

**PART 1 GENERAL**

**1.1 GENERAL REQUIREMENTS**

- .1 Conform to General Instructions, Division 1.

**1.2 SCOPE OF WORK**

.1 Work Included

Provide all plant, labour, equipment and materials to complete the precast-prestressed concrete work. The work includes, but is not limited to:

- manufacture and installation of precast concrete planks.
- coredrilling of all openings in slabs identified by other trades.
- grouting of reinforcing in joints between precast units.
- caulking grooves at bottom side of slab (at exposed precast locations only).
- Installation of dowels into precast slabs.
- Installation of weld plates or angles into slabs unless noted otherwise.
- Welding of rebar anchors grouted into precast slabs to structural steel items.

.2 Related Work Specified Elsewhere

- .1 Cast-In-Place Concrete - Section 03300
- .3 Concrete Underlayment - Section 03360
- .2 Masonry - Section 04200

**1.3 REFERENCED STANDARDS**

- .1 Unless otherwise stated, the applicable provisions of these reference standards are to be considered a part of this application. Standards to be current issue.
- .2 National Building Code.
- .3 Do precast prestressed concrete work in accordance with C.S.A. Standard CAN3-A23.4-M and CAN3-A23.3

- .4 Do welding in accordance with C.S.A. W59-M for welding to steel structures and C.S.A. a251-M for welding reinforcement.
- .5 Workplace Safety Act or any other regulations of the Manitoba Labour Board relating to the work of this section.

#### **1.4 COORDINATION & COOPERATION**

- .1 Coordinate the work of this Section with the work of other sections.
- .2 Cooperate with other sections to ensure an uninterrupted sequence of construction.
- .3 Form or core drill all holes and openings shown or required to accommodate the work of other trades.

#### **1.5 SHOP DRAWINGS**

- .1 Examine all drawings forming a part of this Contract and conform to the requirements of all such drawings. Confirm all dimensions.
- .2 Submit shop drawings for review by the Consultant. If such drawings are not satisfactory to the Consultant, make all required changes prior to the start of the work.
- .3 Shop drawings are to show the following information:
  - .1) Precast design loading
  - .2) Camber on all precast units
  - .3) Types and grades of materials
  - .4) Finish schedule for all precast units
  - .5) Dimensions and joint location of all precast units
  - .6) Location of openings, and cast-in inserts
  - .7) Connection details, reinforcement details, and cast-in anchor details.
  - .8) Reinforcement location and sizes
  - .9) Methods of handling and erection

- .4 Shop drawings are to be signed and sealed by a Professional Engineer, who will be responsible for the design and implementation of these structural systems. The stamping engineer must be experienced in the design and implementation of precast plank framing systems and must be registered in the Province of Manitoba.
- .5 Submit one digital PDF copy and two prints of each shop drawing with minimum scale of 1:50.
- .6 The Consultant's review of the shop drawings does not relieve this Sub-Contractor of his responsibility for ensuring that precast systems are constructed properly.

**1.6 DESIGN CRITERIA**

- .1 Design precast prestressed concrete units to CAN3-A23.3 and to carry handling stresses.
- .2 Design for loading shown on drawings as well as loads due to handling, earthquake, wind, and temperature.
- .3 Consider vibration characteristics in accordance with National Building Code.
- .4 Design Prestressed units to meet two hour fire resistance rating.
- .5 At all locations where load bearing wall bears directly on top of precast slabs, design bearing pads for the loading from the individual slab plus the accumulated wall loads above. Bearing pads are to resist loads without permanent deformation. The accumulated loads at each level are as follows:

<b>Building Level</b>	<b>Bearing Pad Load = Slab Reaction + ½ wall above factored loading in lbs/ft</b>
Underside Roof	Slab reaction +1950 lbs/ft

### 1.7 SOURCE QUALITY CONTROL

- .1 Provide Engineer with certified copies of quality control tests and inspection related to project as specified in CAN3-A23.4 and C.S.A. G279-M
- .2 Inspection of prestressed concrete tendons is required in accordance with C.S.A. G279-M
- .3 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

### 1.8 QUALIFICATIONS OF MANUFACTURER

- .1 Manufacturers of precast concrete elements to be certified by C.S.A. A251-M

## 2.0 PRODUCTS

### 1.1 MATERIALS

- .1 Cement, aggregates, water, admixtures: to CAN3-A23.4-M, CAN3-A23.1-M, CAN3-A23.1S1, and CAN-A23.1S2
- .2 Prestressing steel: Uncoated 7 wire cable conforming to CAN/C.S.A.-S6-M and C.S.A. G279-M
- .3 Weldable Reinforcing Steel - new deformed bars in accordance with CSA G30.12 with a guaranteed yield stress of 400 MPa.
- .4 Anchorage and couplings: To CAN3-A23.1-M, CAN3-A23.1S1, CAN3.1S2
- .5 Embedded steel: To CAN/C.S.A.-G40.21-M type M300W.
- .6 Welding materials: To C.S.A. W48.1-M
- .7 Bearing pads: 3mm thick masonite smooth one side in lightly loaded zones and engineered Korlath or neoprene bearing pads for highly loaded bearing conditions or at locations where masonite pads could become damaged due to wet or moist conditions. All bearing pads are to be a minimum of 75mm (3") wide unless wider pads are required for bearing.

- .8 Insulation: Expanded polystyrene to CAN/CGSB-51-20-M87.
- .9 Chemical admixtures: To CAN3-A266.2-M78.

## **2.2 CONCRETE MIXES**

- .1 Use concrete mix designed to produce 41 Mpa compressive cylinder strength at 28 days with maximum water /cement ratio to CAN3-A23.1-M77, Table 7 for Class D exposure, CAN3-A23.1S1, CAN3-A23.1S2
- .2 Air entrainment of concrete mix to CAN3-A266.5-M.
- .3 Admixtures to CAN3-A266.5-M.
- .4 Do not use calcium chloride or products containing calcium chloride.

## **2.3 GROUT MIX**

- .1 Cement grout - one part type 10 Portland cement 2-1/2 parts sand, sufficient water for placement and hydration.

## **2.4 MANUFACTURE**

- .1 Manufacture units in accordance with C.S.A. 251-M1982
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location on part of unit which will not be exposed.
- .3 Provide hardware suitable for handling elements.
- .4 Provide 50 thick insulation plug at each cell of hollow core at exterior.

### 3.0 EXECUTION

#### 3.1 EXAMINATION

- .1 Examine and obtain all necessary measurements of previously executed and existing work which may affect the work of this section prior to commencing operations.
- .2 Report any discovered discrepancies to the Consultant so that instructions can be given for the necessary remedial action.

#### 3.2 ERECTION

- .1 Erect elements within allowable tolerances indicated or specified.
- .2 Non-cumulative erection tolerances in accordance with CAN3 -A23.4-M78, Section 10.
- .3 Install 3mm masonite bearing pads, smooth side up on bearing ends, of concrete or masonry.
- .4 Set units in a tight, level position on true level bearing surface provided by others. Minimum bearing 90 on masonry and 75 on structural steel.
- .5 Fasten precast units in place as indicated on reviewed shop drawings.
- .6 Level differential elevation of horizontal joints with grout to slope not more than 1:12.
- .7 Clean field welds with wire brush and touch up with primer.
- .8 Field cut holes and openings up to 150 diameter for other trades. Openings larger than 150 to be located on shop drawings at time of approval and to be cut in field. Do not cut reinforcing without approval of precast slab manufacturer and Engineer.
- .9 Grout reinforcing bars in joints as shown on approved shop drawings.

**3.3 TOPPING**

- .1 This contractor shall provide a suitable top finish to accept direct application of finished flooring/roofing as per room finish schedule.
- .2 At locations where 50 concrete topping is to be applied the top surface of the precast prestressed slabs is to be raked (roughened) for bonding of topping.

**3.4 EXPOSED CEILING**

- .1 Refer to Architectural reflected ceiling plans and caulk slab soffit longitudinal joints, at locations where precast slabs are to be left exposed using standard caulking.
- .2 The underside of precast shall be finished as per C.S.A. A23.4-M78 (24.2.2) Standard finish.

**3.5 CLEAN-UP**

- .1 At the completion of the work of this Section, remove from the site any excess materials, debris and equipment.

**END OF SECTION**