SECTION 03 11 13.00 10

STRUCTURAL CAST-IN-PLACE CONCRETE FORMING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)

ACI 117	(2010; Errata 2011) Specifications for Tolerances for Concrete Construction and Materials and Commentary
ACI 301	(2010; ERTA 2015) Specifications for Structural Concrete
ACI 347	(2004; Errata 2008; Errata 2012) Guide to Formwork for Concrete

ASTM INTERNATIONAL (ASTM)

ASTM C578	(2015b) Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Formwork; G
Form Removal Schedule; G

SD-03 Product Data

Form Materials

SD-04 Samples

Fiber Voids; G

SD-05 Design Data

Calculations

SD-06 Test Reports

Inspection

SD-07 Certificates

Fiber Voids

1.3 DELIVERY, STORAGE, AND HANDLING

Store fiber voids above ground level in a dry location. Keep fiber voids dry until installed and overlaid with concrete.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

The design, engineering, and construction of the formwork is the responsibility of the Contractor. Design formwork in accordance with methodology of ACI 347 for anticipated loads, lateral pressures, and stresses, and capable of withstanding the pressures resulting from placement and vibration of concrete. Comply with the tolerances specified in Section 03 30 00 CAST-IN-PLACE CONCRETE, paragraph TOLERANCES FOR FORM CONSTRUCTION. However, for surfaces with an ACI Class A surface designation, limit the allowable deflection for facing material between studs, for studs between walers and walers between bracing to 0.0025 times the span. Design the formwork as a complete system with consideration given to the effects of cementitious materials and mixture additives such as fly ash, cement type, plasticizers, accelerators, retarders, air entrainment, and others. Monitor the adequacy of formwork design and construction prior to and during concrete placement as part of the Contractor's approved Quality Control Plan. Submit design analysis and calculations for form design and methodology used in the design. Submit at least 10 days either before fabrication on site or before delivery of prefabricated forms.

2.2 FORM MATERIALS

Submit manufacturer's data, including literature describing form materials, accessories, and form releasing agents.

2.2.1 Formwork

Comply with ACI 301 Section 2. Provide for surfaces not exposed to public view a surface finish SF-1.0. Provide for surfaces exposed to public view a surface finish SF-3.0. Patch holes and defects in accordance with ACI 301. Submit form removal schedule indicating element and minimum length of time for form removal.

2.2.2 Retain-In-Place Metal Forms

Use retain-in-place metal forms for concrete slabs and roofs as specified in Section 05 30 00 STEEL DECKS.

2.2.3 Pan-Form Units

Use factory-fabricated pan-form units of the approximate section indicated for one-way or two-way concrete joist and slab construction. Units must consist of steel or molded fiberglass concrete form pans. Furnish closure units as required.

2.2.4 Fiber Voids

Fiber voids must be the product of a reputable manufacturer regularly engaged in the commercial production of fiber voids. Construct the voids of double faced, corrugated fiberboard. Fabricate the corrugated fiberboard of wet strength paper liners, impregnated with paraffin, and laminated with moisture resistant adhesive, with a board strength of 275 psi. Voids which are impregnated with paraffin after construction, in lieu of being constructed with paraffin impregnated fiberboard, are acceptable. Design voids to support not less than 1000 psf. To prevent separation during concrete placement fiber voids, assemble with steel or plastic banding at 4 feet on center maximum, or by adequate stapling or gluing as recommended by the manufacturer. Fiber voids placed under concrete slabs and that are 8 inches in depth may be heavy duty "waffle box" type, constructed of paraffin impregnated corrugated fiberboard. Submit one sample unit of fiber voids prior to installation of the voids and certificates attesting that fiber voids conform to the specified requirements.

2.3 FIBER VOID RETAINERS

2.3.1 Polystyrene Rigid Insulation

Polystyrene rigid insulation must conform to ASTM C578, Type V, VI, or VII, square edged. Size: 1-1/2 inches thick by 16 inches in height by 3 feet in length, unless otherwise indicated.

2.3.2 Precast Concrete

Precast concrete units must have a compressive strength of not less than 2500 psi, reinforced with 6 inch by 6 inch by W1.4 WWF wire mesh, and 12 inches (height) by 3 feet (length) by 1-5/8 inches (thickness) in size unless indicated.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Formwork

Comply with ACI 301 Section 2 with surface tolerances in accordance with ACI 117.

3.1.2 Fiber Voids

Place voids on a smooth firm dry bed of suitable material, to avoid being displaced vertically, and set tight, with no buckled cartons, in order that horizontal displacement cannot take place. Seal the ends of each section of void by dipping in paraffin, with any additional cutting of voids at the jobsite field dip in the same type of sealer, unless liners and flutes are completely impregnated with paraffin. Prior to placing reinforcement, cover the entire formed area for slabs with a 4 x 8 feet minimum flat sheets of fiber void corrugated fiberboard. Seal joints with a moisture resistant tape having a minimum width of 3 inches. If voids are destroyed or damaged and are not capable of supporting the design load, replace prior to placing of concrete.

3.1.3 Fiber Void Retainers

Install fiber void retainers, continuously, on both sides of fiber voids placed under grade beams in order to retain the cavity after the fiber voids biodegrade.

3.2 INSPECTION

Inspect forms and embedded items in sufficient time prior to each concrete placement to certify to the Contracting Officer that they are ready to receive concrete. Report the results of each inspection in writing. Submit field inspection reports for concrete forms and embedded items.

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