technical sections of the Specifications be removed.

PART 2 PRODUCTS

2.1 GENERAL

A. Refer to specific Specification sections for equipment requirements.

PART 3 EXECUTION

3.1 GENERAL

A. Installation shall be in accordance with the Specification Section pertaining to the individual equipment.

END OF SECTION