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## **ADDENDUM 1**

07-14-22

### **ADDENDUM 1** **TO THE DRAWINGS AND SPECIFICATIONS FOR:**

#### **RIVER VALLEY LOCAL SCHOOL DISTRICT BOARD OF EDUCATION** **CORRIDOR LINK ADDITION**

197 Brocklesby Rd.  
Caledonia, OH 43314

#### **TO ALL BIDDERS:**

This Addendum revises and/or supplements the original Plans and Specifications and any previously issued addenda and shall be considered in preparing proposals and shall become a part of the Contract Documents. This Addendum must be noted as received and considered on all bid submittals.

All Contractors are cautioned to review all drawings and spec sections and not just their specific trade sections, since their specific trade work may be shown on any drawing or spec section.

#### **ITEM 1 SPECIFICATIONS:**

##### **1.01 Divisions 15 & 16 specifications:**

1. Add the specifications sections attachment to the bidding documents. .

##### **1.02 Section 07411 - Metal Roofing Panels specifications:**

1. Add the following substitution for Section 07411 - Metal Roofing Panels: Dimensional Metals, Inc, (DMI) 58 Klema Drive North, Reynoldsburg, OH; Span-Lock SL20 structural panel with the following provisions: This substitution is acceptable provided that all specifications of the specified product(s) are met or exceeded. Note that the manufacturer is responsible for engineered, detailed submittals as indicated in the specifications, 1.7, Action Submittals and per the Metal Roofing Notes indicated on drawing sheet 4.
2. Add snow guards to the project scope of work. Guards to be installed continuous at approximately 24" up-the-slope at all eaves. Guards to be "bar-type installed with approved metal standing seam rib fastener clips. Product to be the S-5, Color Guard system mechanically attached with S-5 clips. Refer to catalog information provided in the attached submittal.

#### **ITEM 2 MISCELLANEOUS**

- 2.01 Pre-bid Meeting: Attached is the sign-in sheet from the Meeting. No other information was discussed additional to the project documents at the meeting.

<b>Pages Included in this Addendum:</b>	Add01 .....	01 page
	Attachments:	
	Item 1.01 .....	72 pages.
	Item 1.02 .....	10 pages.
	Item 2.01 .....	01 page

**End of Addendum 1**

Mark D Lecky  
Principal Architect

## **MECHANICAL SPECIFICATIONS**

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## **SECTION 15010 - MECHANICAL GENERAL REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Furnish all materials, labor, tools, and equipment to complete and leave ready for operation all HVAC, Plumbing, and Fire Protection systems as called for in these Specifications or shown on the Drawings and any and all details essential to complete the work.
- B. Include any minor items of work necessary to provide complete and fully operative mechanical system connections.
- C. By submitting a bid, the Contractor certifies that:
  - 1. The Contractor has visited the site and is satisfied that he understands all site conditions that may have an effect on his bid price, with the sole exception of those items, which he specifically is taking exception to in writing in his Bid.
  - 2. The Contractor fully understands the make-up, construction, and operation of all systems and equipment he is bidding on and that he has included in his price all materials, supplies, accessories, and services necessary to make these systems complete and operational, whether such materials, supplies, and services are explicitly shown on the Drawings or included in these specifications, or only implied by the clear intent of these Documents for the Contractor to provide a complete and fully operational system as part of the scope of work undertaken by this Contractor.

#### **1.02 WORK DESCRIBED ELSEWHERE**

- A. All work included under this heading is subject to the Bidding Requirements, General Conditions, Special Conditions, and Division 1 General Requirements written for this entire Specification, whether attached to this part or not, and the Contractor is notified to refer thereto as an integral part of his contract work.
- B. Each prime contractor is responsible for becoming thoroughly familiar with all Division Drawings and Specifications prior to bidding so that the entire scope of work is clear with regard to electrical requirements of equipment, etc. The same applies to General Trades Contract items, which have electrical connections.

#### **1.03 APPLICABLE SECTIONS**

- A. Prime contractors shall perform work described in the General Conditions, Division 1 and in the following Sections (as included):
  - 1. Plumbing: Sections 15000 through 15299  
Sections 15400 through 15499
- B. Prime contractors are required to coordinate their work with that described in other sections and therefore must familiarize themselves with the entire set of Specifications.

#### 1.04 RESPONSIBILITY

- A. The Engineer does not supervise, nor is engaged in, construction. The Engineer has no control over, or no charge of, and therefore is not responsible for construction means, methods, techniques, sequences or procedures, or for safety, precautions and programs in connection with the work. These are solely the Contractor's responsibility under the contract for construction.

#### 1.05 GENERAL REQUIREMENTS

- A. The Contractor must read the entire Specifications covering other branches of work. He is responsible for coordination of his work with work performed by other trades.
- B. Consult all contract Drawings which may affect the location of any equipment or apparatus furnished under this work and make minor adjustments in location as necessary to secure coordination.
- C. The layout shown on the Drawings is based on a particular make of equipment. If another make of equipment is used which requires modification or changes of any description from the Drawings or Specifications, Contractor shall be responsible, as a part of this work for making such modifications and changes, including those involving other trades, with the cost thereof included in his Bid. (The Contractor is responsible for the dimensional corrections of all items of equipment he intends to utilize, and shall coordinate same with other trades, Drawings, etc. to avoid conflicts.) In such case, Contractor shall submit Drawings and Specifications prior to starting work showing all such modifications and changes. His proposal shall be subject to the approval of the Architect and Engineer.
- D. System layout is schematic and exact locations shall be determined by structural, existing and other conditions. This shall not be construed to mean that the design of the system may be arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with the equipment included under other Divisions of work.
- E. Contact the Architect immediately if he notices any discrepancies or omissions in either the Drawings or the Specifications or if there are any questions regarding the meaning or intent thereof.
- F. Submit all changes, other than minor adjustments, to the Architect for approval before proceeding with the work.
- G. The Contractor is required to visit the site and fully inform himself concerning dimensions, existing conditions and all other conditions affecting the scope of work. Failure to visit the site shall not relieve the Contractor from any responsibility in the performance of his work.
- H. All workmanship is to be of the highest quality in accordance with the best practices of the trade by craftsmen skilled in this particular work.
- I. Contractor is to have a competent superintendent in charge of the work installed under this Contract. Superintendent is to be experienced in this type of work.

## 1.06 STANDARDS OF QUALITY

- A. Provide quality work conforming to the best accepted practices and standards of the trade. Further definition of quality is given by reference to various laws, codes, standards, and regulations.
- B. Material and equipment installed under this Contract shall be new, undeteriorated, and of a quality not less than the minimum specified. All equipment and conductors shall be certified, listed or labeled by UL. If UL does not certify an associated piece of equipment, then a nationally recognized testing laboratory such as ETL shall be permissible and shall bear the label. If equipment or conductors are of a type that no testing lab lists or labels, then a safety evaluation must be performed at the supplier's expense by the inspecting authority or another Federal, State or municipal agency.

## 1.07 PERMITS, INSPECTIONS AND CODES

- A. File all Drawings, pay all fees and obtain permits and certificates of inspection relative to this work.
- B. Completed installation shall confirm with ALL applicable Federal, State and Local Laws, Codes and Ordinances including but not limited to the latest editions of the following:
  - 1. Ohio Basic Building, Mechanical & Plumbing Code (OBC, OMC & OPC)
  - 2. Specific Construction Safety Requirements, State Industrial Commission
  - 3. National Fire Protection Association Codes
  - 4. Life Safety Code NFPA 101
  - 5. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto
  - 6. State of Ohio Energy, Mechanical, Plumbing, Boiler, Pressure Piping and Fire Codes
  - 7. ANSI Welding Code
  - 8. International Fuel Gas Code (IFGC)
- C. All laws and codes having jurisdiction over this project are deemed to be included in their entirety as a part of these Specifications. Also any other laws, codes, standards, or regulations referenced herein are deemed to be included in their entirety.
- D. Work must be performed by licensed Contractors as required by Local and State Codes.
- E. Contractor arranges for and includes in his bid, inspection of this work by ONE of the following:
  - 1. Local Code Authority
  - 2. State Code Authority
  - 3. Certified Private Inspection Agency

## 1.08 CONTRACT DRAWINGS

- A. Drawings are schematic and show approximate locations and extent of work. Exact locations and extents must be coordinated with other Contractors and verified in the field. Coordination of the final fabrication drawings and final coordination of the installation in the field is the Contractor's responsibility. The Contractor is to take the design to the next level of detail knowing exactly what equipment and materials he is going to provide and build the project based on that equipment and other approved Submittals.
- B. The Drawings indicate required size and point of termination of pipes and ducts and suggest proper routes to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that Drawings indicate all necessary offsets, and it shall be the work of this Contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner.
- C. Significant deviations from Drawings must be approved by the Architect.
- D. The Architect reserves the right to make minor changes in location which do not require additional labor or material up to the time of roughing-in without additional cost. The Architect shall determine what is "significant" and what is a "minor change". No cost shall be added to the Contract for a minor change.
- E. If a conflict occurs between the Drawings and Specifications, the Contractor shall immediately call it to the attention of the Architect, who will determine which interpretation shall take precedence.
- F. If a typical plan or detail is shown that requires a reversed installation on the job site, the Contractor shall be responsible for the installation as part of this contract.

## 1.09 ABBREVIATIONS AND SYMBOLS

- A. Listed below are titles and abbreviations used in the Specification. All may not necessarily apply to this work.
  - 1. AABC - Associate Air Balance Council
  - 2. ADC - Air Diffusion Council
  - 3. AGA - American Gas Association
  - 4. AMCA - Air Movement and Control Association
  - 5. ANSI - American National Standards Institute
  - 6. ARI - Air Conditioning and Refrigeration Institute
  - 7. ASA - Acoustical Society of America
  - 8. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning
  - 9. ASME - American Society of Mechanical Engineers
  - 10. ASSE - American Society of Sanitary Engineers
  - 11. ASTM - American Society of Testing and Materials
  - 12. AWWA - American Water Works Association
  - 13. CGA - Compressed Gas Association
  - 14. CISPI - Cast Iron Soil Pipe Institute

15. MSS - Manufacturers Standardization Society Of The Valve and Fittings Industry, Inc.
16. NEBB - National Environmental Balancing Bureau
17. NEC - National Electrical Code
18. NEMA - National Electrical Manufacturers Association
19. NFPA - National Fire Protection Association
20. OAC - Ohio Administrative Code
21. ODH - Ohio Department of Health
22. ODOE - Ohio Department of Energy
23. ODOT - Ohio Department of Transportation
24. PDI - Plumbing and Drainage Institute
25. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
26. UL - Underwriters' Laboratories
27. EJMA - Expansion Joint Manufacturers Association, Inc.

- B. The Abbreviations are shown on Division 15 Drawings. Contractor shall refer also to the symbols listed shown in the 1993 ASHRAE Fundamentals Handbook, Chapter 34 for further abbreviations.

#### 1.10 EXAMINATION OF SITE

- A. Certain existing conditions affect the manner or sequence of the performance of work. Existing services, structures and operating schedules need to be reviewed to facilitate the installation of the work. Coordinate the scheduling of the work with existing operations.
- B. Visit the site of the proposed project. After the Contract is signed, no allowance will be made for lack of knowledge of the project conditions.
- C. Verify and reconcile work required by the Contract Documents with conditions at the Site, prior to Bidding the project.
- D. Should any discrepancies be noted during the Bidding Period, the Contractor shall notify the Architect immediately, in writing, to permit the issuance of an addenda to prevent misunderstandings at a later date.

#### 1.11 UTILITIES

- A. Locate any existing utilities prior to construction. Make minor relocations to permit installation of work. Advise the Architect immediately of major conflicts to permit modifications of the Contract Documents, within the project limits on a site plan layout and submit to the Architect for review prior to any excavation. Where existing utilities conflict with new work, proposed modifications shall also be marked and identified on the site plan layout.
- B. Contractor shall record locations of all concealed utilities on the Record Drawings.

- C. Coordinate any utility service shutdown or outages with the Architect and the Owner. Shutdowns shall conform to all utility company requirements. Avoid inconveniencing the Owner and provide temporary service during the curtailment, as required by the Architect or Owner. Provide 2 working days (minimum) advance notice to the Owner for any required utility outages.

#### 1.12 RECORD DRAWINGS

- A. Contractor shall maintain at the job site, one copy of Drawings which shall be used exclusively for recording the location of all installed Work.
- B. Record deviations in locations of concealed piping, valves, equipment, ductwork, all buried, concealed utility services, water, gas, fire, etc., dimensioned from a fixed control point, including depth of bury, invert elevations at start of storm or sanitary line, at each change of direction, at each change of slope and as required for further reference. Minor piping or ductwork variations need not be recorded. Record Addendum and Change Order Items.
- C. Record deviations made necessary to incorporate equipment different from the Design Base equipment.
- D. At completion of the Project, Contractor shall deliver Record Drawings to the Architect.

#### 1.13 COORDINATION BETWEEN TRADES

- A. Plumbing, Fire Protection, HVAC, and Electrical Contractors shall coordinate their rough-in, service, and control wiring requirements with each other.
- B. Motors one-half horsepower or smaller shall be single phase; larger motors shall be three phase unless otherwise noted.
- C. Equipment drawing 100 watts or more must have a power factor of 85% or greater at rated load conditions. Equipment with an operating power factor less than 85% shall be corrected to at least 90% under rated load operating conditions. Power factor correction devices shall be the responsibility of the Contractor furnishing the equipment.
- D. All power wiring required for Plumbing, or HVAC equipment shall be installed by the Electrical Contractor. All control and interlock wiring, regardless of voltage is by the Contractor furnishing the control device, except if the control device actuates or is actuated by the fire alarm control panel. The Division 16 Contractor shall be responsible for this wiring from the fire alarm control panel to the control device.
- E. It is the responsibility of each Contractor furnishing motors to advise the Electrical Contractor of the exact function of the systems to assure proper type of starter (including necessary time delays, etc.) with correct number of auxiliary contacts required for the proper operation of the system. If motors are furnished which require larger starters, safety switches, circuit breakers, fuses, and/or branch circuit conductors than indicated, the Contractor furnishing the motors shall reimburse the Electrical Contractor for any cost differential.



- F. All electrical devices furnished as a part of Division 15 equipment, and installation requirements of all electrical work done by Division 15 Contractors shall conform to the applicable sections of Division 16.
- G. Start-up, commissioning and final operation of equipment provided under Division 15 shall be the responsibility of the Division 15 Contractor.

#### 1.14 GUARANTEE

- A. Contractor shall guarantee his equipment, workmanship and materials for a period of one year from date of substantial completion. Should defects develop within this guarantee period, the Contractor shall, upon written notice, remedy the defects and reimburse the Owner for all damage to other Work caused either by the defects or during the work of correcting same.
- B. Refer also to Division 1 and any individual Sections which define the starting date of the guarantee period or discuss either additional warranty requirements or extended warranties beyond the standard period.

### PART 2 - PRODUCTS

#### 2.01 DESIGN BASE MANUFACTURERS

- A. The Drawings and Specifications are based on the requirements and layouts of the equipment of the Design Base Manufacturers. Design coordination of equipment with the building and with other Trades has been made for these specific models and manufacturers of equipment. Where several manufacturers are listed, the first named is the Design Base Manufacturer, unless specifically noted on plans otherwise. Products of the listed manufacturers which are of comparable performance and quality similar to the Design Base Manufacturer shall be submitted for final approval.
- B. Where necessary, prepare new layouts to be used either for substituted equipment or other equipment listed, and adjust and coordinate these layouts with equipment and service requirements and their dimensions, and Code required working clearances which may have different dimensions, and Code required working clearances which are of comparable performance and quality similar to the Design Base Manufacturer shall be submitted for final approval.

#### 2.02 EQUIPMENT AND APPROVAL

- A. The selection of materials and equipment to be furnished shall be governed by the following:
  - 1. Where trade names, brands of manufacturer of equipment or materials as listed in the Specification or on the Drawings, the exact equipment listed shall be used in the bid. Where more than one name is listed, Contractor may select any one of the several brands specified.
- B. If Contractor wishes to bid other brand of material and equipment as equal to the material and equipment specified, Contractor must request approval to bid this material and equipment as equal in writing no later than two (2) weeks prior to the Bid date. If approval is granted, it will

be listed as an approval equal by Addendum. NO VERBAL PERMISSION WILL QUALIFY. If approval is not granted, the material and equipment may be listed as a substitute.

- C. Whenever the Contractor furnishes equipment or materials other than the Design Base Manufacturer specified, the Contractor is responsible for the cost and coordination of all modifications required not only for his work, but also for the work of all other Trades affected.
- D. Where changes to other Trades work are required, this Contractor must include the additional costs of all such work in his bid. The Contractor shall investigate potential conflicts such as the following:
  - 1. Physical dimensions and weights.
  - 2. Code required working clearances.
  - 3. Connecting pipe sizes & locations.
  - 4. Electrical requirements and locations.
  - 5. Increased ventilation requirements.
  - 6. Sound levels.

### 2.03 OWNER FURNISHED EQUIPMENT

- A. Certain items of equipment are to be furnished by the Owner to the Contractor. The Contractor shall take delivery of such items and unload them from the truck at the job site.
- B. The Contractor shall protect and store such items as part of this Contract.
- C. The Contractor shall install these items in conformance with the requirements of the Specifications and Drawings and the supplier's recommended installation instructions.

## PART 3 - EXECUTION

### 3.01 CUTTING AND PATCHING

- A. Cutting and patching shall only apply to the existing construction. Wall, floor and roof opening required in the new construction shall be done with early coordination by each trade and openings shall be prepared with the proper sleeves and curbs. Failure to coordinate at the proper time and after the surface to be penetrated has been completed shall make the delinquent Contractor responsible to hire the other contractors to re-work the finished surface at no additional cost to the Owner.
- B. Unless otherwise required in General Conditions, the Contractor shall perform all cutting and patching required for his own work. Work must be accomplished in a neat and workmanlike manner, acceptable to the Architect.
- C. If necessary to cut into work of other Trades, it shall be done by other Trades at this Contractor's expense. Patching shall be similarly executed.

- D. Cutting of structural support beams, joists, plates, or other structural members is strictly prohibited without the specific written consent of the Architect. Use rotary drill where cutting holes through concrete, brick, plaster, or tile is necessary. Obtain approval of the Architect before proceeding with work.
- E. All cutting and patching shall be done promptly and all repairs shall be made as necessary to leave the entire work in good condition, including all cutting, fitting, drilling of masonry, concrete, metal, wood, plaster, and other materials as specified or required for proper assembly, fabrication, installation, and completion of all work of the Contract.
- F. Patching shall match adjacent materials and shall be accomplished only by tradesmen skilled in the respective craft required. Materials and equipment used in the patching work shall comply with requirement of those Sections of the Specifications relating to material to be used in new construction.

### 3.02 PAINTING AND RELATED WORK

- A. Finish painting in areas of new construction is the responsibility of the General Contractor and is specified in Division 9.
- B. Any other painting, required by Sections of Division 15, is the responsibility of the respective Division 15 Contractor. It shall be done by a qualified tradesman skilled in the craft and shall meet the requirements of Division 9. Each Contractor is responsible for the repainting of finished areas disturbed by his own cutting and patching. Finishes shall match existing conditions.
- C. Factory-finished equipment which has rusted or has been damaged shall be cleaned, spot primed with zinc chromate, and finished to the original quality and color by the Contractor.
- D. Division 15 support steel and bare ferrous metal shall be cleaned, rust removed, primed, and painted in accordance with Division 9 Specifications.
- E. All plywood mounting boards shall be primed and finished in accordance with Division 9 Specifications.

### 3.03 CLEANING

- A. Upon completion of work, all material, fixtures and equipment furnished in this Contract shall be thoroughly cleaned of dirt, stickers, grease, rust, oil and other foreign matter. Prepare for finish painting, where painting is specified.
- B. Clean galvanized piping and ductwork in exposed areas with diluted acetic acid.
- C. Clean copper piping in exposed areas with fine emery cloth and solvent.
- D. Clean all gauges, thermometers, traps, dirt legs, strainers and fittings.

- E. All insulation coverings shall be cleaned. If pre-sized insulation is not used, insulation coverings shall be sized, if finish painting is required.
- F. Maintain all areas as clean as possible during construction.
- G. Refer to Division 1 for additional requirements.

#### 3.04 SCAFFOLDING, RIGGING, HOISTS AND TRANSPORTATION

- A. The Contractor shall provide scaffolding, staging, cribbing, tackle, hoists, and rigging necessary for placing his materials and equipment in their proper places in the Project.
- B. The Contractor shall pay costs for transportation of materials and equipment to the job site and shall include such costs in his proposal.
- C. Scaffolding and hoisting equipment shall comply with requirements of all applicable Federal, State, and Local Laws and Codes.

#### 3.05 TESTS

- A. The Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction may require portions of the work to be inspected, tested or approved. These services shall be performed by approved agencies.
- B. The Architect must be notified of all scheduled tests and adjustments at least 48 hours before they are scheduled so he may witness same. If the Contractor performs any test or adjustment without the Architect present or without proper notification, the Contractor may be required to perform the test or adjustment a second time. All test schedules shall be coordinated with the Architect or Owner to minimize inconvenience.
- C. The Contractor shall bear all costs of such inspections, tests, or approvals.
- D. Required certifications of inspection, testing, or approval shall be secured by the Contractor and included in the Service Manuals. See Section 15020 "Record and Information Booklets".
- E. Concealed lines shall be tested and approved before being concealed. If a leak appears during the final test, the Contractor shall repair the line and any damage resulting from the leak.
- F. After work has been completed, but before pipe covering has been applied, the Contractor shall test each system as required by other Sections of this Specification. At the test pressures, the circulation shall be free and the piping proven free of leaks.
- G. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, Contractor shall uncover the Work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials and workmanship as are necessary for the approval of the Architect and at no additional cost to the Owner.

- H. Contractor shall furnish all test pumps, gauges, equipment, and personnel required, and test as necessary to demonstrate the integrity of the finished installation to the approval of all pertinent authorities and the Architect.

### 3.06 INSPECTION

- A. Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

### 3.07 PROTECTION

- A. Equipment and material shall not be delivered to the site until the Work is ready to receive it, unless it can be protectively stored in a manner acceptable to the Architect.
- B. Protect all equipment and materials during construction from damage by weather, water, dirt, paint droppings, welding and cutting spatters and other construction activities.
- C. All materials or equipment stored outside shall be elevated and protectively covered.
- D. Materials and equipment sensitive to weather or construction conditions shall be stored inside. Where necessary, sensitive equipment shall be stored in a heated area.
- E. During construction, cover all non-operating motors, bearings, and controls which are stored or installed in place.
- F. Refer also to individual Specification Sections for specialized protection.
- G. Damaged equipment or materials must immediately be repaired or replaced by this Contractor, to the satisfaction of the Architect and at no additional cost to the Owner.
- H. Each Contractor shall protect the building and other Contractor's material and equipment from damage caused by his Work. Protect floors from cutting oil and chips.
- I. Use all means necessary to protect materials before, during, and after installation.

### 3.08 MATERIAL SAFETY DATA SHEETS

- A. Material Safety Data Sheets (MSDS's) for all products and/or building materials that may contain hazardous or toxic chemicals shall be made readily available to Contractor, Employees and Owner's Personnel during construction. MSDS's to be forwarded to the Architect at start of and during construction and to the office of environmental health and safety upon completion of project.

END OF SECTION

## **SECTION 15015 - SUBMITTALS**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.
- B. Submittals may be sent electronically.

#### **1.02 SUMMARY**

- A. Contractor shall check all Submittals for DIMENSIONAL CORRECTNESS, INTERFERENCES AND CONFORMANCE to specifications and plans. Stamp Drawings "approved" and indicate when stipulated check has been made before forwarding them. Identify submittal data by project name and equipment identification number.
- B. Engineer's review of Submittals or schedule shall not relieve the Contractor from responsibility for errors, omissions or other deficiencies or deviations in the submittals from the Contract Drawings or Specifications.
- C. Contractor shall submit submittals early enough in project to allow ample time for Engineer's review without causing time delays or conflicts on the project.
- D. Furnish detail drawings of following:
  - 1. VAV boxes and controls
  - 2. Heating water system
  - 3. Plumbing piping
  - 4. Insulation
  - 5. Plumbing Fixtures
  - 6. HVAC Equipment
  - 7. Diffusers and registers
  - 8. Exhaust Fans

**PART 2 – PRODUCTS (NOT APPLICABLE)**

**PART 3 – EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

SECTION 15020  
RECORD AND INFORMATION BOOKLETS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

1.02 SUMMARY

- A. See Division 1 for general requirements.
- B. Submit draft manual to the Architect for review and approval 30 days before final inspection is due.
- C. After approval, submit approved manuals to the Owner and obtain receipt. (See Section 15099, "Requirements for Substantial Completion".)

PART 2 - PRODUCTS

2.01 MANUALS

- A. Manuals shall be loose leaf, three-ring, hard-cover binders. Materials shall be typewritten or printed and be fully legible. Each section shall be divided by labeled tabs.
- B. The followings items, together with any other necessary pertinent data, shall be included in each Service Manual:
  - 1. Each manual to be labeled on front cover with Project name, Contract, Contractor's name, Architect, Engineer, and date of Project completion.
  - 2. Description of systems.
  - 3. Manufacturers' names, nearest Factory Representative and Model and Serial numbers of components of systems.
  - 4. Operating instructions, start-up and shut-down procedures.
  - 5. Maintenance and lubrication instructions. Include routine and emergency service information.
  - 6. Servicing instructions.
  - 7. Parts list with numbers of replaceable items, including sources of supply.
  - 8. Manufacturers' literature describing each piece of equipment.
  - 9. One approved copy of each submittal submitted.
  - 10. Temperature control diagrams.
  - 11. Written warranties.
  - 12. Belt sizes, types, and lengths.
  - 13. Wiring diagrams.
  - 14. Testing and balancing reports.
  - 15. Copy of Owner's statement concerning completion of instruction period. (See Section

- 15099, "Requirements for Substantial Completion".)
16. Routine and 24 hour emergency service/repair information:
    - a. Name, address and telephone number of servicing agency.
    - b. Names of personnel to be contacted for service arrangements.

## 2.02 CONTROL DIAGRAM AND VALVE CHART

- A. Mount approved copy in a neat frame with backing under glass or within a plastic jacket in the main Mechanical Room.

## PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION



## SECTION 15035 SLEEVES

### PART 1 GENERAL

#### 1.01 RELATED PRODUCTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

#### 1.02 SUMMARY

- A. Furnish pipe sleeves for pipe and duct penetrations through precast concrete, masonry, and concrete construction.
- B. Sleeve where pipes and round ductwork pass through walls exposed and where any pipe and ductwork pass through fire rated separations, or equipment room walls or floor.
- C. Sleeving with absolutely watertight seal is required for piping passing through all foundation walls, floor slabs on grade, and other below grade penetrations into building.
- D. Provide dimensions and locations of openings for sleeves immediately before and after each concrete pour and masonry installation.
- E. Carefully coordinate and check locations of sleeves immediately before and after each concrete pour and masonry installation.

### PART 2 - PRODUCTS

#### 2.01 SLEEVE MATERIAL

- A. Machine cut standard weight black steel pipe, for sleeves up to 8 inches diameter; larger sleeves to be fabricated from 12 gauge galvanized steel sheet. Use copper sleeves for bare copper piping. Sleeves to be large enough for insulation to be continuous or for seals to be installed. Provide with waterstop anchor flange at midpoint where penetrating structure at or below grade.

#### 2.02 WATERTIGHT SEALS

- A. Oakum caulking with lead pour elastomeric seal. Elastomeric sealant shall be two-component, polysulfide or polyurethane as manufactured by Thiokol Corp.
- B. Optional: Compression seals - "Linkseal" by Thunderline Corp., CALPICO, Wayne, Michigan with stainless steel bolts and nuts. Provide correct size seal and coordinate with sleeve size.

## PART 3 - EXECUTION

### 3.01 CUTTING

- A. Cut sleeves through walls flush with each surface.
- B. Cut sleeves 1/8 inch above finished floors and 3 inches above floors in equipment rooms, rooms with floor drains, and shafts. Bottom of sleeve to be cut flush with bottom of floor.

### 3.02 INSTALLATION OF SLEEVES

- A. Size sleeves with 1/2 inch minimum, 1 inch maximum clearance all around pipe, or pipe insulation.
- B. Piping is not to bear on sleeves. Sleeves must be installed plumb with respect to wall.
- C. Close space around ducts and pipes passing through walls and floors. Seal space up to a 1/2 inch gap with sealant or caulking. Close off space greater than 1/2 inch gap with sheet metal and seal airtight. Pack all fire rated separation sleeves with fire retardant or other non-combustible material to maintain fire rating of structure. Fill space around all sleeves leading into exposed areas with material compatible with adjacent construction and finish.
- D. Unused sleeves shall be plugged, packed, and finished to match adjacent surface and be compatible to their ratings.
- E. Use sleeves where round or oval duct openings are required through exposed walls, smoke or fire partitions, or equipment room walls. Close off all spaces around rectangular duct through these walls.
- F. Provide chrome plated wall and/or floor escutcheons, sized to cover opening and seal, for all exposed installations.

### 3.03 WATERTIGHT SEALS

- A. Pipe sleeves penetrating outside wall or slabs on grade to have welded intermediate flange imbedded in masonry. Space around pipe to be clamped, packed, and caulked with lead and oakum to make an absolutely watertight seal.

END OF SECTION

SECTION 15040  
PIPING EXPANSION, NOISE AND VIBRATION ISOLATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

1.02 SUMMARY

- A. Provide thermal expansion control for all piping.
- B. Isolate all piping for both noise and vibration transmission
- C. Provide expansion loops, expansion joints, guides, anchors and offsets in piping systems as necessary to accurately control pipe movement due to equipment operation or thermal gradients, to prevent damage to building, equipment, joists, hangers, and piping.
- D. Provide expansion joints and accompanying anchors and guides where shown or where expansion cannot be provided for with loops and offsets.

1.03 MANUFACTURERS

- A. Metraflex Company, Flexible Metal Hose, Wheatley, Mason Industries, or General Rubber.

PART 2 PRODUCTS

2.01 EXPANSION JOINTS

- A. Stainless steel bellows and elements, cast iron equalizing rings, tie-rods and pipe connections as required, 250 psig working pressure. Use packless, internally guided type for lines 2 inches and smaller.

2.02 FLEXIBLE CONNECTORS

- A. Flexible rubber connector, 225 degrees F, 150 psig, 150# ASA flanges, steel retaining ring.

2.03 PIPE ALIGNMENT GUIDES

- A. Painted steel cylinder guide assembly with welded mounting brackets, two-piece pipe clamp "Spider" assembly.

## PART 3 EXECUTION

### 3.01 INSTALLATION

#### A. Line Expansion:

1. U-Bends: In all piping subject to expansion and contraction, install U-Bends or loops in piping, in accordance with ASHRAE Equipment Handbook.
2. Expansion Joints: Where unable to provide U-Bends, or where specifically shown or specified, provide expansion joints. Install according to the manufacturer's instructions.

#### B. Branch Connections:

1. Branch connections to mains shall be made with a minimum of two 90 degree elbows, and must incorporate at least one change of direction in the horizontal plane, and one change of direction in the vertical plane, before connecting to equipment or fixtures, or before dropping in or rising in a wall.
2. Bullhead connections in any piping services are expressly prohibited.

#### C. Guides:

1. All loops and expansion joints shall be supplemented with adequate guides as close to loops and joints as possible and additionally at recommended intervals from joints, to preserve alignment and pitch. Guides shall be rigidly secured to the structure and shall permit axial movement only. Follow the manufacturer's instructions on locations where applicable.

#### D. Anchors:

1. Pipe anchors shall be installed where required to secure the pipe and totally eliminate movement. They shall be attached securely to the structure.

END OF SECTION

## **SECTION 15050 - GENERAL PIPING REQUIREMENTS**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

#### **1.02 PIPING SYSTEMS - GENERAL**

- A. The following instructions apply to all piping systems, except where otherwise noted:
  - 1. Provide unions or flanges at each final connection and at each piece of equipment. Piping to be arranged and unions and flanges located to permit easy removal of parts and equipment for inspection and cleaning. Welded connections to equipment are prohibited.
  - 2. Make connections to equipment as detailed on the Drawings and per the manufacturer's installation instructions.
  - 3. Where connection size is smaller than piping, make reduction at final connection only (do not reduce size of pipe drop).
  - 4. Provide valves and specialties as required, to complete installation of each piece of equipment, for proper operation.
- B. Cleanout and flush water piping system.
- C. If other means of draining are not provided, install drain valves at all low points to permit complete draining of each of the followings systems.
  - 1. Water
  - 2. Fire Protection
- D. Contractor to provide information on chases, sleeves and openings required for his work to other Contractors. This Contractor to assume cost and responsibility for all cutting and patching resulting from improper coordination of the work.
- E. Certified Pipe Welding Bureau. Welds to be stamped at each joint or fitting.
- F. Install dielectric unions at all connections of dissimilar metals.
- G. Where Grooved Piping Systems are allowed by reference in other sections within this specification, the installing Contractor must have installed at least five grooved mechanical piping systems.

## PART 2 - PRODUCTS

### 2.01 UNIONS

- A. Unions in Copper Pipe: Bronze 150 lb. ground joint, solder end (do not use wrought copper unions). Mueller, Chase, Crane or Northern Indiana Brass Company.
- B. Unions in Steel Pipe: Black malleable iron, bronze ground ball joint. Mueller, Chase, Crane or Northern Indiana Brass Company.
- C. Dielectric Unions: Epco, Capital, or Watts.

### 2.02 DRAIN VALVES

- A. 3/4-inch bronze or brass hose threaded gate valve. Powell #503 H. Where concealed, use Powell #502 H with cap and chain.
- B. Milwaukee, Crane, Jenkins, or Walworth are also acceptable.

### 2.03 JOINTS

- A. Flanges:
  - 1. Up through 2-1/2 Inches: Cast iron screwed, 125# or higher as required.
  - 2. 3 Inches and Larger: Steel welding neck, 150# or higher as required.
- B. Gaskets: 1/8" minimum thick, fibrous type with double coat of graphite, except use Type 304 stainless steel with carbon steel guide on high temperature piping systems. Use dielectric gaskets where joining dissimilar piping material.
- C. Bolts for steel, cast iron, brass and bronze, for 250# SWP and 450 degrees F or below to be carbon steel, with American Standard, regular, square heads and American Standard, heavy hexagon, semi-finished nuts.
- D. ASTM A307, Grade B, Tee head, high tensile steel bolts and nuts may be used in mechanical joint pipe lines. (Mechanical joints are not to be used with tubing of copper or aluminum alloys.)
- E. Screwed Piping: Use NPT tapered threads.

### 2.04 GROOVED PIPING

- A. Grooved couplings to be installed on 2"-24" roll or cut grooved standard weight Schedule 40 pipe in accordance with the coupling manufacturer's installation instructions.
- B. Flexible couplings shall be installed with the bolt pads metal to metal; rigid (slant bolt pad) couplings shall be installed within the bolt pads metal to metal with equal offset. Installing Contractor shall verify that bolt pad gaps do not exist.

- C. The grooved mechanical coupling manufacturer shall perform on-site installation demonstrations to the Installing Contractor before grooved coupling Installation Contractor before grooved coupling installation begins.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Each union or flange shall be installed to permit removal of parts and equipment, and in a position permitting the device or equipment to be removed without disconnecting piping.
- B. Make reductions in piping lines with reducing coupling or weld fitting reducer.
- C. Install piping to provide clearance for personnel passage, headroom, operation of doors or windows, equipment, lighting outlets, or with Owner's apparatus and equipment. Coordinate pipe runs and elevations with other Contractors before installation. Where interferences develop in field, pipes may need to be offset or rerouted, at no additional cost to Owner, as required to resolve interferences.
- D. In pipe spaces to be entered for servicing, piping shall be offset so that all lateral runs are located either near floor or 6'0" above floor and all vertical piping is held close to the wall through that height. Keep all piping to side of chase wherever possible. Offset vents immediately above connection to waste line.
- E. Piping containing liquids shall not be installed over electrical equipment.
- F. Install pipes, valves, fittings, etc. with a minimum of 1/2-inch clearance between the finished covering and other work and between the finished covering of parallel, adjacent pipes.
- G. Make changes in pipe line direction with fittings. Do not bend piping.
- H. Offset lines around columns, beams and other obstructions as required. Where special conditions are encountered in field, arrangements and alignment of piping shall be decided by the Architect.
- I. At time of erection, piping components shall be cleaned of loose material. After erection, and prior to putting in service, lines shall be low or flushed free of loose materials. Clean strainer screens and sediment pockets prior to putting lines in service.
- J. Install valves at service connections to equipment and branch lines from main lines. All valves and unions to be installed so as to be accessible through ceiling or wall access panel.
- K. Insulate direct contact between pipe, fittings and hangers of dissimilar metal by use of dielectric unions, shims, gaskets, or coatings.
- L. Install thermometers and gauges to permit them to be read from floor level.
- M. Securely support all piping from structure with approved hangers, rods, brackets and accessories.
- N. Where piping is installed in new masonry block walls, coordinate with General Contractor so

piping extends out through a masonry joint where possible.

- O. Bullhead connections are not allowed.
- P. Where exposed pipes pass through walls, floors or ceilings of finished rooms, provide chrome-plated escutcheons. Prime-coated black iron escutcheons may be used in unfinished rooms. Protect escutcheons from tool marks.
- Q. Keep pipe level except where a slope is required. Use eccentric reducers to keep bottom of pipe level.
- R. Avoid trapping of piping.
- S. Install cocks at pressure gauges and air vents.
- T. All piping accessories and hangers shall be installed to allow free and clear operation of the overhead crane system.

### 3.02 WELDED CONNECTIONS

- A. Welded joints to be fabricated and stamped by welders qualified and certified as required by enforcing bodies.
- B. Buttweld joints shall have substantially full penetration and recommended bead reinforcement.
- C. Slip-on, socket and fillet welds to have geometry indicated in the "Code for Power Piping" (ANSI B31.1).
- D. Remove weld scale from joints as work proceeds and at completion.

### 3.03 SOLDERED AND BRAZED CONNECTIONS

- A. Joints to have pipe or tubing end reamed to full I.D. after cutting.
- B. Exterior of joint must be smooth.
- C. Clean with steel wool.
- D. Apply flux to prevent oxidation.
- E. Apply solder or brazing filler material and thoroughly heat to completely melt material and cause it to migrate completely over the mating surfaces.
- F. Solder and brazing work must comply with (ANSI B31.1).



### 3.04    THREADED CONNECTIONS

- A. Ream pipe ends of threads to full cross sectional area after cutting. Threads shall conform to ANSI Standard B2.1.
- B. Joints shall be made with TGE tape, applied to make threads only. OPTION: Use Permatex pipe dope.

### 3.05    FLANGED CONNECTIONS

- A. Flanged joints to be faced square and true. Install gaskets suitable for the operating temperature and pressure of the fluid or gaseous medium being piped.

### 3.06    PIPE CLEANING

- A. Flush out all water piping systems to remove dirt and grease from pipes and equipment before systems are placed in operation. Clean strainers after each flushing until they remain clean.
- B. For water piping systems, after system has been flushed thoroughly and drained, perform the following steps:

### 3.07    PIPING PROHIBITIONS

- A. Contractor shall not run piping over electrical panels, across windows, door openings, access panels, lighting fixtures or within 36 inches in front of electrical panels. Obtain instructions from the Architect if a conflict occurs.
- B. On any given system, the Contractor will not be permitted to mix and join different types of pipe material. For example, if a storm or sanitary system uses plastic and cast iron, the Contractor may change from one to the other only once, the line may not be changed back to the first material further downstream.
- C. Storm and sanitary lines shall be continuously sloped; trapping is expressly prohibited.

END OF SECTION

SECTION 15065  
EQUIPMENT, PIPING AND DUCTWORK IDENTIFICATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

1.02 SUMMARY

- A. Identify by labels and tags the followings items:
  - 1. Equipment such as air handlers, supply fans, return fan, cooling towers, pumps, chillers, boilers, control cabinets and similar items.
  - 2. Piping exposed in equipment rooms, and accessible service areas.
  - 3. Piping running above accessible ceiling construction and near access panels in non-accessible ceiling construction.
  - 4. Ductwork in equipment rooms.
- B. Install laminated plastic nameplates for equipment, color banding, flow arrows and contents identification for piping.

1.03 COORDINATION

- A. Contractors shall coordinate to insure that the identification used by all Trades is uniform in type, style and appearance.

1.04 MANUFACTURERS

- A. Brady, Seton, CALPICO, EMED or MSI.

PART 2 PRODUCTS

2.01 EQUIPMENT IDENTIFICATION

- A. Engraved laminated plastic, white over black, sized for 3/4-inch high letters or numbers, Gothic style.

2.02 PIPING AND DUCTWORK IDENTIFICATION

- A. Labels or vinyl tape with embossed letters. Color same as 2-inch band.

B. Size to be as follows:

<u>PIPE SIZE</u>	<u>MINIMUM LETTER HEIGHT</u>
Up to 1-1/2 inches dia.	1/2 inch H.
1-1/2 inches to 2 inches dia.	1 inch H.
2-1/2 inches and larger	1-1/4 inches H.

## 2.03 COLOR BANDS

A. 2-inch wide painted gloss enamel or vinyl tape.

## 2.04 IDENTIFICATION SCHEDULE

A. Identify as follows:

<u>TYPE OF SERVICE</u>	<u>2" BAND COLOR</u>	<u>LETTERS COLOR</u>	<u>DESIGNATION</u>
PLUMBING PIPING:			
Domestic Cold Water	Green	Black	DCW
Domestic Hot Water	Green	Black	DHW
Natural Gas	Yellow	Black	GAS
Sanitary	Green	Black	SAN
Storm	Green	Black	STM
HVAC DUCTWORK:			
Low Velocity Supply Air			SUPPLY
Low Velocity Return Air			RETURN
Exhaust Air			EXH
Relief Air			RELIEF
Outside Air			OUTSIDE

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Equipment tags shall be attached with screws, except where screws might damage equipment or ductwork, use compatible adhesive.
- B. Apply piping identification only after finish painting is completed.
- C. Provide service designations, flow arrow and color banding at 15-foot maximum intervals.
- D. Also identify piping at connections to equipment, at valves, at branches from main, at each riser and at both sides of wall or barrier through which pipe passes.
- E. Contractor shall clean piping, duct or insulation in area of labeling just prior to labeling of pipe

duct, or insulation.

- F. Labels must be readable from a standing position.

END OF SECTION

## **SECTION 15075 - ACCESS PANELS**

### **PART 1 GENERAL**

#### **1.01 RELATED DOCUMENTS**

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

#### **1.02 SUMMARY**

- A. Furnish and install access panels necessary for access to mechanical equipment, valves, shock absorbers or other devices requiring service, adjustment or maintenance as follows:
  - 1. Wall

#### **1.03 COORDINATION**

- A. This Contractor is responsible for providing the dimension and locations of all ceiling, wall, and floor openings for the access panels to the General Contractor.
- B. Coordinate with other Contractors with respect to panel locations and group valves, traps, etc., in such a way as to be accessible from a single panel.

#### **1.04 MANUFACTURERS**

- A. Inryco-Milcor, Bilco, Zurn, Acudor, JL, Inland Ryerson, Mitco or Karp.

### **PART 2 PRODUCTS**

#### **2.01 WALL ACCESS PANELS**

- A. Drywall: Inryco-Milcor Style DW prime painted for finish painting with wall.
- B. Masonry and Tile: Inryco-Milcor Style M Standard, prime painted for finish painting with wall or Style M stainless.
- C. Fire-Rated: Inryco-Milcor fire-rated access door, UL approved, prime painted for finish painting with wall.
- D. Plaster: Inryco-Milcor Style K prime painted for finish painting with wall.

## PART 3 EXECUTION

### 3.01 COORDINATION OF INSTALLATION

- A. Coordinate installation of panels required to permit convenient access to valves, dampers, bearings, motors, filters, controls, and other equipment requiring adjustment, service or maintenance. Mark locations of access panels on Record Drawings.

END OF SECTION

SECTION 15099  
REQUIREMENTS FOR SUBSTANTIAL COMPLETION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

1.02 SUMMARY

- A. The following is a partial list of items, which must be submitted as required prior to Substantial Completion. The list includes, but is not limited to:
  - 1. All Division 15 Contractors
    - a. Receipt for Operating Instructions and Service Manual
    - b. Certificate of Equipment Demonstration
    - c. Valve tags and charts
    - d. Receipt for keys
    - e. Warranties
    - f. All required test reports as specified in other Sections
  - 2. Plumbing Contractor Only:
    - a. Certificate of Plumbing Inspection
    - b. Certificate of Sterilization
    - c. Certificate from local fire department and/or Ohio EPA that fuel storage tanks and equipment installation is acceptable
  - 4. HVAC Contractor Only:
    - a. Certificate of inspection
    - b. Air and water balance reports
    - c. Contractor's certificate of operation of fire and smoke dampers
- B. In addition to the written submittals, the following material must also be submitted prior to Substantial completion:
  - 1. Loose or spare parts as specified in other Sections
  - 2. Spare parts as specified in this Section
- C. Refer to Division 1 for additional requirements.

## PART 2 - PRODUCTS

### 2.01 SPARE PARTS

- A. Furnish one complete set of the following spare parts:
  - 1. One set of gaskets for each pump
  - 2. Pump packing/mechanical seal for each pump
  - 3. Gaskets for manholes and handholes
  - 4. Glass for each water gauge
  - 5. One set of all filters (Does not include filters used during construction.)
  - 6. Special keys, wrenches, and similar required or special tools

## PART 3 EXECUTION

### 3.01 OPERATING TEST

- A. At completion, the Contractor shall operate the systems for a period of at least five days, not necessarily consecutive, to demonstrate fulfillment of the requirements of the Contract. During this time, adjust equipment so that it will perform as the manufacturer intended, and so that systems will function as designed. Complete balancing before operating test is started.
- B. Each system shall be operated in every mode of operation and the position of valves, dampers, and other devices shall be checked for proper closure and switching.

### 3.02 PERSONNEL INSTRUCTION

- A. After all system operational tests have been completed, schedule a minimum of a four (4) hours instruction period with the Owner. Instruct the Owner-designated personnel in the operation and maintenance of all systems and equipment. Use manuals to familiarize the Owner with equipment and procedures. Allow time as necessary for this instruction. Schedule time convenient for the Owner and the Architect.
- B. The instruction is to include the following:
  - 1. Location of items of equipment and explanation of their use.
  - 2. Reference to service manual for record and clarity.
  - 3. Coordination of written and verbal instructions so that each is understood by personnel.
  - 4. Explanation of control system.
  - 5. Complete review of items in the manuals.
  - 6. Maintenance procedures to be followed by the Owner.

END OF SECTION



SECTION 15500  
HEATING, VENTILATING AND AIR CONDITIONING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The provisions of the General Conditions, Supplementary Conditions, and the Sections included under Division 1, General Requirements, are included as part of this Section as though bound herein.

1.02 SCOPE

- A. Furnish material, labor, tools, accessories and equipment to complete test, adjust, start up, balance and successfully run all HVAC systems of this Project as described in these Specifications and as shown on the Drawings.
- B. Refer to Sections 15000 through 15099 (as included) for items of a general nature which apply to this portion of the Work. Sections 15500 through 15999 (as included) describe the HVAC work.
- C. Work includes, but is not limited to, the following:
  - 1. Condensation Drain Piping
  - 2. Exhaust Fans
  - 3. Roof Ventilators
  - 4. Filters
  - 5. Low Velocity Ductwork
  - 6. Vent Piping, Breeching and Chimney
  - 7. Grilles, Registers and Diffusers
  - 8. Louvers
  - 9. Dampers
  - 10. Vibration Isolators
  - 11. Temperature control
  - 12. HVAC Systems Balancing
  - 13. Gas Fired Furnace

1.02 LICENSES

- A. The installation of this HVAC work shall be made by a Contractor and craftsmen licensed by the Governing Authorities.
- B. Obtain all permits and licenses required by Local Code authorities having jurisdiction.

1.03 FEES

- A. Unless otherwise noted, this Contractor shall pay for all permits, inspection fees and other charges related to the installation and inspection of the HVAC work.

#### 1.04 CODES, REGULATIONS AND STANDARDS

- A. Unless otherwise noted, this Contractor shall pay for all permits, inspection fees and other charges related to the installation and inspection of the HVAC work.

#### 1.05 HVAC ROUGH-INS

- A. Provide service rough-ins and make final connections to equipment furnished by the Equipment Contractor or the Owner.
- B. Provide piping, valves, ductwork and specialties as required, and as specified under other Sections of these Specifications.

#### 1.06 EQUIPMENT CONNECTIONS

- A. Make final connections to equipment. Coordinate rough-in locations with other Contractors.
- B. Refer to approved equipment drawings for exact rough-in sizes and locations.

#### PART 2 - PRODUCT (NOT APPLICABLE)

#### PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 15505  
HVAC ROUGH-IN AND FINAL CONNECTIONS

PART 1 GENERAL

1.01 SCOPE

- A. Provide service rough-ins and make final connections to equipment furnished by the Equipment Contractor or the Owner.
- B. Provide piping, valves, ductwork and specialties as required, and as specified under Sections of these Specifications.

1.02 EQUIPMENT CONNECTIONS

- A. Make final connections to equipment. Coordinate rough-in locations with other Contractors.
- B. Refer to approved equipment drawings for exact rough-in sizes and locations.

PART 2 PRODUCT (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

## **ELECTRICAL SPECIFICATIONS**

### **INDEX**

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<b>16070</b>	<b>COORDINATION BETWEEN TRADES</b>
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<b>16500</b>	<b>LIGHTING FIXTURES, LAMPS AND BALLASTS</b>
<b>16900</b>	<b>EQUIPMENT HOOK-UP AND FINAL CONNECTION</b>
<b>16915</b>	<b>LIGHTING CONTROLS</b>

## **SECTION 16010 - ELECTRICAL GENERAL REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Furnish all materials, labor, tools, transportation, incidentals and appurtenances to complete in every detail and leave in working order all items of work called for herein or shown on the accompanying drawings.
- B. Include any minor items of work necessary to provide complete and fully operative electrical system connections.
- C. By submitting a bid, the Contractor certifies that:
  - 1. The Contractor has visited the site and is satisfied that he understands all site conditions that may have an effect on their bid price, with the sole exception of those items, which they specifically are taking exception to in writing in his Bid.
  - 2. The Contractor fully understands the make-up, construction, and operation of all systems and equipment he is bidding on and that he has included in his price all materials, supplies, accessories, and services necessary to make these systems complete and operational, whether such materials, supplies, and services are explicitly shown on the Drawings or included in these specifications, or only implied by the clear intent of these Documents for the Contractor to provide a complete and fully operational system as part of the scope of work undertaken by this Contractor.
- D. Electrical Contractor shall provide temporary electrical service. Refer to Division 1.

#### **1.02 WORK DESCRIBED ELSEWHERE**

- A. All work included under this heading is subject to the Bidding Requirements, General Conditions, Special Conditions, Owner's Conditions to Contract and General Requirements, and General Requirements written for this entire Specification, whether attached to this part or not, and the Contractor is notified to refer thereto as an integral part of his contract work.
- B. The Contractor is responsible for becoming thoroughly familiar with all Division Drawings and Specifications prior to bidding so that the entire scope of work is clear with regard to Electrical requirements of equipment, etc. The same applies to General Contract items, which have Electrical connections.

#### **1.03 RESPONSIBILITY**

- A. The Engineer does not supervise, nor is engaged in, construction. The Engineer has no control over, or no charge of, and therefore is not responsible for construction means, methods, techniques, sequences or procedures, or for safety, precautions and programs in connection with the work. These are solely the Contractor's responsibility under the contract for construction.

#### 1.04 GENERAL REQUIREMENTS

- A. The Electrical Contractor must read the entire Specifications covering other branches of work. They are responsible for coordination of their work with work performed by other trades.
- B. Consult all contract Drawings which may affect the location of any equipment or apparatus furnished under this work and make minor adjustments in location as necessary to secure coordination.
- C. The layout shown on the Drawings is based on a particular make of equipment. If another make of equipment is used which requires modification or changes of any description from the Drawings or Specifications, Contractor shall be responsible, as a part of this work for making such modifications and changes, including those involving other trades, with the cost thereof included in their Bid. (The Contractor is responsible for the dimensional corrections of all items of equipment he intends to utilize, and shall coordinate same with other trades, Drawings, etc. to avoid conflicts.) In such case, Contractor shall submit Drawings and Specifications prior to starting work showing all such modifications and changes. His proposal shall be subject to the approval of the Architect and Engineer.
- D. System layout is schematic and exact locations shall be determined by structural, existing and other conditions. This shall not be construed to mean that the design of the system may be arbitrarily changed. The equipment layout is to fit into the building as constructed and to coordinate with the equipment included under other Divisions of work.
- E. Contact the Architect immediately if you notice any discrepancies or omissions in either the Drawings or the Specifications or if there are any questions regarding the meaning or intent thereof.
- F. Submit all changes, other than minor adjustments, to the Architect for approval before proceeding with the work.
- G. The Contractor is required to visit the site and fully inform himself concerning dimensions, existing conditions and all other conditions affecting the scope of work. Failure to visit the site shall not relieve the Contractor from any responsibility in the performance of his work.
- H. All workmanship is to be of the highest quality in accordance with the best practices of the trade by craftsmen skilled in this particular work.
- I. Contractor is to have a competent superintendent in charge of the work installed under this Contract. Superintendent is to be experienced in this type of work.

#### 1.05 STANDARDS OF QUALITY

- A. Provide quality work conforming to the best accepted practices and standards of the trade. Further definition of quality is given by reference to various laws, codes, standards, and regulations.

- B. Material and equipment installed under this Contract shall be new, undeteriorated, and of a quality not less than the minimum specified. All equipment and conductors shall be certified, listed or labeled by UL. If UL does not certify an associated piece of equipment, then a nationally recognized testing laboratory such as ETL shall be permissible and shall bear the label. If equipment or conductors are of a type that no testing lab lists or labels, then a safety evaluation must be performed at the supplier's expense by the inspecting authority or another Federal, State or municipal agency.

#### 1.06 PERMITS, INSPECTIONS AND CODES

- A. File all Drawings, pay all fees and obtain permits and certificates of inspection relative to this work.
- B. Completed installation shall confirm with all applicable Federal, State and Local Laws, Codes and Ordinances including but not limited to the latest editions of the following:
  - 1. Ohio Basic Building Code (OBBC)
  - 2. Specific Construction Safety Requirements, State Industrial Commission
  - 3. National Electrical Code (NFPA 70)
  - 4. Life Safety Code NFPA 101
  - 5. Occupational Safety and Health Act (OSHA) of 1971 and all amendments thereto
- C. All laws and codes having jurisdiction over this project are deemed to be included in their entirety as a part of these Specifications. Also any other laws, codes, standards, or regulations referenced herein are deemed to be included in their entirety.
- D. Work must be performed by licensed Contractors as required by Local and State Codes.
- E. Contractor arranges for and includes in his bid, inspection of this work by ONE of the following:
  - 1. Local Code Authority
  - 2. State Code Authority
  - 3. Certified Private Inspection Agency

#### 1.07 DRAWINGS

- A. Drawings are schematic and show approximate locations of electrical equipment. Exact locations shall be coordinated with other Contractors and verified in the field. ( It shall be part of the Contractor's responsibility to check and verify the physical size of the specified equipment they intend to utilize.)
- B. The Drawings indicate required size and point of termination of pipes and ducts and suggest proper routes to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that Drawings indicate all necessary offsets, and it shall be the work of this Contractor to make the installation in such a manner as to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear, without further instructions or cost to the Owner.
- C. Significant deviations from Drawings must be approved by the Architect.
- D. The Architect reserves the right to make minor changes in location which do not

require additional labor or material up to the time of roughing-in without additional cost. The Architect shall determine what is "significant" and what is a "minor change". No cost shall be added to the Contract for a minor change.

- E. If a conflict occurs between the Drawings and Specifications, the Contractor shall immediately call it to the attention of the Architect, who will determine which interpretation shall take precedence.
- F. If a typical plan or detail is shown that requires a reversed installation on the job site, the Contractor shall be responsible for the installation as part of this contract.

#### 1.08 EXAMINATION OF SITE

- A. Certain existing conditions affect the manner or sequence of the performance of work. Existing services, structures and operating schedules need to be reviewed to facilitate the installation of the work. Coordinate the scheduling of the work with existing operations.
- B. Visit the site of the proposed project. After the Contract is signed, no allowance will be made for lack of knowledge of the project conditions.
- C. Verify and reconcile work required by the Contract Documents with conditions at the Site, prior to Bidding the project.
- D. Should any discrepancies be noted during the Bidding Period, the Contractor shall notify the Architect immediately, in writing, to permit the issuance of an addenda to prevent misunderstandings at a later date.

#### 1.09 UTILITIES

- A. Locate any existing utilities prior to construction. Make minor relocations to permit installation of work. Advise the Architect immediately of major conflicts to permit modifications of the Contract Documents, within the project limits on a site plan layout and submit to the Architect for review prior to any excavation. Where existing utilities conflict with new work, proposed modifications shall also be marked and identified on the site plan layout.
- B. Contractor shall record locations of all concealed utilities on the Record Drawings.
- C. Coordinate any utility service shutdown or outages with the Architect and the Owner. Shutdowns shall conform to all utility company requirements. Avoid inconveniencing the Owner and provide temporary service during the curtailment, as required by the Architect or Owner. Provide 2 working days (minimum) advance notice to the Owner for any required utility outages.

#### 1.10 RECORD DRAWINGS

- A. Contractor shall maintain at the job site, one copy of Drawings which shall be used exclusively for recording the location of all installed Work.
- B. Record any changes in location of concealed boxes, circuiting, service runs and similar construction on a set of prints and deliver them to the Architect or upon completion of



the work.

- C. Record location and depth of concealed work carefully for future reference.
- D. At completion of the Project, Contractor shall deliver Record Drawings to the Architect.

#### 1.11 INSPECTION

- A. Contractor arranges for and includes his bid, inspection of this work by ONE of the following :
  - 1. Local Code Authority
  - 2. State Code Authority
  - 3. Certified Private Inspection Agency

#### 1.12 GUARANTEE

- A. Contractor shall guarantee his equipment, workmanship and materials for a period of one year from date of substantial completion. Should defects develop within this guarantee period, the Contractor shall, upon written notice, remedy the defects and reimburse the Owner for all damage to other Work caused either by the defects or during the work of correcting same.
- B. Refer also to Division 1 and any individual Sections which define the starting date of the guarantee period or discuss either additional warranty requirements or extended warranties beyond the standard period.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Furnish new and un-deteriorated materials of a quality not less than what is specified.
- B. Contractor to furnish and install only those brands of equipment mentioned specifically or approved as alternates.

#### 2.02 EQUIPMENT AND APPROVAL

- A. The selection of materials and equipment to be furnished shall be governed by the following:
  - 1. Where trade names, brands of manufacturer of equipment or materials as listed in the Specification, the exact equipment listed shall be used in the bid. Where more than one name is listed, Contractor may select any one of the several brands specified.
- B. If Contractor wishes to bid other brand of material and equipment as equal to the material and equipment specified, Contractor must request approval to bid this material and equipment as equal in writing no later than two (2) weeks prior to the Bid date. If approval is granted, it will be listed as an approval equal by Addendum. NO VERBAL PERMISSION WILL QUALIFY. If approval is not granted, the material and equipment may be listed as a substitute.

- C. Whenever the Contractor furnishes equipment or materials other than the Design Base Manufacturer specified, the Contractor is responsible for the cost and coordination of all modifications required not only for his work, but also for the work of all other Trades affected.
- D. Where changes to other Trades work are required, this Contractor must include the additional costs of all such work in his bid. The Contractor shall investigate potential conflicts such as the following:
  - 1. Physical dimensions and weights.
  - 2. Code required working clearances.
  - 3. Connecting pipe sizes.
  - 4. Additional control and interlock wiring.
  - 5. Lug size and quantity.
  - 6. Increased wire size, fuse size, and motor control equipment size.
  - 7. Increase ventilation requirements
  - 8. Battery capacity.
  - 9. Sound levels of audible devices
  - 10. Increases withstand and interrupting rating of downstream equipment due to differences in overcurrent protective device characteristics. Where changes to design are required, the Contractor shall submit such changes to the Architect for approval.

## 2.03 OWNER FURNISHED EQUIPMENT

- A. Certain items of equipment are to be furnished by the Owner to the Contractor. The Contractor shall take delivery of such items and unload them from the truck at the job site.
- B. The Contractor shall protect and store such items as part of this Contract.
- C. The Contractor shall install these items in conformance with the requirements of the Specifications and Drawings and the supplier's recommended installation instructions.

## PART 3 - EXECUTION

### 3.01 CUTTING AND PATCHING

- A. Give the General Contractor locations and sizes of all openings required for the installation of equipment before construction and walls are started. If it becomes necessary to cut into new work because of the failure of Contractor to notify the General Contractor, then the General Contractor shall do any necessary cutting and patching at this Contractor's expense.

### 3.02 PROTECTION AND CLEANING

- A. Protect all equipment against damage from leaks or abuse and pay the cost of repair or replacement of equipment made necessary by failure to provide suitable safeguards or protection.
- B. After all equipment has been inspected and approved, thoroughly clean all equipment,

provided under this work.

- C. After all fixtures have been installed, thoroughly clean all fixtures, remove foreign matter and leave every part in acceptable condition, clean and ready for use. Install all new lamps and check for satisfactory operation.
- D. All scratches and chipped prime or finish coats on all electrical equipment are to be touched – up with matching paint. All dents in all electrical equipment are to be pounded out and the prime or finish coats touched-up. If damage is excessive, replacement will be required.

### 3.03 SCAFFOLDING, RIGGING, HOISTS AND TRANSPORTATION

- A. The Contractor shall provide scaffolding, staging, cribbing, tackle, hoists, and rigging necessary for placing his materials and equipment in their proper places in the Project.
- B. The Contractor shall pay costs for transportation of materials and equipment to the job site and shall include such costs in his proposal.
- C. Scaffolding and hoisting equipment shall comply with requirements of all applicable Federal, State, and Local Laws and Codes.

### 3.04 TESTS

- A. The Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction may require portions of the work to be inspected, tested or approved. These services shall be performed by approved agencies.
- B. The Architect must be notified of all scheduled tests and adjustments at least 48 hours before they are scheduled so he may witness same. If the Contractor performs any test or adjustment without the Architect present or without proper notification, the Contractor may be required to perform the test or adjustment a second time. All test schedules shall be coordinated with the Architect or Owner to minimize inconvenience.
- C. The Contractor shall bear all costs of such inspections, tests, or approvals.
- D. Should any of the Work be covered up or enclosed prior to all required inspections and approvals, Contractor shall uncover the Work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials and workmanship as are necessary for the approval of the Architect and at no additional cost to the Owner.

### 3.05 INSPECTION

- A. Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

### 3.06 MATERIAL SAFETY DATA SHEETS

- A. Material Safety Data Sheets (MSDS's) for all products and/or building materials that may contain hazardous or toxic chemicals shall be made readily available to Contractor, Employees and Owner's Personnel during construction. MSDS's to be forwarded to the Architect at start of and during construction.

### 3.07 CONDUIT SLEEVES

- A. Sleeves shall be installed in all walls and floors where conduits or raceways are to pass through.
- B. Sleeves through fire rated constructions shall be packed with calcium silicate, asbestos rope or silicone "RTV" foam. Sleeve rating shall match construction fire rating.

- C. Cut all openings with rotary type drill, or other method approved by Architect. Holes cut with pneumatic hammer will not be acceptable.

### 3.08 IDENTIFICATION NAMEPLATES

- A. Each piece of service equipment and individual distribution panel switches, all disconnects, starters, all power and lighting panels, all cabinets and pull boxes for auxiliary systems new or existing, shall be identified on the front cover or trim with its name and/or designation number or letter as shown on the Drawings and with the voltage available within the panel as indicated on the following example:

PANEL A  
120/240 VOLT, 1 PHASE, 3-WIRE

- B. Identification shall be in the form of laminated plastics nameplates, white, face, with the letters engraved into the black background, minimum 1/4" high. Plates shall be secured to each pieces of equipment with screws. No "Dymo" or similar tape type labels will be allowed

END OF SECTION

## **SECTION 16015 - SUBMITTALS**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. Contractor shall check all submittals for DIMENSIONAL CORRECTNESS, INTERFERENCES AND CONFORMANCE to specifications and plans. Stamp drawings "approved" and indicate when stipulated check has been made before forwarding them. Identify submittal data by project name and equipment identification number.
- B. Engineer's review of submittals or schedule shall not relieve the Contractor from responsibility for errors, omissions or other deficiencies or deviations in the submittals from the Contract Drawings or Specifications.
- C. Contractor shall send submittals early enough in project to allow ample time for Engineer's review without causing time delays or conflicts on the project.
- D. Furnish detailed drawings of the following:
  - 1. Lighting Fixtures, Lamps, and Lenses
  - 2. Panelboards

### **PART 2 PRODUCTS (NOT APPLICABLE)**

### **PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**

## **SECTION 16052 - ELECTRICAL TESTS, ADJUSTMENTS & INSPECTIONS**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. The Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction may require portions of the work to be inspected, tested, or approved. These services shall be performed by approved agencies.
- B. The Contractor shall bear all costs of such inspections, tests, or approvals.
- C. All tests and adjustments must be witnessed by the Architect or Engineer who shall be given at least 48 hours notice.
- D. Test lines to be concealed before burying or covering with new construction.
- E. Tests shall include:
  - 1. Proper operation of lights and equipment.
  - 2. Continuity of conduit system.
  - 3. Insulation leakage and impedance.
  - 4. Ground system resistance.
  - 5. Eliminate reverse rotation and single-phasing of motors.
  - 6. Amperage Phase Balance.
  - 7. Operating Voltage.
  - 8. Any sub-system tests described in other Sections of these Specifications or Recommended by manufacturer.
- F. Adjustments shall include load balancing of all electrical phases, at device, panels and switchboards.

#### **1.02 ARRANGEMENTS FOR INSPECTION**

- A. On-going inspections shall be performed by:
  - 1. State inspection authority having jurisdiction OR
  - 2. Private inspection agency.
- B. Contractor shall include cost of any testing costs and all fees in his Bid.

#### **1.03 CERTIFICATE**

- A. Furnish approved Certificate of Final Inspection.

### **PART 2 PRODUCTS (NOT APPLICABLE)**

### **PART 3 EXECUTION (NOT APPLICABLE)**

### **END OF SECTION**

## **SECTION 16058 - REQUIREMENTS FOR FINAL INSPECTION**

### **PART 1 GENERAL**

#### **1.01 REQUIREMENTS FOR FINAL INSPECTION**

- A. ALL OF THE FOLLOWING ITEMS MUST BE COMPLETED PRIOR TO FINAL INSPECTION. NO EXCEPTIONS WILL BE MADE AND NO FINAL PAYMENT WILL BE MADE UNTIL ALL ITEMS ARE COMPLETE.
1. Thoroughly clean all parts of electrical apparatus and equipment. Exposed parts which are to be painted shall be thoroughly cleaned of cement, plaster and other materials and all oil and grease spots shall be removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out.
  2. Exposed metal work shall be carefully brushed down with steel brush to remove rust and other spots and left smooth and clean.
  3. Clean fixtures, relamp with new lamps and check for lighting of all lamps. Incandescent lamps that have been used during construction shall be replaced with new lamps. Fluorescent lamps that are used during construction do not need to be replaced unless more than one-fourth of lamp life has been used. New lamps, however, shall be provided to Owner to match the total number of burning hours in cases where lamps have been used less than one-fourth of total lamp life (i.e., 100,000 operating hours total for all lamps are rated at 2,500 hours each, thus, Contractor shall provide an additional 40 lamps to Owner.)
  4. Submit copies of operating instructions and service manuals as required in Section 16055.
  5. Submit Certificate of Final Inspection.
  6. Submit As-Built Drawings.

### **PART 2 PRODUCTS (NOT APPLICABLE)**

### **PART 3 EXECUTION (NOT APPLICABLE)**

**END OF SECTION**



SECTION 16070  
COORDINATION BETWEEN TRADES

PART 1 GENERAL

1.01 SCOPE

- A. General Plumbing, HVAC, and Electrical Contractor shall coordinate their rough-in, service, and control requirements with each other.
- B. Electrical Contractor shall coordinate all of his work with the General Contractor and architectural drawings for location of all devices, fixtures and equipment prior to rough-in.
- C. All wiring required to power Plumbing or HVAC equipment shall be installed by the Electrical Contractor. All control and interlock wiring, regardless of voltage, is by the contractor furnishing the control device.
- D. If motors are furnished which require larger starters, safety switches, circuit breakers, fuse and/or branch circuit conductors than indicated, the Contractor furnishing the motors shall reimburse the Electrical Contractor for any cost differential.
- E. Electrical Contractor shall coordinate with others Contractors prior to installation of switchboards and panelboards to insure requirements of NEC Article 384-4 are met. The Contractor violating this requirement shall be responsible for the cost of all modifications required to comply to the satisfaction of the inspection agency for failure to meet the above code requirements.
- E. Final operation of equipment provided under Division 15 shall be the responsibility of the Division.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

END OF SECTION

SECTION 16100  
HANGERS, SUPPORTS, AND INSERTS

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install complete hangers, supports and concrete inserts as required for the installation of conduits, cabinets, transformers and equipment installed under Division 16.
- B. Provide all beam clamps, expansion anchors, threaded rod, framing steel and hardware as required.

1.02 MANUFACTURERS

- A. Hangers, supports, and inserts
  - 1. GTE/Unistrut International Inc.
  - 2. Superstrut
  - 3. Kindorf/Midland Ross Corporation
  - 4. Grinnell

PART 2 PRODUCTS

2.01 MATERIALS

- A. Conduits or raceway shall be securely supported and anchored with proper devices, using lead shields in walls or side of beams, expansion shields or other approved type device for direct down-pull loads. Minerallac type hanger shall be limited to above ceilings. Holes made in walls or ceilings for use with anchoring devices shall be covered by large steel washers. Include special hangers, as required. Minerallac type fittings shall not be permitted within 8 feet of the floor surface where exposed raceways are installed.
- B. Hangers shall be individual ring or clevis type, one hole straps or multiple trapeze hangers.
- C. In lieu of hanger rods, the use of hanger wire #12 or #8 for the suspension of luminous ceilings, lighting fixtures, and the like, shall have the approval of Architect/Engineer prior to installation.

2.02 STRUCTURAL ATTACHMENTS

- A. Concrete: Use Grinnell Fig. 285, or equal, Light Weight concrete insert for loads up to 400#; or Grinnell Fig. 282, or equal, Universal Concrete insert for loads up to 1430#.
- B. Steel Beams: Where pipe size is 2 inches or less, use Grinnell Fig. 87 or equal, Malleable iron C-Clamp and Retaining Clip. Where pipe size is over 2 inches, use Grinnell Fig. 229, or equal.
- C. Wooden Ceilings and Beams: Use Grinnell Fig. 153, or equal. Hanger Flange or equal.

- D. Intermediate Attachments: Continuous threaded rod shall be used wherever possible. No chain, wire or perforated strap shall be used. Up to 2 inches trade size pipe use 3/8 inch (min.) rod, 2-1/2 inches and larger use 1/2 inch (min.) rod.
- E. Pipe Attachments: For steel pipe use Grinnell Fig. 115 Ring and Turnbuckle Adjuster, or equal, or Fig. 260 Clevis, or equal.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Conduits shall be supported to meet the conditions of the work in a thoroughly workmanlike manner, using proper type and size straps, clamps, and hangers.
- B. Exposed conduits shall be installed parallel with or at right angles to building structure, fastened at least every 8 feet and at both sides of each outlet, except at one side only of conduit terminating outlets.
- C. Conduit risers shall be supported with friction clamps with two point bearing anchored to building construction and at every floor.
- D. The following hanger methods are not permitted:
  - 1. Wood plugs
  - 2. Perforated band iron
  - 3. Hook chain supports
  - 4. Bailing wire, etc.
  - 5. Minerallacs as denoted in Paragraph 2.01.1.
- E. Whenever possible, use supports, clamps, hangers, etc., designed especially for conduit.
- F. The maximum permitted load on hanger rod, plain or all-thread, shall be as follows:
  - 1. 1/4 inch size – 750 pounds.
  - 2. 3/8 inch size – 1000 pounds.
  - 3. 1/2 inch size – 2000 pounds.
  - 4. 5/8 inch size – 3000 pounds.
  - 5. The minimum size hanger rod permitted is 1/4 inch size.

END OF SECTION

## **SECTION 16110 - CONDUIT & FITTINGS**

### **PART 1 - GENERAL**

#### **1.01 SCOPE**

- A. All wiring to be run in steel thin wall (EMT). MC cable, PVC sch. 40 conduit, or rigid heavy wall steel conduit. Exterior exposed conduit and conduit in poured concrete or buried beneath concrete slabs which, shall be rigid heavy wall steel; below grade conduit may be sch. 40 PVC.. All conduits in concrete slabs shall have a minimum of 1" cover.
- B. Minimum conduit is 3/4" for EMT and rigid and 3/8" for flexible conduit.
- C. Flexible Steel Conduit shall be used for connections to VAV boxes, motors, vibrating equipment, and connections for which rigid EMT conduit is not applicable. A green grounding conductor shall be installed in each flexible conduit as specified in Section 16450, "System Grounding Requirements". All runs shall be terminated in insulated flexible conduit fittings in accordance with NEC article 350. Minimum size to be 1/2 inch.
- D. Liquid tight flexible steel conduit and appropriate fittings shall be used for connections to motors and vibrating equipment in areas exposed to the weather or likely to become damp.
- E. MC cable may be run concealed above ceilings and in walls.

#### **1.02 DESCRIPTION**

- A. Provide complete grounded conduit systems for all electrical conductors.
- B. All conduits shown on the Drawings shall meet National Electric Code requirements for the conductors enclosed.
- C. Conduit raceway systems shall be made mechanically tight and electrically continuous throughout. All metal raceway systems shall be grounded.

#### **1.03 QUALITY ASSURANCE**

- A. Conduit and Fittings shall be UL listed and labeled.
- B. Conduit shall be in accordance with National Electric Code Articles 345, 346, 350 and 351 as applicable.

#### **1.04 MINIMUM SIZE**

- A. 3/4"; 1" below slab or underground.

#### **1.05 ACCEPTABLE MANUFACTURES**

- A. Steel conduit, Allied, Steel Duct, Omega LTV, or an approved equal.
- B. Non-metric conduit-Carlon, Certanteed Tred, Condux or Natural Pipe.

## PART 2 - PRODUCTS

### 2.01 RIGID STEEL CONDUIT

- A. Conduit shall be hot dipped, zinc galvanized inside and out, with circular cross section, uniform wall thickness, continuously welded seams & chamfered threaded ends. Conduit shall be furnished in ten-foot standard lengths.

### 2.02 ELECTRICAL METALLIC TUBING (EMT)

- A. Conduit shall be hot dipped zinc galvanized inside and out, with circular cross section, uniform wall thickness continuously welded seams. Conduit shall be furnished in ten-foot standard lengths.

### 2.03 FLEXIBLE STEEL CONDUIT

- A. Conduit shall be hot dipped, zinc galvanized inside and out and made from one continuous length of high grade steel strip of uniform weight and thickness shaped into interlocking convolutions with smooth interior and exterior surfaces. Conduit shall be provided in standard coil lengths.

### 2.04 LIQUID-TIGHT FLEXIBLE STEEL CONDUIT

- A. Conduit shall be hot dipped, zinc galvanized inside and out and made from one continuous length of high grade steel strip of uniform weight and thickness shaped into interlocking convolutions with smooth interior and exterior surfaces. Conduit shall be provided in standard coil lengths.
- B. Conduit shall have a continuous PVC jacket enclosing it.

### 2.05 CONDUIT FITTINGS

- A. All EMT fittings shall be galvanized malleable iron or steel. Connectors and couplings shall be threaded, set screw or compression type, concrete-tight.
- B. Conduit bodies shall be malleable iron, threaded for heavy wall conduit and compression or set screw type for EMT and intermediate conduit, with cadmium finish and cadmium plated sheet steel covers. Provide neoprene cover gaskets for conduit body covers exposed to the weather.
- C. Expansion fittings shall be O-Z/Gedney Type "AX" for rigid metal conduit and type "TX" for electrical metallic tubing. For intermediate metal conduit applications, a 15 inch minimum length of rigid metal conduit shall be used with a Type "AX" expansion fitting. Provide O-Z/Gedney type "BJ" bonding jumpers at all expansion fittings.
- D. Sealing fittings shall be Crouse Hinds type EYD or Appleton type EYD, with drain.
- E. Rigid and IMC conduit bushings shall be of the insulated type with phenolic thermosetting insulation molded to a hot dipped galvanized malleable iron body. Bushings on rigid and IMC conduit shall be of the set screw type.
- F. EMT fittings shall be of the insulated throat type.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Generally, all conduits shall be concealed and installed perpendicular to walls and floor. Exposed conduits will be permitted only on existing walls, similar unfinished spaces, overhead in areas without dropped ceilings or where specifically noted on the plans.
- B. Conduit shall be securely and rigidly fastened in place with approved pipe straps, wall brackets, conduit clamps, conduit hangers, threaded C-clamps, or ceiling trapeze. C-clamps and beam clamps shall have strap or rod-type retainers.
- C. Conduit support fastenings shall be by:
  - 1. Wood screws or screw-type nails to wood.
  - 2. Toggle bolts on hollow masonry units.
  - 3. Expansion bolts on concrete or brick.
  - 4. Machine screws, welded threaded studs, heat-treated or spring steel tension clamps on steel work.
  - 5. Nail-type anchors or threaded studs driven by a powder charge and provided with lock washers and nuts for concrete, brick or steel work.
- D. Conduit shall not be supported using wire or nylon ties.
- E. Conduit shall be independently supported from elements of the building and shall not rest on, nor be supported from suspended ceilings. Boxes shall be fastened to structure independently from conduit system.
- F. Avoid installing conduits within poured concrete construction such as slabs, beams and columns. Where it is absolutely necessary to imbed or locate conduits in concrete, the Electrical Contractor shall satisfy the following requirements:
  - 1. Conduit O.D. shall be less than  $\frac{1}{3}$  of the total thickness of concrete.
  - 2. Conduits shall be spaced no closer than three conduit diameters center-to-center.
  - 3. Imbedded conduits shall not displace enough concrete to significantly impair the strength of construction.
  - 4. Conduits are to be rigid steel only.
  - 5. Place conduits above the bottom reinforcement and below the top reinforcement in concrete slabs, and run conduits parallel to the main reinforcing steel in the slab.
- G. Lay out conduit system to avoid crossing building expansion joints. Where crossings are necessary, use expansion fittings.
- H. Exposed conduits rising from floor shall have a 3-inch high concrete curb, with

chamfered edges, encasing the conduits at the floor.

- I. All conduits shall be continuous from outlet to outlet or junction box, and installed complete before pulling conductors. Swab conduits free of dirt, grease and moisture before pulling conductors.
- J. Install bushings on all conduit ends. Fasten conduit to boxes and cabinets using locknuts. Provide two locknuts where required by the NEC, where insulating bushings are used and where bushings cannot be brought in to firm contact with the box.
- K. All conduits entering or leaving refrigerated or moisture-laden spaces shall be sloped away from equipment and secured with sealing fittings. Secure conduits with threaded hubs to prevent air circulation and condensation.
- L. Provide #12 AWG copper insulated pull wire in all empty conduits and cap ends.
- M. Maintain minimum clearances of 6 inches from parallel hot water piping and 4 inches from crossovers.
- N. Maximum conduit hangers spacing shall be as follows:

CONDUIT	SPACING
3/4" - 1-1/4"	8 ft.
1-1/2" - 4"	10 ft.

END OF SECTION

## **SECTION 16115 - PULL, JUNCTION AND OUTLET BOXES**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. Outlets to be provided for devices, lighting fixtures, motors, and equipment connections, systems equipment connections, special outlets, and as otherwise required.
- B. Outlet boxes shall be of sufficient size to provide free space for all conductors enclosed in the box. Boxes shall be not less than the minimum size required by NEC Article 370 for the number and size of conductors contained within.
- C. Pull or junction boxes to be provided in all raceway systems where required to avoid an excessive number of bends, to facilitate wire pulling, or to afford required access to the raceway system. Maximum distance between boxes in raceway systems shall not exceed 100 feet.
- D. Pull and junction boxes shall provide adequate space and dimensions for the installation of conductors in accordance with NEC Article 370.
- E. All pull and junction boxes below 20'-0" above finished floor shall be type "FS".

### **PART 2 PRODUCTS**

#### **2.01 PULL AND JUNCTION BOXES**

- A. Pull and Junction Boxes: Provide galvanized code-gauge sheet steel junction and pull boxes, with screw-on covers, or types, shapes and sizes, to suit each respective location and installation.
- B. Concealed pull or junction boxes to be flush in finished walls, located near the floor and provided with flush type covers; blank device plates, in case of outlet type boxes and flat plates prime painted and secured with flat head screws in the case of larger boxes. Surface junction boxes in utility areas to be without knockouts, to have close fitting screw covers and to be finished in medium gray enamel.
- C. Boxes exposed to the weather to be weatherproof type as required by NEC.
- D. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knock-out closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes to suit respective uses and installation.

#### **2.02 OUTLET BOXES**

- A. Interior Outlet Boxes: Provide galvanized flat rolled sheet steel interior outlet wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation; construct with stamped knockouts in back and sides, and



with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices. Through wall boxes shall not be used.

- B. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations. Choice of accessories is Installer's option.
- C. Weatherproof Outlet Boxes: Provide corrosion-resistant cast-metal, weatherproof outlet wiring boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit ends, cast-metal face plates with spring-hinged waterproof caps suitably configured for each application, including face plate gaskets and corrosion-resistant fasteners.
- D. Lighting outlet boxes to be standard 4-inch octagonal, 1-1/2 inches minimum deep boxes.
- E. Flush device boxes in masonry walls to be masonry boxes designed for the purpose, or 4 in. sq. boxes with raised covers designed for masonry.
- F. Wiring device boxes for surface conduit work and located in potentially damp areas to be FS series cast boxes.
- G. Where outlet boxes are to be cast in concrete slabs, they shall be boxes designed for concrete installation.
- H. Flush device boxes in plaster or dry construction to be 4 in. sq., 2-1/8 inch deep boxes with plaster covers or gangable 2-1/2 inch deep boxes. Shallow 1-1/2 inch deep gangable boxes may be used only in demountable partitions and in other walls too thin for standard depth boxes.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Outlet Boxes
  1. All outlet boxes upon which lighting fixtures are to be installed, to be equipped with 3/8 inch fixture studs.
  2. All boxes to be rigidly supported from building structure independent of the conduit system. Boxes cast into masonry or concrete are considered to be rigidly supported. Framing members of suspended ceiling systems shall not be permitted as a support.
  3. Pull and junction boxes to be located in utility areas or above accessible ceiling systems wherever possible. Boxes located in exposed areas shall be brought to the attention of the Architect prior to installation.
  4. Pull and junction boxes to be sized in accordance with the NEC for both contained conductors and conduit entrances and exits.
  5. Fasten boxes rigidly to structural surfaces, or solidly imbed electrical boxes in concrete or masonry.

6. Boxes not otherwise accessible in ceilings and walls shall be made accessible by an 18" x 18" or large hinged door access panels.
7. Provide watertight boxes, slip expansions or bonding jumpers where dictated by construction conditions.

END OF SECTION

## **SECTION 16120 - WIRE AND CABLE**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. Furnish and install all electrical conductors for feeders, branch circuit wiring and control wiring.

#### **1.02 QUALITY ASSURANCE**

- A. Wire and cable furnished shall be in accordance with the following standards where applicable:
  - 1. UL Standard 44 for rubber insulated wires and cables.
  - 2. UL Standard 83 for thermoplastic insulated wires and cables.
  - 3. UL Standard 817 for flexible cords and cables.
  - 4. UL Standard 1569 for Type MC cable.
- B. Wire and cable shall be in accordance with NEC Articles 310, 333 and 334 as applicable.
- C. Wire and cable shall be identified by surface markings indicating manufacturer, size, metal type, voltage rating, UL listing and cable type.

#### **1.03 ACCEPTABLE MANUFACTURERS**

- A. Pirelli, Southwire, Clifford, American, Canadian Wire, Triangle, Rome, Anaconda.

### **PART 2 PRODUCTS**

#### **2.01 TYPE "THHN/THWN" WIRING**

- A. Wire to be single conductor annealed uncoated copper with PVC insulation and nylon jacket. Insulation shall be heat and moisture resistant with light stabilized jacket. Wire shall be rated 600 volt, 90 degrees C in dry locations, 75 degrees C in wet locations.
- B. Conductors No. 10 AWG and smaller may be solid; No. 8 AWG and larger shall be stranded.

#### **2.02 TYPE "XHHW" WIRING**

- A. Wire to be single conductor annealed uncoated copper with heat and moisture resistant thermosetting cross-linked polyethylene insulation. Wire shall be rated 600 volt, 90 degrees C in dry locations, 75 degrees C in wet locations.

#### **2.03 SPLICES**

- A. Splices in No. 10 AWG and smaller wire shall be made with insulated connectors with

metallic coil springs and contoured wings such as 3M "Scotchlok", Ideal Co. "Wing Nut", Thomas and Betts Co. "Piggy" connectors, or with mechanically crimped sleeves as manufactured by T&B or Ideal Co., which shall be insulated with pressure sensitive vinyl plastic electrical tape equal to Scotch No. 33 or No. 88.

- B. All taps, terminations or splices, size No. 8 and larger shall be made with bolted-type pressure or compression connectors. Connectors shall be compatible with the conductor material. Insulate connectors with electrical tape to 150% of the insulating value of the conductor insulation. The tape shall be insulating properties equivalent to the conductor.

## PART 3 EXECUTION

### 3.01 APPLICATION

- A. All branch circuits, feeders and control wiring shall be type "THHN/THWN".
- B. Unless otherwise noted, minimum wire size for lighting and power branch circuits shall be No. 12 AWG and for control and auxiliary systems No. 14 AWG. Wire size for branch circuit homeruns shall be as indicated in the panelboard schedules. Remainder of branch circuit to be No. 12 AWG, unless noted otherwise.

### 3.02 INSTALLATION

- A. Install electrical cables, wires and connectors as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard Installation", and in accordance with recognized industry practices.
- B. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.
- C. No wire may be pulled until masonry and concrete is in place. Free ends and loops at boxes and enclosures are to be pushed back in box and protected by blank covers or other means until the interior painting and decorating work is completed.
- D. Leave at least 6 inches of free conductor at all outlets except where conductors are intended to loop without joints through outlets for fixtures or wiring devices hookups.
- E. Wire color and code shall be used as follows:

#### 120/240 Volt

Phase A	Black
Phase B	Red
Neutral	White
Ground	Green

- F. Provide a separate neutral conductor for each branch circuit.
- G. Number of branch circuit conductors including switch legs and travelers shall not exceed nine conductors. Conductors shall be derated in accordance with NEC Article 310 when more than three current carrying conductors are installed in a raceway.
- H. Branch circuits shall be connected as numbered on the Drawings. Test and permanently tag by circuit number each circuit wire, except neutrals in panelboard gutter before connecting to panelboard. Numbered adhesive tapes may be used at Contractor's option.
- I. Use pulling compound or lubricant, where necessary; compound must not deteriorate conductor or insulation.
- J. Use pulling means, including fish tape, cable or rope which cannot damage raceway.
- K. Conductor splices shall be kept to a minimum.
- L. Electrical Contractor shall provide cords and plugs for equipment furnished by General Trades Contractor which is intended or shown for connection to a receptacle but not furnished with the equipment.

END OF SECTION

SECTION 16140  
WIRING DEVICES

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install wiring devices and plates as specified herein and as shown, described or required on the Drawings.
- B. Specialty switches and receptacles required for auxiliary systems shall be specified under those Sections or as shown on the Drawings.
- C. All devices shall be ganged together where shown or noted grouped on the Drawings.

1.02 QUALITY ASSURANCE

- A. Wiring devices shall be UL listed and labeled.
- B. Wiring devices and plates shall be furnished by one of the manufacturers listed. No mixing of manufacturer's products shall be permitted unless otherwise noted herein or on the Drawings.

1.03 MANUFACTURERS

- A. Wire devices and plates:
  - 1. Arrow-Hart
  - 2. Pass & Seymour
  - 3. Hubbell Electric
  - 4. Leviton
  - 5. General

1.04 FINISH

- A. In general, all devices and coverplates shall be ivory. Specific areas of the space will require additional colors. Coordinate colors of all devices and plates with the Architect or Engineer.

PART 2 PRODUCTS

2.01 SWITCHES

- A. Switches shall conform to NEMA Heavy Duty Standards and shall be specification grade, general use AC quiet type, 20 ampere, 120-277 volt, back and side wired with ivory handles, unless noted otherwise, Arrow Hart 1991I Series. Switches wired on emergency system shall have red handles.

- B. Switches shown on the Drawings adjacent to doors with glass walls or windows shall actually be located in the door frame, unless noted otherwise. Switches shall be 20 ampere, 120-277 volt with ivory handles, end wired, Arrow Hart QST Series.

## 2.02 RECEPTACLES

- A. All convenience and power receptacles shall conform to NEMA Heavy Duty Standards and shall be specification grade, grounding type.
- B. Convenience duplex receptacles shall be 20 ampere, 125 volt, back and side wired, 3 wire grounding.
- C. Safety type grounding duplex receptacles shall be 15 amperes, 125 volt, 3 wire grounding.
- D. Ground-fault circuit interrupting duplex receptacles shall be 20 ampere, 125 volt "feed-thru" type.

## 2.03 PLATES

- A. Plates for flush devices in interior partitions shall be thermoplastic with a smooth finish. Color of thermoplastic plates shall match device color.
- B. Plates for flush devices on concrete block walls shall be specification grade "Jumbo" plates, to match other plates.
- C. Plates for devices in surface fittings shall be cadmium plated steel surface covers. Covers shall fit without overlap and have round corners.
- D. Plates for specialty switches and receptacles required for auxiliary systems shall be stainless steel, furnished and specified with the device.
- E. Plates for future system outlets shall be blank plates matching device plates in quality and finish.

## 2.04 COVER ASSEMBLIES

- A. Wiring devices subject to wet locations shall be provided with NEMA 3R cover assemblies UL listed for wet locations while in use. Cover assemblies shall use a vertically-lifting "canopy" to protect the wiring device(s). Cover assemblies shall be standard size, one or two gang as required with gasket.

## PART 3 EXECUTION

### 3.01 APPLICATION

- A. Install wiring devices as indicated, in compliance with the manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices to fulfill project requirements.
- B. Coordinate installation of wiring devices with other trades, including painting, electrical box and wiring work, as necessary.
- C. Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt and debris.
- D. Delay installation of wiring devices until wiring work is completed.
- E. Delay installation of wiring devices and wall plates until after painting work is completed. Wiring devices may be installed prior to painting where protective plastic covers are used.
- F. Upon installation of wall plates and receptacles, advise Contractor regarding proper and cautious use of convenience outlets. At time of Substantial Completion, replace those items which have been damaged, including those burned and scored by faulty plugs.
- G. Provide electrically continuous, tight grounding connections for wiring devices, as required by NEC Article 250-74.
- H. Devices shown grouped on the Drawings shall be ganged together.
- I. Install device plates on all devices. Wiring devices grouped together shall have gang plates where compatible.
- J. All wiring devices and covers shall be clean and free of paint upon completion of work.
- K. Receptacle plates shall be labeled on the back with panelboard and circuit number.
- L. Switches shall be installed under a common wall plate where possible.

END OF SECTION



SECTION 16440  
DISCONNECT SWITCHES AND FUSES

PART 1 GENERAL

1.01 DESCRIPTION

- A. Provide disconnect switches as shown and as required by code.
- B. Provide fuses for disconnect switches, combination starters, and other circuits, where indicated.
- C. Provide overcurrent protection for equipment and wiring as required by Article 240 of the National Electrical Code.

1.02 QUALITY ASSURANCE

- A. Switches: NEMA Standards KS1-1975, UL-98, ANSI-C33.64.
- B. Fuses: UL-198.

1.03 RATINGS AND CAPACITIES

- A. Refer to Drawings for ampacity, number of poles, voltage rating and NEMA Type.

1.04 ACCEPTABLE MANUFACTURERS

- A. Switches: Square D, ITE, Cutler-Hammer, Siemens, or General Electric.
- B. Fuses: Bussman, Gould-Shawmut, or Littlefuse.

PART 2 PRODUCTS

2.01 DISCONNECT SWITCHES

- A. NEMA Heavy Duty Type HD, steel enclosure, dual cover interlocks, horsepower-rated plated contacts, indicating handle, provisions for padlocking.
- B. Switches must be NEMA Type approved for environmental conditions prevailing.
- C. Provide Class R rejection fuse clips.
- D. Toggle-operated disconnect switches equal to Square D Class 2510 will be acceptable for unfused loads less than 16 amperes.

## 2.02 SWITCH FUSES

- A. General: NEMA Class RK-1 dual element, current-limiting, 200,000 ampere RMS symmetrical interrupting capacity.
- B. 600 Ampere and Below:
  - 1. 250 volt: Buss Type KRP-C "Hi-Cap".

## PART 3 EXECUTION

### 3.01 SWITCH INSTALLATION

- A. Locate switches to provide access and minimum 3 ft. clearance in front and minimum 2 ft. grade.
- B. Coordinate location with other prime contractors.

### 3.02 INSTALLATION OF FUSES

- A. Coordinate fuses selection with the ampere draw and type of load being served.
- B. Install fuse reducer in all existing or new fusible switches as required.
- C. Install spare fused cabinet with (3) spare fuses for each size rating, fuse pullers, and a frame typewritten list of fuse sizes. Install adjacent to switchboard.

END OF SECTION

SECTION 16450  
SYSTEM GROUNDING REQUIREMENTS

PART 1 GENERAL

1.01 SCOPE

- A. Furnish and install a complete wired grounding system for electrical equipment and circuits as shown on the Drawings and described generally below.
- B. All components of the electrical system shall be grounded and bonded including: raceways, enclosure receptacles, motors, controllers, panelboards, switchboards, contactors, lighting fixtures, telephone systems, and all other electrical subsystems.

PART 2 PRODUCTS – (NOT APPLICABLE)

PART 3 EXECUTION

3.01 GROUNDING INSTALLATION

- A. All grounding conductors shall be GREEN, where exposed in panel, switchboard, outlet and boxes.
- B. All enclosures and non-current carrying metals to be grounded. Conduit system to be electrically continuous. All lock nuts must cut through enameled or painted surfaces on enclosures. Where enclosures and non-current carrying metals are isolated from the conduit system, use bonding jumpers with approved clamps.
- C. RUN A SEPARATE GROUNDING CONDUCTOR IN EACH CONDUIT, #12, minimum or as shown on Drawings. For panel feeders bond the grounding conductor to the conduit, where entering and leaving the conduit. All ground clamps shall be Penn-Union similar to "GPL" type. Conduit ground bushings shall be Thomas & Betts similar to #3800 Series with nylon insulated throat.
- D. All devices shall be bonded to a separate grounding conductor and to the conduit system. Use a bonding jumper between the outlet box and the device grounding terminal. Metal-to-metal contact between the device yoke and the outlet box is NOT acceptable as a bond for either surface mounted boxes or flush type boxes. All unktion boxes, outlet boxes and pull boxes shall be bonded to the conduit system.
- E. Feeders to motor driven equipment shall contain a wired ground as scheduled on the Drawings.
- F. System Grounding Connections:
  - 1. The service entrance conductors shall be grounded in accordance with NEC Article 250-23. The grounding electrode conductor shall be connected to the grounded service conductors at the terminal or bus at the main service disconnecting means. A grounding

connection shall not be made to any grounded circuit conductor on the load side of the service disconnecting means.

G. Enclosure and Equipment Grounding:

1. Metal enclosures or raceways for conductors or equipment shall be grounded.
2. Exposed noncurrent-carrying metal parts of fixed equipment likely to become energized shall be grounded.
3. Exposed noncurrent-carrying metal parts of switchboard frames and structures, motor frames, enclosures for motor controllers, and lighting fixtures shall be grounded.

H. Method of Grounding:

1. Equipment grounding connections at service equipment shall be made by bonding the equipment grounding conductor to the grounded service conductor and the grounding electrode conductor.
2. The grounding electrode conductor shall connect the equipment grounding conductors, the grounded service conductors and the service entrance enclosures to the grounding electrode.
3. A main bonding jumper shall connect the equipment grounding conductors and the service equipment enclosure to the grounded conductor within the service equipment.
4. Circuits shown with isolated ground devices shall have a completely separate isolated grounding conductor run in addition to equipment grounding conductor.

I. Bonding:

1. Bonding shall be provided and conform to all requirements of NEC Article 250 G.

J. Grounding Electrode System: It shall consist of all the following components exothermically bonded together:

1. The main domestic water service pipe ahead of any meter, and within five feet of entry into building.
2. The Steel Frame of the Building: At a column nearest to the service entrance equipment and at a point accessible to view.
3. Driven Ground Rods – Two ground rods, installed vertically into earth near the service entrance point and spaced 20 feet apart.

END OF SECTION

## **SECTION 16470 - CONTROL AND INTERLOCKING WIRING**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. Provide all power and control and interlock wiring and conduit, relays, control transformers and auxiliary contacts as required to provide complete and operating control systems.
- B. Relays, control power transformers, and wiring inside temperature control panels shall be the responsibility of the Division 15 Contractor.
- C. Systems shall be wired to perform the operation required in Section 15900, "HVAC Controls".

#### **1.02 DESCRIPTION OF CONTROL WIRING REQUIREMENTS**

- A. Thermostats: Provide control wiring.
- B. VAV box control wiring.

#### **1.03 WIRING DIAGRAMS**

- A. It will be the responsibility of the Division 15 Contractor to provide a full set of detailed wiring diagrams for the use of the Division 16 Contractor.

#### **1.04 ADDITIONAL REMARKS**

- A. This Contractor will be responsible for providing any additional relays, auxiliary contact, control power transformers and fuses as required to effect the proper sequence of operation of each equipment subsystem.

### **PART 2 PRODUCTS – (NOT APPLICABLE)**

### **PART 3 EXECUTION – (NOT APPLICABLE)**

**END OF SECTION**

## **SECTION 16500 - LIGHTING FIXTURES, LAMPS AND BALLASTS**

### **PART 1 GENERAL**

#### **1.01 SCOPE**

- A. Furnish and install lighting fixtures and in-line fuses as herein specified and shown on the Drawings.
- B. Lighting fixture manufacturer and model numbers shall be as scheduled on the Drawings. Fixtures not bearing a letter symbol shall match adjacent fixtures in space.
- C. Furnish and install all necessary mounting brackets, hardware, concrete mounting bases, etc. as required for a complete installation.

#### **1.02 QUALITY ASSURANCE**

- A. Lighting fixtures shall be UL listed and labeled, and certified by ETL & CBM.

#### **1.03 MANUFACTURERS**

- A. Lighting fixtures:
  - 1. Refer to Lighting Fixture Schedule on the Drawings.
  - 2. Only manufacturers listed on lighting fixture will be approved.
  - 3. Provide safety chains on ballast and optical assemblies of all suspended HIP fixtures.
  - 4. All fixtures to be installed on walls in halls, corridors, passage ways and aisles maintained between 27"-88" AFF shall protrude no more than 4" into space is to comply with 1992 Americans with Disability Act.
- B. Lamps:
  - 1. All lamps are LED per specifications on schedule.

## PART 2 PRODUCTS

### 2.01 LIGHTING FIXTURES

- A. Lighting fixtures shall be as scheduled on the Drawings.
- B. Recessed incandescent fixtures shall have integral thermal protection.

### 2.02 LAMPS

- A. Unless specifically indicated otherwise, all incandescent lamps shall be inside frosted 120 volt.
- B. Unless specifically indicated otherwise, all high intensity discharge lamps to be phosphor coated or have diffusions bulb finish.

### 2.03 ACRYLIC LENS

- A. Unless otherwise noted, all lenses on fluorescent fixtures to be acrylic. (Minimum thickness of .125 inch.)

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Fixtures to be securely mounted to elements of the building structure such that fixtures will be square, plumb, and rigid, and will not fall or sag. This Contractor shall verify the actual suspension system to be used and make all adjustments in fixture installation provisions occasioned thereby. Provide plaster flanges where required for plaster ceilings.

SECTION 16900  
EQUIPMENT HOOK-UP AND FINAL CONNECTION

PART 1 GENERAL

1.01 DESCRIPTION

- A. Contractor shall provide rough-in and final connection for each piece of equipment requiring power, including, but not limited to, the following:

1. All heating, ventilating, and cooling equipment, including exhaust fans and similar items.

1.02 COORDINATION

- A. This Contractor is responsible for coordinating the electrical requirements of equipment with the supplying Prime Contractor or Manufacturer.

PART 2 PRODUCTS – NOT APPLICABLE

PART 3 EXECUTION - NOT APPLICABLE

END OF SECTION



## **SECTION 16915 LIGHTING CONTROLS**

### **PART 1 GENERAL**

#### **1.01 DESCRIPTION**

- A. Provide the following lighting controls:
  - 1. Occupancy Sensors

### **PART 2 PRODUCTS**

#### **A.01 OCCUPANCY SENSORS**

- A. Refer to drawings for specified occupancy sensors.
- B. Wall box sensors to be multi-technology type Leviton or equal by Hubbell Automation, or Wattstopper.

### **PART 3 EXECUTION**

#### **3.01 CONTACTORS**

- A. Mount contactors at locations shown on the Drawings and wire to exterior lighting circuits.

#### **3.02 Occupancy sensors**

- A. Mount at locations shown as close as possible but at least 3'-0" away from return or supply air register.
- B. Install all low voltage cabling in conduit where exposed and where above accessible ceiling the cabling must be plenum rated.

**END OF SECTION**



# BIDDER'S SUBSTITUTION REQUEST FORM

Dimensional Metals, Inc. – 58 Klema Drive North – Reynoldsburg, OH 43068 – 800-828-1510

Mark Lecky Architects

ARCHITECT

**668 S. Ninth St.**

STREET ADDRESS

**Columbus**

CITY

**614-621-9339**

PHONE

FAX

**Caledonia/ River Valley Public Schools**

PROJECT NAME

**OH**

STATE

**43206**

ZIP

**2022-233C**

PROJECT NUMBER

We submit for your Consideration the following Product in addition to the specified Product for the above Project:

As per Section

No.

**07411-5**

Paragraph No.

**2.1**

Specified

Product -

**Metal Roof Panel**

We submit our

**SL2016**

Panel System.

*(Attached you will find technical data and any laboratory tests, if applicable.)*

The following changes will take place to the Drawings and Specifications for the proposed substitution's proper installation:

- A. Dimension changes in drawings - *None*
- B. DMI will or will not pay for changes to the design, including engineering and detailing costs caused by the substituted product – *Not applicable*
- C. Effects on other installers - *None*
- D. Differences between our panel and panel specified – *none*
- E. Warranty differences - *None*

The undersigned states that the function, appearance, and quality are equivalent or superior to the specified Product.

Submitted By:

**Jeff Earley**

SIGNATURE

**Dimensional Metals, Inc**

COMPANY NAME

**58 Klema Drive North**

STREET ADDRESS

**Reynoldsburg**

CITY

**419.889.8427**

PHONE

**866.863.4334**

FAX

**OH**

STATE

**43068**

ZIP

## FOR ARCHITECT'S USE ONLY

☐ - ACCEPTED

☐ - ACCEPTED AS NOTED

☐ - NOT ACCEPTED

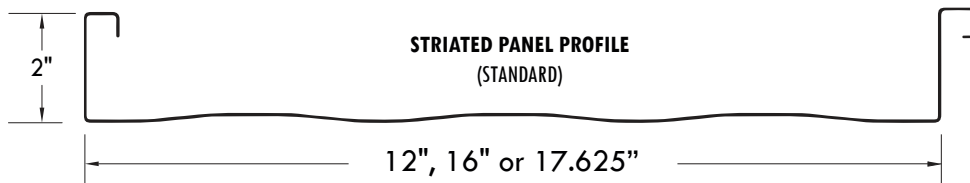
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BY

DATE

ADDITIONAL REMARKS

PUBLISHED IN ADDENDUM NUMBER -



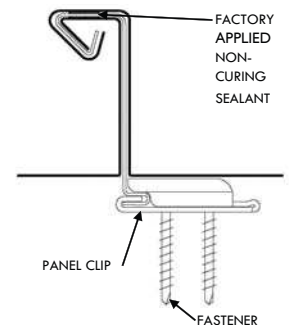
**SPAN-LOCK SL20** is a structural panel that is mechanically seamed during installation. The panel is an integral interlocking system by design which installs in one direction from a given starting point. The Span-Lock is a very flexible panel that works well with a wide range of building designs.

### Uses & Applications

Product uses include low to high slope roofing, vertical fascia, equipment screens, mansards, and wall panels. This system may also be installed on tapered roof areas.

### Advantages

- Factory Applied Non-Curing Sealant - for superior watertightness
- Mechanically seamed - may be installed on low slope applications down to 1/2:12 slope
- No Hand Seaming Required - built-in locking leg keeps the roof panel in place until ready to mechanically seam
- Multi-directional Mechanical Seaming - panel seaming simplified
- Expansion Clips - allows for thermal expansion and contraction
- Continuous Roll Formed Lengths - eliminates need for panel lap joints (4' min. panel length)
- Total System Warranties available - for total confidence

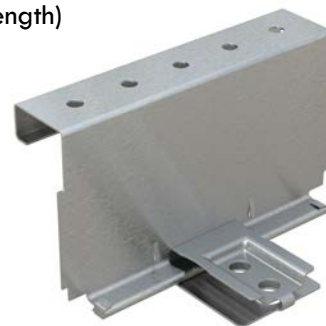


**Seam Cross Section**

### Performance Tested

- UL-580 Wind Uplift
- UL-2218 Impact Resistance
- ASTM E1592 Uniform Static Air Pressure
- ASTM E1646 Water Penetration
- ASTM E1680 Air Leakage
- ASTM E2140 Static Water Penetration

Please consult DMI for applicability of test reports for your project.



**Low Floating  
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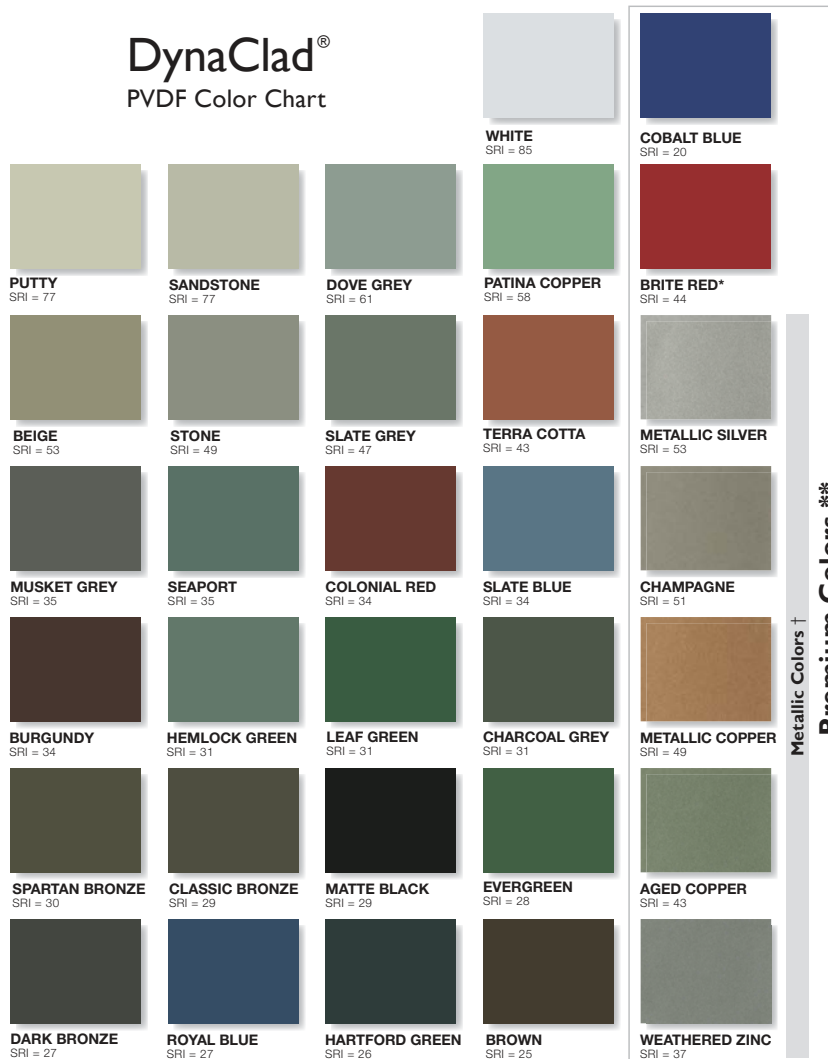
METAL ENVELOPE SYSTEMS SINCE 1988

Project Name: \_\_\_\_\_  
 Architect: \_\_\_\_\_  
 Installing Contractor: \_\_\_\_\_  
 General Contractor: \_\_\_\_\_  
 Specification Section: \_\_\_\_\_

Stiffener Profile



## DynaClad® PVDF Color Chart



### Custom Colors Available

Colors shown are samples and may vary slightly from actual material.  
 Please consult DMI Color Chart for stacking color availability.

†Metallic colors are directionally sensitive and therefore entire roof areas should be ordered at once time to ensure uniformity.

\*Brite Red has a clear coat. \*\*Premium colors carry an upcharge.

### Panel Width

12"  
 16"  
 18" (17.625")

### Clip

Low Floating  
 Fixed  
 Long Fixed (Custom Application)

### Substrate

24 ga. Galvalume®  
 22 ga. Galvalume®  
 .032 Aluminum  
 .040 Aluminum

16 oz. Copper  
 20 oz. Copper

### Embossed:

Consult DMI for minimum quantities, upcharges, set up fees and extended lead times

### Standard Finishes (N/A on Mill Finishes)

DynaClad® PVDF:  
 Acrylic Coated Galvalume (Acrylume®)  
 Clear Anodized Aluminum

### Premium Finishes\*

DynaClad® Metallic PVDF:  
 DynaClad® Brite Red PVDF  
 DynaClad® Cobalt Blue PVDF  
 DynaClad® Standard Color PVDF w/ Clearcoat:  
 DynaClad® Premium Color PVDF w/ Clearcoat:  
 Custom Color:

\*Premium Colors subject to minimum quantities, extended lead times and upcharges.  
 Consult DMI for details.

### Warranty

#### Finish

DynaClad® Paint Finish  
 Galvalume® 20 Year - 6 Month (Substrate)  
 Aluminum Sheet 2 Year (Substrate)

#### Watertight

DynaClad® Metal Roofing System:  
 DynaClad® Metal Roofing System NDL:

Since 1988 Dimensional Metals, Inc. (DMI) has specialized in the manufacturing of architectural metal roof and wall panel systems as well as fabricated architectural sheet metal for the construction industry. We are backed by decades of proven metal envelope design, dependable Technical Field Services, and an Engineering Department delivering sustainable solutions. You are sure to find the product that will best enhance your design.

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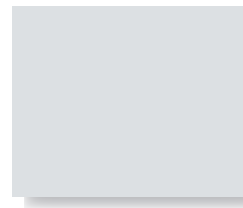
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METAL ENVELOPE SYSTEMS SINCE 1988



# DynaClad®

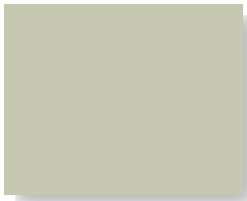
## PVDF Color Chart



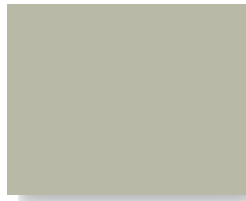
**WHITE**  
SRI = 85



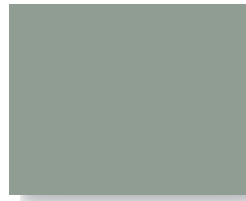
**COBALT BLUE**  
SRI = 20



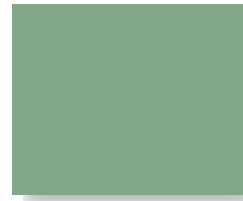
**PUTTY**  
SRI = 77



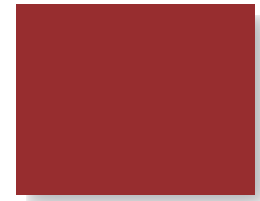
**SANDSTONE**  
SRI = 77



**DOVE GREY**  
SRI = 61



**PATINA COPPER**  
SRI = 58



**BRITE RED\***  
SRI = 44



**BEIGE**  
SRI = 53



**STONE**  
SRI = 49



**SLATE GREY**  
SRI = 47



**TERRA COTTA**  
SRI = 43



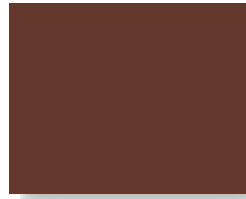
**METALLIC SILVER**  
SRI = 53



**MUSKET GREY**  
SRI = 35



**SEAPORT**  
SRI = 35



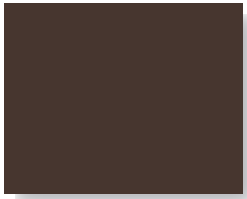
**COLONIAL RED**  
SRI = 34



**SLATE BLUE**  
SRI = 34



**CHAMPAGNE**  
SRI = 51



**BURGUNDY**  
SRI = 34



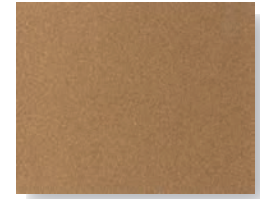
**HEMLOCK GREEN**  
SRI = 31



**LEAF GREEN**  
SRI = 31



**CHARCOAL GREY**  
SRI = 31



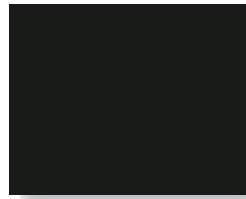
**METALLIC COPPER**  
SRI = 49



**SPARTAN BRONZE**  
SRI = 30



**CLASSIC BRONZE**  
SRI = 29



**MATTE BLACK**  
SRI = 29



**EVERGREEN**  
SRI = 28



**AGED COPPER**  
SRI = 43



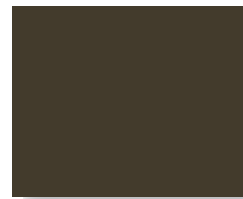
**DARK BRONZE**  
SRI = 27



**ROYAL BLUE**  
SRI = 27



**HARTFORD GREEN**  
SRI = 26



**BROWN**  
SRI = 25



**WEATHERED ZINC**  
SRI = 37

† Metallic Colors †

**Premium Colors \*\***

† Metallic colors are directionally sensitive and therefore entire roof areas should be ordered at one time to ensure color uniformity.

\*Brite Red has a clear coat. \*\* Premium colors carry an upcharge. SRI = Solar Reflectance Index.

Colors shown are samples and may vary slightly from actual material.

**CUSTOM COLORS ARE AVAILABLE**



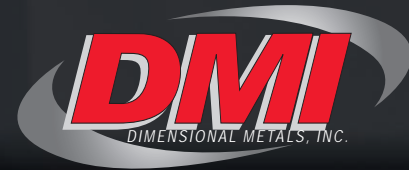
# PROVEN. DEPENDABLE. SUSTAINABLE.

## METAL ENVELOPE SYSTEMS SINCE 1988

800.828.1510

www.dmmetals.com

sales@dmmetals.com



**PRODUCT** - DynaClad® Prefinished Architectural Tension Levelled Coil and Flat Sheet is coated with a 70% Full Strength PVDF Paint Finish. The top side is coated with a polyester primer and a 70% full strength PVDF topcoat for a total mil thickness of 1.1 (± .1). The reverse side is a polyester primer and a polyester topcoat with a total dry film thickness of .55 (± .1).

### Substrates

#### Galvalume®

Consists of aluminum-zinc alloy coated (55% aluminum, 43.4% zinc, 1.6% silicon, nominal percentage by weight) carbon steel of commercial weight meeting ASTM 792.

#### HDG-90

Consists of hot-dipped galvanized steel base sheet of commercial weight (AISI G90 designation) meeting ASTM A653.

#### Aluminum

Consists of 3003/3105 H14 alloy aluminum base sheet of commercial weight meeting ASTM B209.

Stocked substrates are produced from 48" wide coil. Standard sized flat sheets are 48" X 120". Custom sized flat sheets can be produced in various widths and lengths with extended lead times and additional costs.

**WARRANTY** - A finish warranty covering color fade, chalking, and film integrity as well as a perforation warranty (Galvalume® only) covering base sheet integrity is available at no additional cost.

DYNACLAD® STOCKING COLOR/MATERIAL						
COLOR (IN ALPHABETICAL ORDER)	24 GAGE GALVALUME KYNAR 500	22 GAGE GALVALUME KYNAR 500	.032 ALUM. 3003/3105 H14 KYNAR 500	.040 ALUM. 3003/3105 H14 KYNAR 500	.050 ALUM. 3003/3105 H14 KYNAR 500	.063 ALUM. 3003/3105 H14 KYNAR 500
AGED COPPER	•		•			
BEIGE	•	•	•	•	•	
BRITE RED	•		•	•		
BROWN	•		•	•		
BURGUNDY	•		•			
CHAMPAGNE	•		•			
CHARCOAL GREY	•		•	•		
CLASSIC BRONZE	•		•	•		
COBALT BLUE	•		•			
COLONIAL RED	•		•			
DARK BRONZE	•	•	•	•	•	•
DOVE GREY	•	•	•	•		
EVERGREEN	•		•	•		
HARTFORD GREEN	•		•			
HEMLOCK GREEN	•		•			
LEAF GREEN	•		•			
MATTE BLACK	•		•	•		
METALLIC COPPER	•		•			
METALLIC SILVER	•		•			
MUSKET GREY	•		•	•		
PATINA COPPER	•		•	•		
PUTTY	•	•	•	•	•	
ROYAL BLUE	•		•	•		
SANDSTONE	•	•	•	•		
SEAPORT	•		•			
SLATE BLUE	•		•			
SLATE GREY	•	•	•	•	•	
SPARTAN BRONZE	•		•	•		
STONE	•		•	•		
TERRA COTTA	•		•			
WEATHERED ZINC	•		•			
WHITE	•	•	•	•	•	•

COLORS LISTED ABOVE ARE AVAILABLE ON ANY OF THE SUBSTRATES BUT WILL HAVE ADDITIONAL LEAD TIMES AND COST.

### STOCKED NON-PAINTED MATERIAL

HDG-90 24 ga, 22 ga, 20 ga, 18 ga, and 16 ga

ACRYLUME® 24 ga and 22 ga

MILL FINISHED ALUMINUM .032, .040, .050, and .063

CLEAR ANODIZED ALUMINUM .032 and .040

COPPER 16 oz. and 20 oz.

RHEINZINK® .7 mm, .8 mm, and 1.0 mm

STAINLESS STEEL TYPE 304 24 ga and 22 ga

DynaClad® is a registered trademark of Dimensional Metals, Inc.

Fluoropon® is a registered trademark of Sherwin-Williams.

Galvalume® is a registered trademark of BIEC International Inc. and some of its licensed partners.

Acrylume® is a registered trademark of USXC.

### PERFORMANCE SPECIFICATION

#### ABRASION RESISTANCE (ASTM D968)

Passed 80 Liters

#### ACCELERATED WEATHERING (ASTM D4587, G154)

5,000 hours with no chalking, blistering or loss of adhesion

#### CHEMICAL RESISTANCE (ASTM E1308)

No visible changes

#### ADHESION (ASTM D3359)

No coating removed

#### COLOR CHANGE (ASTM D2244)

After 2,000 hours color change less than 2 NBS units

#### FLAME TEST (ASTM E84)

Class A

#### FLORIDA EXTERIOR DURABILITY (ASTM G7, E2244 & D4214)

Less than 5 Δ units color change and chalk rating of less than 8

#### FORMABILITY / T BEND (ASTM D522 & D4145)

No adhesion loss on a 1/8" Mandrel and 2T bend

#### GLOSS (ASTM D523)

30% (±5%) at 60 degrees

55% (±5%) at 85 degrees

#### HUMIDITY (ASTM D2247)

2,000 hours Galvalume® and G-90

3,000 hours Aluminum

#### IMPACT (ASTM D2794)

No cracking or loss of adhesion

#### PENCIL HARDNESS (ASTM D3363)

HB Minimum

#### SALT SPRAY (ASTM B117)

No blisters or adhesion loss after 2,000 hours for Galvalume® & G-90

No blisters or adhesion loss after 3,000 hours for Aluminum

#### CYCLIC SALT FOG (ASTM D5894)

Acceptance

See dmmetals.com for test reports, thermal emittance, and SR values.



PROUDLY FINISHED WITH  
**SHERWIN-WILLIAMS**  
Coil Coatings



2020-01

# S-5!®

## The Right Way!

ColorGard® is the only snow retention system to be warranted for the life of the roof! Its unsurpassed holding strength and perfect color-match are guaranteed!



### ColorGard®

When snow accumulations begin to melt, the result can be catastrophic as the blanket of snow avalanches off the roof, dumping tons of snow onto anything in its path, damaging landscape, gutters, adjacent roofs, vehicles, and causing injury or death to passers-by. ColorGard® dramatically reduces the risks associated with rooftop avalanches and maintains the clean colorful appearance of the roof with perfect color and finish matching, which lasts as long as the roof itself! ColorGard is the only snow retention system designed and

engineered on a site-specific basis; guaranteed to perform, to not damage the roof or finish, and to exactly match the roof color—for the entire life of the roof\*.

Today's premium Kynar 500® and Hylar 5000® (PVDF) paint systems used on metal panels are "coil-coated" and oven-cured. This is the only finish application method that can be warranted against color fade for 30 years or longer. Nothing can equal it! So, why settle for less in a snow guard system? While some dyes, powder-coats and air-dried color application methods may initially simulate a perfect match, the color soon begins to fade and becomes increasingly mismatched with a few years of age. By utilizing a strip of the actual roof material, ColorGard perfectly matches the roof—forever!

ColorGard is mechanically attached with patented S-5!® clamps. S-5! is the trusted name in metal rooftop attachment technology worldwide. S-5! patented, round-point setscrews grip the seam securely without penetration and without damage to the panel's protective finishes. The clamps are precision-machined from aircraft quality, high tensile aluminum—not cast or plastic. All related hardware is non-ferrous stainless steel for lasting performance.

\*See optional limited ColorGard System Warranty Program information at [www.S-5-ColorGard.com](http://www.S-5-ColorGard.com)

The right way to attach almost anything to metal roofs!

ColorGard®



888-825-3432 | [www.S-5.com](http://www.S-5.com) |

# S-5!®

The Right Way!

ColorGard® dramatically reduces the risks associated with rooftop avalanches and maintains the clean, colorful appearance of the roof with perfect color and finish matching, which lasts as long as the roof itself! S-5!® is the only manufacturer of snow retention systems that can be designed and engineered on a site-specific basis.

## Can ColorGard® be Retrofitted to an Existing Roof?



Yes, **ColorGard®** can be easily retrofitted to existing roofs, or incorporated into new construction design. Using S-5!® CorruBrackets™ or VersaBrackets™, ColorGard installs perfectly on corrugated and exposed-fastened roofs. ColorGard can be installed any time of year.

## Is Design Assistance Available For ColorGard®?

Yes! It is critical to design a solution that takes into account the effects of gravity on a snow-covered roof. The tested holding strength of ColorGard must be checked and proven against the actual “in-service” gravity loads of the roof. This important step in application engineering should not be omitted for any snow retention product.



Consult with your distributor or use our online calculator at **www.S-5.com** to help quickly and easily design each job. The calculator will help you “tailor” the ColorGard system on a project-specific basis, allowing for all the variables involved—and even provide a printout of the calculations and a material requirement list.

S-5! also offers its Certified Engineer Stamp Program. To receive the engineer stamp of approval, simply submit your project calculations to our registered engineer for a professional review. Learn more at **www.S-5.com/Calculator**.

## How Easy is it to Install?

Once designed, ColorGard is easy to install, requiring tools that are common to the trade. Because S-5! ColorGard uses mechanical attachment rather than adhesives, installation can be done any time of year, with no cleaning, no priming, no cure times, and no callbacks!

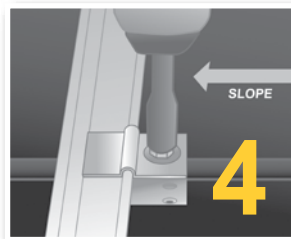
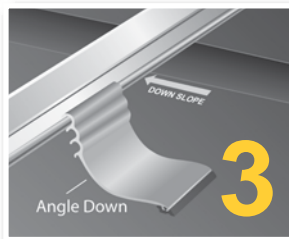
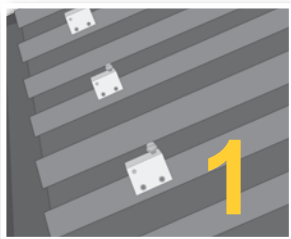
## What About Cost?

ColorGard is the best buy on the market! This is the best news of all! ColorGard has greater holding strength, better aesthetics, longer service life, and lower installed cost than any other bar-type system on the market. Pound-for-pound of holding strength, ColorGard is a better buy than individual cleats or glued units.

## Why is S-5!® the Best Choice?

The premium finishes used on today's metal roof products are fluorocarbons—paint resins that are similar in chemical composition to “Teflon,” the popular non-stick coating. The benefits of this type of paint are related to its nonstick characteristics. Chemical bonds like tapes, glues and adhesives, therefore, provide only temporary and unreliable solutions. Other mechanical alternatives that involve penetrating the roof or galling the surface result in leakage, corrosion, and voided warranties. Thanks to our patented round-point setscrews, S-5! clamps do not pierce metal paneling, thereby protecting roof coatings and weather-tightness warranties.

Check out our  
ColorGard® Mobile Calculator



### S-5!® Warning! Please use this product responsibly!

Products are protected by multiple U.S. and foreign patents. Visit the website at [www.S-5.com](http://www.S-5.com) for complete information on patents and trademarks. For maximum holding strength, setscrews should be tensioned and re-tensioned as the seam material compresses. Clamp setscrew tension should be verified using a calibrated torque wrench between 160 and 180 inch pounds when used on 22ga steel, and between 130 and 150 inch pounds for all other metals and thinner gauges of steel. Consult the S-5! website at [www.S-5.com](http://www.S-5.com) for published data regarding holding strength.

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S-5! aggressively protects its patents, trademarks, and copyrights. Version 052115.

Distributed by





## DYNACLAD® KYNAR 500® COATING 20 Year Limited Warranty

Dimensional Metals, Inc. (DMI) warrants for a period of twenty (20) years after Customer's shipment of painted products that Dimensional Metal's standard color, Medium Gloss DynaClad® coil coatings (Coatings) when applied on Galvalume, HDG-90 steel and aluminum substrate will not:

- A. Peel, flake or otherwise lose adhesion to an extent that is apparent on ordinary outdoor visual observation.
- B. Change color more than 5 Delta E Units when measured per ASTM D-2244 on clean surface.
- C. Chalk more than a number eight (8) rating when measured per ASTM D-4214.

### TERMS AND CONDITIONS

1. It is acknowledged that fading or color change may not be uniform if the surfaces are not equally exposed to the sun and elements. DMI recommends that there be a systematic fresh water rinse maintenance program in effect in areas of high salt concentration (such as adjacent to the seashore and/or industrial atmospheres) so as to prevent the accumulation of concentrated mineral deposits.
2. This Limited Warranty covers DMI Coatings exposed to normal atmospheric conditions and specifically excludes corrosive or aggressive atmospheres including direct salt spray, contact with animal or animal waste. This Limited Warranty shall not apply where coating failure is the result of physical damage resulting from fabrication or embossing operations, corrosion due to cut edge exposure, salt spray, acts of God, vandalism, any negligent acts of the Customer including, but not limited to, improper packaging, storage, shipping, or, installation which prohibit proper drainage of standing water or other such occurrences beyond DMI's control.
3. DMI's liability and the Customer's exclusive remedy for any breach of this Limited Warranty or failure of the Coatings is strictly limited to the direct cost of refinishing or replacing the failed coated metal. Refinishing of the failed coated metal shall be performed by using standard finishing practices and materials. DMI will, in all instances, be the sole judge as to whether refinishing or replacement of the failed areas is required to fulfill its obligation under this Limited Warranty and reserves the right to approve and negotiate the contract.
4. This Limited Warranty shall not be extended by the refinishing or replacement of the coated material, but the remaining warranty period shall continue in effect and be applicable to the refinished or replaced areas under the terms and conditions of the Limited Warranty.
5. Claims under this Limited Warranty must be presented in writing during the warranty period and within sixty (60) days after Customer becomes aware that any warranted condition has occurred. Time is of the essence and failure to give notice within the specified time shall discharge DMI from any obligations under this Limited Warranty. DMI must be given a reasonable opportunity to an on-site inspection to determine the cause and the corrective action to be taken if it is determined to be a Coating failure.
6. THIS LIMITED WARRANTY IS GIVEN AS THE EXCLUSIVE WARRANTY AND REMEDY, AND DMI DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DMI SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES. THE CUSTOMER'S EXCLUSIVE REMEDY SHALL BE THAT SET FORTH IN PARAGRAPH 3 FOR ANY CLAIM OF LIABILITY RELATING TO THE COATINGS UNDER NEGLIGENCE, STRICT LIABILITY, BREACH OF WARRANTY, OR ANY OTHER LEGAL THEORY.
7. This Limited Warranty is extended to Customer alone, is nontransferable and non-assignable, and may not be modified or enlarged in its scope by any representative, salesman, agent, or other employee of DMI. Customer shall not permit anyone to claim or imply that this Limited Warranty extends to anyone other than Customer. This condition is a material term of this Limited Warranty and its violation by Customer or its agents or representatives shall release DMI from its obligations hereunder.

This Limited Warranty shall be governed by and interpreted in accordance with the laws of the State of Ohio. Jurisdiction and venue for any dispute concerning the roof or this Limited Warranty are fixed in Franklin County, Ohio.

Project Name

Sold To

Address

Address

City

State

Zip

City

State

Zip

Material Description

Invoice/ (Order Number)

Effective Date

Dimensional Metals, Inc.

58 Klema Drive North - Reynoldsburg, OH 43068 - (740) 927-3633

Signature

Title

Date

Kynar 500® is a registered trademark of Atochem of North America. Hylar 5000® is a registered trademark of Ausimont USA, Inc. DYNACLAD® is a registered trademark of Dimensional Metals, Inc.





# DynaClad® Metal Roofing System

## XX Year Limited Warranty

LITHO IN U.S.A.

Dimensional Metals, Inc. (hereinafter referred to as "DMI") warrants to the named building owner (hereinafter referred to as "owner") that subject to all term(s), condition(s), limitation(s), allocation(s) of warranty, and responsibility(ies) stated herein, the installers workmanship on the named building will be adequate to prevent leaks for xx years from the date of completion of the metal roof system installation. This includes all materials supplied by DMI including but not limited to insulation, felt underlayment, ice and water underlayment, vapor barrier and fasteners. The installer is solely responsible for any leaks arising during the first two years after completion of the installation and DMI is responsible for any leaks first arising after the second anniversary of successful completion of the installation of the subject roof but arising not later than xxth anniversary of such completion. This warranty will be fully satisfied by repair of the roof, and any such repairs shall carry a warranty against leaks only for any then remaining balance of the original xx year warranty period.

DMI's aggregate total cumulative liability under this warranty is limited to the dollar amount of the original materials furnished by DMI only and the installation of those materials only.

DMI MAKES NO OTHER WARRANTY EITHER EXPRESS OR IMPLIED. ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE WHICH EXCEED OR DIFFER FROM THE WARRANTIES HEREIN EXPRESSED ARE DISCLAIMED AND EXCLUDED FROM THIS WARRANTY. DMI DOES NOT IN ANY WAY WARRANT THE MERCHANTABILITY OF THE GOODS SOLD HEREBY. NO WARRANTIES EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF INCLUDING TERMS, CONDITIONS, AND LIMITATIONS LISTED.

Roof Completion Date - \_\_\_\_\_

XXXXXXX

Building/Project Name

XXXXXXX

Building Address

City

State

XXXXXXX

Building Owners Name

XXXXXXX

Owners Address

City

State

1. Owner shall provide DMI with written notice within thirty (30) days of the discovery of any leaks in the roof. Failure of the owner to do so shall relieve both DMI of any and all responsibility and/or liability under this warranty.
  2. DMI shall not have any liability or responsibility under or in connection with either this warranty or the roof, if any one or more of the following shall occur:
    - a. Deterioration caused by marine atmosphere or regular spray of salt water.
    - b. Corrosion caused by heavy fallout or exposure to any corrosive chemicals, ash or fumes from any type of manufacturing facility.
    - c. Deterioration caused by any corrosive substance or any condensation of any harmful substance contained, generated or released inside the building.
    - d. Damage caused by owner's agents, employees or any other third party not under the direct control and supervision of DMI and/or installer on the roof.
    - e. Damage caused by natural disasters, including, but not limited to lightning, any strong gale, hurricane, tornado, or earthquake.
    - f. Damage caused by any panels or other components installed in a manner that does not permit drainage of water from all surfaces or have a slope of less than 1/4" per foot.
    - g. Damage caused, after installation of the roof system by the installer, resulting from any alterations, such as, but not limited to, structures, fixtures, or utilities being placed upon or attached to the roof without prior written authorization from DMI.
    - h. Corrosion to the underside of the roof system which is or was caused at any time in part or wholly by any condensation resulting from either or both of the following; the use of inadequate vapor barrier where insulation is installed immediately beneath the roof panels. (An adequate vapor barrier must have a perm rating of .05 or less with sealed joints and perimeter) or inadequate ventilation of the attic space between roof panel and insulation.
    - i. If there is any failure by the owner or occupant or user to use reasonable care in maintaining the roof.
    - j. If the owner fails to comply with every term and/or condition stated in this Limited Warranty.
    - k. Any other cause beyond DMI's control, including but not limited to acts of war, terrorism or civil disobedience.
  3. DMI shall not have any liability or responsibility under or in connection with either this Limited Warranty or the roof in the event of a failure by any contractor or subcontractor to use approved installation methods and details indicated in approved shop drawing details furnished by DMI, [or to substitute therefore only products approved in writing in advance by DMI as equal (if provided by the contractor or subcontractor)].
  4. DMI shall not have any obligation under this Limited Warranty until final shop drawings of the projects roof are submitted by DMI to the installer and accepted in writing by the installer, architect, general contractor and DMI. Shop drawings must show the exact number, size and location of all roof penetrations and roof top equipment.
  5. DMI shall not have any obligation under this Limited Warranty until all invoices for installation, supplies, materials, and services have been paid in full to both DMI and installer.
  6. DMI shall not be responsible for any consequential damage or loss to the building, its contents or other materials.
  7. In no event shall DMI have any liability for any commercial loss, claims for labor, or consequential damages of any other type, whether owner's claim be based in contract, tort, warranty, strict liability, or otherwise, it is expressly agreed that owners remedies expressed in this Limited Warranty are owners exclusive remedies.
  8. DMI's failure at any time to enforce any of the terms and conditions stated herein shall not be construed to be a waiver of such provisions or of the right to exercise any right in the future.
  9. During the term of this warranty, DMI, its sales representatives and employees, shall have free access to the roof during regular business hours.
- This Limited Warranty is tendered for the sole benefit of the original purchaser as named below and is not transferable or assignable. It becomes valid only when signed by DMI.
- This Limited Warranty may not be changed orally.
- THIS LIMITED WARRANTY SHALL BE GOVERNED BY AND CONSTRUED AND ENFORCED IN ACCORDANCE WITH THE LAWS OF THE STATE OF OHIO. JURISDICTION AND VENUE FOR ANY DISPUTE CONCERNING THE ROOF OR THIS LIMITED WARRANTY ARE FIXED IN FRANKLIN COUNTY, OHIO.
- Installing Contractor
- Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_
- Building Owner
- Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_
- Dimensional Metals, Inc.  
58 Klema Drive North - Reynoldsburg, OH 43068  
(740) 927-3633
- Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_





## GALVALUME SHEET 20 YEAR-6 MONTH LIMITED WARRANTY

### EXCLUSIVE WARRANTY

Dimensional Metals, Inc., 58 Klema Drive North, Reynoldsburg, Ohio 43068 ("seller") hereby provides the LIMITED WARRANTY to: \_\_\_\_\_ ("Buyer"). Dimensional Metals, Inc. Warrants that, subject to the following provisions, Seller's hot dipped aluminum-zinc alloy-coated Galvalume sheet steel sold for use as steel building, roofing and siding panels, if erected within the Continental United States, WILL NOT rupture, fail structurally, or perforate within a period of 20 years and 6 months after shipment from our facility due to exposure to normal atmospheric conditions.

### EXCLUDED ATMOSPHERIC CONDITIONS

This limited warranty DOES NOT APPLY to sheets exposed at any time to corrosive or aggressive atmospheric conditions, including but not limited to:

1. Areas subject to salt-water marine atmospheres or to constant spraying of either salt or fresh water.
2. Areas subject to fallout or exposure to corrosive chemicals, fumes, ash, cement dust or animal waste.
3. Areas subject to water run-off from lead or copper flashings or areas in metallic contact with lead or copper.
4. Conditions/circumstances where corrosive fumes or condensates are generated or released inside the building.

### OTHER EXCLUDED SITUATIONS

This warranty DOES NOT APPLY in the event of:

1. Bends less than 2T for sheet thickness 0.030" and thinner and less than 4T for sheet thickness 0.031" and thicker.
2. Slopes of the roof or sections of the roof flatter than 1/4:12.
3. Mechanical, chemical, or other damage sustained during shipment, storage, forming, fabrication, or during or after erection.
4. Forming which incorporates severe reverse bending or which subjects coating to alternate compression and tension.
5. Failure to provide free drainage of water, including internal condensation, from overlaps and all other surfaces of the sheets or panels.
6. Failure to remove debris from overlaps and all other surfaces of the sheets or panels.
7. Damage caused to the metallic coating by improper roll forming, scouring or cleaning procedures.
8. Deterioration of the panels caused by contact with green or wet lumber or wet storage stain caused by water damage or condensation.
9. Presence of damp insulation or other corrosive materials in contact with or close proximity to the panel.
10. This warranty does not apply in the event of deterioration to the panels caused directly or indirectly by panel contact with fasteners. Selection of suitable long-lasting fasteners to be used with Galvalume roofing and siding panels rests solely with the Buyer.

### EXCLUSIVE REMEDIES

Buyer's exclusive remedy and Seller's sole liability for breach of this limited warranty shall be limited exclusively to the cost of either repairing nonconforming panels, or at Seller's sole option, of furnishing FOB buyer's plant sufficient sheet product to enable Buyer to fabricate replacement panels for the nonconforming panels.

### LIMITATION OF DAMAGES

THE LIABILITY OF THE SELL SHALL NOT EXTEND TO PERSONAL INJURY, PROPERTY DAMAGE, LOSS OF PROFIT, DELAY OR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE FAILURE OF ANY SHEET TO CONFORM WITH THE PROVISIONS OF THIS LIMITED WARRANTY.

### OTHER WARRANTIES, INCLUDING MERCHANTABILITY

THERE ARE NO WARRANTIES, PROMISES OR AFFIRMATIONS OF FACT, INCLUDING WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE OTHER THAN THOSE EXPRESSLY SET FORTH HEREIN. THE CONDITIONS OF LIABILITY, RIGHTS, OBLIGATIONS AND REMEDIES OF THE PARTIES RELATING TO CLAIMS ARISING FROM ANY NONCONFORMING SHEET SHALL BE GOVERNED EXCLUSIVELY BY THE TERMS SET FORTH HEREIN.

### INSPECTIONS AND NOTICE OF CLAIM

Buyer shall exercise diligence in inspection of material as received from Seller prior to utilization so as to mitigate expense involved in repairing, repainting, or replacing nonconforming sheets. Claims for any breach of warranty must be made within the period of this limited warranty and within 30 days after Buyer discovered the nonconforming sheet, and Buyer must give Seller a reasonable opportunity to inspect the material.

### DUTIES OF BUYER IN PRESENTING CLAIMS

As a condition precedent to Seller's liability hereunder, Buyer must present with his claim such records so to enable Seller and the date of installation in the form of building panels for the claimed nonconforming sheet. Buyer shall also present such evidence that establishes any claimed nonconformance was due to a breach of the limited warranty stated herein.

### TRANSFERS REPRESENTATIONS AND ASSIGNMENTS

UNLESS EXPRESSLY AGREED IN WRITING BY AND BETWEEN BUYER AND SELLER, THIS LIMITED WARRANTY IS EXTENDED TO BUYER AS THE ORIGINAL PURCHASER FROM SELLER AND IS NON-TRANSFERABLE AND BY ANY PURPORTED TRANSFER OR ASSIGNMENT, NOR SHALL ANY RIGHT AGAINST SELLER SURVIVE ANY TRANSFER OR ASSIGNMENT. BUYER OR ITS AGENTS OR REPRESENTATIVES SHALL NOT CLAIM, REPRESENT OR IMPLY NOR PERMIT ITS CUSTOMERS, DISTRIBUTORS, APPLICATORS, OR CONTRACTORS TO CLAIM, REPRESENT OR IMPLY THAT THIS LIMITED WARRANTY EXTENDS OR IS AVAILABLE TO PARTIES OTHER SHALL CAUSE ANY PARTY TO CEASE AND DESIST IN ANY SUCH MISREPRESENTATIONS. THIS CONDITION SHALL CONSTITUTE A MATERIAL TERM OF THIS LIMITED WARRANTY AND ITS VIOLATION BY BUYER SHALL EXCUSE SELLER FROM ITS OBLIGATIONS HEREUNDER.

### WAIVER OR MODIFICATIONS OF SELLER'S RIGHTS

No terms or conditions, other than those stated herein, and no agreement or understanding, oral or written, and no course of conduct or performance, in any way purporting to modify this limited warranty or to waive Seller's rights hereunder, shall be binding on Seller unless the same be clearly set forth in a writing that expressly refers to this limited warranty and expressly refers to having such effect upon this limited warranty is signed by the authorized representative of Seller.

### TERMINATION

Seller reserves the right to terminate this limited warranty, except with respect to orders, which it has already accepted, upon the giving of written notice thereof.

### GOVERNING LAW

The substantive law of the State of Ohio shall of exclusively govern the rights and duties of the parties under this agreement.

### ENTIRE AGREEMENT

The provisions set forth herein are in lieu of and expressly supersede any other provisions irrespective of where contained. All proposals, negotiations and representations, if any, made prior to or with reference hereto are merged herein.

Signature	Title	Date
Dimensional Metals, Inc.		





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## SIGN IN SHEET

### Project: River Valley Schools - Corridor Link Addition

Pre-Bid Meeting 07-14-22, 1:00 PM

<u>Co Name</u>	<u>Attendance By</u>	<u>Phone</u>	<u>Email Address</u>
MARK LECKY ARCHITECTS, LLC	MARK LECKY	614 621 9339	<a href="mailto:Lecky@MLArchs.com">Lecky@MLArchs.com</a>
RIVER VALLEY SCHOOLS	BRAD MORROW	740 225 0383	<a href="mailto:bmorrow@rvk12.org">bmorrow@rvk12.org</a>
RIVER VALLEY SCHOOLS	BRITTANY KELLER	740 725 5499	<a href="mailto:bkeller@rvk12.org">bkeller@rvk12.org</a>
RIVER VALLEY SCHOOLS	ADAM WICKHAM	740	<a href="mailto:awickham@rvk12.org">awickham@rvk12.org</a>

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