

Special Specification 6128

Environmentally Controlled Communications Building



1. DESCRIPTION

Furnish and install an Environmentally Controlled Communications Building as shown on the plans. Use this building to house various surveillance and control equipment.

2. CONSTRUCTION

2.1. Submittals.

Submit details of the building design to the Engineer for review and approval before fabricating.

Submit a building layout for each building location for approval by the Engineer. Only buildings with an approved layout will be accepted under this project.

2.2. Building. Provide a building which is made of steel reinforced, pre-cast, and post-tensioned concrete. Ensure that the building meets the following codes and standards: ACI-318-83 "Building Code Requirements for Reinforced Concrete," and the Concrete Reinforcing Institute "Manual for Standard Practice." Provide a building with minimum dimensions of 8 ft. wide x 12 ft. long or as shown on the plans. Design the building for the following loads: 0.35 PSI floor live load, and 125 mile/hr wind load. Provide roof with a 1 in. slope, front to back and a 1.5 in. overhang. Ensure that the reinforcing steel meets the requirements of ASTM A615. Post-tension the roof and floor each by a single continuous strand. Caulk the joints between the panels on the exterior surface. Arrange the panels so that the end of the building can be removed for future addition to the building.

2.3. Building Components. Attach 4 in. studs to the interior of the walls on 24 in. centers. Place 4 in. insulation batts between the studs and cover the studs with 0.5 in. thick vinyl-faced gypsum board.

Provide each building complete with all internal components, back and side panels, terminal strips, harnesses, and connectors as well as mounting hardware necessary to provide for installation of equipment as described herein and on the plans. Ensure the electronic components comply with Special Specification, "Electronic Components," located elsewhere in the project documents.

Provide stainless steel screws, nuts, and locking washers for external uses. Do not use self tapping screws unless specifically approved by the Engineer. Ensure all parts are made of corrosion resistant material, such as plastic, stainless steel, aluminum, or brass. Ensure the materials used in construction are resistant to fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

Ensure the building is completely weatherproofed to prevent the entry of water, dust, and dirt.

Equip the building with metal shelves for supporting the shelf-mounted equipment as shown on the plans. Mount the shelves on unistrut or keyhole channels or equal. Ensure the shelves are at least 10.5 in. deep and positioned in the building to provide a 0.5 in. clearance between the back of the shelf and wall. Support the shelves at least every 24 in. of shelf length.

Provide two industrial-type fluorescent fixtures with white porcelain enamel reflector and four 48 in. fluorescent lamps in the building. Provide the lights with an on-off switch. Position the light to provide illumination to all areas of the building.

Install one momentary, pin-type door switch for each door in the building. Wire the switch to a terminal block for the purpose of detecting a building intrusion condition.

Include the building foundation as part of this bid item. Mount the building on a concrete foundation as shown on the plans. Construct the foundation in accordance with Item 656, "Foundation for Traffic Control Devices." Ground the building to a 5/8 in. (minimum) copper clad ground rod 8 ft. long driven into the ground and installed in the foundation.

Design the equipment for ease of maintenance. Ensure that the component parts are readily accessible for inspection and maintenance.

- 2.4. **Air Conditioning and Ventilation.** Install a standard thermostatically controlled window air conditioner of not less than 12,000 BTU in the building. Ensure the air conditioner has a fan which can be run with the compressor on or off.
- Furnish and install security bars for the air conditioning unit. Attach the security bars to the exterior masonry wall, as recommended by the manufacturer, with tamper resistant fasteners. Fabricate the bars from A-36 steel, galvanized, and painted to match the exterior of the building.
- 2.5. **Door.** Provide doors as shown in the plans, made of 18 gauge galvanized steel, full flush, with a 1-1/2 hr. fire rating without a window, and paint to match the exterior and interior. Use minimum dimensions of 36 in. x 80 in. or as shown on plans. Provide stainless steel hinges that have flush non-rising pins with concealed set screws. Install a neoprene gasket and a weatherstrip at the bottom of the door. Equip the doors with a UL-listed lock having the following features: A guard bolt which deadlocks the latch bolt, an inside knob which will always open the lock, and a toggle or other device on the inside which will prevent the outside knob from retracting the latch bolt. Provide two keys for the lock. Provide a chain to limit the opening of the door. Key all buildings alike.
- 2.6. **Equipment Racks.** Equip each building with an open frame equipment rack for mounting EIA 19 in. rack mounted equipment. Ensure that the rack has a minimum of 72 in. of usable equipment mounting space. Provide the rack with mounting platforms to be mounted to the building foundation with a minimum of 4 bolts. Equip the rack uprights with mounting holes drilled on EIA universal spacing and tapped with 10-32 threads. Ensure the racks are rust resistant and painted. Ground the rack to the building grounding system using a minimum of number 6 AWG stranded cable. Mount two 12 outlet UL approved 15 ampere circuit breaker protected electrical outlet strips on the rack. Provide the outlet strips with AC power cords 12 ft. in length.
- 2.7. **Electrical requirements.**
- 2.7.1. **Distribution Panel.** Furnish the building with a U.L.-listed single-phase, 3 wire, 120/240 VAC, 100 A main circuit breaker, and a twelve-space indoor flush-mounted power distribution panel mounted on the inside wall of the building. Provide the distribution panel with a cover containing a door. Provide a detailed layout for approval by the Engineer. Ensure that the panel is Square D QO series or equivalent. Install the power wiring in accordance with the National Electrical Code.
- 2.7.1.1. **Receptacles.** Install receptacles as shown on the plans. Ensure that the receptacles have circuit breaker protection. Ensure that electronic equipment receptacles are NEMA type 5-20R or as required to match electronic equipment plugs. Ensure convenience outlets are NEMA type 5-20R and have Ground Fault Circuit Interrupter Protection. Ensure Air Conditioning receptacles are NEMA type 6-30R or as required to match air conditioning equipment.
- 2.7.1.2. **Circuit Breakers.** Install Circuit breakers as shown on the plans. Provide the circuit breakers from the same manufacturer as the distribution panel. Ensure the spare breaker spaces have 20 ampere breakers installed.

The above breakers are in addition to any auxiliary fuses which may be furnished with the electronic equipment to protect component parts. Protect the load side of the circuit breakers by an EDCO Model SHP-

300-10, or equivalent, lightning arrestor. Use number 8 AWG or larger stranded copper conductors to connect the arrestor into the circuit.

- 2.7.1.3. **Radio Interference Suppressor.** Equip all buildings with UL-approved radio interference suppressors installed on the load side of each electronic equipment circuit breaker and that meet the following requirements:
- Attenuation: 50 dB
 - Frequency range: 200 KHz to 75 MHz
 - Voltage: 120 VAC
- 2.7.1.4. **Power Cable Input Junction Terminals.** Provide a barrier terminal block with a minimum of three terminals and one compression fitting designed to accept up to a No. 2 AWG stranded wire for the power supply lines and rated at 100 amperes minimum.
- 2.7.2. **Loop Input Distribution Panel.** When required for use with equipment shown on plans, mount a fully wired loop input distribution panel on the inside wall of the building. Provide a detailed layout for approval by the Engineer. Provide surge protection for incoming loop pairs and install on the loop input distribution panel.
- 2.7.3. **Back Panel.** Provide a detailed layout for approval by the Engineer. When required for equipment shown on plans, provide the necessary back panels for interconnection of equipment. Provide necessary back panels to distribute and properly interconnect the building wiring related to the specific complement of equipment called out in the Plans. Properly terminate the cable harnesses of each item of equipment, including any furnished by the Department, at terminal boards on the back panel.
- 2.7.4. **Wiring.** Ensure that the wiring within the building is neatly wrapped and routed such that opening and closing the door or raising or lowering of back panels will not twist or crimp the wiring. Ensure that no cable pressure points are present.
- Cut the wires to the proper length before assembly. Ensure that no wires are doubled back to take up slack. Ensure cable harnesses are covered with PVC sheathing, woven braid or braided. Secure cables with nylon cable clamps.
- Provide cable slack to facilitate removal and replacement of assemblies, panels, and modules.
- Color code the harnesses and wiring. Cross-reference each harness to a chart on the building print that lists the connector pin letter or number, the wire number, the terminal number that the wire is connected to, and the function of the wire. Ensure each harness is enclosed in PVC sheathing, woven braid or braided.
- Provide sufficient length of cable to easily reach the electronic equipment placed anywhere on the shelves.
- Route and bundle the wiring containing line voltage AC separately and shield it from low voltage, i.e., control circuits. Cover the conductors and live terminals or parts with suitable insulating material.
- Ensure that the wiring containing line voltage is a minimum size of No. 14 AWG.
- 2.7.5. **Terminal Blocks.** Ensure that the terminal blocks located on the panels are accessible to the extent that it is not necessary to remove the electronic equipment from the cabinet to make an inspection or connection.
- Ensure terminal blocks are two-position, multiple-pole barrier type of minimum size 10-32 screws. Arrange terminal blocks so that they do not upset the entrance, training, and connection of incoming field conductors. Identify the terminals suitably by legends permanently affixed and attached to the terminal blocks. Ensure that no more than 3 conductors are brought to any one terminal screw. Ensure no electrically energized components or connectors extend beyond the protection afforded by the barriers.
- 2.7.6. **Building Internal Grounding.** Provide the building with internal ground bus-bars permanently affixed to the building and connected to the grounding electrode. Use bare stranded No. 1/0 AWG copper wire between

the bus-bars and between bus-bar and grounding electrode. Ensure that each copper ground bus-bar has a minimum of 20 connector points, each capable of securing at least one No. 10 AWG conductor. Return AC neutral and equipment ground wiring to these bus-bars.

2.7.7. **Environmental Design Requirements.** Ensure that the building meets its functional requirements during and after subjection to any combination of the following requirements:

- Ambient temperature range of 0°F to 158°F.
- Temperature shock not to exceed 30°F per hour, during which the relative humidity does not exceed 95%.
- Relative humidity range not to exceed 95%.
- Moisture condensation on all surfaces caused by temperature changes.

2.8. **Documentation.**

Provide each Environmentally Controlled Communications Building with the following documentation:

2.8.1. Three (3) complete and accurate building wiring diagrams. Provide one (1) complete set of wiring diagrams in CADD form in a format approved by the Engineer.

2.8.2. Document the wiring diagrams on every harness wire termination in the building. Provide updated drawings if any discrepancies are discovered.

2.8.3. Place one set of the documentation in the building in a heavy duty plastic envelope approved by the Engineer. Deliver the other documentation to the Engineer.

2.9. **Testing and Warranty.**

Provide testing of the Environmentally Controlled Communications Building in accordance with Special Specification 6005, "Testing, Training, Documentation, Final Acceptance, and Warranty."

Provide a warranty of the Environmentally Controlled Communications Building in accordance with Special Specification 6005, "Testing, Training, Documentation, Final Acceptance, and Warranty."

3. **MEASUREMENT**

This Item will be measured as each unit furnished, installed, and tested in accordance with this special specification.

4. **PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Environmentally Controlled Communications Building." This price is full compensation for the equipment described under this item with cables and connectors, building foundation, documentation and testing, and for furnishing labor, tools, materials, training, equipment, and incidentals.