SECTION 034713

TILT-UP CONCRETE

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
	1. SUMMARY
		1. Section Includes:
			1. Tilt-up sitecast concrete wall panels, non-load bearing, erected from mold to final position.
			2. Supports, devices, and attachments.
			3. Reinforcement, anchorages, and accessories.
		2. Related Sections:
			1. Section 012300 - Alternates.
			2. Section 033000 - Cast-In-Place Concrete: Grout and concrete curing.
			3. Section 051200 - Structural Steel Framing: Support plates and angles with anchor studs, expansion bolts, and epoxy bolts which are embedded in or cast into concrete for supporting structural steel, steel joists, and steel deck.
			4. Section 055000 - Metal Fabrications: Other metal components cast into concrete.
			5. Section 076200 - Sheet Metal Flashing and Trim: Counterflashing receivers or reglets.
			6. Section 079200 - Joint Sealants: Installation of panel Joint sealers.
			7. Section 099100 - Painting: Priming metal inserts.
	2. REFERENCES
		1. American Society for Testing and Materials (ASTM):
			1. ASTM A 615 - Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
			2. ASTM C 33 - Specification for Concrete Aggregates.
			3. ASTM C 94 - Specification for Ready‑mixed Concrete.
			4. ASTM C127 - Test Method for Specific Gravity and Absorption of Course Aggregate.
			5. ASTM C128 - Test Method for Specific Gravity and Absorption of Fine Aggregate.
			6. ASTM C 150 - Specification for Portland Cement.
			7. ASTM C 260 - Specification for Air-Entraining Admixtures for Concrete.
		2. American Welding Society (AWS):
			1. AWS D1.1 - Structural Welding Code.
		3. Concrete Reinforcing Steel Institute (CRSI):
			1. CRSI Manual of Practice.
		4. Portland Cement Association (PCA):
			1. PCA EB 074D - Tilt-Up Load-Bearing Walls.
			2. PCA EB 079B - Tilt-Up Concrete Walls.
			3. PCA EB 110D - Connections for Tilt-Up Wall Construction.
	3. SYSTEM DESCRIPTION
		1. Design Requirements:
			1. Concrete tilt‑slab panels are designed for in place stresses only. Lifting and handling stress design is responsibility of Contractor and erector. Execute design for lifting, handling, and erection stresses by a registered Professional Engineer in the State in which the project is located.
			2. Design units and connections for wind load as indicated on Drawings and as required by governing codes. Design units and connections to withstand applicable dead loads and erection stresses.
			3. Design tilt-up units and connections in accordance with, as general guides, PCA EB 074D, PCA EB 079 B, and PVA EB 110D.
			4. Provide sealed and finished panel joints to match and coincide with location of vertical rustication joints.
	4. SUBMITTALS
		1. Section 013300 - Submittal Procedures: Procedures for submittals.
			1. Shop Drawings: Indicate layout, tilt-up unit locations, configuration, unit identification marks, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent components.
			2. Product Data: Adhesive (Alternate 1 Section 012300)
			3. Calculations including load exerted on the slab during forming and lifting panels in place for Alternates 1 Section 012300
	5. QUALITY ASSURANCE
		1. Qualifications:
			1. Fabricator: Company specializing in performing Work of this Section with minimum five years documented experience with established quality control program in effect.
			2. Erector: Company specializing in performing precast concrete erection Work of this Section with minimum five years documented experience.
			3. Welding: AWS D1.1.
			4. Fabricator and Erector: Certify and indicate experienced personnel, physical facilities, management process, and quality control procedures.
		2. Regulatory Requirements: Construct and install precast concrete wall panels to meet requirements of local governing building code.
		3. Mock‑Ups:
			1. Fabricate and erect at site, one full size panel, illustrating shape, lifting device, and attachment points, and finish.
			2. Fabricate and erect at location determined by Contracting Officer
			3. Prepare a sample of repairs.
			4. Obtain inspection and approval of wall panel and repair samples.
			5. Approved mock-up may remain as part of Work.
		4. Pre-Installation Meeting:
			1. Convene a pre-installation meeting at site, one week prior to commencing Work of this Section. Require attendance of parties directly affecting Work of this Section, including, but not limited to, Contracting Officer Contractor, Construction Manager, Tilt-up Concrete Wall Panel Fabricator and Tilt-up Concrete Wall Panel Erector.
			2. Contact Construction Manager two weeks prior to pre-installation meeting to confirm schedule.
			3. Review preparation and installation procedures and coordinate scheduling required with related Work.
			4. Record discussions of meeting and decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending. Review foreseeable methods and procedures related to Manufactured Wall Panel Work, including:
				1. Discuss procedures for Bid Alternate 1 in Section 012300, and set up guidelines if the Contracting Officer elects to proceed with Bid Alternate 1.
				2. Tour, inspect, and discuss conditions of wall panel casting, erection, attachment structure components, locations, and other preparatory work performed by other trades.
				3. Review wall panel system requirements (drawings, specifications, and other Contract Documents).
				4. Review required submittals, both completed and yet to be completed.
				5. Review and finalize construction schedule related to wall panel work and verify availability of materials, erector's personnel, equipment and facilities needed to make progress and avoid delays.
				6. Review required inspections, testing, certifying, and material usage accounting procedures.
				7. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
	6. DELIVERY, STORAGE AND HANDLING
		1. Section 016000 - Product Requirements: Transport, handle, store, and protect products.
		2. Cast panels on the slab on grade after the slab has reached its designed compressive strength. The formwork shall be secured on the slab on ground with screws using predrilled holes. A repair method must be submitted and a sample of repairs must be prepared with the mock up for approval. The precast concrete panels must be handled with equipment to protect units from dirt and damage. The Contractor upon approval of Contracting Officer may secure the panels on the slab with adhesive.
		3. Do not place panels on ground.
		4. Transport panels in vertical or near‑vertical position.
		5. Support panels during shipment on expanded polystyrene or similar non‑staining shock‑absorbing materials.
		6. Provide lateral support sufficient to prevent excessive bowing and warping. Adequately protect edges of units by padding or other means to prevent staining, chipping, or spalling of concrete.
		7. Minimize lateral movement by casting panels as close as possible to erection location.
2. PRODUCTS

2.1 MATERIALS

* + 1. Concrete:
			1. Cement: ASTM C 150; Type I. Use same brand, type, and source of supply.
			2. Air Entrainment: ASTM C 260.
			3. Aggregates: ASTM C 33; maximum 2 percent water absorption rate. Use same type of aggregate and source of supply.
			4. Water: Clean potable water, not detrimental to concrete.
			5. Bond Breaker: By same manufacturer as curing compound for casting slab.
		2. Form Release Agent:
			1. Polymerized solution of synthetic resins and organic compounds containing no wax, oil, silicates, or varnish.
			2. Not sensitive to lime, alkalis, or organic acids.
			3. Compatible with coating, adhesives, or sealants applied to panel surfaces.
		3. Reinforcing Steel: ASTM A 615, Grade 60.
		4. Inserts: Galvanized with stainless steel tips.
		5. Flashings Receivers: 28 gage formed galvanized steel.
		6. Bar Supports: Class E; CRSI Manual of Practice.
		7. Bearing Pads: Neoprene, 70 durometer.
	1. MIXES
		1. Mix concrete in accordance with ASTM C 94.
		2. Provide concrete with the following characteristics:
			1. Compressive Strength: 4000 psi at 28 days.
			2. Air Content: 5 percent, plus or minus 1.5 percent.
			3. Minimum Cement Content: 550 lb./cu yd.
			4. Maximum Water/Cement Ratio: 0.53.
			5. Maximum Coarse Aggregate Size: 3/4 inch.
			6. Slump: Not to exceed 4 inches.
	2. FABRICATION
		1. Forms: Smooth, rigid, and constructed on materials that shall result in finished products conforming to shape, lines, and dimensions indicated on Drawings.
		2. Finish: Free of honeycomb cast against poured in place casting bed, forms, and accessories. Provide smooth steel troweled true surface, if not a formed surface.
		3. Reinforcing:
			1. Cover reinforcing steel with a minimum 1‑1/2 inch concrete unless an increased cover is specified by the Engineer.
			2. Do not use metal chairs, with or without coatings, or plastic-tip chairs in the finished face of panels. Utilize plastic chairs with configuration to ensure a sufficient amount of concrete encases the tip of the chair.
		4. Curing: As specified in Section 033000.
		5. Panel Identification:
			1. Mark each precast panel to correspond to identification mark on Shop Drawings for panel location.
			2. Mark each precast panel with date cast.
		6. Embedded Items: Cast connectors, weld plates, and other embedded items detailed on Drawings. Take care to match up pairs of weld plates or other connectors. Coordinate locations of embedded items with metal building manufacturer. Paint surfaces of embedded items with primer after completion of welding.
		7. Allowable Tolerances:
			1. Length and width of precast units measured at face adjacent to mold:
				1. Units 10 Feet or Under: ±1/8 inch.
				2. Units 10 Feet to 20 Feet: +1/8 inch; -3/16 inch.
				3. Units 20 Feet to 30 Feet: +1/8 inch; -1/4 inch.
				4. Units Over 30 Feet: ±1/16 inch for each additional 10 feet.
			2. Thickness of Units: +1/4 inch; -1/8 inch.
			3. Dimensions for Windows, Doors, Louvers, and Other Openings: Maximum of 1/8 inch per 6 feet, or 1/4 inch total.
			4. Units and Openings Within Units: Not out of square more than 1/8 inch per 6 feet, or 1/4 inch total.
			5. Location of Inserts, Bolts, and Pipe Sleeves: ±1/4 inch.
			6. Location of Flashing Receivers or Reglets: ±1/4 inch.
			7. Bowing or warping of precast panels after casting: Not to exceed L/500.
1. EXECUTION
	1. EXAMINATION
		1. Examine surfaces and adjacent areas where wall panels will be cast and erected and verify that conditions conform to requirements. Verify lines, levels, and dimensions of previously constructed Work. Verify that structure and anchorage inserts not within tolerances required to erect panels have been corrected. Verify location of all inserts prior to placing concrete for panels.
		2. Determine field conditions by actual measurements.
		3. Report to Contracting Officer any condition in previously constructed Work that would prevent satisfactory completion of the work under this Section. Do not proceed until conditions are corrected under other Sections.
		4. Beginning of casting and erection indicates acceptance of previously constructed Work and existing conditions
	2. ERECTION
		1. Set precast concrete wall panels straight, level, plumb, and square.
		2. Non‑cumulative Erection Tolerances:
			1. Joint Dimension: Nominal 3/8 inch; to vary not more than +3/16 inch or -1/8 inch.
			2. Joint Taper: Panel edges at joint not out of parallel over 1/40 inch per foot.
			3. Edge Alignment: Misalignment of panel edges not exceeding 1/4 inch.
			4. Panel Face Offset:
				1. Faces of adjacent panels offset not over 1/8 inch.
				2. Bowed panels, within allowable bowing tolerances, arranged so offset between adjacent panels does not exceed 1/4 inch.
		3. Set units dry, without mortar, attaining specified joint dimension on bearing pads. Use steel shims as required to level panel.
		4. Fasten precast concrete panels in place by bolting or welding, or both. Protect units from damage by field welding or cutting operations. Provide non‑combustible shields as necessary during erection operations. Protect all work and materials of other trades at all times.
		5. Tighten bolted connections with equal torque, or finger tighten as indicated on Structural Drawings.
		6. Secure bolts with lock washers or tack‑weld nut to bolt.
		7. Provide temporary bracing for panels. Maintain bracing in place until final support is provided.
		8. Clean field welds with wire brush and protect materials other than stainless steel with primer or with zinc rich coating.
		9. Remove shims and spacers from joints requiring sealant prior to installing sealant.
		10. Grout connection to foundation with non‑shrink grout as specified in Section 033000.
		11. Waterproof embedded steel plates and angles below grade with asphaltic mastic prior to backfill.
	3. SEALING
		1. Seal joints between panels or between panel and adjacent materials as indicated on Drawings and as specified in Section 079200.
	4. FIELD QUALITY CONTROL
		1. Inspect precast concrete wall panel installation.
		2. Correct deficiencies in Work which inspection indicates are not in compliance with Contract documents.
	5. PATCHING
		1. Mix and place patching mixture to match color and texture of surrounding concrete and to minimize shrinkage.
		2. Adhere patch to hardened concrete with bonding agent.
		3. Level patch to plane of panel surface.
		4. Replace defective precast concrete wall panels if patching is not acceptable to Construction Manager as directed by Contracting Officer.
		5. Fill bubbles larger than 1/8 inch with sand cement and rub smooth.
		6. Clean and patch concrete floor slabs where temporary brace inserts are located.
	6. CLEANING
		1. After erection, clean soiled precast concrete wall panel surfaces with detergent and water, using fiber brush and sponge. Rinse thoroughly with clean water.
		2. Do not use acid to clean panels. Consult Special Coating manufacturer for recommended cleaning methods for stains remaining after initial cleaning.
		3. Rinse thoroughly with clear water immediately after using cleaner.
	7. PROTECTION
		1. Provide protective measures to prevent damage to concrete wall panels and adjacent Work.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022