



MODULAR ENCLOSURE SPECIFICATIONS

15320-3 FIRE PUMP SYSTEM & ACCESSORIES

Part 3 – Enclosure Modular Panel Design

3.1 System Enclosure:

1. The entire fire pump system shall be enclosed in a single module. The module shall be complete as specified herein including shop wiring and piping of the equipment furnished under these Equipment specifications. The module shall be mounted on a concrete foundation provided by the Buyer.
2. Structural Design: The module shall be the manufacturer's standard design that meets or exceeds the site design conditions. The floor shall be framed with structural members with provisions for bolting to the concrete foundation. A means shall for lifting shall be provided the assembled module without damage using overhead rigging.
3. Arrangement: The manufacturer shall arrange the equipment furnished under these equipment specifications to allow proper access to the components for operation and maintenance. The minimum headroom in all walkways shall be 7'-0"the module shall be completely assembled at the sellers assembly plant, with all the accessories listed in this specification fully installed, wired, and tested prior to shipping to the job site, including the fire pump equipment, disconnect switches, panel board(s) and transformer(s), lighting, light switches and receptacles required to make a complete operating system.

A. Design Criteria

1. All enclosures shall be designed in accordance with the applicable sections of the latest edition of the International Building Code and conform to ASCE (American Society of Civil Engineers) "Minimum Design Loads for Buildings and other structures".
2. Each enclosure shall be designed for the following loads, in addition to the stationary weight of the enclosure. Reduction of loads due to tributary loaded areas will not be permitted.
3. The vertical live load of the enclosure shall not be less than 40 pounds per square foot applied on the roof
4. The horizontal wind load of the enclosure shall not be less than 110 MPH and shall be distributed and applied in accordance with the applicable edition of the International Building Code and ASCE.



MODULAR ENCLOSURE SPECIFICATIONS

15320-3 FIRE PUMP SYSTEM & ACCESSORIES

5. The enclosure shall be designed to resist the effects of seismic ground motions which may be expected in seismic zone 4.
6. All combining and distributing of auxiliary equipment loads imposed on the enclosure system shall be done in accordance with the applicable section of the ASCE.
7. Upon request, the selected enclosure manufacturer shall provide the enclosure purchaser with a complete design certification signed and sealed by a registered professional engineer.

B. Modular Panel Construction

1. All enclosures shall be constructed with prefabricated wall and ceiling panels formed to exact size. All panels to be constructed with die-formed interior and exterior metal pans securely fastened to a perimeter frame of kiln dried spruce-pine-fir (SPF) specie, #2 grade lumber. Perimeter frame to feature tongue and groove profile for positive alignment and sealing and shall utilize pressure treated lumber. Panels shall be filled with poured-in-place urethane, which securely bonds to metal pans and perimeter frame creating a rigid structural panel with a tough, resilient, shock-resisting surface. Standard panels shall be interchangeable for ease of assembly. Special panels (if required) shall be manufactured to the size required to obtain a specified building size.

C. Panel Fasteners

1. Cam-lock fasteners shall provide a tight and positive seal. These fasteners reduce on-the-job installation time to a minimum. Fastener material shall be steel housing, hook and pin with high-pressure die-cast zinc cam. Hardened steel hexagonal wrench is provided to tighten panel fasteners. The hook of the fastener shall engage over the pin when rotating the wrench and with cam-action, draw the panels tightly together. Polyethylene snap-in caps cover the wrench holes. Lock spacing shall not exceed 48" on center.

D. Panel Gaskets

1. Each joint shall exhibit a polyvinyl chloride (PVC) bulb type; compression gasket to eliminate water vapor permeability. All gaskets are factory installed and require no additional handling. Gaskets shall be resistant to chemical corrosion and ultraviolet radiation. Gasket operating temperature shall be -34 degrees C to +71 degrees C (-30 degrees F to +160 degrees F).

E. Insulation



MODULAR ENCLOSURE SPECIFICATIONS

15320-3 FIRE PUMP SYSTEM & ACCESSORIES

1. Insulation shall be 100% rigid urethane with a conductivity factor (K factor) not to exceed 0.128 Btu/hr. Urethane is to be poured in place with a density of 2.2 pounds per cubic foot. Overall coefficient of heat transfer (U factor) and R value to be as follows:

	THICKNESS	"U" FACTOR	"R" VALUE
Wall Panels	3 – 1/2"	.036	28
Roof Panels	5"	.025	40

This insulation shall be a listed urethane with a rating of no more than 25 for flame spread and 450 for smoke developed per ASTM E84. This urethane will also meet the ignition properties requirements of ASTM D-1929.

F. Panel Finishes

1. Interior and Exterior metal pans shall be nominal 24 gauge galvanized steel conforming to ASTM A-653 specifications with the galvanized coating conforming to G60 standards. Minimum yield strength of the panel material shall be 50,000 PSI. The interior finish shall be white embossed and the exterior finish shall be tan or white embossed with mesa profile. Panel finish shall be factory applied coating of 0.9 to 1.1 mils of dry film thickness. Alternate colors are available by special order.
2. The finish coat shall be a baked-on siliconized polyester formulation that will meet the following performance standards after 10 years continuous exposure in "normal" atmospheric conditions not containing corrosive fumes such as chemicals or salt spray.
 - a. Panel finish shall show no evidence of blistering, peeling, or chipping.
 - b. Panel finish shall not show surface chalking in excess of the No. 4 rating D659 as established by the American Society of Testing Materials (ASTM).
3. Panel finish after cleaning, shall not show color change in excess of 7 NBS units when measured in accordance with the ASTM D-2244 standard.
4. The above performance standards shall not apply where panels have been damaged by fire, radiation or other physical damage.

G. Roof System

1. A prefabricated roof system shall be provided for the enclosure to provide a waterproof covering for insulated ceiling panels.

2. The roof system shall be a galvanized standing seam, 22 gauge, 16 inches wide, sheet metal over ceiling panels with a slope of 1/4" per foot. Fasteners shall be corrosion resistant rubber washered tek screws with length and strength required for metal to be fastened.

H. Wall Panel Design

1. Exterior wall panels of the enclosure shall be a single continuous length from the steel skid to the roof panel of the enclosure and at the side walls and the end walls of the enclosure except where interrupted by wall openings.
2. Wall panels shall be fastened from the interior through a steel plate in the skid with 3/8" diameter electro-galvanized lag bolts. The fastening system shall be designed so that no wall fasteners are exposed on the exterior surface of the walls.

I. Enclosure Type

1. Each enclosure roof shall have 1/4" pitch in enclosure width. Roof panels shall have interlocking tongue and groove and attached to the wall through factory pre-drilled holes with 3/8" corrosion resistant fasteners and an interior angle fastened to walls and top panels. The roof system shall include factory manufactured "J" rail at the low side wall. The "J" rail shall be nominal 18 gauge galvanized steel.
2. Transmission of horizontal wind loads across the enclosure shall be made through the panel roof system and no separate roof or wall diagonal bracing shall be required.
3. Structural frame wind belts and wind bents shall not be required for proper transmission of lateral winds loads.

J. Hollow Metal Doors

1. All doors shall be 1-3/4" thick flush-type. Door panels shall be nominal 18 gauge cold rolled steel reinforced by lamination to a polystyrene core enclosed with 16 gauge end channel. The hinge reinforcements shall be nominal 7 gauge and the lock reinforcements shall be nominal 16 gauge.
2. Door frames shall be 4-3/4" deep double rabbited type of nominal 16 gauge cold rolled steel.



MODULAR ENCLOSURE SPECIFICATIONS

15320-3 FIRE PUMP SYSTEM & ACCESSORIES

3. Door and frames shall be factory painted with one coat of baked on primer. All doors shall be pre-assembled in their frames and hardware installed and tested prior to shipment. Field installation of single leaf door units shall not require any frame assembly or door hanging.

K. Door Hardware

1. Door hardware shall consist of:
 - a. 3– 4-1/2" x 4-1/2" standard weight, plain bearing hinges per ANSI A5133 630 stainless steel finish with non-rising pins.
 - b. 3-1/2" wide x 1" high extruded aluminum threshold (Out Swing).
 - c. 3/16" x 5/16" silicone rubber weather-stripping.
2. Cal-Royal deadbolt lockset per ANSI Grade 3, LSD-01 Series, stainless steel finish.
3. Cal-Royal BA-30 Keyless Passage set, Grade 2, ANSI F75-2, stainless steel finish.
4. Door closer is certified to conform to ANSI 156.4 Grade 1 and meets exterior barrier free codes in 689 aluminum powder coat finish.
5. Rim Type "Cross Bar" panic device per ANSI A156.3, Type 1, Grade 1, Function 08, with powder coated aluminum finish or rim type "Push Pad" panic device built to ANSI A156.3, Type 1, Grade 2, Function 08 with powder coat aluminum finish are available as an option.

3.2 Enclosure Accessories:

A. Electrical

1. All wiring shall be installed in surface mounted (EMT)(hot dipped galvanized rigid) conduit installed per NFPA 20 2007 edition and the latest edition of NEC. All conduit installed below grade shall be hot dipped rigid conduit. Flexible liquid-tite conduit 18" maximum length shall be permitted at equipment and enclosure connections.
2. Power Supply: The pump station manufacturer shall provide an auxiliary power transformer if required. The transformer shall be mounted and wired on the skid. It shall deliver 240/120 volt single phase power to its distribution panel sized to support all building loads without overloading. Transformer shall dry type shielded type enclosed in a Nema 3R rated enclosure. The transformer shall be UL listed and comply with the latest edition of NEC.

3. Lighting: The module shall be equipped interior, exterior and emergency lighting per NFPA 20 and installed per the latest edition of the NEC.
 - a. Interior lighting: The enclosure shall be equipped with a minimum of two fluorescent wrap around type fixtures with magnetic ballast and T8 lamps. The lighting levels shall be as recommended by the I.E.S.(Illuminating Engineering Society). The fixture shall be UL Listed
 - b. Exterior lighting: The enclosure shall be equipped with a minimum of one exterior lighting fixture per door. The fixture shall be of the high pressure sodium type with photoelectric control. The fixture shall be UL Listed
 - c. Emergency Lighting: The enclosure shall be equipped with emergency lighting. The fixture shall provide a minimum of 90 minutes of illumination and be powered by a maintenance free lead-calcium battery.
4. Receptacles: The manufacturer shall furnish and install 120 volt wall mounted convenience outlets. The outlets shall be located in in an accessible area on each wall of the enclosure. The outlets shall be of the GFCI (ground fault circuit interrupting) type. The outlets shall be UL Listed.

B. Heating and ventilating

1. The enclosure shall be equipped thermostat controlled electric space heater capable of maintaining a minimum of 40 deg F per NFPA 20 2007 edition. The heater shall be wall or ceiling mounted, fan forced with adjustable outlet louvers
2. Ventilation shall be provided for the following functions:
 - a. To control the maximum temperature to 120 deg F (49C) at the combustion air cleaner inlet with the engine running at rated load.
 - b. To supply air for engine combustion
 - c. To remove any hazardous vapors
 - d. To supply and exhaust air as necessary for radiator cooling of the engine when required.
3. Exhaust Fan: The enclosure shall be equipped with a high capacity, direct drive propeller wall mounted fan. Fan shall come complete with wall collar, rear guard and exhaust damper. The fan shall be controlled by a wall mounted thermostat. The fan shall meet NFPA 20 and be UL listed and OSHA compliant.
4. Inlet louver: The enclosure shall be equipped with electric actuated, center pivot damper with bug screen mounted on the enclosure exterior. The louver shall be 120/1/60V powered closed, spring open and fail in the open position, fast acting, two position and be UL Listed and OSHA compliant

C. Testing:

1. The fire pump will be factory performance tested in accordance with the requirements of NFPA, UL and FM. The fire pump and jockey pump controllers will be electrically tested prior to shipment. Additionally, the entire package system will be hydrostatically



MODULAR ENCLOSURE SPECIFICATIONS

15320-3 FIRE PUMP SYSTEM & ACCESSORIES

tested at the factory at a pressure rating per NFPA 20 Section 11-1.1 for a minimum of 2 hours. A copy of the test procedures shall be provided upon request.

End of Section

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