

JOINT BASE LEWIS-
McCHORD

DESIGN STANDARDS

DIVISION 03 - CONCRETE

SECTION 03 47 13

TILT-UP CONCRETE
07/20

PART 1 GENERAL

Section 05 05 23.16 STRUCTURAL WELDING, Section 03 30 53 MISCELLANEOUS CAST-IN-PLACE CONCRETE, and Section 07 92 00 JOINT SEALANTS, along with ACI 551.1R and ACI CP-50 apply to work specified in this section.

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 (ACI)

ACI 302.1R	(2015) Guide for Concrete Floor and Slab Construction
ACI 551.1R	(2014) Tilt-up Concrete Construction Guide
ACI CP-50	(2007) Tilt-Up Supervisor & Technician Reference Guide

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2020) Structural Welding Code - Steel
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ASTM INTERNATIONAL (ASTM)

ASTM C494/C494M	(2019) Standard Specification for Chemical Admixtures for Concrete
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1.2 ADMINISTRATIVE REQUIREMENTS

1.2.1 Pre-Installation Meetings

No later than [30] [_____] days after Contract Award, the Contracting Officer will schedule a pre-installation meeting. Bring to attention of the Contracting Officer any discrepancies found in the architectural and structural drawings. Submit the following:

- a. Submit [Fabrication Drawings](#) signed and sealed by a registered professional engineer. Include dimensions of panels and size and location of openings for concrete formwork on the fabrication drawings. Show connection details, reinforcing details, and lifting devices on the installation drawings, used for the following items:
 - (1) [Panels](#)
 - (2) [Reinforcement and Embedded Items](#)
- b. Submit certificates for the following items showing conformance with referenced standards contained in this section:
 - (1) [Facing Aggregate](#)
 - (2) [Concrete Aggregates](#)
 - (3) [Chemical Admixtures](#)
 - (4) [Release Agent](#)
 - (5) [Pick-Up Inserts](#)
 - (6) [Bracing Inserts](#)
 - (7) [Reglets](#)

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submittals with an "S" are for inclusion in the [Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING][Environmental Records Binder, in conformance with Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS[. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

[SD-01 Preconstruction Submittals](#)

[Chemical Admixtures \(Recycled Content\); S](#)

[Release Agent \(Biobased Content\); S](#)

[Concrete Leveling and Patching Materials \(Biobased Content\); S](#)

[SD-02 Shop Drawings](#)

[Fabrication Drawings](#)

[Panels](#)

[Reinforcement and Embedded Items](#)

[SD-04 Samples](#)

Concrete Panel Sample; G[, [____]]

Exposed Aggregate; G[, [____]]

SD-07 Certificates

Facing Aggregate

Concrete Aggregates

Chemical Admixtures

Release Agent

Pick-Up Inserts

Bracing Inserts

Reglets

SD-11 Closeout Submittals

Chemical Admixtures (Recycled Content); S

Release Agent (Biobased Content); S

Concrete Leveling and Patching Materials (Biobased Content); S

1.4 QUALITY CONTROL

1.4.1 Erector Qualifications

Provide an experienced supervisor for panel construction and erection having at least [2] [____] years of successful experience in tilt-up construction, similar to the size and amount required for this project. Personnel working pursuant to this section, may at the Contracting Officer's option, be required to demonstrate technical competence by performing sample work [and/or by displaying their state qualifications/certificates], at no additional cost to the Government.

1.4.2 Tolerances

Apply the following tolerances to this work:

- a. Dimensional tolerances: Plus or minus 3.2 millimeter (1/8 inch) in length and height, 4.8 millimeter (3/16 inch) across diagonals
- b. Bowing or warpage tolerance: Plus or minus 12.7 millimeter in 3050 millimeter (1/2[____] inch in 10 feet)
- c. Thickness tolerance: Plus 12.7, minus 3.2 millimeter (1/2, minus 1/8 inch)

[1.4.2.1 Samples

Cast a 1200 by 1200 millimeter (4 by 4 foot) Concrete Panel sample on a casting slab to demonstrate releasing ability of release agent and

architectural effects. Also provide three, 300 by 300 millimeter (12 by 12 inches) test panels of [Exposed Aggregate](#).

]PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

2.1.1 Water Absorption

Ensure water absorption of facing aggregates is not less than the percentage obtained by testing the facing aggregates in the approved sample panel.

2.2 EQUIPMENT

2.2.1 Form Liners

Provide [rubber matting][wood board][plywood panel][nailed-on inserts][fiberglass][plastic sheets][pattern as shown on drawings] form liners.

2.3 MATERIALS

2.3.1 [Chemical Admixtures](#)

Provide materials and documentation meeting the requirements at Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19.0 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS] paragraph RECYCLED CONTENT. See <https://sftool.gov/greenprocurement/green-products/1/construction-materials/29/cement-concrete/0?addon=False> for more information.

[Provide admixture conforming to [ASTM C494/C494M](#), Type B for retarder.

] [Provide admixture conforming to [ASTM C494/C494M](#), Type C for accelerator.

]2.3.2 [Release Agent](#)

Provide materials and documentation meeting the requirements at Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19.0 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS] paragraph BIO-BASED PRODUCTS. See <https://sftool.gov/greenprocurement/green-products/16/roadway-construction/61/concrete-asphalt-release-fluids/0> for more information.

[Use resin type release agent, containing no materials that could affect bond of subsequent finishes or natural appearance of exposed concrete surfaces.

] [Use paraffin type release agent.

]2.3.3 Facing Aggregate

Provide [gravel][limestone][quartz][marble][granite][glass][ceramic] aggregate. Match color and gradation appearance of facing aggregates of panels to the accepted sample panel.

2.3.4 Concrete Aggregates

Provide concrete aggregates conforming to Section 03 30 53 MISCELLANEOUS CAST-IN-PLACE CONCRETE for concrete aggregates, except that coarse aggregate ranges from 31.5 to 9.5 millimeter (1-1/4 to 3/8 inch) in size.

2.3.5 Concrete Leveling and Patching Materials

Provide materials and documentation meeting the requirements at Section [01 33 29 SUSTAINABILITY REPORTING][01 57 19.0 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS] paragraph BIO-BASED PRODUCTS. See <https://www.biopreferred.gov/BioPreferred/faces/pages/ProductCategories.xhtml> for more information.

2.4 CAST-IN ACCESSORIES

2.4.1 Pick-Up Inserts

[Provide [double] [single] type inserts.

] [Provide [corrosion-resistant steel] [hot-dip galvanized] inserts.

]2.4.2 Bracing Inserts

Provide [corrosion-resistant steel] [hot-dip galvanized] inserts with a height corresponding to the thickness of the panel.

2.4.3 Reglets

[Provide [corrosion-resistant] [hot-dip galvanized-] steel, 0.48 millimeter (28-gage), metal reglets with styrofoam rigid filler.

] [Provide extruded polyvinylchloride reglets with styrofoam rigid filler.

]2.4.4 Sleeves

[Provide pipe sleeves, size as indicated.

] [Provide sheetmetal sleeves, size as indicated.

]2.4.5 Lifting Devices

Provide hot-dipped galvanized [angle] [swivel] type lifting devices.

PART 3 EXECUTION

3.1 PREPARATION

Clean forms and the casting slab of extraneous materials. Locate the casting area for the panel in an area where floor joints are preferably avoided or at least minimize the impact to the panel being casted. Spackle and/or caulk floor joints and temporarily patch floor openings that occur in the casting area.

Treat casting slab with a release agent before placing reinforcing and embedded items. Use care not to scuff the release agent when placing reinforcing and embedded items.

Re-treat scuffed areas with the release agent, using care not to coat reinforcing and embedded items. Repair holes and spalling within the slab surface from previous cast and allow to cure before applying a new coat of releasing agent.

Field verify and correct any errors in the footings and foundations such as levelness, embed locations, etc. prior to lifting. Refer to Section 03 33 00 CAST-IN-PLACE ARCHITECTURAL CONCRETE for additional requirements.

3.2 INSTALLATION

3.2.1 Reinforcement And Embedded Items

Accurately locate reinforcing and items to be embedded in the panels in accordance with approved drawings and place into forms.

[Extend horizontal reinforcing rods at sides of panels a minimum of 300 millimeter (12 inches) into column forms.

3.2.2 Casting

Cast panels individually on a temporary casting slab or on the concrete floor slab of the building. Refer to Section 03 30 53 MISCELLANEOUS CAST-IN-PLACE CONCRETE and comply with ACI 302.1R. Vibrate concrete to produce the maximum density without voids throughout the entire panel thickness. Do not displace reinforcing or inserts, or cause scoring of forms, liners, or the casting slab.

[Install [_____] millimeter (inch) cant strip along edges of formwork.

][Install strong backs at locations where panel legs are less than [_____] millimeter (inches) in width.

]Furnish plastic or plastic tipped steel chairs for placement of reinforcing.

3.2.3 Finishes

Finish exposed face surfaces of panels to match the approved sample panel.

Provide exposed panels with a [smooth trowel] [light broom] [exposed aggregate] [[brick][stone] pattern] finish.

Provide architectural accents and reveals per construction drawings.

Provide unexposed panel backs with a [smooth float] [broom] finish.

Cracks, voids, protrusions, spalls, or non-uniform color or texture are not acceptable. Patch and repair minor defects from casting to match adjacent final finish.

3.2.4 Curing

After casting, form-cure panels until sufficient strength has developed to permit handling the units without damage.

After removal of forms, moist-cure panels for a minimum of 6 calendar days.

3.3 FIELD QUALITY CONTROL

Do not start erection of panels until representative concrete test cylinders have a minimum compressive strength as specified on the drawings.

Locate pickup points in concrete panels so that concrete tensile stresses during erection do not exceed 10 percent of the cylinder compressive strength at time of erection.

3.4 ERECTION

Level the setting bed for wall panels using high-strength mortar so that the panel in place will have a level tolerance within 1 to 500.

Erect panels using spreader bars, chockers with equalizer sheaves, adjustable bracing, and other erecting accessories as required to place panels in location. Ensure bracing equipment meets applicable codes.

Tilt panels from the casting platform to slope within 1 horizontal to 6 vertical ratio.

Plumb initial setting of panels within 75 millimeter (3 inches) of true.

Plumb final setting of panels with adjustable braces to vertical tolerance of 1 to 500, leaving braces in place until panels are secured in their final location as indicated.

Bolt panels to the supporting structure with high-strength bolts as specified in Section 05 12 00 STRUCTURAL STEEL.

Weld panels to the supporting structure.

Ensure welding meets the requirements of AWS D1.1/D1.1M.

Before welding, clean surfaces of loose scale, slag, rust, grease, and other foreign substances that could affect the strength of the welds.

Weld connections with weld materials that correspond to the steel being welded.

Use and maintain shielded metal arc welding.

Provide inspection gages for checking the size, length, and quality of welds.

Correct or replace welds having cracks, surface porosity, slag accumulation, insufficient throat, or concavity.

Remove weld splatter from steel surfaces to be painted.

Brace panels with adjustable turnbuckle pipe braces or timber braces.

Pack joints between wall panels and foundation and wall panels and columns with [portland cement] [plastic] mortar.

3.5 PATCHING

Dry pack holes in panels left after lifting rigging has been removed with nonshrink mortar to match adjacent surfaces.

[Wet stained surfaces, coat surfaces with a thick mortar mixture, and rub the area with burlap pads to remove the excess mortar and fill surface voids.

] [Remove surface stains with diluted muriatic acid, scrubbing with stiff brushes and flushing with clean water.

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-- End of Section --