GENERAL SPECIFICATIONS
FOR
PRECAST CONCRETE RESTROOMS

1. Scope

This specification addresses the materials for the fabrication of a transportable, prefabricated concrete restroom structure.

2. General

Restroom areas will meet the design criteria to satisfy the standards of public accommodation established by the Americans with Disabilities Act of 1990 and its subsequent revisions. The concrete wall panels will be engineered and manufactured to withstand the penetration of a 30/06 rifle projectile fired at distance of 15' (per UL 752 standards). The structure will be a two-hour fire rated concrete structure (per UBC). Design and manufacturing of the structure module(s) shall conform to the requirements of ACI 318-89 and its subsequent revisions.

Individual structure modules will be composed of single piece, steel reinforced concrete wall and floor panels. Roof panels will be a cast low slope 4" thick single panel, two 4" thick panels for gable profiles or a single flat panel to accept a site constructed secondary roof system. The finished floor to finished ceiling interior height will be no less than 8'-0" at the eaves for any roof profile. Completed structures may consist of more than one concrete module. Interior layouts to be customized to suit purchaser needs but all layouts will include a man accessible service/chase area constructed of either concrete or wood framed partition walls. Module(s) will have lifting points integrated into either the wall or roof panels and the necessary lifting brackets/shackles will be supplied with the module(s).

All service utilities will enter the structure via a cast-in opening in the floor of the service/chase area. All distribution of utilities within the structure shall terminate at the service/chase area floor opening.

3. Structural Design

Floor panels will be a single 8" thick waffled structural precast concrete panel. Ribs will be 2'-0" O.C. transverse and 4'-0" O.C. longitudinal. All surfaces to be form smoothed. Exposed floor finish may be either commercial grade 12"x12" vinyl tile applied with mastic or epoxy painted with texture additives.

Roof panels will extend beyond the module walls by a minimum of 2" on all sides (except on mating side of multiple module configurations). Exposed side of roof panel will be waterproofed, sheathed with a multi-layer rubber sealing membrane or covered with 24-gauge, overlapping ribbed metal roofing panels with exposed fasteners.

Wall panels will have a minimum 4" thickness with cast-in steel plates along the edges to facilitate a welded steel bar connection at all wall-to-wall, wall-to-roof and wall-to-floor intersections.

Interior framing for shower enclosures, concealment walls and partitions will be metal or treated wood stud construction with purchaser selected sheathing materials.

Exterior finish of wall panels may be one of three styles: 1) sealed exposed aggregate; 2) smooth acrylic paint over broom finish concrete; 3) smooth acrylic paint over a purchaser selected

architectural pattern (brick, rock, stone, wood grain, etc.) cast into the wall panel. No custom formed exterior pattern presenting a pattern reveal depth of greater than 5/8" will be available. Exterior surface of walls and roof shall be sealed prior to final finishing with two coats of concrete sealer.

Exterior finish for roof panels may be one of two styles: 1) rubber sealing membrane for cast, low slope profiles; 2) raised rib, exposed fastener secondary metal roofing.

Interior finish of wall panels and underside of roof panels may be one of three styles: 1) painted moisture resistant gypsum board; 2) ¾" HDPE plywood sheathing; 3) acrylic paint over form smoothed concrete. Rigid foam board insulating material may be added to the gypsum board and HDPE plywood finishes to achieve specified insulating values. Purchaser to have choice of color scheme (single or contrasting) for wall panels, metal roofing, door & door trim from paint manufacturer's standard selections.

Floor finish will be either 12"x12" commercial grade vinyl tile or urethane based paint and non-slip textured additive with 4" flexible cove molding.

All exposed floor/wall and ceiling/wall intersections will be trimmed with painted fiber-cement board where no gypsum or HDPE interior finish exists.

All wall/floor/ceiling joints will be sealed with a continuous line of compressible, resilient sealant.

Door frames will be 16-gauge galvanized steel and cast into the wall panel.

When called for, natural lighting windows will be decorative glass block inserts mortared/grouted/sealed into cast-in wall openings.

4. Design Criteria

Structure module(s) will be designed to the following:

- floor panel to meet ASCE 7-88, uniform distributed load of 150 lbs. per square foot (200PSF or 300PSF options available).
- roof panel(s) to meet SCE 7-88 roof snow load specification of 60 lbs. per square foot (increased roof load options available and ice fall protection options are available).
- wind loading to meet ASCE 7-88 basic wind speed specifications of 150 MPH.
- structure will be designed for earthquake category D.

5. Materials Specifications

Compressive strength of concrete used will be 5000 PSI at 28 days.
Mix design shall be 114-118 lbs. per cubic foot structural lightweight concrete. Cement component of concrete mix will conform to the requirements of the Standard Specifications for Portland Cement, ASTM Designation C150. Concrete aggregates shall conform to one of the following:

- Specifications for Concrete Aggregates, ASTM Designation: C33.
- Specifications for Lightweight Aggregates for Structural Concrete, ASTM Designation C330.
- Water shall be free from injurious quantities of oil, alkali, vegetable matter and salt. Non-potable water shall not be used in mixing concrete. Admixtures to be used in concrete shall be subject to prior approval by the quality control supervisor and shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing the concrete proportions in the mix design.
- Air-entraining admixtures shall conform to Specifications for Air-entraining Admixtures for Concrete, ASTM Designation: C260.

- Water reducing admixtures, retarding admixtures, accelerating admixtures, and water reducing and accelerating admixtures shall conform to Specifications for Chemical Admixtures for Concrete, ASTM Designation: C494.
- Fly ash or other pozzolans used as admixtures shall conform to Specifications for Fly Ash and Raw or Calcined Natural Pozzolans for Use in Portland Cement Concrete, ASTM Designation: C618.

Reinforcement bars shall be deformed steel conforming to the requirements of the Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, ASTM Designation: A615. Welded smooth wire fabric shall be steel wire fabric conforming to the requirements of the Specifications for Welded Steel Wire Fabric for Concrete Reinforcement, ASTM Designation: A185.

Concrete sealer will be Thoroseal waterproof sealant or equivalent.

Concrete form liner for simulated architectural features will be Dayton Superior products, Reckli products or equivalent.

Exterior color application will be BASF MasterProtect HB 400 (formerly Thorocoat) a water-based, high-build, 100% acrylic, waterproof coating for above-grade concrete. Interior color application (walls & ceiling) will be Sherwin Williams ProMar 200 acrylic coatings.

Floor color application will be Sherwin Williams Armorseal Rexthane single component, aliphatic, moisture cure urethane industrial floor coating or Armstrong 12"x12" standard Excelon Imperial Texture commercial vinyl tile with recommended adhesive.

Joint trim will be HardieTrim 4/4, 5/4 decorative non-load bearing trim products.

Metal parts color application shall be Sherwin Williams Sher-Kem metal finishing enamel.

Rubber roof sealing membrane to be multi-layer material affixed to face of roof panel with metal termination strip with fasteners at 6" intervals - Duro-Last 40 MIL (DL40) or equivalent.

Metal roof panels will be 26-gauge, R-panel style with exposed fasteners over sealing membrane - All American Metal Components or equivalent.

6. Doors & Windows

Entry doors will be 3'x7'x1-3/4" 18-gauge, flush fit, square edge style, galvanized insulated steel - CECO, Megamet, DeanSteel or equivalent. Hardware package and accessories will include NRP non-corrosive hinges or adjustable tension self-closing hinges, lever handle, mortise style lockset, interior deadbolt (where specified), door check, door stop, weather-stripping and exterior aluminum drip cap. Service area entry doors will be 2'7"x7'x1-3/4" size of identical materials.

Primary locksets will be mortise style with interchangeable core and keys - Sargent, Schlage, Yale or equivalent. Deadbolt locks, where required, will be configured to purchaser specifications - PDQ or equivalent. Interior panic bar exit hardware, where required, will be two-point style - Monarch or equivalent.

Natural lighting windows will be glass block arrays - Pittsburg Corning products or equal.

7. Electrical Equipment

Equipment and wiring will conform to the latest edition of the National Electrical Code and shall consist of the following as a minimum:

- 100 amp, 120/240v AC, 20 position surface mounted load center and cover with 12 single pole 20 amp breakers -
- PVC conduit, boxes and fittings
- appropriately gauged conductor for all circuits
- GFCI duplex outlets

Interior Lighting may be switch controlled or motion/occupancy activated damp location two bulb fluorescent or strip LED interior fixtures.

Exterior Lighting may be photocell actuated incandescent or LED weather protected fixtures.

Emergency & Exit Lighting will be two head style with batteries and charger.

8. Heating, Cooling & Ventilation Equipment

Segregated occupancy areas will each have an appropriately sized switch or motion actuated ventilation system that is comprised of an appropriately sized electric in line fan with grills and ducting to a common backdraft louvered exhaust vent located in the service/chase area drawing through louvered intake vents in the lower half of the entry doors or in the restroom area walls.

Where interior climate control is specified, heating and cooling equipment will consist of appropriately sized ductless style electric heat pump units with thermostat controls - Mitsubishi, Fujitsu or equivalent.

Wall mounted fan forced electric heaters will be located in service/chase area where piping freeze protection is specified - Qmark Type CRA or equivalent.

9. Plumbing

Plumbing materials, installation and testing will be in accordance with the latest edition of applicable state and local code procedures, methods and requirements including the most stringent health and safety standards as interpreted by the authority having jurisdiction. Above ground water supply piping to be Type L Hard Copper with soldered fittings and connections with all drain, waste and vent piping to be PVC Schedule 40.

10. Fixtures

Toilet stations to consist of wall mounted siphon jet style with carrier, rear or top spud, elongated bowl in either Vitreous china or stainless steel with hinged plastic seat (Kohler, Acorn, Metcraft or equivalent).

Urinal stations to consist of wall mounted siphon jet style with carrier, rear or top spud, in either Vitreous china or stainless steel (Kohler, Acorn, Metcraft or equivalent).

Lavatory stations will be wall mounted style with 4" centers in Vitreous china or stainless steel (Kohler, Acorn, Metcraft or equivalent).

Flush valves will be ADA compliant, low consumption style configured as concealed or exposed with either manual or sensor control (Zurn or equivalent).

Faucets will be ADA compliant configured as manual or sensor control with metering (Zurn, Delta, Symmons or equivalent).

Shower stalls will be 36"x36" transfer type chrome finish pushbutton timing shower valves - SYMMONS 4420 or equivalent and hand held shower head(s). Shower seats for ADA size shower stations will be reversible, solid phenolic folding style - BOBRICK B-5181 or equivalent

Hot water supply will be electric compact tank style water heaters.

Water fountains will be ADA compliant, single or double station, ambient or refrigerated, wall mounted style in stainless steel (Elkay or equivalent).

Restroom and service areas will have 2" PVC floor drains with covers.

11. Accessories & Amenities

Basic restroom accessories will include wall mounted multiple roll toilet paper dispensers (Royce Rolls or equivalent), wall mounted center pull paper towel dispensers, liquid soap dispensers, stainless steel framed wall hung mirrors and the appropriate ADA compliant building signage.

Optional accessories may include items such as concealed motor or flush mount electric air blown hand dryers, wall mounted, fold down baby changing stations, sanitary napkin receptacles, waste paper receptacles, coat hooks, kick plates, etc.