



## **JEA Northside Generating Station**

# **Material Handling / By-Products Building Pre-Engineered Metal Building Specifications**

**BID ISSUE**

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## **01100 - Technical Scope and Performance Requirements**

### **01100.1 Technical Scope of Work**

The work under these specifications shall include the following:

One (1) Pre-Engineered Metal Building and building systems. The building is to be designed, furnished, and installed to the various discipline scope listed here.

- Building structure and shell
  - Building foundation per structural drawing 420333-CBSA-S5000
  - Full building calculations (member design, diaphragm design, roof design, connection design, foundation loads, anchor bolt design)
  - Include joist loading diagrams for roof joist design (joist design/supply by steel supplier)
  - Refer to Section 21000 – Technical section supplemental specifications for building design requirements.
  - Florida Signed/Sealed Design Drawings and Calculations
- Building architectural package and schedules using the preliminary floor plan and wall type list on drawing 420333-DS-4001
  - Complete building envelope plan and detail package including, but not limited to, interior and exterior finishes, door schedules, wall and roof systems and assemblies, and egress requirements.
  - Furnish and install all appliances, cabinets, toilets, sinks, showers, hot water tank and furnishings as specified.
- Design, furnish, and erect building HVAC system.
  - Design of the building HVAC systems per ASHRAE standards
  - Furnish and erect HVAC equipment, ducting, registers, and all necessary components.
  - Building total cooling and heating capacity provided in Section 15951 – HVAC Installation and Erection Air Conditioners Datasheet.
- Design, furnish, and erect potable water system.
  - Potable water piping shall be stainless steel and or CPVC piping.
  - Connect to existing 2" stainless steel potable water supply piping.
- Design, furnish, and erect sanitary waste system.
  - Sanitary waste system shall be stainless steel and/or CPVC piping.
  - Connect to existing 4" sanitary sewer lift-station (35 GPM capacity) piping.
- Design, furnish, and erect building electrical distribution, grounding, and lighting systems, interior and exterior in accordance with NEC code.
  - Existing power source is 208Y/120 / 3.
- Design, furnish, and erect building fire protection system, refer to attachment 211300 - Fire Suppression Sprinkler System.
  - Connect to existing cast iron fire water supply piping.
  - Building shall have a sprinkler system constructed of steel piping.
  - Building shall have a fire detection and alarm system.
- Design, furnish, and erect graveled parking area for 20 parking spaces with light posts.
- Grade building and parking area for positive drainage into existing site drainage pond to the northwest.

All Work shall be produced in accordance with the current laws, ordinances, regulations, codes, standards, and rules applicable to Professional Engineers practicing in the state of Florida. If required by the applicable current laws, ordinances, regulations, codes, standards, and rules; the Supplier design documents (calculations, drawings, specifications, statements of special inspections, certificates of compliance, etc.) shall be certified and sealed by an engineer licensed to practice in the state of Florida and shall be submitted to the Owner.

### 01100.2 Record Drawings

Maintain a clean, undamaged set of blue or black line white prints of Contract Drawings. Mark the set to show the actual installation. Mark which drawing is most capable of showing conditions fully and accurately. Give particular attention to concealed elements that would be difficult to measure and record later.

### 01100.3 Engineer's Attachments

The following listed attachments shall be part of the Purchase Order:

Drawing No. or Other Designation	Rev. No.	Title
420333-CBSA- S5000	0	Material Handling Bldg. Replacement – Foundation Plan, Sections, and Details
420333-CGAU- S1000	0	Material Handling Bldg. Replacement – Site Plan
420333-CGAU- G1000	0	Material Handling Bldg. Replacement – Location Plan
420333-DS-4001	0	Material Handling Building Floor Plan
211300		Fire Suppression Sprinkler System

### 01100.4 Schedule of Submittals

Item No.	Reference Section	Submittal Item	Submittal Dates			
			Calendar Days		Event	Due Date
1.	01100	<u>Scope of Work</u>			.	
2.	01100	Documented Training Records for NGS Site Safety Orientation	2	Before	Employee site access	
3.	01100	Standard 5-Panel Substance Abuse Screen (All Contractor Employees)	7	Before	Employee site access	
4.	01100	Level 3 Construction Schedule	30	After	Notice to Proceed	
5.	01100	Building Erection Plan	30	After	Notice to Proceed	
6.	01100	Daily Construction Report	1	Before	8:00 AM each workday	
7.	01100	Weekly Progress Meeting / Report	7	After	Each report date	
8.	13120	<u>Pre-Engineered Metal Buildings</u>				
9.	13120	Pre-engineered metal building certified building drawings, all miscellaneous framing details, foundation loads, and anchor bolt arrangements	30	After	Effective Date	
10.	13120	Pre-engineered metal building certified building drawings indicating underground piping arrangement to termination point approximately five feet outside of building edge. Termination point will be provided at contract award.	30	After	Effective Date	

Item No.	Reference Section	Submittal Item	Submittal Dates			
			Calendar Days		Event	Due Date
11.	13120	Pre-engineered metal building certified design calculations for structural framing, structural anchorage, and covering panels	30	After	Effective Date	
12.	13120	Pre-engineered metal building doors and hardware, model numbers, manufacturers, and catalog data	45	After	Effective Date	
13.	13120	Pre-engineered metal building windows and glazing types, manufacturers, and materials	45	After	Effective Date	
14.	<b>15400</b>	<b><u>Plumbing</u></b>			.	
15.	15400	Plumbing piping routing for all underground sanitary sewer, venting, floor drains, closet flanges, and trap priming. All items shall be dimensioned and tied to the building column rows. These early items support the concrete foundation design and underground piping.	30	After	Effective Date	
16.	15400	Catalog cuts of fixtures, facets, etc.	60	After	Effective Date	
17.	15400	Water heater data	60	After	Effective Date	
18.	15400	Sample colors of all fixtures, hardware	60	After	Effective Date	
19.	15400	Power Requirements, kW				
20.	<b>15730</b>	<b><u>HVAC Air Conditioners</u></b>			.	
21.	15730	Arrangement drawings with ductwork (flexible)	30	After	Effective Date	
22.	15730	Electrical one-line and elementary diagrams	45	After	Effective Date	
23.	<b>15951</b>	<b><u>HVAC Installation and Erection</u></b>			.	
24.	15951	HVAC wiring and raceway drawings	60	After	Effective Date	
25.	<b>16502</b>	<b><u>Lighting for Pre-Engineered Buildings</u></b>			.	
26.	16502	Lighting and Receptacle Layout and wiring drawing	60	After	Effective Date	
27.	<b>E100</b>	<b><u>Wiring Methods, Cable and Raceway</u></b>			.	
28.	E100	Supplier Circuit List	90	After	Effective Date	

## **01100.5 Construction Progress Updates and Reports**

This Section includes requirements for documenting the progress of construction during performance of the Work.

### **01100.5.1 Weekly Construction Progress Report**

1. Contractor shall submit a report on actual construction progress on a weekly basis.
2. Weekly Construction Progress Reports shall consist of the revised construction progress schedule and a narrative report which shall include but not be limited to the following:
  - a. Work Activities planned.
  - b. Number and size of crews.
  - c. Construction equipment on Site.
  - d. Safety issues and corrective actions.
  - e. Comparison of actual progress to planned progress shown on originally accepted Contractor's Schedule.
  - f. Summary of activities completed since the previous construction progress report.
  - g. Summary of activities planned for next reporting period.
  - h. Planned, earned, and spent earned value analysis for the week.
  - i. Identification of problem areas.
  - j. A description of current and anticipated delaying factors, if any.
  - k. Impact of possible delaying factors.
  - l. Proposed corrective actions.
  - m. Request for Information Log.
  - n. Change Order Request Log.
3. If weekly Construction Progress Report update reveals that the Work is likely to be completed later than a completion date as provided in the Contractor's Schedule, Contractor shall:
  - a. Provide a plan of corrective action to Owner detailing the steps Contractor proposes to implement to make up the lost time and complete the Work no later than the date for completion set forth in the Contract.
4. Contractor shall provide Weekly Construction Progress Reports to Owner no later than the end of workday on the Friday of the work week.

## **01100.6 Contractor Safety Management Process**

Contractors shall adhere to JEA's Contractor Safety Management Process. The safety document is provided as an attachment to this specification, and can be accessed online through this link ([https://www.jea.com/About/Procurement/Contractor\\_Safety/](https://www.jea.com/About/Procurement/Contractor_Safety/))

## 13120 - Pre-Engineered Metal Buildings Datasheet

Table 1 – General Information		
Codes and Standards		
1.	Building design	<p>MBMA - Metal Building Manufacturers Association Low Rise Building Systems.</p> <p>AISC - Steel Design Guide No. 3-Serviceability Design Considerations for Low Rise Buildings.</p> <p>Minimum construction type: IIB</p>
2.	Steel design	AISC Specification for Structural Steel Buildings, AISC 360, with Commentary and Supplements. AISC Seismic Provisions for Structural Steel Buildings, 341, with Commentary and Supplements. Structural members to be ASTM A572 grade 50 or ASTM A992. Structural bolts to be ASTM F3125 grade A325.
3.	Light gauge structural steel design	AISI - Specifications for the Design of Cold Formed Structural Members
4.	Wind loading criteria	UL 580 - Tests for Uplift Resistance of Roof Assemblies
5.	Deflections and drift of the structural system	AISC - Steel Design Guide No. 3 - Serviceability Design Considerations for Steel Buildings
6.	Concrete design	ACI 318 - Building Code Requirements for Structural Concrete
7.	Welding and related operations for structural steel and low alloy steel	AWS D1.1 - Structural Welding Code-Steel
8.	Welder qualifications	AWS D1.1 - Structural Welding Code-Steel
9.	Fire rated doors and frames	
10.	Class A, 2-1/2-hour, 250° F maximum temperature rise in 30 minutes of exposure	Underwriters Laboratories Inc. or Factory Mutual Classifications
11.	Class B, 1-1/2-hour, 250° F maximum temperature rise in 30 minutes of exposure	Underwriters Laboratories Inc. or Factory Mutual Classifications
12.	Class C, 3/4-hour, 250° F maximum temperature rise in 30 minutes of exposure	Underwriters Laboratories Inc. or Factory Mutual Classifications
13.	Fire rated oversized doors	Underwriters Laboratories Inc. "Certificate for Oversize Construction"
14.	Sound transmission classification (STC)	ASTM E90 and E413
15.	Aluminum windows	AAMA/WDMA 101/I.S.2-97
16.	Commercial windows	AAMA C20
17.	2" deep monumental windows	AAMA HC40

18.	Ceiling tiles	ARMSTRONG – square Lay-in “Cortega” ceiling tile. Material – Wet-formed mineral fiber Surface Finish – Factory-applied latex paint Color – White Light Reflectance – White – 0.82 (rating per ASTM E1477) Weight – .69 lbs./SF depending on size of tile Size - 24”x24”x 5/8” NRC – 0.55 CAC – minimum 33 Fire Performance - ASTM E84 and CAN/ULC S102 surface burning characteristics. Flame Spread Index or less. Smoke Developed Index 50 or less (UL labeled) Anti-Mold/Mildew Bacteria – Standard Insulation Value - Average R factor is 1.5 BTU units 0.26 (Watt units) Sag Resistance – Standard
19.	closers	Fed Spec FF-H-121D, US Government Type 3009VH for 3 ft by 7 ft exterior, Type 3009 VIH for 3 ft by 8 ft exterior, hold-open-arm, US32D satin stainless-steel finish
20.	Thresholds	Extruded aluminum saddle type, 3-1/2 inch by 5/8 inch. Door, when closed, shall seal against threshold.
21.	Grout thickness under base plates	1 1/2”
22.	Exterior metal wall panel	Standard nominal 1 1/2” deep rib by approximately 36 inches wide (non-insulated) Manufacturer’s standard sandwich panel that meets all listed requirements (Insulated), 24 gage. 20-year warranty.
23.	Roof system	Interlocking standing or batten seam type. Continuous from ridge to eave. 24 gage. Minimum 1” in 12”. 20-year warranty
24.	Trim, flashing and gutters	Trim and flashing members, including gutters and downspouts, shall be fabricated of the same material as the wall panels. Members shall be the building manufacturer’s standard profiles for the use intended.
25.	Wall board	5/8” water resistant gypsum wall board

<b>Table 2 - Products</b>		
<b>Materials</b>		
1.	Roof panel, wall panel, trim, and flashing	ASTM A924, Grade B
2.	Roof and wall panel galvanizing	ASTM A653, Designation G90
3.	Aluminum zinc alloy coating in place of galvanizing	ASTM A792, Class AZ55
4.	Structural members less than 1/4 inch thick	ASTM A1008 and ASTM A1011 for steel used to form members on built-up sections
5.	Hot-dip zinc coating of structural members	ASTM A653 or A924
6.	Shop prime coating of structural members	Air dried rust inhibitive alkyd primer, containing at least 40 percent solids by volume



7.	Structural members	ASTM A572 Grade 50 or ASTM A992
8.	Cast-in-place column anchor bolts and nuts, furnished by Owner	ASTM F1554, Grades 36, 55, and 105 as noted on drawings, with nuts conforming to ASTM A563, Grade A heavy hexagon
9.	Structural bolts and nuts	ASTM F3125 Grade A325
10.	Other bolts and nuts	ASTM A307 galvanized in accordance with ASTM B633
11.	Grout	General purpose non-shrink cementitious grout, minimum ASTM C1107
12.	Insulation	Fiberglass batt insulation. Ceiling to have a minimum R-38 and walls to have a minimum R19.
13.	Door hardware	Door hardware shall be in accordance with ANSI/BHMA A156 and the following requirements
14.	Butts	1-1/2 pair per leaf, 4-1/2 inch by 4-1/2 inch, full mortised, template type, nonremovable pin, ball bearing, extra heavy-duty, US32D satin stainless steel; two pair for 8 ft door height
15.	Locksets	Key-in-knob, pin tumbler cylinder type, US32D satin stainless steel. Master key all-keyed locksets, two keys per lock. ANSI/BHMA A156.2 Series 4000, Grade 1. Corbin Russwin, CL3500 Series-Heavy duty, Lustra lever design handle (LWA) for mortise lockset satin stainless steel US32D (BHMA 630) finish. Satin plated chromium (626), Complete Large Format Interchangeable Core (LFIC), 6-Pin high security, keyed to existing Corbin Russwin 60-70 series restricted system with construction control key. Patented Corbin Russwin Master Keying System
16.	Non keyed lockset	Corbin Russwin style
17.	Electrified Locksets	Corbin Russwin, ML20606 NAC Series Electrified Mortise Lock with High Security Monitoring, Full model No. ML20606 PSM NAC SEC RO4 630 CL6 Cylindrical: Corbin Russwin, CL33905 Electrified Lockset – Fail Secure, Full Model No. CL33905 PZD 626 M92 SEC CL6 Corbin Russwin, CL33903 Electrified Lockset – Fail Safe, Full RIM Exit Device with Electric Trim: Corbin Russwin, ED5200S Panic- Listed Secure Bolt Exit Device, Full Model No. ED5200S PR9905 M92 630 CL6 M54 RIM Exit Device with Electric Latch Retraction: Corbin Russwin, ED5200S Panic-Listed Secure Bolt Exit Device, Full Model No. ED5200S P955 M95 M94 630 CL6 M54
18.	Latch set	Similar to lockset (no key)
19.	Closers	Fed Spec FF-H-121D, US Government Type 3009VH for 3 ft by 7 ft exterior, Type 3009 VIH for 3 ft by 8 ft exterior, hold-open-arm, US32D satin stainless-steel finish
20.	Thresholds	Extruded aluminum saddle type, 3-1/2 inch by 5/8 inch. Door, when closed, shall seal against threshold.

21.	Weatherstripping	Extruded vinyl in an extruded aluminum keeper for head and jambs. Extruded vinyl sweep in an extruded aluminum keeper for door bottoms			
22.	<b>Partition Framing</b>	<b>Material:</b>	<b>Size:</b>	<b>Gauge:</b>	<b>Spacing:</b>
23.	Studs	Galvanized steel	3-5/8 in. (90 mm)	0.0312 in. (0.792 mm) (20 gauge)	16 in. (405 mm)
24.	Bottom track and top track	Galvanized steel	Same size as stud	Same gauge as stud	
25.	Furring channel	Galvanized steel	1-1/2 in. (38 mm) deep "z" shape	0.0312 in. (0.792 mm) (20 gauge)	16 in. (405 mm)
26.	<b>Suspended Ceiling</b>	<b>Material:</b>	<b>Size:</b>	<b>Gauge:</b>	<b>Spacing:</b>
27.	Ceiling runner	Galvanized steel	1-1/2 in.	0.475 lb./ft	48 in.
28.	Ceiling channel	Galvanized steel	7/8 in. by 1-5/16 in.	0.475 lb./ft	24 in.
29.	Suspended ceiling shall be 9'-0" clear from finished floor				
30.	<b>Fastening</b>				
31.	Ceiling runner	Hangers at 48 in.			
32.	Ceiling channel	Saddle tying			
33.	Gypsum wallboard	Manufacturer's standard			
34.	<b>Plumbing Piping</b>				
35.	Hot and cold-water supply	CPVC			
36.	Building service water supply	CPVC			
37.	Sanitary drain	PVC			
38.	Ground floor drain	Ductile Iron			
39.	Sanitary vent	PVC			
40.	<b>Partition Framing</b>	<b>Material:</b>	<b>Size:</b>	<b>Gauge:</b>	<b>Spacing:</b>
41.	Studs	Galvanized steel	3-5/8 in. (90 mm)	0.0312 in. (0.792 mm) (20 gauge)	16 in. (405 mm)
42.	Bottom track and top track	Galvanized steel	Same size as stud	Same gauge as stud	
43.	Furring channel	Galvanized steel	1-1/2 in. (38 mm) deep "z" shape	0.0312 in. (0.792 mm) (20 gauge)	16 in. (405 mm)

## **16502 - Lighting for Pre-Engineered Buildings**

### **16502.1 Scope of Supply**

Scope of supply shall include designing, furnishing, and installing the building lighting and convenience receptacle system as specified herein.

### **16502.2 Performance and Design Requirements**

Performance and design requirements for the equipment and materials to be furnished under this section of these specifications are indicated herein.

The lighting system shall be designed by the Contractor to provide personnel with illumination for plant operations under normal conditions, essential lighting in selected electrical/control areas and means of egress under emergency conditions. The power supply for the normal lighting system shall be from Contractor provided 120/208 volt, 3-phase, 4 wire lighting transformer/panelboards. The power supply for convenience receptacles shall be from Contractor provided 120/208 volt, 3-phase, 4 wire lighting transformer/panelboards. Emergency egress lighting shall be provided with normally "off," emergency "on" integral lead acid battery powered emergency lighting units with chargers rated for 1.5 hours minimum and in accordance with UL 924.

The lighting system shall be designed in accordance with the recommendations of the Illuminating Engineering Society (IES) Lighting Handbook. Emergency egress and exit lighting shall be designed in accordance with National Fire Protection Association (NFPA) 101, Life Safety Code, latest edition. The illumination levels shall be as listed. Calculations shall be submitted.

<b>Area</b>	<b>Average Maintained Illumination Level (foot- candles)</b>
Offices/Conference Rooms/Meeting Rooms	50
Electrical or DCS rooms	30
Lunchrooms/Dining Area	15
Toilet/Locker Rooms	15
Laboratory	75
Hallway/Lobby	15
HVAC Room	7.5

Electric power to light fixtures shall be switched with wall mounted light switches or other devices as required by the local state Energy Code, located at the entrance to all rooms on the latch side of the door. Light fixtures located outside above doors shall be provided with integral photoelectric controllers.

Convenience receptacles shall be grounding type and spaced to provide access to any point in the buildings with a 100-foot extension cord. A minimum of one receptacle shall be provided on each wall of every room except for janitor closet, corridor, toilets, and offices. Two receptacles shall be provided in offices, one on each wall that is opposite the door. One receptacle shall be provided in toilets and janitor closet. One weatherproof GFI receptacle shall be provided on each of the four exterior sides of the building. Convenience receptacles in areas with finished ceilings shall be limited to six per branch circuit because of possible computer loading.

2 x 4 handy boxes with data / communication ports shall be supplied, installed, and wired in each office and

conference room to the network equipment room from all offices, conference room, and computer lab. Four (4) boxes with data and communication ports shall be supplied in the computer lab and wired to the network equipment room.

Illumination levels for the building spaces shall be in accordance with the IESNA and the NFPA Life Safety Code 101. Illumination calculations shall be provided to the Owner for all spaces. Calculations shall be average maintained values determined from a working plane height of 30 inches above the floor. Light loss factors shall be determined as recommended by IESNA.

Provide drawings indicating location of duplex receptacles, data ports, communication ports, GFCI outlets, reflected ceiling plan.

Lighting in process areas shall be designed with the equipment in the space in mind and to avoid interferences with tray, piping and HVAC ducts which are being designed by others. Contractor shall obtain information from the Owner regarding these other utilities and make use of this information in locating fixtures.

### **16502.3 Luminaires**

Luminaires shall be as specified in this specification section.

Office area luminaires shall be 2 foot (60 cm) by 4 foot (120 cm) recessed static enclosures with aluminum parabolic reflectors that are in accordance with ANSI/IESNA RP-1 recommendations or volumetric troffers. Luminaires in corridors, restrooms, locker rooms, and similar spaces may use 1 foot (30 cm) by 4 foot (120 cm) recessed static enclosures with minimum 0.125 inch (6 mm) thick prismatic acrylic diffuser lens. The Control Room shall use 2-foot (60 cm) by 4-foot (120 cm) enclosures with dimming ballasts and 1/2 inch (13 mm) by 1/2 inch (13 mm) parabolic louvered diffusers with an acrylic overlay. Surface mounted fluorescent luminaires shall be baked white enamel steel enclosures with prismatic acrylic diffusers.

Industrial fluorescent luminaires for electrical and mechanical rooms shall be steel enclosures with baked white enamel, end caps, center V reflector, and 20 percent minimum uplight. Enclosed and gasketed fluorescent luminaires shall be suitable for damp and wet locations with acrylic diffusers and stainless-steel latches.

All fluorescent ballasts shall be electronic programmed rapid start with less than 10 percent harmonic content. Fluorescent dimming ballasts shall be suitable for the dimming system as manufactured by Lutron.

Office area luminaires shall be recessed LED volumetric static troffers. Luminaires in corridors, restrooms, locker rooms and similar spaces may use recessed LED standard static troffers. The control room shall use low glare LED volumetric static troffers with dimming drivers.

Industrial LED luminaires for electrical and mechanical rooms shall be metallic linear enclosures with hardened lens. LED luminaire color temperature shall be 4000°K with 500mA drivers.

### **16502.4 Switches**

Switches shall be totally enclosed tumbler type with single mounting yoke design. Single- and double- pole switches shall be position indicating.

### **16502.5 Device Plates**

Device plates shall be furnished for all device boxes. Stamped steel shall be provided for unfinished areas, and stainless steel shall be provided for finished areas. Outdoor location device plates shall be suitable for wet locations with the plug installed.

### **16502.6 Lamps**

Lamps shall be furnished for all luminaires. Fluorescent lamps shall be 32-watt, 3500 K, four foot T8 type. Fluorescent and high-pressure sodium lamps shall be compliant with Toxicity Characteristic Leaching Procedure (TCLP) standards. High-pressure sodium and pulse start metal halide lamps shall be clear with mogul (preferred) or medium bases.

### **16502.7 Lighting Contactors**

Lighting contactors shall be as specified in this specification section. Lighting contactors shall be electrically or mechanically held as required by the design and shall include an enclosure suitably rated for the installation environment (NEMA 12 minimum), hand-off-auto control switch, control fuse, and contacts rated for the application.

### **16502.8 Lighting and Convenience Receptacle Conductors**

The following conductor types for use in the lighting and convenience receptacle circuits shall be provided in accordance with Cable Specification Sheets included in Section 16510.

<b>Cable Type</b>	<b>Circuit Use</b>
THHN	For 120-volt circuits in heated areas
XHHW-2	All 208Y/120-volt circuits and all 120-volt circuits in unheated areas
SF-2	For incandescent luminaire connections

### **16502.9 Conduit Components**

An electrical conduit system shall be furnished and installed with the following specifications. Conduit components shall include conduit, fittings, supports, and hardware required for a complete system.

#### **16502.9.1 Rigid Galvanized Steel Conduit**

Steel conduit, couplings and elbows shall be a threaded hot-dipped galvanized rigid mild steel manufactured in accordance with ANSI/NEMA C80.1 and UL 6. The conduit interior and exterior surfaces shall have a continuous hot-dipped galvanized coating with a transparent overcoat of enamel, lacquer, or zinc chromate. Each length of conduit shall have a coupling on one end and a thread protector on the other. The thread protector shall have sufficient mechanical strength to protect the threads during normal handling and storage. Rigid galvanized steel conduit shall be similar to Type GRC as manufactured by Allied Tube and Conduit Corporation, or Engineer accepted equal.

#### **16502.9.2 Rigid Plastic Conduit**

Plastic conduit and elbows shall be unthreaded Schedule 40 or Schedule 80 polyvinyl chloride manufactured in accordance with NEMA TC-2 and UL 651. Rigid plastic conduit shall be as manufactured by Cantex, Inc. or Engineer accepted equal.

## **15400 - Plumbing**

### **15400.1 Scope of Work**

Scope of work shall include furnishing and installation of plumbing works, as well as any other related services as specified herein.

Plumbing design is required by the Supplier to support foundation and civil design. Plumbing design must be accomplished early for all underfloor and in-floor items with complete routing and dimensions. Refer to the schedule of submittals section of this specification.

Work performed under these specifications shall comply with the International Plumbing code and applicable municipal codes, ordinances, and state regulations.

The following materials shall be used:

<b>Location and Use</b>	<b>Type of Pipe</b>
Hot and cold-water supply	CPVC
Building service water supply	CPVC
Sanitary drain	polyvinyl chloride

### **15400.2 Drainage Piping**

Drainage piping shall be installed where required and shall, in general, conform to the locations indicated on the drawings. Horizontal soil and waste pipes shall be given a slope of 1/4 inch per foot (20 mm per meter) (2 percent) wherever possible, but in no case shall the slope be less than 1/8 inch per foot (10 mm per meter) (1 percent) downward toward the drainage outlet of any drainpipe. Where cleanouts are required in finished floors or in partition walls, a nickel-bronze access cover and frame with securing screw shall be installed over the cleanout plug.

All drainage piping which is buried beneath floors shall be ductile iron. Bell-ups shall be installed with the top rim flush with the floor surface.

### **15400.3 Isolation of Main Supply Lines**

Each branch from a main water supply line and the water supply piping to and at each plumbing fixture and unit of equipment connected thereto shall be provided with a shutoff valve and union which will enable each such branch line, fixture, or equipment unit to be isolated and disconnected without disturbing the water supply in the remainder of the piping system. Road boxes shall be supplied and installed as necessary depending on location of root valve.

### **15400.4 Air Chambers/Water Hammer Arresters**

Air chambers, or any other acceptable water hammer prevention devices shall be provided on all water supply lines at fixtures and at tops of all risers to prevent water hammer. Each air chamber shall consist of a piece of pipe not less than 12 nominal pipe diameters in length with the top end capped and soldered.

### **15400.5 Provisions for Drainage**

Cold water piping shall pitch toward the nearest valve, and hot water piping shall drain to the lowest point in the system. Provisions shall be made for complete drainage of each unit of water supply piping.

#### **15400.6 Pipe Insulation**

Hot and cold-water piping shall be covered with sectional pipe covering. Fittings, valve bodies, and flanges shall be similarly covered. Insulation shall be cemented in place and all joints shall be sealed with an adhesive recommended by the insulation manufacturer.

## 15951 - HVAC Installation and Erection

### 15951.1 Scope of Supply

Scope of supply shall include installation and erection of HVAC systems and services as specified under these technical specifications.

Design and Construction Requirements		
1.	Air Conditioners	
2.	Units shall be completely factory assembled and piped, internally wired, and fully charged with refrigerant and compressor oil for direct expansion cooling system and electric heating system. Rooftop air conditioners shall be fully weatherproof for outdoor installation on a roof curb. Packaged ductless, split-system air conditioner or heat pump shall consist of an indoor evaporator component and an outdoor condenser component.	
3.	Controls	
4.	Where indicated, units shall be provided with an outside air economizer cycle for modulation of outside air and return air dampers controlled by the mixed air temperature. During economizer operation, a mixed air controller shall modulate outside and return air dampers to satisfy cooling requirements. In free cooling mode, a discharge temperature sensor shall modulate the outside and return air dampers to maintain the unit supply air temperature. In mechanical cooling mode, the outside air dampers shall go to the minimum outside air positions. The discharge air temperature sensor shall load and unload compressor stages to maintain the unit supply air temperature. The return/exhaust fans shall be capable of 100 percent exhaust or return air. The amount of air exhausted shall be controlled by modulating discharge dampers or inlet vanes at the fan. Control signals from optional economizer dampers or exhaust/return fan dampers, and from supply fan inlet vane dampers, shall be coordinated to adjust for the varying amount of supply air.	
Requirements and Performance		
5.	Type	Packaged split system air conditioner
6.	Quantity	Per Contractor's design. Total cooling & heating capacity must meet the values in rows 17 through 19
7.	Ambient temperature for cooling, °F	95
8.	Entering room air temperature, °F	
9.	Dry bulb	75
10.	Voltage, volts	208Y/120
11.	Phase	3
12.	Frequency, Hz	60
13.	Configuration/Grounding	3-Phase, 3 Wire, Wye/High Resistance
14.	Electrical equipment enclosures	NEMA 4 - Watertight and Dust tight - Indoor and Outdoor
15.	Acceptable refrigerant types	Standard or R134a, or R-410a or R- 454B
16.	Heating types	Electric
17.	Total cooling capacity, minimum, Btu/h	365,000
18.	Sensible cooling capacity, minimum, Btu/h	210,119



19.	Heating capacity, Btu/h (watt)	191,374
20.	Economizer	Yes
21.	<b>Thermostat</b>	
22.	Location	Remote mounted, adjustable
23.	Control type	FAN-OFF-COOL switch
24.	Automatic heat/cool changeover	Yes
25.	Mounting	Wall sleeve
26.	<b>Casing</b>	
27.	Material	Steel
28.	Exterior coating	Refer to Technical Supplemental Q300 General Coating Requirements
29.	Sound pressure level (5 ft (1.5 m) from housing), maximum, dBA	85
30.	SEER rating	14
31.	Access to equipment	Standard
32.	Insulation of interior surface in contact with air stream	Standard
33.	Floor mounted air handler	
34.	Pad mounted condensing unit	
35.	Condenser fan features	Thermal overhead protection and permanently lubricated bearings
36.	Refrigerant accessories	Oil safety control, Sight glass with moisture indicator in front of expansion valve, Filter dryer on liquid refrigerant piping, Back-setting shutoff valves
37.	Fuses for fan overload protection	No
38.	115-volt convenience outlet	Yes
39.	Factory mounted unit disconnect switch	Yes
40.	Direct digital controls	Yes
41.	Compressor safety controls	Standard
42.	Multiple speed fan control	Yes
43.	Two-position ventilation control (fresh air intake/room air recirculation)	Yes
44.	Pigtail and male plug	No
45.	<b>Approved Manufacturers of Components</b>	
46.	Packaged split system air conditioner	Trane, Bard, Carrier, Lennox, McQuay, Johnson Controls, or AAF Snyder General
47.	Only the listed manufacturers above are recognized as maintaining the level of quality of workmanship required by these specifications. If the Supplier wants to propose a non-listed manufacturer that is considered to provide an equivalent level of quality, this manufacturer must be identified and supporting testimony provided. Acceptance of the manufacturer as a substitute is at the discretion of the Owner.	

## 15951.2 Heating, Ventilation, and Air Conditioning (HVAC)

### 15951.2.1 Corrosion Coating Specifications for HVAC Units

**Bronz-Glow Coating.** All coil(s) (condenser, evaporator, reheat, etc.) will have the refrigerant removed and stored for later installation.

All copper tubing will be capped, and coil charged with 200 lbs. of nitrogen to ensure no leaks develop in the coating process.

Coils are to be removed from the HVAC units and:

1. Cleaned with Bronz-Glow cleaners & hot treated water.
2. Spray primed with Bronz-Glow "Husky Gold Primer".
3. Dip coated (submerged in tank) with Bronz-Glow "Husky Gold Protectant".

All copper tubing, compressors, and metal components in the unit will be cleaned, primed and protective coated with Bronz-Glow "Component Coat "(Husky Gold can also be used for this function).

1. Components include: All metal devices attached to the copper tubing, such as filter dryers, receivers, reversing valves, compressors, solenoids, sensors, etc.
2. Condenser fan motor and blades – only when specifically approved by a JEA Facilities foreman.
3. Evaporator Blower assembly – only when specifically approved by a JEA Facilities foreman.
4. Interior Cabinetry – only when specifically approved by a JEA Facilities foreman.

All brazed soldered joints (due to their combination of metals) are very susceptible to corrosion and deteriorate faster than the rest of the copper. These joints will get extra cleaning to remove any patina, primer and double the normal amount of protectant coat.

Once treated, the coil(s) will be reinstalled into the unit, the unit will be evacuated, recharged with refrigerant, inspected, and readied for shipment.

### 15951.2.2 Thermostats

The Honeywell T6 Pro series HP/Conventional, non-programmable and 7-day programmable digital thermostat to replace the discontinued Honeywell Models 5000, 6000, & 8000.

### 15951.2.3 Performance and Design Requirements

Performance and design requirements for the HVAC installation and erection are indicated on the HVAC Installation and Erection Specification Sheet included at the end of this section.

### 15951.2.4 HVAC Controls Installation

The Supplier shall provide labor required to install, adjust, and calibrate control system components and to place the temperature control systems in operation.

### 15951.2.5 Testing, Adjusting, and Balancing

The Supplier shall be responsible for testing and balancing the installed ducted air systems and completing the checkout of the installed piping, air-conditioning equipment, and ducted fans.

## **16925 - Conductors Installation**

### **16925.1 General**

This section covers the installation of cable, conductors, and accessories for the Pre-Engineered Building. Insulated cable, conductors, and conductor accessory installation shall be in accordance with the cable manufacturer's recommendations and these specifications.

Installation shall be defined to include receiving; unloading; storage; placement; splicing; terminating conductors; coiling and taping of spare conductors; and identification, testing, and verification of each circuit, cable, and conductor.

Terminating a conductor shall include installing cable termination kits for shielded cable, attaching the conductor at its designated location, and insulating the entire connection where specified or required by the application.

Phase tape shall be applied to each conductor at the terminations of all power and lighting circuits that are not already properly color coded.

### **16925.2 Scope of Supply**

Unless otherwise specified as being furnished by others, the Contractor, shall furnish all lighting and grounding cable, terminations, fittings, splices, lubricants, equipment, and miscellaneous materials as required for a complete conductor installation.

## 16941 - Lighting System Installation for Pre-Engineered Buildings

### 16941.1 Scope of Supply

Scope of supply shall include installing the lighting system as specified herein.

#### 16941.1.1 Items Furnished by Others and Interfaces

Items furnished by others and not in this scope of supply include the following: The building power supply to the building breaker panels will be provided by the Owner.

#### 16941.1.4 Codes and Standards

Work performed under these specifications shall be done in accordance with the local codes and standards. Unless otherwise specified, the applicable governing edition and addenda to be used for all references to codes or standards specified herein shall be interpreted to be the jurisdictionally approved edition and addenda. If a code or standard is not jurisdictionally mandated, then the current edition and addenda in effect at the date of this document shall apply:

Work	In Accordance With
Lighting installation	NFPA 70 - National Electrical Code
Emergency lighting installation	NFPA 101 - Life Safety Code

### 16941.2 Fixtures

Recessed fluorescent or LED static troffers shall be supported from the ceiling system grid and support structure above the ceiling. Supports shall be designed for the project seismic criteria.

Emergency and exit lighting shall be installed in accordance with NFPA 101.

Each complete fixture shall be secured to its support assembly. This work includes, but is not limited to, all special drilling, assembling, disassembling, reassembling, and wiring. Except for light fixtures with swivel support power hook hanger assemblies, light fixtures shall be rigidly supported. Chain supports are not acceptable.

Light fixtures shall be controlled from light switches installed inside the room on the latch side of each door entrance. Rooms with multiple entrances shall utilize appropriate three- and four-way switching schemes. Light fixtures in the large open process equipment areas shall be controlled from panelboard circuit breakers. The panelboard shall be located in a readily accessible location to the space. Fixtures not controlled by local switches shall be circuited so adjacent fixtures are connected to alternate phases of the panelboard.

Conduits connecting recessed light fixtures and their adjacent junction boxes shall be flexible metallic conduit 1/2 inch (13 mm) minimum size.

Immediate lamp replacement, whenever burnouts occur, shall be continuous until the date of commercial operation.

Fixture maintenance shall be continuous until the date of commercial operation.

### 16941.2.1 Location

Fixture locations shall be coordinated with other work in the same area to prevent interference between lighting fixtures, ductwork, piping, or other equipment. Light fixtures shall be symmetrically and uniformly spaced, as much as practical, and shall not be located over the top of piping and equipment. Any fixture shall be relocated if, after installation, it is found to interfere with other equipment or is so located to prevent its practical and intended use. No fixture shall be located to prevent the full use of any accessway beneath a removable grating or slab.

Personnel access doors into a building shall be provided with a cutoff wall pack fixture above the door at approximately 8 feet (2.4 meters) above the floor. If door canopies do not allow installation above the door, the fixtures may be located lower below the canopy and at the side of the doorway as high as possible.

Industrial fluorescent or linear LED fixtures shall be used for mounting heights between 8 feet (2.4 meters) to 12 feet (3.6 meters), and high-pressure sodium, LED or pulse start metal halide fixtures shall be used above 12 feet (3.6 meters).

### 16941.2.2 Alignment

Fixtures installed in rows shall be carefully aligned vertically and horizontally. Lighting fixtures and outlet boxes, mounted on building steel, shall be centered on the beam flanges or webs, except where deviations are required to avoid interference with ductwork, piping, or miscellaneous steel. Fixtures and poles shall be carefully aligned vertically and horizontally.

### 16941.2.3 Wiring Devices

Wiring devices, such as switches and receptacle socket outlets, shall be installed in boxes approved for the purpose, and the polarity of receptacles shall be verified and tested.

**16941.1.3.1 Wiring Device Mounting Heights.** Unless otherwise indicated on the drawings, the bottom of the wiring devices shall be mounted at the following distances above the finished floor. Note that “finished areas” are defined as rooms with a suspended ceiling system, and “unfinished areas” are all other indoor locations:

Wiring Device	Location	Distance Above Floor
Receptacles	Offices and finished areas	15 inches (380 mm)
	All other locations	35 inches (915 mm)
Switches	All locations	46 inches (1,170 mm)

### 16941.2.4 Lighting Conductors

The following requirements shall apply to the installation of lighting conductors, in addition to applicable installation procedures specified in these specifications:

At least 6 inches (150 mm) of free conductor shall be left at each junction box.

Cables shall be installed in continuous lengths. Splices shall only be permitted where the route length exceeds the maximum drum length, unless otherwise approved by the Construction Manager. Wires to be spliced shall be installed in accordance with local codes and standards.

Lighting conductors shall be 12 AWG minimum size.

#### **16941.2.5 Lighting Raceway**

The following requirements shall apply to the installation of lighting raceway, in addition to applicable installation procedures specified in these specifications:

Raceway installed in finished areas, such as offices, locker rooms, toilets, control room, etc., shall be concealed in the walls, or above the ceiling.

Conduit shall not be routed on the exterior surface of building walls.

## 21000 - Technical Supplemental Specifications

This section contains technical supplemental specifications that provide additional requirements applicable to the work covered under the technical sections.

### 21000.1 Site Meteorological and Seismic Data

Work shall be designed according to the following building code and site conditions:

<b>General Design Data:</b>	
Building Code	2023 Florida Building Code (ASCE 7-16)
Risk Category	III
Site Elevation (Mean Sea Level), ft (m)	TBD
<b>Wind Design Data:</b>	
Basic Wind Speed, V Nominal 3 second gust wind speed at 33 ft (10 m) above ground for Exposure C category, mph	140
Exposure Category	C
<b>Seismic Design Data:</b>	
0.2 Second Maximum Considered Earthquake (MCE <sub>R</sub> ) Spectral Response Acceleration, S <sub>s</sub>	0.109
One Second Maximum Considered Earthquake (MCE <sub>R</sub> ) Spectral Response Acceleration, S <sub>1</sub>	0.057
Site Class	D
Seismic Design Category	B
Importance Factor (Seismic Loads), I <sub>e</sub>	1.25

### 21000.2 Minimum Uniform Live Loads

Minimum uniform live loads shall be in accordance with the following.

Area	Live Load, psf (kN/m <sup>2</sup> )
Ground Floor Slabs	
Shops, warehouses	125 (6.0)
Other structures	100 (4.8)
Concrete floors	100 (4.8)
Roofs	20 (1.0)

## 21000.3 Manufacturer's Standard Coating

Unless otherwise specified, the manufacturer's standard coating systems shall be applied in the shop to ferrous metal surfaces of equipment and materials. The coating systems shall provide resistance to corrosion caused by weather and industrial environments. Manufacturer's standard coating systems shall be specified to provide medium (M) durability in accordance with BS EN ISO 12944, Paints and Varnishes – Corrosion Protection of Steel Structures by Protective Paint Systems, for Corrosivity Category C5 as defined in Table 1 for the intended service environment. Surfaces that will be inaccessible after assembly shall be protected for the life of the equipment.

## 21000.4 Furnishings

Building furnishings to be supplied and installed by the Contractor:

Quantity	Description	Model Information
Men's Bathroom		
2	ADA toilets	American Standard - Madera; Model 3043 Kohler – Highline; Model K-4405 Zurn – Z-HET; Model Z5565-K These water closets are able to flush waste in buildings with sufficient water pressure (above 25 psi) to properly operate a flushometer unit such as the Sloan Royal Valve. Construction - Vitreous china, glazed trap way Height – Must meet ADA minimum rim dimension of 16.125" Flow Rating – 1.6 gallons per flush. Color - White Performance Score – 1,000 grams or more MaP Codes – ASME A112.19.2 for vitreous china, ADA/ICC/ANSI 117.1. Installation – Floor outlet centerline shall be 12" or less from the finished wall Availability – repair parts locally available in Jacksonville. Design – Smooth contours, easy to clean. ¼ turn supply valve.
2	Urinals	Wall hung, Vitreous China, White, American Standard Trimbrook 6561.017, siphon jet action, ¾" top spud handle, Sloan Royal 186, 1 GPF.
2	Hand sink	Wall hung vitreous china, white, American Standard Lucerne 355.012, 20 ½" x 18 ¼"
1	Multi-station hand sink	Best sheet metal, H.D. 14 ga. Multi station wash up sink, 60" 032E60208R
2	Toilet compartment	Scranton solid plastic toilet compartment, HDPE Global color through phenolic
2	Hand towel dispensers	Tork Elevation Matic Model 5510282
2	Soap dispenser	GOJO FMX-12 Dispenser – Black – SKU 5155-06
2	Toilet paper dispenser	Tork Twin Jumbo Bath Tissue Roll Dispenser, Article 247549A, Color: Black, SCC: 10073286622393
3	Bathroom mirror	Mirror with angled frame, welded corners. Frame made of one piece formed stainless steel ¾" x ¾" corners welded with satin finish Back of mirror is galvanized steel secured to frame with concealed screws. Mirror is ¼" float glass, thermosetting infrared cured 36" high x 48" wide over multi station hand sink. Paint backing with poly glaze finish manufactured to ASTM C 1036 and ASTM C 1503 standards. Mirror is protected by ¼" extruded polystyrene between mirror and galvanized steel. Wall hanger is 18 gauge rolled steel all welded construction



Quantity	Description	Model Information
2	Shower	30" x 60" one piece shower stall complete with mixing valve and shower head
40	Locker	Uline single tier lockers, unassembled, 45" wide, 18" deep.
4	Bench	Uline locker bench, 48" x 9" x 17" standard
1	Floor drain	
2	Shower curtain w/rod	Vinyl with hooks
1	Faucets	
<b>Women's Bathroom</b>		
2	ADA toilet	American Standard - Madera; Model 3043 Kohler – Highline; Model K-4405 Zurn – Z-HET; Model Z5565-K These water closets are able to flush waste in buildings with sufficient water pressure (above 25 psi) to properly operate a flushometer unit such as the Sloan Royal Valve. Construction - Vitreous china, glazed trap way Height – Must meet ADA minimum rim dimension of 16.125" Flow Rating – 1.6 gallons per flush. Color - White Performance Score – 1,000 grams or more MaP Codes – ASME A112.19.2 for vitreous china, ADA/ICC/ANSI 117.1. Installation – Floor outlet centerline shall be 12" or less from the finished wall Availability – repair parts locally available in Jacksonville. Design – Smooth contours, easy to clean. ¼ turn ball valve supply valve
2	Flush valve	Sloan Royal Flush valve
1	Hand sink	Wall hung vitreous china, white, American Standard Lucerne 355.012, 20 ½" x 18 ¼"
1	Multi-station hand sink	Best sheet metal, H.D. 14 ga. multi-Station wash up sink, 60" 032E60208R
3	Faucets	Chicago (420-ABCP) deck mounted 4"- single lever Hot and Cold-water mixing faucet with 0.5 GPM non-aerating spray and ceramic cartridge.
2	Toilet compartment	Scranton solid plastic toilet compartment, HDPE Global color through phenolic
2	Hand towel dispenser	Tork Elevation Matic Model 5510282
2	Soap dispenser	GOJO FMX-12 Dispenser – Black – SKU 5155-06
2	Toilet paper dispenser	Tork Twin Jumbo Bath Tissue Roll Dispenser, Article 247549A, Color: Black, SCC: 10073286622393
1	Bathroom mirror	Mirror with angled frame, welded corners. Frame made of one piece formed stainless steel ¾" x ¾" corners welded with satin finish Back of mirror is galvanized steel secured to frame with concealed screws. Mirror is ¼" float glass, thermosetting infrared cured 36" high x 48" wide over multi station hand sink. Paint backing with poly glaze finish manufactured to ASTM C 1036 and ASTM C 1503 standards. Mirror is protected by ¼" extruded polystyrene between mirror and galvanized steel. Wall hanger is 18 gauge rolled steel all welded construction. 48" wide x 36" high over multi station hand sink
1	Shower	30" x 60" one piece shower stall complete with mixing valve and shower head
1	Locker	Uline single tier lockers, unassembled, 12" wide, 18" deep

Quantity	Description	Model Information
1	Bench	Uline locker bench – 48" x 9" x 17", standard
1	Floor drain	
3	Shower curtain with rod	Vinyl / aluminum
<b>Kitchen</b>		
1	Range	Frigidaire gallery series ceramic top stove model# FGFE3030PFC
1	Sink and faucet	Double sink, 33" x 22" three hole, 18 gage type 302 stainless steel, Elkay Lustertone LMR-3322, Elkay LK800, Wristblade levers faucet
	Service sink	Wall, 22" x 18", 16 gage type 302 stainless steel, American standard Florwell 7741.000.
	Faucet	American standard Aquaseal 8345, 100, including supply fittings with bail hook and brace or American Standard 8350.243, including vacuum breaker or Elkay LK-400, including vacuum breaker, bail hook, and wall brace
	Flooring	All rooms to be 1/8" x 12" x 12" Vinyl composition tile except for shower rooms, and locker rooms
1	Dual kitchen sink	Double bowl 18 gage stainless steel
6	Refrigerator	Maytag model 118FFFE08, 18 cubic foot, top freezer, color black
1	Ice Machine	Hoshizaki KM-520MAJ/B-300SF 556 lb. Crescent Cube Ice Machine w/ Bin-300 lb. storage, Air cooled, 115V
1	Dryer	LG 7.8 cubic foot dual invert heat pump ventless electric dryer with direct drive motor. AI sensor dry in black stainless steel. 208V
1	Washer	LG 5.5 cubic foot smart top load washer in Matte black with impeller, model WT8400CB
1	Floor drain	
18 ft	Cabinetry	24" base cabinets and 30" high wall cabinets
18 ft	Countertop	Formica
<b>Common Area</b>		
	Tables and chairs by JEA	
2	Double entrance door	72" x 80" commercial aluminum double door with full light both sides
2	Single entrance door	36" x 80" commercial aluminum single door with full light
3	Industrial lockers	Uline industrial lockers – six tier, 3 wide, assembled 36" wide, 18" deep x 72" high, model H-1393AT, Gray. Total width of system will be 9 feet.
	Roof over both entrances	Canopy design to match building exterior, with gutters, downspouts, aluminum posts and handrail.
<b>Mechanical Room</b>		
1	Mop sink	
1	Water heater	Electric tank type, 60 gallon, 208Y/120/3, porcelain glass lined, ASME-AGA rated temperature and pressure relief valve
1	Fire detection panel	Designed, supplied, and installed by Contractor
2	Electrical panel	Designed, supplied, and installed by Contractor
<b>Computer Lab</b>		
4	Workstation	

## **21000.5 Shop Drawings and Instruction Manuals**

This section, in conjunction with the Schedule of Submittals, stipulates the requirements for engineering data that Supplier shall submit for design information and review. Document submittal procedures shall be in accordance with the requirements of this Purchase Order.

### **21000.5.1 Submittal Requirements**

Technical data shall be submitted in electronic format.

Drawings shall be submitted in AutoCAD 2024 as well as PDF.

### **21000.5.2 Wiring Diagrams**

Wiring Diagrams shall be submitted.

### **21000.5.3 Instruction Manuals**

Instruction Manuals shall be submitted.