

SECTION 13 34 23 – SPECIALITY STRUCTURES - PRECAST CONCRETE BUILDINGS

PART 1 – GENERAL

1.1 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA)
 - a. CSA-A23.1-09 / A23.2-09, Test Methods and Standard Practices for Concrete.
 - b. CSA-A23.3-04(R2010), Design of Concrete Structures.
 - c. CSA-A23.4-09, Precast Concrete – Materials and Construction.
 - d. CSA-W59-03, Weld Steel Construction
 - e. CSA-W186-M 1990 (R2002), Weld of Reinforcing bar in Reinforced Concrete.
- .2 National Building Code of Canada, 2010
- .3 Ontario Building Code, 2012
- .4 Concrete Reinforcing Institute, “Manual of Standard Practice”
- .5 Steel Door Institute, “Recommended Specification for Steel Doors and Frames” (SD-100)

1.2 QUALITY OF MANUFACTURER

- .1 Manufacturer shall be certified by CSA, meeting requirements of CSA A23.4-09 for appropriate class of work.
- .2 Manufacturer shall be fully experienced in and equipped for this type of work and shall be able to document minimum ten consecutive years of activity in the field and have successfully completed projects of similar size and complexity.
- .3 Manufacturer shall be a member of the National Precast Concrete Association (NPCA).
- .4 Approved manufacturer: **Hy-Grade Precast Concrete** (905.684.8568).

1.3 DESIGN CRITERIA

- .1 Building shall be pre-engineered model: _____ **SPECIFIER CHOICE**
- .2 Design precast concrete elements to carry handling and expected service loads, without detrimental effects. Assumed Standard Loads as follows:

Standard Live Roof Load:	2.87 kPa (60 psf)
Standard Wind Load:	1.29 kPa (27 psf)
Standard Floor Load:	4.79 kPa (100 psf)
- .3 Retain a structural engineer, registered in Ontario, experienced in the field of precast concrete to ensure adequacy of the structural aspects of the design, shop drawings, manufacturing, transportation and installation of all precast concrete components, attachments, hardware and assemblies.
- .4 “Flat” Roof: The roof slab shall be fabricated with varying thickness to achieve a minimum 51mm slope from front-to-back or side-to-side. The roof shall extend a minimum of 76mm beyond the wall panel on each side.
- .5 Pitched Roof (**Option**): Wall panels shall be fabricated with a gable design to create a pitched roof application with a 4/12 pitch. Roof slabs are to be fabricated with a consistent thickness and a simulated metal seam finish. The roof slabs shall extend a minimum of 152mm beyond the wall panels on all sides. **SPECIFIER CHOICE – Only include this item if required for specific project; DELETE LINE .4 IF SELECTING THIS OPTION**
- .6 Floor slab must have a minimum 13mm step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.

1.4 QUALITY ASSURANCE

- .1 Conform to requirements of CSA A23.4-09 for allowable tolerances.

1.5 SUBMITTALS

- .1 Prepare and submit detailed drawings, containing all pertinent information in regard to the erection of the precast concrete building including:
 - a. Location of each panel / slab in the completed structure and identifying marks for each unit
 - b. Size and dimensions of each panel / slab complete with connection details
 - c. Grade of reinforcement, concrete strength and admixtures
 - d. Locations and details for lifting hooks and handling points

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- e. Sequence of erection and any special instructions that may be required in handling and setting.
- .2 Shop drawings to be sealed by professional engineer licensed to practice in jurisdiction of this project.

1.6 DELIVERY, HANDLING AND STORAGE

- .1 Proper lifting devices for the completed unit shall be incorporated to ensure that it will be safely and efficiently handled and not produce distortion, cracking or deflection nor strain or adversely affect the unit.
- .2 Precast panels shall be handled and adequately protected during fabrication, curing, storage and transport by methods that will prevent damage, warping, cracking, breakage, chipping, staining or other disfigurement. Units shall not be permitted to contact the earth or other staining influences.
- .3 Repair chipped, checked, cracked, blemished or defective units.

PART 2 – PRODUCTS

2.1 MATERIALS

- .1 Cement Type: HE – Mix Design: MD-40
- .2 Aggregates, water, admixtures: to CSA A23.4-09.
- .3 Formwork materials: All forms shall be accurately constructed, well braced and stiffened to avoid deformations under pressure of wet concrete and vibrators.
- .4 Use same brands and source of cement and aggregate for entire project to ensure uniformity of colouration and other mix characteristics.
- .5 Reinforcing steel: to CAN/CSA-G30.18-M92. All reinforcing steel to be weldable grade 400W.
- .6 Panel Connections: All panels shall be securely fastened together with minimum 9.5mm thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A283, Grade C and hot dipped galvanized after fabrication. All fasteners to be 13mm diameter bolts complying with ASTM A307 for low-carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior #F-42, or equal.

2.2 CONCRETE MIXES

- .1 Use a concrete mix designed to produce minimum 30 MPa compressive strength at 28 Days.

2.3 FINISHES

- .1 All exterior wall faces to have a _____ finish. **SPECIFIER'S CHOICE**
- .2 All interior wall faces to have a Smooth steel form finish.
- .3 Curing and Sealing:
 - a. All exterior floor and roof edges to be treated with Externit #50 'Special Grey' coating.
 - b. Any simulated exterior surfaces will be finished with concrete stain – colour selection by owner (if required).
 - c. Any exposed aggregate exterior precast surfaces will be treated with a Masonry Sealer (if required).

2.4 DOORS

- .1 Doors and Frames:
 - a. The building shall be equipped with one (or two) 914mm x 2134mm x 44mm (36"x84"x1¾") 18 gauge metal door with lockseam construction and honeycomb interior.
 - b. The doors shall be installed in a 16 gauge galvanized steel door frame.
 - c. The door and frame paint colour to be selected by the owner from manufacturer's standard colours.
- .2 Hardware:
 - a. Hinges: Taymor 4100 series, 114mm x 102mm grey primed with non-removable pins.
 - b. Lockset: Dorex TLA5132D – Standard Schlage
 - c. Threshold: KN Crowder – Extruded Aluminum CT-804
 - d. Sweep: KN Crowder – Extruded Aluminum W-13S-2 with Neoprene Inserts
 - e. Pull: Commercial grade 102mm x 406mm Plate with 178mm pull handle (each door)

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- f. Check Chain: N157A with binder posts and fasteners
- g. Drip Cap: KN Crowder – Extruded Aluminum W-3
- h. Astragal: Weld on flat plat; finished same as door

2.5 LOUVRES

- .1 The building shall be equipped with two 419mm x 121mm louvres
 - a. Model: Sunvent FL164 – 50mm deep stormproof louvre with perimeter flange.
 - b. Louvres come with stationary blades and a 19 gauge bird screen.

PART 3 – EXECUTION

3.1 SITE PREPARATION (*Recommendation only; actual design as directed by consultant*)

- .1 Contractor to provide clear and level area at a minimum of 610mm wider and longer than the building with the building situated at the center of the prepared base.
- .2 The base area should be stripped of all organic and deleterious material. Excavate to 1200mm below grade or to frost penetration depth. Backfill with OPSS 1010 Granular 'B' compacted to 98% standard proctor dry density. Provide a minimum 400mm of 19mm crushed subbase beneath the slab on grade compacted to 100% standard proctor dry density. Provide a minimum 50mm top layer of fine material suitable for grading.
- .3 Ensure that the granular subbase and the area surrounding the building are well drained by positive slope of subgrade or by underfloor drainage pipes. Ensure all finished surfaces adjacent to the building slope away from the building perimeter.
- .4 If soil is disturbed, excavation must be lower than the disturbed level as per geotechnical review.

3.2 INSTALLATION

- .1 All work shall be executed using workers skilled in the trade of precast erection.

3.3 ACCESS

- .1 Contractor must provide level unobstructed area large enough for a crane and a tractor-trailer to park adjacent to the pad. The crane must be able to place its' outriggers within 1.5m of the edge of the pad. The truck and crane must be able to get side-by-side under their own power. No overhead lines may be within a 22m radius of the center of the pad. A minimum of 610mm clearance is required between this building and adjacent buildings.

3.4 CLEANING

- .1 Clean soiled precast concrete surfaces by approved means to satisfaction of consultant.
- .2 Repair units that have minor visual defects to the satisfaction of consultant.

3.5 INSPECTION AND TESTING

- .1 All inspection and testing as directed by consultant. Costs incurred for all inspection and testing shall be the responsibility of the contractor.

END