

Part 1 General

1.1 MEASUREMENT AND PAYMENT

- .1 Measure precast elements in units supplied, delivered, stored and erected.
- .2 Precast elements measured as individual units, will include cost, supply, delivery, storage and erection of bearing assemblies anchor bolts and field grouting of grout keys between precast members.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
 - .3 ASTM D412[06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension.
 - .4 ASTM D2240-05(2010), Standard Test Method for Rubber Property - Durometer Hardness.
 - .5 ASTM C494/C494M-11, Standard Specification for Chemical Admixtures for Concrete.
- .2 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum [2007]).
 - .2 LEED Canada-NC-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.
 - .3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Commercial Interiors.
 - .4 LEED Canada-EB: O M-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System for Existing Buildings: Operations and Maintenance 2009.
- .3 CSA International
 - .1 CSA A23.1/A23.2-[09], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3-[04(R2010)], Design of Concrete Structures.
 - .3 CSA A23.4-[09], Precast Concrete-Materials and Construction.
 - .4 CAN/CSA-A3000-[08], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .5 CSA G30.18-[09], Carbon and Steel Bars for Concrete Reinforcement.

- .6 CSA G40.20/G40.21-[04(R2009)], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .7 CSA G279-[M1982(R1998)], Steel for Prestressed Concrete Tendons (Metric Version).
- .8 CAN/CSA-S6-[06] + S6S1-[10], Consists of CAN/CSA-S6, Canadian Highway Bridge Design Code and S6S1, Supplement #1 to CAN/CSA-S6.
- .9 CSA W47.1-[09], Certification of Companies for Fusion Welding of Steel Structures.
- .10 CSA W48-[06(R2011)], Filler Metals and Allied Materials for Metal Arc Welding.
- .11 CSA W59-[03(R2008)], Welded Steel Construction (Metal Arc Welding).
- .12 CSA W186-[M1990(R2007)], Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-[A2011], Architectural Coatings.
 - .2 SCAQMD Rule 1168-[A2005], Adhesives and Sealants Applications.
- .5 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - [current edition].
 - .1 MPI #18 Primer, Zinc Rich Organic.
 - .2 MPI #79 Primer, Alkyd, Anti-Corrosive for Metal.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-[11], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .7 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete mixes and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec , Canada.
 - .2 Submit shop drawings to CSA A23.4 and CAN/CSA-A23.3.
 - .3 Submit 2 copies of detailed calculations and design drawings for typical precast elements and connections for Consultant for approval 2 weeks prior to manufacture.

- .4 Indicate on drawings:
 - .1 Design calculations for items designated by manufacturer.
 - .2 Tables and bending diagrams of reinforcing steel.
 - .3 Camber.
 - .4 Finishing schedules.
 - .5 Methods of handling and erection.
 - .6 Openings, sleeves, inserts and related reinforcement. [Including embedded handling hardware].
- .4 Samples:
 - .1 Produce, deliver and erect where directed by Consultant] on project site, 1 full size sample of each type of precast concrete unit showing details, colour, finish and quality for approval of Consultant.
 - .1 Begin production of precast units after receipt of Consultant written approval.
- .5 Submit evidence of welding certification including welding procedures before commencing work.
- .6 Sustainable Design Submittals:
 - .1 LEED Canada submittals: in accordance with Section 01 35 21 - LEED Requirements.
 - .2 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 50 % of construction wastes were recycled or salvaged.
 - .3 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with EPA 832/R-92-2005.
 - .4 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer content, and total cost of materials for project.
 - .2 Submit evidence, when Supplementary Cementing Materials (SCMs) are used, to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.
 - .5 Regional Materials: submit evidence that project incorporates required percentage 10 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .6 Low-Emitting Materials:
 - .1 Submit listing of coatings sealers used in building, showing compliance with VOC and chemical component limits or restriction requirements.

1.4 QUALITY ASSURANCE

- .1 Fabricate and erect precast concrete elements using manufacturing plant certified by CSA International in appropriate categories to CSA A23.4.
- .2 Precast concrete manufacturer to be certified to CSA's certification procedures for precast concrete plants prior to submitting bid and to specifically verify as part of bid that plant is currently certified in appropriate categories: Architectural.
- .3 Only precast elements fabricated in such certified plants to be acceptable to owner, and plant certification to be maintained for duration of fabrication, erection until warranty expires.
- .4 Welder Qualification: certified to CSA W47.1 and for weld type required.
- .5 Submit evidence of welding certification including welding procedures before commencing work.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect [precast panels] from [damage].
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan

1.6 WARRANTY

- .1 For spalling and cracking of precast elements 12 months warranty period prescribed is extended to 60 months.
- .2 Contractor hereby warrants that precast architectural elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with CCDC 2 General Conditions..

Part 2 Products

2.1 MATERIALS

- .1 Cement, [white cement] [colouring material], aggregates, water, admixtures: to CSA A23.4 and CSA A23.1/A23.2.
 - .1 Recycled content: incorporate SCM's in concrete mix, minimum of 10% Post-Industrial recycled content.
- .2 Exposed aggregate to match selected finish sample.

- .3 Use same brands and source of cement and aggregate for entire project to ensure uniformity of colouration and other mix characteristics.
- .4 Reinforcing steel: epoxy coated.
- .5 Prestressing steel: to CAN/CSA-S6 and CSA G279.
- .6 Welded wire fabric
- .7 Forms: to CSA A23.4.
- .8 Hardware and miscellaneous materials: to CSA A23.1/A23.2.
- .9 Anchors and supports: to CSA G40.20/G40.21, galvanized.
- .10 Welding materials: to CSA W48.
- .11 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m.
- .12 Steel primer: to [MPI #79].
- .13 Epoxy coating: to [ASTM A775/A775M].
- .14 Sealant:
 - .1 Sealant: VOC limit 250 g/L maximum to SCAQMD Rule 1168.

2.2 FINISHES

- .1 Finish and colour of precast units to match approved sample in Consultant's office.
- .2 Exposed aggregate finish:
 - .1 Apply uniform coat of retardant to inside face of forms.
 - .2 Expose coarse aggregate by washing and brushing away surface mortar.
 - .3 Expose aggregate to conform with approved sample which can be viewed at consultant's office.

2.3 SOURCE QUALITY CONTROL

- .1 Provide Consultant with certified copies of quality control tests related to this project as specified in CSA A23.4.
- .2 Provide records from in-house quality control programme based upon plant certification requirements to Consultant for inspection and review.
- .3 Provide Consultant] with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.
- .4 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Consultant for review upon request.

Part 3 Execution

3.1 GENERAL

- .1 Do precast concrete work to CSA A23.4.

3.2 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for precast concrete installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.3 ERECTION

- .1 Erect precast elements within allowable tolerances as indicated.
- .2 Set elevations and alignment between units to within allowable tolerances before connecting units.
- .3 Grout underside of unit bearing plates with shrinkage compensating grout.
- .4 Fasten precast panels in place as indicated on reviewed shop drawings.
- .5 Secure bolts with lockwashers
- .6 Uniformly tighten bolted connections with torque indicated.
- .7 Do not weld or secure bearing plates at sliding joints.
- .8 Set units dry, without mortar, attaining specified joint dimension with [plastic] shims.
- .9 Clean field welds with wire brush and touch-up shop primer with primer galvanized finish with zinc-rich primer.
- .10 Remove shims and spacers from joints of non-load bearing panels after fastening but before sealant is applied.
- .11 Apply sealers ,sealant to precast panels to manufacturer's recommendations unless specified otherwise.

3.4 CLEANING

- .1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by precast concrete installation.

END OF SECTION