

## **1 GENERAL**

### **1.1 WORK INCLUDES**

- .1 The Work of this section includes the design, supply, installation and commissioning of a complete and fully functional photovoltaic (PV) power system.
- .2 The purpose of the system is to provide 208Vac, 3 phase, 60 Hz grid compliant power to the building electrical loads and the utility grid. During sunny periods, photovoltaic (PV) panels will provide power to the building and utility grid through micro-inverters. The PV system status and performance will be monitored via web-based monitoring and management software.
- .3 The system generally includes, but is not necessarily limited to the following components:
  - .1 Sixty (60) 72-cell 315W PV panels.
  - .2 Required solar PV rack rail system.
  - .3 Sixty (60) micro-inverters.
  - .4 Communications gateway.
  - .5 Required cabling, wiring, and conduit
  - .6 PV system grounding
  - .7 Installation of all components
  - .8 Commissioning of all components
  - .9 Component and system approvals and warranties
  - .10 Shop drawings
  - .11 Operation and Maintenance manuals (minimum of 3)

### **1.2 RELATED SECTIONS**

- .1 Metal Fabrications: Section 05 50 00.
- .2 Electrical: Division 26.

### **1.3 SUBMITTALS**

- .1 Provide shop drawings and submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturers printed product literature, specifications, and data sheets including product characteristics. Performance criteria, physical size, finish and limitations.
- .3 Manufacturers installation instructions, special handling criteria, installation sequence and cleaning procedures.

- .4 Schematic diagram of complete PV system including wiring and component interconnection.

#### **1.4 CLOSEOUT SUBMITTALS**

- .1 Provide spare parts as recommended by the manufacturer.
- .2 Provide an operation and maintenance manual in accordance with Section 01 78 00 - Closeout Submittals.

### **2 PRODUCTS**

#### **2.1 SYSTEM DESIGN REQUIREMENTS**

- .1 Size the solar power system to provide 18.9kWp power to Panel PV.1. Refer to drawings for PV system wiring diagram.
- .2 Electrical equipment, wiring, conduit and grounding to comply with Division 26 - Electrical.

#### **2.2 SOLAR POWER SYSTEM**

- .1 Polycrystalline solar panel constructed using a tempered glass front with anti-reflective coating, EVA encapsulant, and composite sheet back cover.
  - .1 Minimum efficiency of 16.2%.
  - .2 Heavy duty aluminum frame.
  - .3 Galvanized steel, aluminum or stainless steel mounting frame suitable for mounting solar panels.
  - .4 Weather resistant junction box (NEMA3R).
  - .5 Power: 315W.
  - .6 Voltage at maximum power: 27.3V.
  - .7 Open circuit voltage: 45.9V.
  - .8 Operating Conditions:
    - .1 Operating temperature: -40 to 85 deg. C.
    - .2 Hail safety impact velocity: 25mm at 23 m/s.
    - .3 Static load wind/snow: 4000 Pa/7000 Pa.
- .2 Micro-inverters:
  - .1 Minimum input DC voltage: 62VDC.
  - .2 Nominal output voltage: 208VAC.
  - .3 Nominal output current: 1.15A.
  - .4 Output frequency: 60Hz.
  - .5 Total Harmonic Distortion (THD) <5%.
  - .6 Maximum continuous output power: 240W.
  - .7 Inverter efficiency (peak): 96.5%.
  - .8 Waveform: Pure sine wave.

- .9 Operating Temperature: -20°C to 60°C.
- .10 Natural convection cooling.

### **3 EXECUTION**

#### **3.1 INSTALLATION**

- .1 Install all system components as indicated on the drawings and in accordance with the manufacturer's requirements.
- .2 Complete all electrical work in accordance with Division 26.
- .3 Install all wiring and associated conduit. Have wiring and associated conduit sized, supplied and installed by the system Vendor. Size wiring such that the voltage drop across the system does not exceed 2%.
- .4 Provide trained personnel to commission all components of the system. Provide all necessary programming and testing, provide a letter certifying the system installation to the Departmental Representative upon completion.
- .5 Provide system training on the operation and maintenance of the system to the facility operating staff. Coordinate the time a minimum of one (1) week in advance. Utilize the operation and maintenance manuals as a reference during the training.

**END OF SECTION**