

ICC-ES Evaluation Report

ESR-1792

Reissued January 2024


This report also contains:

- LABC Supplement
- CBC Supplement

Subject to renewal January 2025

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<p>DIVISION: 06 00 00 — WOOD, PLASTICS AND COMPOSITES</p> <p>Section: 06 12 13 — Cementitious Reinforced Panels</p>	<p>REPORT HOLDER: USG CORPORATION</p>	<p>EVALUATION SUBJECT: USG STRUCTURAL PANELS PRODUCT DESIGNATIONS:</p> <ul style="list-style-type: none"> • USG STRUCTO-CRETE® BRAND STRUCTURAL PANELS (aka USG STRUCTURAL PANEL CONCRETE SUBFLOOR) • USG STRUCTO-CRETE® BRAND STRUCTURAL ROOF DECK PANELS (aka USG STRUCTURAL PANEL CONCRETE ROOF DECK) • USG STRUCTO-CRETE® BRAND STRUCTURAL XTRA STRENGTH PANELS (aka USG STRUCTURAL PANEL CONCRETE FOUNDATION WALL XD) 	
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1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)
- 2013 *Abu Dhabi International Building Code (ADIBC)*[†]

[†]The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

For evaluation for compliance with codes adopted by [Los Angeles Department of Building and Safety \(LADBS\)](#), see [ESR-1792 LABC and LARC Supplement](#).

For evaluation for compliance with codes adopted by California Office of Statewide Health Planning and Development (OSHPD), AKA: California Department of Health Care Access and Information (HCAI) and Division of the State Architect (DSA), see [ESR-1792 CBC and CRC Supplement](#).

The evaluation listing results are reported in ICC-ES [ESL-1421](#), reissued July 2023.

Properties evaluated:

- Structural
- Combustibility
- Fire propagation

1.2 Evaluation to the following green code(s) and/or standards:

- 2019 [California Green Building Standards Code \(CALGreen\)](#), Title 24, Part 11

2.0 USES

USG Structural Panels are noncombustible, cementitious sheathing panels used as combination subfloor and underlayment (single floor), as subfloor only, as roof deck or above-grade and below-grade (foundation) wall applications. [Table 1](#) shows the approved application for each panel type.

2.1 USG STRUCTO-CRETE[®] Brand Structural Panels (aka USG Structural Panel Concrete Subfloor) used as combination subfloor and underlayment (single floor) or as subfloor only. When used as floor sheathing, installation must be limited to weather-protected locations. *USG STRUCTO-CRETE[®] Brand Structural Panels* are fastened to cold-formed steel, hot-rolled steel or wood framing to form a structural floor. These systems resist gravity loads and act as horizontal shear diaphragms, resisting wind and seismic loads. These panels may also be used for anchoring non-structural components when used as floor sheathing, as specified in [Table 7](#) of this report. When used in structures regulated under the IRC, floor systems using *USG STRUCTO-CRETE[®] Brand Structural Panels* must be designed in accordance with IRC Section R301.1.3.

2.2 USG STRUCTO-CRETE[®] Brand Structural Roof Deck Panels (aka USG Panel Concrete Roof Deck) used as roof sheathing. When used as roof sheathing, the panels must be protected by an approved roof covering. *USG STRUCTO-CRETE[®] Brand Structural Roof Deck Panels* are fastened to cold-formed steel, hot-rolled steel, bar joists or wood framing to form a structural roof system. These systems resist gravity and uplift loads and act as horizontal shear diaphragms, resisting wind and seismic loads. When used in structures regulated under the IRC, floor and roof systems using USG Structural Panels must be designed in accordance with IRC Section R301.1.3.

2.3 USG STRUCTO-CRETE[®] Brand Structural Xtra Strength Panels (aka USG Structural Panel Concrete Foundation Wall XD) used in below grade foundation wall applications. These panels are fastened to cold-formed steel, hot-rolled steel, or wood framing to form a foundation wall system. The capacity of the system to resist lateral soil pressure and axial loads are outside the scope of this report and shall be determined by a registered design professional. When used as foundation wall, the panels must be waterproofed in accordance with the applicable code. When used in structures regulated under the IRC, floor and roof systems using USG Structural Panels must be designed in accordance with IRC Section R301.1.3.

2.4 USG Structural Panels may also be used as shear resisting elements of cold-formed steel framed shear walls in Seismic Design Categories A and B, as specified in [Tables 8](#) and [9](#) this report. When used in structures regulated under the IRC, floor and roof systems using USG Structural Panels must be designed in accordance with IRC Section R301.1.3.

3.0 DESCRIPTION

3.1 USG Structural Panels:

USG Structural Panels are formed from a composite consisting of glass fibers, cementitious materials and aggregate. USG Structural Panels are nominally $\frac{3}{4}$ inch (19.1 mm) thick, 4 feet (1219 mm) wide, and 8 feet (2428 mm) long with tongue-and-groove edges along the length of the panel. The panels are also available with square edges. The panels weigh approximately 5 psf (24.4 kg/m²). The panels are available with or without a glass mat surface.

The panels are noncombustible when tested in accordance with ASTM E136. The panels have a flame-spread index of 0 and a smoke-developed index of 0 when tested in accordance with ASTM E84.

The USG Structural Panels physical and mechanical properties are listed in [Table 2](#) of this report.

3.1.1 CALGreen: The attributes of the USG Structural Panels have been verified as conforming to the provisions of CALGreen Sections 4.504 and 5.504 for compliance with the California Department of Public Health, "Standard Method for Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers" Version 1.1, February 2010 (also known as Specification 01350).

Note that conditions on compliance for CALGreen rest with the user of this report, see Section 5.5 for compliance conditions.

3.2 Floor and Roof Framing (Sections 2.1 and 2.2 applications):

Floor and roof framing, web stiffeners, and blocking must be cold-formed from steel complying with AISI S100, with a minimum base-metal thickness of 43 mils [0.043 inch (1.15 mm)], a minimum yield strength of 50 ksi (345 MPa), and a minimum G60 galvanized coating. The supporting flange of the framing member must be at least 1.625 inches (41 mm) wide. Alternate types of framing members listed in [Table 4A](#) of this report may be used as indicated in this evaluation report. Wood framing members must be designed in accordance with the applicable provisions in IBC Chapter 23. Hot-rolled steel framing members must be designed in accordance with the applicable provisions in IBC Chapter 22.

3.2.1 Proprietary Cold-Formed Steel Trusses (Section 2.1 applications): Cold-formed steel floor trusses must be made from truss components described in ESR-2361. The truss components shapes must be formed from minimum base steel thickness of 43 mils (1.09 mm), Grade 50 and 3.25-inch-deep (83 mm) and 1.625-inch-wide (41 mm) flange cold-formed steel members. The minimum truss width is 3.25 inches (83 mm) and minimum truss depth is 12 inches (305 mm). The maximum truss spacing must not exceed 24 inches (610 mm) on center. The floor truss must be designed by registered design professional.

3.2.2 Blocking:

When blocking is required, as shown in [Tables 5A, 5B, 6A](#) and [6B](#) of this report, it must comply with the following requirements, as applicable:

3.2.2.1 Diaphragm Strap Blocking: Strap blocking must be minimum Grade 33 cold-formed steel straps which are 4 inches (102 mm) wide with a minimum base steel thickness of 43 mils [0.043 inch (1.09 mm)], and a minimum G60 galvanized coating.

3.2.2.2 Diaphragm Track Blocking: Track blocking must be minimum Grade 50 cold-formed steel C-shaped tracks which are 4 inches (102 mm) deep, have a minimum flange width of 1¹/₄ inches (32 mm), have a minimum base steel thickness of 43 mils [0.043 inch (1.09 mm)], and a minimum G60 galvanized coating. The track sections must be notched where they overlap the supporting joists.

3.2.2.3 Diaphragm Truss Frame Strap Blocking: Strap blocking for cold-formed steel truss diaphragms must be minimum Grade 33 cold-formed steel straps which are 3.5 inches (89 mm) wide with a minimum base steel thickness of 43 mils [0.043 inch (1.09 mm)], and a minimum G60 galvanized coating.

3.2.3 Fasteners: The panels may be fastened to the cold-formed steel framing, hot-rolled framing or wood framing and blocking as defined in [Table 4A](#).

When used with cold-formed steel trusses per Section 3.2.1, the panels must be fastened with Grabber Construction Products, Inc., #8 x 1⁵/₈" winged self-drilling screws, Part No. CGH8158LG, addressed in [ESR-4223](#).

3.3 Below Grade (Foundation) Wall Framing (Section 2.3 Applications):

Wall framing, web stiffeners, and blocking must be cold-formed from steel complying with AISI S100, with a minimum base-metal thickness of 54 mils [0.0538 inch (1.37 mm)], a minimum yield strength of 50 ksi (345 MPa), and a minimum G60 galvanized coating. The supporting flange of the framing member must be at least 1.625 inches (41 mm) wide. Alternate types of framing members listed in [Table 4B](#) of this report may be used as indicated in this evaluation report. Wood framing members must be designed in accordance with the applicable provisions in IBC Chapter 23. Hot-rolled steel framing members must be designed in accordance with the applicable provisions in IBC Chapter 22. Framing supporting panels must be designed by registered design professional.

3.3.1 Blocking: Each foundation wall panel must be fully blocked at all panel edges. If blocking is used to connect two adjacent panels to create a wall taller than 8 feet (2.44 m), a full 8-foot panel must always be located at the bottom of the wall with the blocking at the top connecting the additional panel section.

3.3.1.1 Steel Strap Blocking: Steel strap blocking must be minimum 54 mils [0.0538-inch (1.37 mm)] thick by 4-inch (102 mm) width steel having a minimum 50 ksi (345 MPa) yield strength.

3.3.1.2 Lumber Blocking: Lumber blocking must be minimum 2x4 Spruce Pine Fir Lumber with the wider edge in-plane with the panels.

3.3.2 Fasteners: Acceptable fasteners type of foundation wall framing members listed in [Table 4B](#) of this report may be used as in this evaluation report.

3.4 Above Grade Wall Framing (Section 2.4 applications): The framing and blocking must be as described in [Tables 8](#) and [9](#) of this report.

4.0 DESIGN AND INSTALLATION

4.1 Design:

4.1.1 General: The framing components must be designed to comply with the strength and deflection requirements of the IBC and the project specifications. The design of the floor, roof or wall systems must address the selection of the framing members, the connections of the framing members to the supporting structure, the layout of the sheathing, and the fastening schedule for attaching the sheathing to the framing members.

4.1.2 Uniform Gravity and Uplift Loads for Floor or Roof Applications (Sections 2.1 and 2.2 of this report): The nominal uniform gravity loads for USG Structural Panels used as floor or roof sheathing are shown in [Table 3A](#). The nominal uniform gravity and uplift loads for USG Structural Panels used as roof sheathing are shown in [Table 3B](#). The nominal values in [Tables 3A](#) and [3B](#) must be adjusted for use in ASD or LRFD in accordance with [Tables 3A](#) and [3B](#) of this report.

4.1.3 Concentrated Live Load for Floor or Roof Applications (Section 2.1 and 2.2 of this report): The USG Structural Panels with tongue and groove edges meet the 2,000 lbf (8.9 kN) concentrated live load defined in IBC Section 1607.4 and IBC Table 1607.1. The maximum framing spacing must not exceed 24 inches (610 mm). The capacity of the framing members resisting the concentrated live load is outside the scope of this report and must be determined by a registered design professional.

4.1.4 Diaphragm Loads for Floor or Roof Applications (Sections 2.1 and 2.2 of this report):

4.1.4.1 General:

Diaphragm analysis must comply with the applicable requirements of IBC Chapter 16. For horizontal diaphragms constructed with the USG Structural Panels, the length-to-width aspect ratio of the diaphragm must be no greater than 3:1 for unblocked diaphragms and 4:1 for blocked diaphragms. Diaphragm classification as flexible or rigid must be determined in accordance with Section 12.3.1 of ASCE 7. USG Structural Panels used in unblocked diaphragms and diaphragms blocked with steel straps must have tongue-and-groove edges.

Diaphragm design must consider diaphragm loading parallel and perpendicular to the floor framing. For select configurations, the results of testing of simple beam assemblies are shown in [Table 5A](#). These values are applicable when the diaphragm load is parallel to the framing members. Results of testing of cantilever assemblies are shown in [Table 6A](#). These values apply to diaphragm loads which are parallel and perpendicular to the framing, except where loading parallel to framing is addressed in [Table 5A](#). The values in [Tables 5A](#) and [6A](#) are nominal diaphragm shear values, which must be adjusted for use in ASD or LRFD in accordance with [Tables 5A](#) and [6A](#) of this report.

4.1.4.2 Deflections: Diaphragm deflection must be calculated as follows:

4.1.4.2.1 Based on Simple Beam Diaphragm Testing: Deflection of diaphragms loaded parallel to the framing, for which diaphragm strength is provided in [Table 5A](#), must be calculated as follows:

$$\Delta = \frac{5VL^3}{8EAb} + \frac{VL}{4Gt} + XLe_n$$

where:

Δ = Diaphragm deflection, inch

V = Unit shear parallel to the framing, plf

L = Diaphragm length perpendicular to the direction of the applied load, feet

E = Elastic modulus of steel rim members designed as diaphragm chords, 29,500,000 psi. Elastic modulus of wood-framed rim members must be determined in accordance with the AWC National Design Specification (NDS) for Wood Construction.

A = Net area of rim chord cross section, in.²

- b = Diaphragm width parallel to the direction of the applied load, feet
 G = Shear modulus of sheathing, 285,714 psi
 t = Effective thickness of sheathing, 0.73 inch
 X = Slip coefficient from [Table 5A](#)
 e_n = Fastener slip, which is based on the ratio of V/S_u as follows:
 e_n = 0.011 inch at $0.20S_u$
 e_n = 0.019 inch at $0.33S_u$
 e_n = 0.032 inch at $0.60S_u$
 e_n = 0.084 inch at S_u

where:

S_u = Nominal shear strength given in [Table 5A](#)

Other values of e_n are permitted to be determined by interpolation.

4.1.4.2.2 Based on Cantilever Diaphragm Testing: Deflection of diaphragms loaded parallel or perpendicular to the framing, for which diaphragm strength is provided in [Table 6A](#), must be calculated as follows:

$$\Delta = \frac{5V(2L)^3}{8EAb} + \frac{VL}{4Gt} + X(2L)e_n$$

where:

Δ = Diaphragm deflection, inch

V = Unit shear in the direction under consideration, plf

L, E, A, b, G, t = See Section 4.1.3.2.1.

X = Slip coefficient from [Table 6A](#)

e_n = Fastener slip, which is based on the ratio of V/S_u as follows:

e_n = 0.011 inch at $0.20S_u$

e_n = 0.019 inch at $0.33S_u$

e_n = 0.032 inch at $0.60S_u$

e_n = 0.084 inch at S_u

where:

S_u = Nominal shear strength given in [Table 6A](#)

Other values of e_n are permitted to be determined by interpolation.

4.1.5 Diaphragm Loads for Cold-formed Steel Floor Trusses:

4.1.5.1 General:

Diaphragm analysis must comply with the applicable requirements of IBC Chapter 16. For horizontal diaphragms constructed with the USG Structural Panels, the length-to-width aspect ratio of the diaphragm must be no greater than 2:1 for unblocked and blocked diaphragms. Diaphragm classification as flexible or rigid must be determined in accordance with Section 12.3.1 of ASCE 7. USG Structural Panels used in unblocked diaphragms and diaphragms blocked with steel straps must have tongue-and-groove edges.

Diaphragm design must consider diaphragm loading parallel and perpendicular to the floor truss. For select configurations, the results of testing of simple beam assemblies are shown in [Table 5B](#). These values are applicable when the diaphragm load is parallel to the truss members. Results of testing of cantilever assemblies are shown in [Table 5B](#). The values in [Tables 5B](#) and [6B](#) are nominal diaphragm shear values, which must be adjusted for use in ASD or LRFD in accordance with [Tables 5B](#) and [6B](#) of this report.

4.1.5.2 Deflections: Diaphragm deflection must be calculated as follows:

4.1.5.2.1 Based on Simple Beam Diaphragm Testing: Deflection of diaphragms loaded parallel to the truss member, for which diaphragm strength is provided in [Table 5B](#), must be calculated as follows:

$$\Delta = \frac{5VL^3}{8EAb} + \frac{VL}{4Gt} + XLe_n$$

where:

- Δ = Truss diaphragm deflection, inch
- V = Unit shear parallel to the truss, plf
- L = Diaphragm length perpendicular to the direction of the applied load, feet
- E = Elastic modulus of steel rim members designed as diaphragm chords, 29,500,000 psi.
- A = Net area of rim chord cross section, in.²
- b = Diaphragm width parallel to the direction of the applied load, feet
- G = Shear modulus of sheathing, 285,714 psi
- t = Effective thickness of sheathing, 0.73 inch
- X = Slip coefficient from [Table 5B](#)

e_n = Fastener slip, which is based on the ratio of V/S_u as follows:

$e_n = 0.006$ inch at $0.20S_u$

$e_n = 0.016$ inch at $0.40S_u$

$e_n = 0.038$ inch at $0.60S_u$

$e_n = 0.151$ inch at S_u

where:

S_u = Nominal shear strength given in [Table 5B](#)

Other values of e_n are permitted to be determined by interpolation.

4.1.5.2.2 Based on Cantilever Diaphragm Testing: Deflection of diaphragms loaded parallel or perpendicular to the framing, for which diaphragm strength is provided in [Table 6B](#), must be calculated as follows:

$$\Delta = \frac{5V(2L)^3}{8EAb} + \frac{VL}{4Gt} + X(2L)e_n$$

where:

Δ = Diaphragm deflection of cold-formed steel floor truss, inch

V = Unit shear in the direction under consideration, plf

L, E, A, b, G, t = See Section 4.1.5.2.1.

X = Slip coefficient from [Table 6B](#)

e_n = Fastener slip, which is based on the ratio of V/S_u as follows:

$e_n = 0.006$ inch at $0.20S_u$

$e_n = 0.016$ inch at $0.40S_u$

$e_n = 0.038$ inch at $0.60S_u$

$e_n = 0.151$ inch at S_u

where:

S_u = Nominal shear strength given in [Table 6B](#)

Other values of e_n are permitted to be determined by interpolation.

4.1.6 Design Loads for USG Foundation Wall Applications: The nominal uniform loads for USG Structural Panel Concrete Foundation Wall XD is shown in [Table 10](#). The nominal values in [Table 10](#) must be adjusted for use in ASD or LRFD in accordance with [Table 10](#) of this report. The nominal shear wall values for USG Structural Panel Concrete Foundation Wall XD are shown in [Table 11](#). The nominal shear wall values in [Table 11](#) must be adjusted for use in ASD or LRFD in accordance with [Table 11](#) of this report. The framing supporting the panels must be designed by a registered design professional.

4.1.6.1 Shear Wall Deflection: Shear wall deflection of tested wall assembly can be calculated as follows:

$$\Delta = \frac{P}{G'} \left(\frac{H}{L} \right)$$

Δ = shear wall assembly deflection, in.

P = Shear load applied to wall panel, lbs.

G' = Wall assembly apparent stiffness, $\frac{\text{lbs}}{\text{in}}$.

H = Shear wall Height, in.

L = Shear wall length, in.

4.1.7 Design Loads for Above Grade Wall Applications: The nominal positive and negative uniform loads for USG Structural Panels used in above grade wall applications are shown in [Tables 3A](#) and [3B](#). The nominal values in [Tables 3A](#) and [3B](#) must be adjusted for use in ASD or LRFD in accordance with [Tables 3A](#) and [3B](#) of this report. The nominal shear values for USG Structural Panels used in above grade wall applications are shown in [Tables 8](#) and [9](#) of this report. Framing supporting wall panels must be designed by a registered design professional.

4.2 Installation:

4.2.1 General: Installation of USG Structural Panels and framing must be in accordance with the IBC, this report, USG's published installation instructions and the approved plans. Copies of this report, USG's published installation instructions and the approved plans must be available at the jobsite at all times during installation of the panels.

4.2.2 Framing: The floor or roof framing must be supported on a foundation that is uniform and level, or directly by bearing studs or headers installed at the top of the bearing wall to distribute the load. The wall framing must be supported on footing that are uniform and level.

Web stiffeners must be provided at reaction points and/or concentrated loads as specified in the approved plans, based on the framing manufacturer's requirements and the applicable ICC-ES evaluation report on the framing members. End blocking must be provided where joists ends are not otherwise restrained from rotation.

Floor, roof or wall framing must be provided at a spacing indicated in the tables in this report. Additional framing must be provided under parallel partitions and around all openings that interrupt one or more spanning members. Framing members must be fastened to the supporting walls or structure in accordance with the approved plans.

All blocking or bridging for the framing must be installed prior to the installation of the USG Structural Panels.

Framing must comply with the manufacturing tolerances specified in the code.

When blocking is required at the abutting edges of the panels, it must be centered under the longitudinal joints between sheathing panels and installed prior to installation of the sheathing panels.

4.2.3 USG Structural Panels Floor and Roof Application:

4.2.3.1 General: The temperature during panel installation must be a minimum of 0°F (-18°C).

4.2.3.2 Panel Layout: USG Structural Panels must be installed with the long edges perpendicular to the framing. Panels may be installed with either surface against the framing. However, because the panel markings that facilitate fastening are on one side only, the panels should preferably be applied with the markings toward the installer.

Panel installation must commence by marking a line across the framing members parallel to the rim joist at a distance equal to the width of the first panel being placed. Whenever possible, the panel layout must be

planned so the first and last panel row width is a minimum of 24 inches (610 mm). Panels less than 24 inches (610 mm) wide must be supported by framing on all sides in accordance with the USG installation instructions.

The cut edge or tongue must be placed along the rim joist. Each panel must be supported across two or more framing members, as indicated in the tables in this report. Panels must be trimmed to ensure that the butted ends of each panel are centered on the framing member flanges.

For panels with tongue-and-groove edges, adjacent panels must be butted together so that the tongue of one panel being installed fits into the groove of the installed panel. Panels with square edges must be butted tightly together. No gaps are required between panels. When the framing spacing is 24 inches (610) or less, panel rows must be placed in a running bond pattern so that end joints fall over the center of the framing members and are staggered by at least two framing members from where the end joints fall in the adjacent rows, except when panels less than 8 feet (2440 mm) long are used, in which case an offset of one framing member is allowed. When the framing spacing is greater than 24 inches (610 mm), panel rows must be placed in a running bond pattern so that end joints fall over the center of the framing members and are staggered by at least one framing member from where the end joints fall in the adjacent panel rows.

4.2.3.3 Panel Fastening: Each panel must be fastened to the framing members in accordance with the requirements for the applicable screw pattern shown in [Tables 5A, 5B, 6A and 6B](#), and in accordance with the fastening schedule specified in the approved plans. Fastening must commence at one end and fan out across the panel, and corners must not be fastened initially. Fasteners must be placed sequentially one row at a time. Screws must be installed using tools recommended by the screw manufacturer. Screw fasteners must be installed so the heads are flush with the panel surface. Panels must be fastened in accordance with one of the following patterns, as required by [Tables 5A, 5B, 6A and 6B](#):

- **Screw Pattern A:** Sheathing must be fastened at 4, 6 or 8 inches (102, 152 or 203 mm) on center at the perimeter of the diaphragm and at the panel-to-panel butt joints, as required by [Tables 5A and 6A](#). At the panel corners, fasteners must be inset 2 inches (51 mm). In the field of the panel, fasteners must be spaced a maximum of 12 inches (305 mm) on center. Fastener edge distance at all panel edges must be a minimum of 1/2 inch (12.7 mm) or as indicated in [Table 4A](#) of this report, whichever is more restrictive, except at T-joints (intersection of butt joint with tongue-and-groove joint) where two fasteners are required, one placed 1 inch (25.4 mm) and another at 2 inches (51 mm) from the panel edge. [Figure 1](#) illustrates the Screw Pattern A fastener layout.

- **Screw Pattern B and C:** Sheathing must be fastened at 2, 4, 6 or 8 inches (102, 152 or 203 mm) on center at the perimeter of the diaphragm and at the panel-to-panel butt joints, as required by [Tables 5A and 6A](#). At the panel corners, fasteners must be inset 2 inches (51 mm). In the field of the panel, fasteners must be spaced a maximum of 12 inches (305 mm) on center. Fastener edge distance at all panel edges must be a minimum of 1/2 inch (12.7 mm) or as indicated in [Table 4A](#) of this report, whichever is more restrictive, except at T-joints where one fastener must be placed 1 inch (25.4 mm) from the panel edge. Fastener edge distance at tongue and groove panel joint over blocking must be a minimum of 1 inch (25.4 mm). [Figure 1](#) illustrates the Screw Patterns B and C fastener layout.

- **Staggered and Stacked Panel Layouts Screw Details:** Sheathing must be fastened at 4 or 6 inches (102 or 152 mm) on center at the perimeter of the diaphragm and at the panel-to-panel butt joints, as indicated in [Tables 5B and 6B](#). At the panel corners, fasteners must be inset 1.25 inches (32 mm). In the field of the panel, fasteners must be spaced a maximum of 12 inches (305 mm) on center. Fastener edge distance at all panel edges must be a minimum of 1.25 inches (32 mm). [Figure 2](#) illustrates the Staggered and Stacked Screw fastener layouts.

4.2.3.4 Field Modifications: As needed, the panels must be cut to proper length and width in accordance with USG's installation instructions.

Cut-outs in the panels must be created before installation of the panels. All cut-out ends and edges exceeding 6 inches (152 mm) in any dimension must be supported by framing.

4.2.4 Floor Finish: Before application of floor finish materials, all structural panels must be completely fastened. All voids and depressions in the panel surface must be filled with cement-based patching or leveling compounds. Panel surfaces must be clean and free of moisture.

Before application of floor finish materials, USG Structural Panels must be conditioned in the same environment as required for the finish floors, if applicable, for at least 48 hours.

Underlayments must be secured to USG Structural Panels with fastenings specified for the flooring material. Mechanical fasteners must be long enough to penetrate the USG Structural Panels $\frac{1}{4}$ to $\frac{1}{2}$ inch (6.4 to 12.7 mm).

For wood flooring, No. 15 felt or equivalent must first be laid over the USG Structural Panels. For engineered wood flooring, the specified moisture barrier must be used in lieu of the felt. The USG Structural Panels must be kept dry and maintained in a conditioned space for a minimum of 30 days prior to the installation of wood flooring. The wood flooring must then be installed in accordance with the wood flooring manufacturer's installation instructions for application over wood floor sheathing.

Tackless strips, designed for concrete application, must be used for the installation of stretched carpet.

4.2.5 Roof Finish: Before application of approved roof coverings, all structural panels must be completely fastened. Panel surfaces must be clean and free from moisture. Roof systems (above USG Structural Panels) must be attached directly to the panels.

4.2.6 Foundation Wall Finish: A code approved waterproofing membrane must be installed over the finished foundation wall assembly in accordance with the membrane manufacturer's installation instructions. Panels must be protected from construction moisture, damage and impact during and after installation. [Table 12](#) shows bond strength values of several waterproofing membranes bonded to *USG STRUCTO-CRETE[®] Brand Structural Xtra Strength Panels*.

Extreme caution should be maintained while backfilling the area around the panels and backfilled must be lightly compacted in maximum lifts of 1 foot (305 mm).

4.2.7 Above Grade Wall Finish: Code-complying water-resistive barrier and exterior wall covering must be installed over the panels.

4.3 Special Inspections: For the purpose of determining special inspection requirements, the floor systems described in this report must be considered special cases, in accordance with Section 1705.1.1 of the IBC (2009 IBC Section 1704.15). Inspection of diaphragm construction is required when the fastener spacing is less than or equal to 4 inches (102 mm).

5.0 CONDITIONS OF USE:

The USG Structural Panels described in this report comply with, or are suitable alternatives to what is specified in, the codes indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1 The products must be installed in accordance with this report, the manufacturer's published instructions, the approved plans and the applicable code. In the event of a conflict amongst these documents, the most restrictive requirements govern.
- 5.2 When used in floor and roof applications, calculations and details showing that the applied gravity and uplift loads do not exceed the applicable uniform load capacity, and that the applied diaphragm loads do not exceed the available diaphragm strengths specified in this report, must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3 When used in wall applications, calculations and details showing that the applied uniform loads do not exceed the applicable uniform load capacity, and that the applied shear loads do not exceed the available shear wall capacity specified in this report, must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.4 Design of the supporting building structure is outside the scope of this report.
- 5.5 For use in roof applications, the uplift loads in this report apply only to the structural capacity of the panel and its attachment to the supporting framing. Evaluation of allowable uplift loads for roof covering systems applied to the USG Structural Panels used as roof sheathing are outside the scope of this report.
- 5.6 For use in wall applications, the negative wind pressure loads in this report apply only to the structural capacity of the panel and its attachment to the supporting framing. Attachment of exterior wall covering systems to the USG Structural Panels is outside the scope of this report.
- 5.7 For applications under CalGreen code described in Section 3.1.1 of this report, the user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of

those conditions is outside the scope of this report. This code or standard often provides supplemental information as guidance.

5.8 The USG Structural Panels are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the [ICC-ES Acceptance Criteria for Structural Cementitious Floor and Roof Sheathing Panels \(AC318\)](#), dated March 2018 (editorially revised March 2021).
- 6.2 Data in accordance with the [ICC-ES Acceptance Criteria for Horizontal Diaphragms Consisting of Structural Cementitious Sheathing Panels Attached to Cold-formed Steel Framing \(AC319\)](#), dated March 2018 (editorially revised March 2021).
- 6.3 Reports of tests on USG structural panels in accordance with ASTM C1185, ASTM D1293, ASTM D3330, ASTM E96, ASTM G21, AWP Standard E1-17 and Specification 01350.
- 6.4 Reports of tests in accordance with ASTM D1761 and ASTM D1037, including engineering analysis to qualify alternate fasteners and framing members.
- 6.5 Reports of pull-through tests in accordance with ASTM D1037 for floor anchorage to USG structural panels.
- 6.6 Reports of racking shear tests in accordance with ASTM E564 for USG structural panels used as shear wall resisting elements.

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-1792) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, each panel or bundle of panels is identified with one of the product names listed in Section 3.1; the USG Corporation name and address; the ICC-ES report number (ESR-1792); and the date of manufacture.
- 7.3 The report holder's contact information is the following:

USG CORPORATION
700 N US HIGHWAY 45
LIBERTYVILLE, ILLINOIS 60048
(800) 950-3839
www.usg.com

TABLE 1—USG STRUCTURAL PANEL TYPE END USE APPLICATIONS

End Use Application	USG Panel Type		
	USG STRUCTO-CRETE [®] BRAND STRUCTURAL PANELS (aka USG STRUCTURAL PANEL CONCRETE SUBFLOOR)	USG STRUCTO-CRETE [®] BRAND STRUCTURAL ROOF DECK PANELS (aka USG STRUCTURAL PANEL CONCRETE ROOF DECK)	USG STRUCTO-CRETE [®] BRAND STRUCTURAL XTRA STRENGTH PANELS (aka USG STRUCTURAL PANEL CONCRETE FOUNDATION WALL XD)
Combination subfloor and underlayment	yes	yes	yes
Subfloor	yes	yes	yes
Roof deck	no	yes	yes
Below grade foundation wall	no	no	yes
Above grade wall	yes	yes	yes

TABLE 2—PHYSICAL AND MECHANICAL PROPERTIES OF USG STRUCTURAL PANEL

Property	Test Standard	Requirements	Tested Values
Concentrated Load, Wet or Dry	ASTM E661	550 lbf static 0.108 max deflection at 200 lbf	840 lbf static 0.066-inch deflection at 200 lbf
Fastener Lateral Resistance ¹	ASTM D1761	Dry > 210 lbf Wet > 160 lbf	Dry: 776 lbf Wet: 800 lbf
Density-Oven Dried ²	ASTM C1185	Minimum 75 pcf	78.6 pcf
Bending Strength,	ASTM C1185	n/a	2,050 lb-in/ft
Modulus of Elasticity	ASTM C1185	n/a	1,035,000 psi
Weight, ¾-inch-thick,	ASTM D1037	N/A	5.3 lb/ft ²
pH Value	ASTM D1293	N/A	10.5
Linear Variation with Change in Moisture 25% to 90% Relative Humidity	ASTM C1185	< 0.10%	0.06%
Thickness Swell	ASTM D1037	< 3.0%	0.04%
Freeze/Thaw Resistance	ASTM C1185	Minimum 75% retention of dry flexural strength testing per ASTM C1185	100% retention
Mold Resistance	ASTM D3273	10	10
	ASTM G21	≤ 1	≤ 1
Water Absorption ³	ASTM C1185	< 15.0%	9%
Noncombustibility	ASTM E136	Must Pass	Passed
Surface Burning Characteristics	ASTM E84	0 Flame Spread Index / 5 Smoke Developed Index	0 Flame Spread Index / 0 Smoke Developed Index
Long Term Durability	ASTM C1185	Min. 75% retention of dry flexural strength testing per ASTM C1185	100% retention
Water Durability	ASTM C1185	Min. 70% retention of dry flexural strength testing per ASTM C1185	100% retention
Water Vapor Transmission (Method B)	ASTM E96	N/A ⁴	Permeance 1.4 Perms
Termite Resistance	AWPA Standard E1-17	N/A ⁴	Termite resistant to subterranean termites, including Formosan termites

For SI: 1 inch= 25.4 mm, 1 lb= 4.45 N, 1 pcf= 16.02 kg/m³, 1 lb/ft²= 4.88 kg/m², 1 perm= 57.2 ng/Pa*s*m².

¹Fastener lateral resistance measured with applicable fasteners in [Table 4A](#) and [4B](#)

²Density measured at equilibrium conditioning per Section 5.2.3.1-Tested 28 days after manufacturing

³Absorption measured from equilibrium conditioning followed by immersion in water for 48 hours

⁴N/A-not applicable.

**TABLE 3A—NOMINAL AND ALLOWABLE UNIFORM GRAVITY LOADS³
FOR USG STRUCTO-CRETE BRAND STRUCTURAL PANELS USED AS FLOOR SHEATHING OR USG STRUCTO-CRETE[®] BRAND STRUCTURAL ROOF DECK PANELS USED AS FLOOR OR ROOF SHEATHING
WITH SUPPORT FRAMING SPACED UP TO 24 INCHES ON CENTER**

Support Framing Spaced at 24 inches on center	Number of Span(s) Over Support Framing ^{1,2}		
	1-Span	2-Spans	3 or more Spans
Nominal Uniform Load, PSF	676	429	451
Allowable Uniform Load, PSF	225	143	150
Displacement Limit, inches	Allowable Load, PSF		
L/180	225	143	150
L/240	225	143	150
L/360	204	143	150
L/480	153	143	150
L/600	123	143	150
L/720	102	143	136
Support Framing Spaced at 19.2 inches on center	Number of Span(s) Over Support Framing ^{1,2}		
	1-Span	2-Spans	3 or more Spans
Nominal Uniform Load, PSF	1020	656	698
Allowable Uniform Load, PSF	340	219	233
Displacement Limit, inches	Allowable Load, PSF		
L/180	340	219	233
L/240	340	219	233
L/360	340	219	233
L/480	274	219	233
L/600	219	219	233
L/720	183	219	233
Support Framing Spaced at 16 inches on center	Number of Span(s) Over Support Framing ^{1,2}		
	1-Span	2-Spans	3 or more Spans
Nominal Uniform Load, PSF	1400	928	998
Allowable Uniform Load, PSF	467	309	333
Displacement Limit, inches	Allowable Load, PSF		
L/180	467	309	333
L/240	467	309	333
L/360	467	309	333
L/480	441	309	333
L/600	353	309	333
L/720	294	309	333
Support Framing Spaced at 12 inches on center	Number of Span(s) Over Support Framing ^{1,2}		
	1-Span	2-Spans	3 or more Spans
Nominal Uniform Load, PSF	2304	1606	1758
Allowable Uniform Load, PSF	768	535	586
Displacement Limit, inches	Allowable Load, PSF		
L/180	768	535	586
L/240	768	535	586
L/360	768	535	586
L/480	768	535	586
L/600	744	535	586
L/720	620	535	586

For SI: 1 inch = 25.4 mm, 1 psf = 47.88 Pa.

¹These loads represent the load-carrying capacity of the panels spanning between the framing members. The support span conditions of the structural panels must be determined by a registered design professional. This table does not consider the influence of joist deflection.

²Values based on panel flexural strength and stiffness properties. The tabulated values for Allowable Strength Design (ASD) are on the nominal values divided by a safety factor, Ω, of 3.0. For Load and Resistance Factor Design (LRFD), the nominal tabulated values must be multiplied by a resistance factor, φ, of 0.50. The design load at deflection limit apply to both ASD and LRFD. The L in deflection limit is the support framing spacing in inches.

³Maximum fastener spacing for gravity loads is 12-in. o.c.

**TABLE 3B—NOMINAL UNIFORM GRAVITY LOADS² AND UPLIFT LOADS FOR
USG STRUCTO-CRETE[®] BRAND STRUCTURAL ROOF DECK PANELS USED AS ROOF SHEATHING³**

Support Framing Spacing, inches	Nominal Uniform Gravity Load, PSF	Nominal Uniform Uplift Load, PSF ¹			
		Fastener Spacing at Panel Edges / In the Field, inches			
		8/12	8/8	6/6	4/4
12	See Table 2A	570	855	1,140	1,710
16	See Table 2A	428	641	855	1,171
19.2	See Table 2A	356	534	713	875
24	See Table 2A	285	428	475	475

TABLE 3B—NOMINAL UNIFORM GRAVITY LOADS² AND UPLIFT LOADS FOR USG STRUCTO-CRETE[®] BRAND STRUCTURAL ROOF DECK PANELS USED AS ROOF SHEATHING³ (Continued)

Support Framing Spacing, inches	Nominal Uniform Gravity Load, PSF		Nominal Uniform Uplift Load, PSF ¹			
			Fastener Spacing at Panel Edges / In the Field, inches			
			8/12	8/8	6/6	4/4
32	Nominal Uniform Load, PSF	255	214	255	255	255
	L/240 Deflection, PSF	145				
	L/360 Deflection, PSF	105				
48	Nominal Uniform Load, PSF	231	143	180	180	180
	L/240 Deflection, PSF	56				
	L/360 Deflection, PSF	40				

For SI: 1 inch = 25.4 mm, 1 psf = 47.88 Pa.

¹Values based on panel flexural properties, fastener pull-through and fastener pull-out from the supporting steel complying with Section 3.2 of this report and having a minimum thickness of 54 mils. For Allowable Strength Design (ASD), the nominal values must be divided by a safety factor, Ω , of 3.0. For Load and Resistance Factor Design (LRFD), the nominal tabulated values must be multiplied by a resistance factor, ϕ , of 0.50. The design load at deflection limit apply to both ASD and LRFD.

²Maximum faster spacing for gravity loads is 12-in. o.c.

³Table 3B applies to the USG Structo-Crete Brand Structural Roof Deck Panels.

TABLE 4A—ACCEPTABLE DIAPHRAGM FASTENERS FOR USED IN FLOOR AND ROOF APPLICATIONS¹

Minimum Framing	Minimum Edge Distance, inch	Manufacturer	Part No.	Type ³
16 ga. [0.0538-inch (1.37 mm)] cold formed steel complying with Section 3.2.1	1/2	Grabber Construction Products	CGH8158LG	No. 8 x 1 5/8-inch winged self-drilling screw, ESR-4223
		Grabber Construction Products	CGHM8200LG	No. 8 x 2-inch self-drilling screw
		Simpson Strong-Tie Company, Inc.	CBSDQ158S	No. 8 x 1 5/8-inch winged self-drilling screw, ESR-4208
18 ga. [0.0403-inch (1.02 mm)] cold formed steel complying with Section 3.2.1	1	Grabber Construction Products	CGH8158LG	No. 8 x 1 5/8-inch winged self-drilling screw, ESR-4223
1/8-inch-thick hot rolled steel, min. yield strength 50 ksi	1	Aerosmith	5324HPG	0.145-inch-diameter x 1 1/4-inch power actuated fastener
		Hilti	X-U 32	0.157-inch-diameter x 1 1/4-inch power actuated fastener, ESR-2269
		Grabber Construction Products	CC12250LRG	No. 12 x 2 1/2-inch winged self-drilling screw, ESR-4223
		Dewalt	50458-PWR	0.157-inch-diameter x 1 1/4-inch power actuated fastener, ESR-2024
1/4-inch-thick hot rolled steel, min. yield strength 36 ksi	3/4	Grabber Construction Products	CC12250LRG	No. 12 x 2 1/2-inch winged self-drilling screw, ESR-4223
		Muro North America	RSM645	M6 x 45 mm winged self-drilling screw
		Simpson Strong-Tie Company, Inc.	TBG1260S	No. 12 x 2 3/8-inch, flat head Strong-Drive TB Wood to Steel screw

TABLE 4A—ACCEPTABLE DIAPHRAGM FASTENERS FOR USED IN FLOOR AND ROOF APPLICATIONS¹ (Continued)

Minimum Framing	Minimum Edge Distance, inch	Manufacturer	Part No.	Type ³
¼-inch-thick steel tubing, min. yield strength 50 ksi	¾	Hilti	X-U 27 Pin	0.157-inch-diameter 1¼-inch power actuated fastener, ESR-2269
3/8-inch-thick steel tubing, min. yield strength 50 ksi				
½-inch-thick steel tubing, min. yield strength 50 ksi				
SPF Lumber (Min. SG- 0.42)	5/8	Grabber Construction Products	C8200L2M	No. 8 x 2-inch, flat head, Type 17, nibs, GrabberGard
		Simpson Strong-Tie Company, Inc.	WSNTLG2S	No. 8 x 2-inch, flat head, twin threads, Nibs, ESR-1472
	½	Senco ²	GL24AABF	8d Ring Shank Nails

For SI: 1 inch= 25.4 mm, 1 ksi= 6.89 MPa.

¹Fastener pull-through capacity of 581 lbs (2584 N) may be applied to all listed fasteners. Capacity is based on ultimate tested value for all tabulated fasteners. The registered design professional shall apply the appropriate safety factor (ASD) or resistance factor (LRFD).

²Senco 8d ring shank nails are manufactured with a length of 2⅜-inch (60 mm), a head diameter of 0.266-inch and a shank diameter of 0.113-inch.

³Screw lengths shown are minimums.

TABLE 4B—ACCEPTABLE FASTENERS FOR FOUNDATION WALL APPLICATIONS^{1,4}

Minimum Framing	Minimum Edge Distance, inch	Manufacturer	Part No.	Type ³
16 ga. [0.0538-inch (1.37 mm)] cold formed steel	½	Grabber Construction Products	CGH8158LG	No. 8 x 1⅝-inch winged self-drilling screw, ESR-4223
		Simpson Strong-Tie Company, Inc.	CBSDQ158S	No. 8 x 1-5/8-inch winged self-drilling screw, ESR-4208
1/8-inch-thick hot rolled steel, min. yield strength 50 ksi	1	Aerosmith	5724HPG	0.145-inch-diameter x 1 ¼-inch power actuated fastener
		Hilti	X-U 32MX	0.157-inch-diameter x 1 1/4-inch power actuated fastener, ESR-2269
		Dewalt	50458-PWR	0.157-inch-diameter x 1 ¼-inch power actuated fastener, ESR-2024
¼-inch-thick hot rolled steel, min. yield strength 36 ksi	¾	Grabber Construction Products	CC12250LRG	No. 12 x 21/2-inch winged self-drilling screw, ESR-4223
		Muro North America	RSM645	M6 x 45 mm winged self-drilling screw
		Simpson Strong-Tie Company, Inc.	TBG1260S	No. 12 x 2 3/8-inch, flat head Strong-Drive® TB Wood to Steel screw
SPF Lumber (Min. SG- 0.42)	5/8	Grabber Construction Products	C8200L2M	No. 8 x 2-inch, flat head, Type 17, nibs, GrabberGard
		Simpson Strong-Tie Company, Inc.	WSNTLG2S	No. 8 x 2-inch, flat head, twin threads, Nibs, ESR-1472
	½	Senco ²	GL24AABF	8d Ring Shank Nails

¹Fastener pull-through capacity of 581 lbs (2584 N) may be applied to all listed fasteners. Capacity is based on ultimate tested value for all tabulated fasteners. The registered design professional shall apply the appropriate safety factor (ASD) or resistance factor (LRFD).

²Senco 8d ring shank nails are manufactured with a length of 2⅜-inch (60 mm), a head diameter of 0.266-inch and a shank diameter of 0.113-inch.

³Screw lengths shown are minimums.

⁴Fasteners shall be flush or slightly below the surface and care must be taken to not strip out the steel framing. No fasteners shall be installed within 2-inches (50.8 mm) of the corner of a panel and shall not be closer than the minimum distance from panel edges indicated above.

TABLE 5A—NOMINAL SHEAR STRENGTH FOR SIMPLE BEAM DIAPHRAGMS CONSTRUCTED WITH USG STRUCTURAL PANELS USED WITH COLD-FORMED STEEL, HOT-ROLLED STEEL AND WOOD FRAMING MEMBERS SHOWN IN TABLE 4A^{1,2,3,4}

Support Framing Spacing, inches	Minimum Number of Supports per Panel	Required Blocking ⁵	Maximum Fastener Spacing, inches		Screw Pattern (See Figure 1)	Shear Strength, S _u PLF	Slip Coefficient, X
			Perimeter	Field			
<i>USG STRUCTO-CRETE[®] Brand Structural Panels</i>							
<i>USG STRUCTO-CRETE[®] Brand Structural Roof Deck Panels</i>							
24	3	Strap	6	12	C	1,526	0.346
24	3	Strap	6	12	C	1,468	0.180
24	3	Strap	6 panel 2 diaphragm	12	C	1,999	0.218
24	3	Strap	4 panel 2 diaphragm	12		2,541	0.313
24	3	None	4	12	A or B	1,341	0.476
24	3	None	6	12	A or B	1,053	0.397
16	3	None	4	12	B	1,462	0.443
16	3	None	6	12	B	1395	0.421
<i>USG STRUCTO-CRETE[®] Brand Structural Roof Deck Panels</i>							
32	2	Strap	8	12	C	1,317	0.193
48	2 ⁽⁶⁾	Track	8	12	C	1,488	0.301
32	2	Strap	4	12	C	2,035	0.216
48	2 ⁽⁶⁾	Track	4	12	C	2,812	0.415

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

¹See Section 3.2 for framing requirements. See Table 4A.

²See Section 3.2.3 for fastener requirements. See Table 4A.

³See Section 4.2.3.3 for a description of the screw patterns.

⁴For Allowable Strength Design (ASD) the nominal load values must be divided by safety factor of 2.8 for diaphragms with cold-formed steel and hot-rolled steel framing members subjected to wind and seismic forces; a safety factor of 3.30 for diaphragms with wood framing members subject to seismic forces; and safety factor of 2.35 for diaphragms with wood framing members subject to wind forces. For Load and Resistance Factor Design (LRFD), the nominal values must be multiplied by resistance factor of 0.6 for diaphragms with cold-formed steel and hot-rolled steel framing members subjected to wind and seismic forces; a resistance factor of 0.5 for diaphragms with wood framing members subject to seismic forces; and resistance factor of 0.70 for diaphragms with wood framing members subject to wind forces.

⁵See Section 3.2.2 for blocking requirements.

⁶When only two supports are provided (single span) a framing member must be added at the center of the panel, running between the two supports, as illustrated in the USG installation instructions.

TABLE 5B—NOMINAL SHEAR STRENGTH FOR SIMPLE BEAM DIAPHRAGMS CONSTRUCTED WITH USG STRUCTURAL PANELS USED WITH COLD-FORMED STEEL FLOOR TRUSSES DESCRIBED IN SECTION 3.2.1^{1,2,3,4,5,6,7}

Required Blocking	Maximum Fastener Spacing ⁷ , inches		Fastening Details (Figure 2)	Panel Layout	Shear Strength, S _u PLF	Slip Coefficient, X
	Perimeter	Field				
None	4	12	B,C	Staggered	1,774	0.272
None	6	12	A,B	Staggered	1,351	0.241
None	4	12	C,E	Stacked	1,601	0.280
Strap	4	12	D	Staggered	2,170	0.126

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

¹See Section 3.2.1 for truss member requirements.

²See Section 3.2.3 for fastener requirements.

³See Section 4.2.3.3 for a description of the screw patterns.

⁴For Allowable Strength Design (ASD) the nominal load values must be divided by safety factor of 2.8 for diaphragms subjected to wind and seismic forces. For Load and Resistance Factor Design (LRFD), the nominal values must be multiplied by resistance factor of 0.6 for diaphragms subjected to wind and seismic forces.

⁵See Section 3.2.2.3 for blocking requirements.

⁶Panels must be installed perpendicular to truss member span and panels must be supported by minimum of two (2) truss members. The minimum panel width, measured parallel to the truss member, shall not be less than 24 inches. The maximum truss member spacing must not exceed 24 inches.

⁷Panel fasteners must be inset 2-inch from the corners.

TABLE 6A—NOMINAL SHEAR STRENGTH FOR CANTILEVER DIAPHRAGMS CONSTRUCTED WITH USG STRUCTURAL PANELS USED WITH COLD-FORMED STEEL, HOT-ROLLED STEEL AND WOOD FRAMING MEMBERS SHOWN IN TABLE 4A^{1,2,3,4}

Support Framing Spacing, inches	Minimum Number of Supports per Panel	Required Blocking ⁵	Maximum Fastener Spacing (inches)		Screw Pattern (See Figure 1)	Shear Strength, S _u PLF	Slip Coefficient, X
			Perimeter	Field			
<i>USG STRUCTO-CRETE® Brand Structural Panels</i>							
<i>USG STRUCTO-CRETE® Brand Structural Roof Deck Panels</i>							
24	3	Strap	6	12	C	1,148	0.354
24	3	None	4	12	A	713	0.732
24	3	None	6	12	A	487	0.518
24	3	None	8	12	A	475	0.511
24	3	None	6	12	B	525	0.625
24	3	None	8	12	B	465	0.754
16	3	None	4	12	A	975	0.833
16	3	None	6	12	A	915	0.765
16	3	None	8	12	A	860	0.702
12	3	None	4	12	A	1,121	0.759
12	3	None	6	12	A	940	0.541
12	3	None	8	12	A	772	0.484
<i>USG STRUCTO-CRETE® Brand Structural Roof Deck Panels</i>							
32	2	Strap	8	12	C	1,006	0.481
48	2 ⁽⁶⁾	Track	8	12	C	1,098	0.391
32	2	Strap	4	12	C	1,516	0.570
48	2 ⁽⁶⁾	Track	4	12	C	1,641	0.426

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

¹See Section 3.2 for framing requirements. See Table 4A.

²See Section 3.2.3 for fastener requirements. See Table 4A.

³See Section 4.2.3.3 for a description of the screw patterns.

⁴For Allowable Strength Design (ASD) the nominal load values must be divided by safety factor of 2.8 for diaphragms with cold-formed steel and hot-rolled steel framing members subjected to wind and seismic forces; a safety factor of 3.30 for diaphragms with wood framing members subject to seismic forces; and a safety factor of 2.35 for diaphragms with wood framing members subject to wind forces. For Load and Resistance Factor Design (LRFD), the nominal values must be multiplied by resistance factor of 0.6 for diaphragms with cold-formed steel and hot-rolled steel framing members subjected to wind and seismic forces; a resistance factor of 0.5 for diaphragms with wood framing members subject to seismic forces; and resistance factor of 0.70 for diaphragms with wood framing members subject to wind forces.

⁵See Section 3.2.2 for blocking requirements.

⁶When only two supports are provided (single span) a framing member must be added at the center of the panel, running between the two supports, as illustrated in the USG installation instructions.

TABLE 6B—NOMINAL SHEAR STRENGTH FOR CANTILEVER DIAPHRAGMS CONSTRUCTED WITH USG STRUCTURAL PANELS USED WITH COLD-FORMED STEEL FLOOR TRUSSES DESCRIBED IN SECTION 3.2.1^{1,2,3,4,5,6,7}

Required Blocking ⁵	Maximum Fastener Spacing, inches		Fastening Details (Figure 2)	Panel Joint Layout	Shear Strength, S _u PLF	Slip Coefficient, X
	Perimeter	Field				
None	4	12	B,C	Staggered	996	0.346
None	6	12	A,B	Staggered	891	0.407
None	4	12	C,E	Stacked	1,002	0.356
Strap	4	12	D	Staggered	1,893	0.384

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m.

¹See Section 3.2.1 for truss member requirements.

²See Section 3.2.3 for fastener requirements.

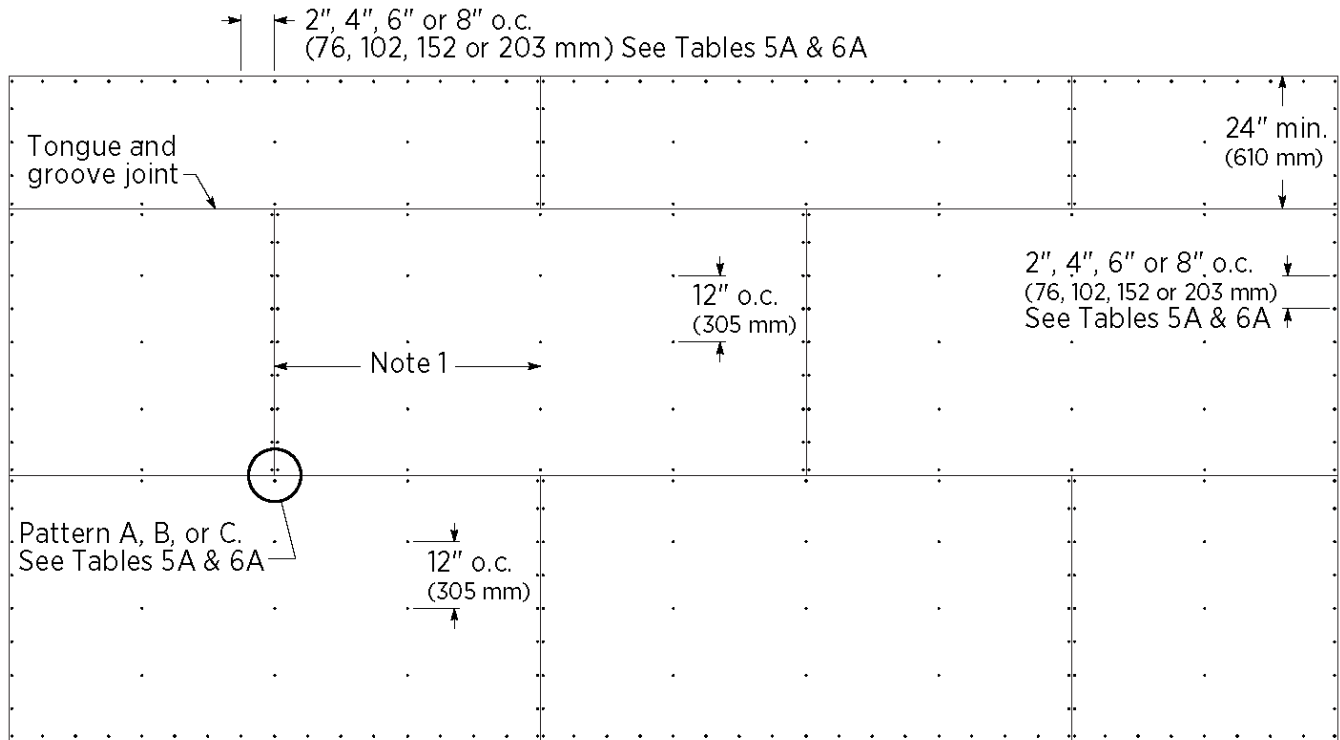
³See Section 4.2.3.3 for a description of the screw patterns.

⁴For Allowable Strength Design (ASD) the nominal load values must be divided by safety factor of 2.8 for diaphragms subjected to wind and seismic forces. For Load and Resistance Factor Design (LRFD), the nominal values must be multiplied by resistance factor of 0.6 for diaphragms subjected to wind and seismic forces.

⁵See Section 3.2.2.3 for blocking requirements.

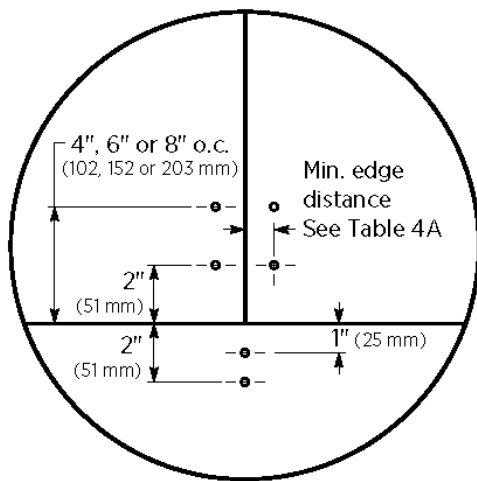
⁶Panels must be installed perpendicular to truss member span and panels must be supported by minimum of two (2) truss members. The minimum panel width, measured parallel to the truss member, shall not be less than 24 inches. The maximum truss member spacing must not exceed 24 inches.

⁷Panel fasteners must be inset 1¼-inch from the corners. Fastener edge distance at all panel edges must comply with spacing in Table 5B, as well as exception to the tongue and groove joints where the truss members are perpendicular to the joint. The fasteners must be kept flush or slightly below the surface of the panel.

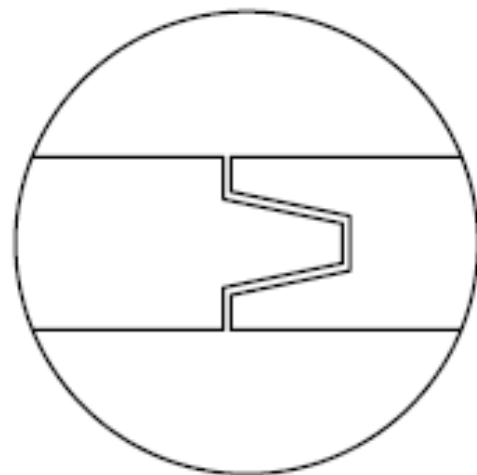


1. Two Span offset of Seams w/o Blocking. One Span w/ Blocking.

Panels Layout



PATTERN A



Tongue & Groove Joint

FIGURE 1- SCREW PATTERNS A, B AND C (TABLE 5A AND 5B)

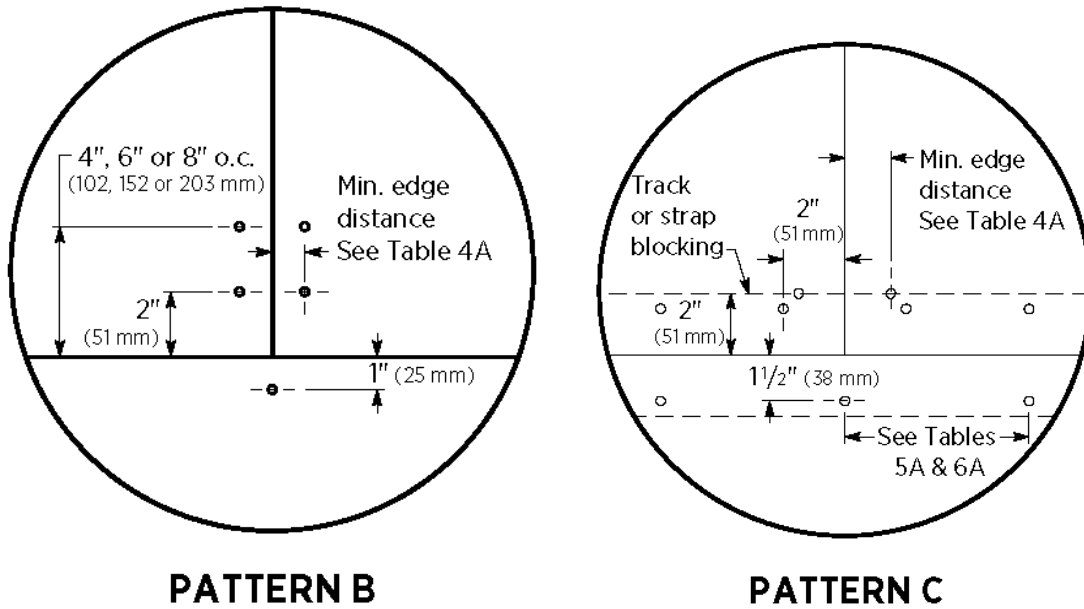
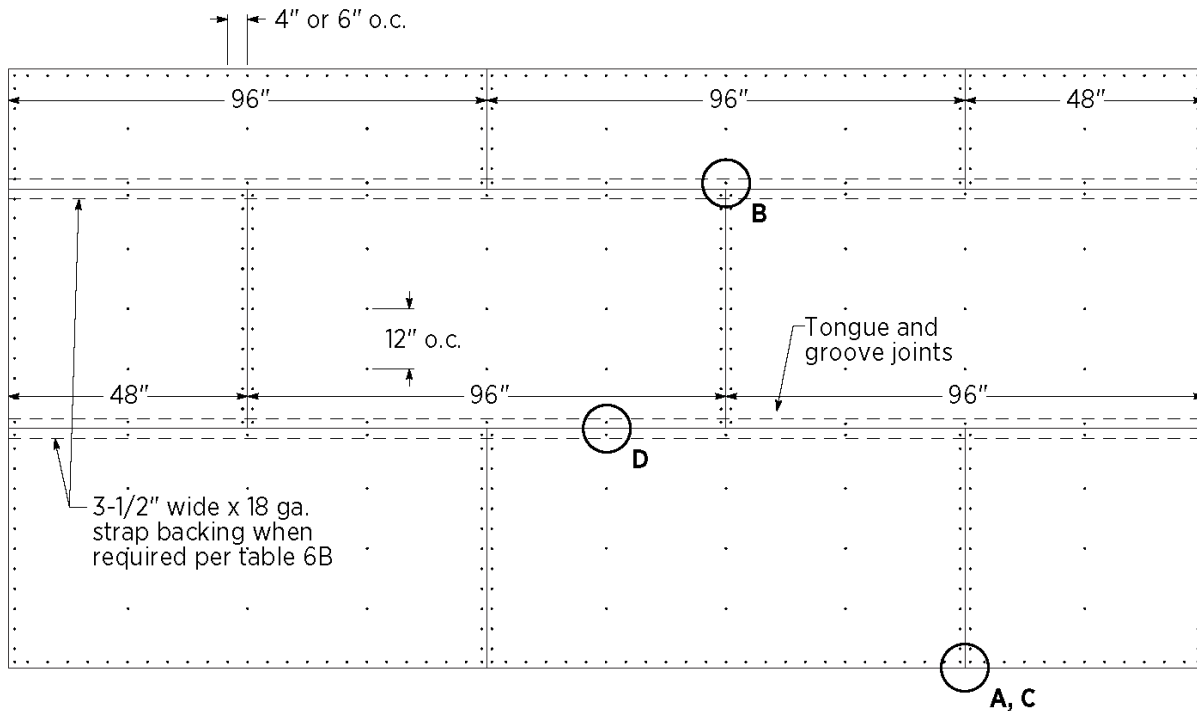


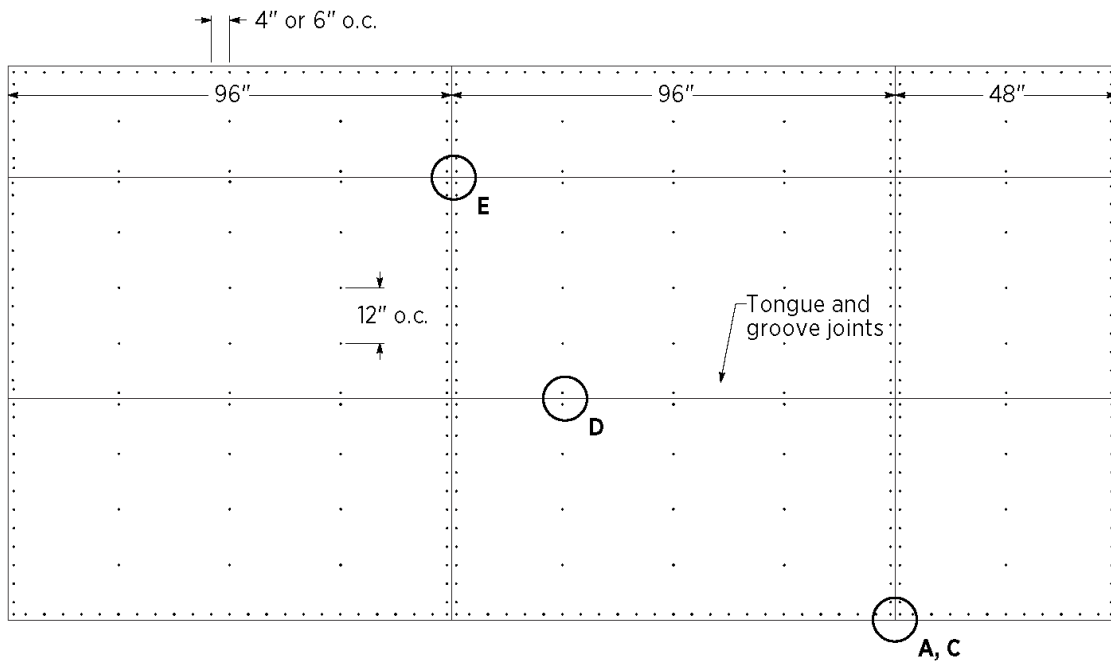
FIGURE 1- SCREW PATTERNS A, B AND C (TABLE 5A AND 5B) (CONTINUED)



Staggered Panel Layout

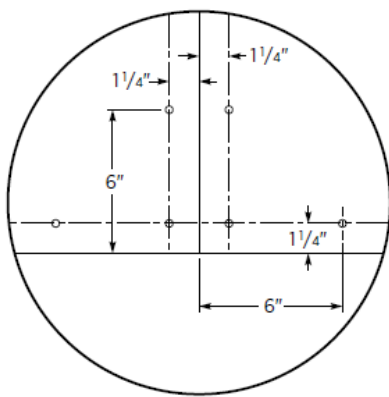
STAGGERED PANEL LAYOUT

FIGURE 2- SCREW PATTERN FOR COLD-FORMED STEEL FLOOR TRUSSES (TABLE 5B AND 6B)

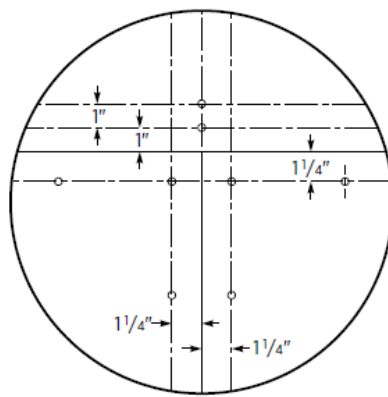


Stacked Panel Layout

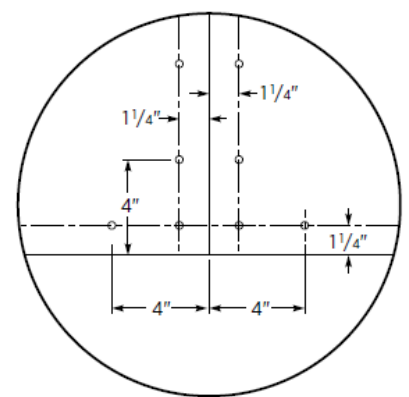
STACKED PANEL LAYOUT



DETAIL A

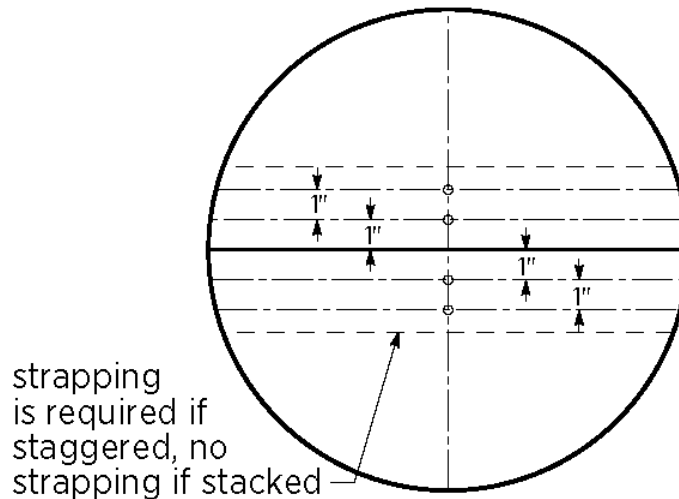


DETAIL B

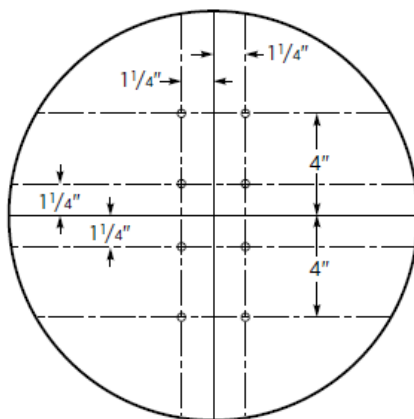


DETAIL C

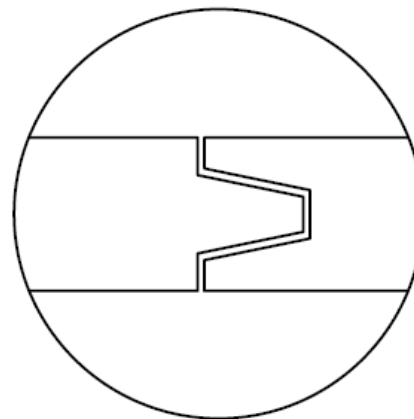
FIGURE 2- SCREW PATTERN FOR COLD-FORMED STEEL FLOOR TRUSSES (TABLE 5B AND 6B) (CONTINUED)



DETAIL D



**DETAIL E
Stacked Pattern**



Tongue & Groove

FIGURE 2- SCREW PATTERN FOR COLD-FORMED STEEL FLOOR TRUSSES (TABLE 5B AND 6B) (CONTINUED)

TABLE 7—ANCHORAGE OF STEEL STANDOFF BASE TO USG STRUCTURAL PANEL

Anchor Type	Distance Between Anchors, d (inches)	Number of USG Structural Panel Layers	Nominal Tension (T) Capacity of Two Anchor Connection ^{1,2} , (lbs)	Nominal Shear (V) Capacity of Two Anchor Connection ^{1,2} , (lbs)
3/8-inch-diameter Captive anchor toggle bolt (by others) ³	2	1	1,856	232
		2	(2,200)	430
	4	1	2,016	252
		2	(2,200)	430
	6	1	2,168	271
		2	(2,200)	430
	8	1	(2,200)	291
		2	(2,200)	430

TABLE 7—ANCHORAGE OF STEEL STANDOFF BASE TO USG STRUCTURAL PANEL (Continued)

Anchor Type	Distance Between Anchors, d (inches)	Number of USG Structural Panel Layers	Nominal Tension (T) Capacity of Two Anchor Connection ^{1,2} , (lbs)	Nominal Shear (V) Capacity of Two Anchor Connection ^{1,2} , (lbs)
½-inch-diameter captive anchor toggle bolt (by others) ⁴	2	1	1,896	237
		2	(3,000)	461
	4	1	2,048	256
		2	(3,000)	501
	6	1	2,200	275
		2	(3,000)	540
	8	1	2,352	294
		2	(3,000)	580
¼-inch x 3-inch steel blind rivet (by others) ⁵	2	1	1,272	159
	4	1	1,344	168
	6	1	1,312	164
	8	1	1,336	167

For SI: 1 inch=25.4 mm, 1 lbf= 4.45 N.

¹The tabulated nominal tension and shear values are determined through testing by applying a lateral load to the top of a steel standoff base fastened to one or two layers of USG Structural Panel as shown in [Figure 3](#). The panel is installed on support framing at maximum spacing of 24 inches. The design of the steel standoff base is outside the scope of this report and must be determined by registered design professional. Values in parentheses () are governed by the nominal tensile anchor capacity published in specification.

²For Allowable Strength Design (ASD), the tabulated values must be divided by a safety factor, Ω, of 4.0. For Load and Resistance Factor Design (LRFD), the tabulated values must be multiplied by a resistance factor, φ, of 0.40.

³Captive anchor toggle bolt must comply with Federal Specification FF-588D, Type V and must be composed of a Grade 5 SAE J429

³/₈-inch-diameter hex head bolt threaded to a steel U-shaped wing with the following minimum dimensions; 2.62-inch-long by 0.047-inch-thick.

⁴Captive anchor toggle bolt must comply with Federal Specification FF-588D, Type V and must be composed of a Grade 5 SAE J429 ½-inch-diameter hex head bolt threaded to a steel U-shaped wing with the following minimum dimensions: 3.25-inch-long by 0.062-inch-thick.

⁵Steel blind rivets must comply with IFI-114 Grades 16 or 19.

⁶ $P = V$ and $T = \frac{24P}{3}$, see [Figure 3](#).

⁷Withdrawal capacity tests in accordance with [Figure 3](#) were conducted. A registered design professional must evaluate and design the attachment of panel(s) to support and/or blocking when anchors are installed close to the panel(s) edge. The attachment capacity must exceed the tabulated capacities reported in [Table 7](#). Installation of standoff base at panel edges/corners must be determined by registered design professional.

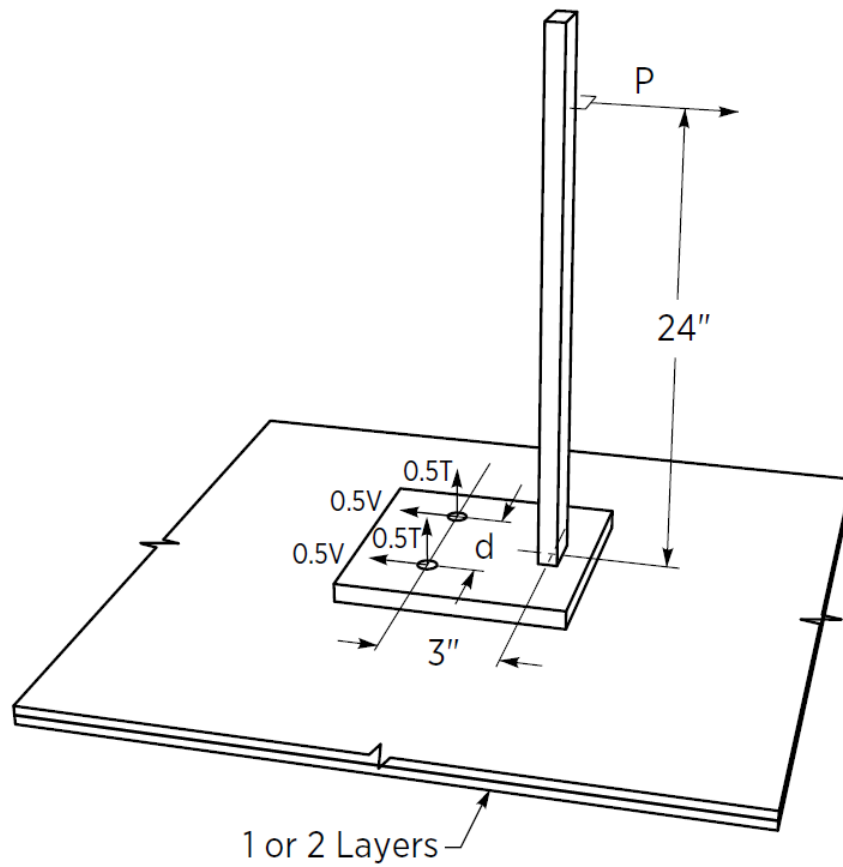


Figure 3—Steel Standoff Base Attachment to USG Structural Panel

TABLE 8—NOMINAL RACKING SHEAR WALL CAPACITY OF USG STRUCTURAL PANELS FASTENED TO COLD FORMED STEEL FRAMING AT 16 INCHES ON CENTER^{1,2,7}

Sides Sheathed	Strap at Seam ³	Sheathing Orientation ^{4,5}	Fastener Spacing to Framing and Strap ⁶ , inches		Nominal Load, PLF	Stiffness, LBS/IN
			Perimeter	Field		
Single	No	Vertical	8	12	914	6185
Single	No	Vertical	6	12	1320	7416
Single	No	Vertical	4	12	1726	8647
Single	Yes	Horizontal	8	12	984	5535
Single	Yes	Horizontal	6	12	1402	7268
Single	Yes	Horizontal	4	12	1821	9003
Double	Yes	Horizontal	8	12	1901	13287
Double	Yes	Horizontal	6	12	2625	22677
Double	Yes	Horizontal	4	12	3349	32067

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 lbs/in=175 N/m.

¹Framing must be 16 ga. (54 mils) thick by 3.625-inch-deep cold-formed steel C stud spaced 16 inches on center.

²For Allowable Strength Design (ASD), the tabulated values must be divided by a safety factor as determined by registered design professional. For Load and Resistance Factor Design (LRFD), the tabulated load values must be multiplied by a resistance factor as determined by registered design professional. Shear wall assemblies described in Table 8 are limited to Seismic Design Categories A and B.

³Cold-formed steel straps located behind sheathing seam must be 16 ga. (54 mils) thick by 2 inches wide by 48 inches long made from steel having minimum yield strength of 50 ksi.

⁴Vertical orientation denotes that the length of the panel is parallel to the stud framing. The shear wall assembly did not include vertical or horizontal sheathing joints.

⁵Horizontal Orientation denotes that the length of the panels is perpendicular to the stud framing. The shear wall assembly includes a horizontal sheathing joint and no vertical joints.

⁶Fasteners must be Grabber Construction Products No. 8 by 1⁵/₈-inch Grabber SuperDrive Lox Drive self-drilling screws (item no. CHS8158JBWG2). Fasteners must be 3¹/₈ inches from panel edges. At panel corners, fasteners must be installed 2 inches from the edges.

⁷Tabulated values are based on racking shear tests conducted in accordance with ASTM E564 of a 96-inch-high by 48-inch-wide wall assembly installed with a tie-down device. The tie-down device must be designed by registered design professional.

TABLE 9—NOMINAL RACKING SHEAR WALL CAPACITY OF USG STRUCTURAL PANELS FASTENED TO COLD FORMED STEEL FRAMING AT 24 INCHES ON CENTER^{1,2,7}

Sides Sheathed	Strap at Seam ³	Sheathing Orientation ^{4,5}	Fastener Spacing to Framing and Strap ⁶ , inches		Nominal Load, PLF	Stiffness, LBS/IN
			Perimeter	Field		
Single	No	Vertical	8	12	819	5882
Single	No	Vertical	6	12	1201	7736
Single	No	Vertical	4	12	1584	9590
Single	Yes	Horizontal	8	12	906	5117
Single	Yes	Horizontal	6	12	1292	7384
Single	Yes	Horizontal	4	12	1679	9590
Double	Yes	Horizontal	8	12	1730	11684
Double	Yes	Horizontal	6	12	2432	19945
Double	Yes	Horizontal	4	12	3135	28207

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 lbs/in=175 N/m.

¹Framing must be 16 ga. (54 mils) thick by 3.625-inch-deep cold-formed steel C stud spaced 24 inches on center.

²For Allowable Strength Design (ASD), the tabulated nominal values must be divided by a safety factor as determined by registered design professional. For Load and Resistance Factor Design (LRFD), the tabulated load values must be multiplied by a resistance factor as determined by registered design professional. Shear wall assemblies described in Table 9 are limited to Seismic Design Categories A and B.

³Cold-formed steel straps located behind sheathing seam must be 16 ga. (54 mils) thick by 2 inches wide by 48 inches long made from steel having minimum yield strength of 50 ksi.

⁴Vertical orientation denotes that the length of the panel is parallel to the stud framing. The shear wall assembly did not include any vertical or horizontal sheathing joints.

⁵Horizontal Orientation denotes that the length of the panels is perpendicular to the stud framing. The shear wall assembly includes a horizontal sheathing joint and no vertical joints.

⁶Fasteners must be Grabber Construction Products No. 8 by 1⁵/₈-inch Grabber SuperDrive Lox Drive self-drilling screws (item no. CHS8158JBWG2). Fasteners must be 3¹/₈ inches from panel edges. At panel corners, fasteners must be installed 2 inches from the edges.

⁷Tabulated values are based on racking shear tests conducted in accordance with ASTM E564 of a 96-inch-high by 48-inch-wide wall assembly installed with a tie-down device. The tie down device must be designed by registered design professional.

**TABLE 10—NOMINAL UNIFORM LOADS FOR
USG STRUCTO-CRETE® BRAND STRUCTURAL XTRA STRENGTH PANELS** ^{1,2,3,4}

Support Framing Spacing, inches	Nominal Uniform Load, PSF
12	2083
16	1172

For SI: 1 inch = 25.4 mm, 1 psf = 47.88 Pa.

¹ Values based on panel flexural strength and stiffness properties. The tabulated values for Allowable Strength Design (ASD) must be determined by dividing the nominal values by a safety factor, Ω, of 3.0. For Load and Resistance Factor Design (LRFD), the nominal tabulated values must be multiplied by a resistance factor, φ, of 0.50. The design load at deflection limit apply to both ASD and LRFD.

² Minimum of three framing spans per panel.

³ Framing members supporting panels must be designed to resist applicable forces. Framing members and corresponding fasteners listed in [Table 4B](#) may be used.

⁴ [Table 10](#) applies to USG Structo-Crete® Brand Structural Xtra Strength Panels (aka USG Structural Panel Concrete Foundation Wall XD).

**TABLE 11—NOMINAL RACKING SHEAR WALL CAPACITY OF USG STRUCTO-CRETE® BRAND STRUCTURAL XTRA STRENGTH
PANELS FASTENED TO COLD FORMED STEEL FRAMING AT 16 INCHES ON CENTER** ^{1,2,3,5}

Fastener Spacing to Framing and Strap ⁴ , inches		Nominal Load, PLF	Stiffness, LBS/IN
Perimeter	Field		
8	12	914	6185
6	12	1320	7416
4	12	1726	8647

For SI: 1 inch = 25.4 mm, 1 plf = 14.6 N/m, 1 lbs/in=175 N/m.

¹ Framing must be 16 ga. (54 mils) thick by 3.625-inch-deep cold-formed steel C stud spaced 16 inches on center.

² For Allowable Strength Design (ASD), the tabulated values must be divided by a safety factor as determined by registered design professional. For Load and Resistance Factor Design (LRFD), the tabulated load values must be multiplied by a resistance factor as determined by registered design professional. Shear wall assemblies described in [Table 11](#) are limited to Seismic Design Categories A and B.

³ Wall panels are only to be mounted in the vertical orientation, with square edges butting up against each other, and adjacent edges bearing a minimum on 3/4" (19 mm) on each of the studs. Install the panels such that the printed logo and code information face the framing. The shear wall assembly is based on one side-sheathed and no straps at seams are required.

Shear wall assemblies are based on one side of wall sheathed, sheathing vertical orientation and no straps at seams.

⁴ Fasteners must be as described in [Table 4B](#) for 16 gage cold-formed steel. Fasteners must be spaced from panel edges as indicated in [Table 3B](#) for 16 gage cold-formed steel framing member. At panel corners, fasteners must be installed 2 inches from the edges.

⁵ Tabulated values are based on racking shear tests conducted in accordance with ASTM E564 of a 96-inch-high by 48-inch-wide wall assembly installed with a tie-down device. The tie down device must be designed by registered design professional.

**TABLE 12—TESTED PEEL ADHESION OF VARIOUS WATERPROOFING MEMBRANES BONDED TO USG STRUCTURAL PANEL
CONCRETE FOUNDATION WALL XD**

Membrane	Coating/Adhesive ³	Average Peel Adhesion (lb/in)
Delta® Thene 40	Delta Primer	12.9 ¹
	(no primer)	7.8 ²
Blueskin® WB25	Henry Blueskin Adhesive/Primer	8.0 ¹
	-(no primer)-	3.5 ²
Grace VYCOR® Plus	Valspar Concrete Bonding Primer	6.1 ¹
	(no primer)	5.3 ²

For SI: 1 lb/in = 175.1 N/m

¹ Peel adhesion tested in accordance with ASTM D3330 Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape.

² Peel adhesive values for the various membrane products have been provided by manufacturers.

³ Coatings and adhesives are intended to enhance the adhesion of the various membrane products to the USG Structural Panel Foundation Wall substrate.

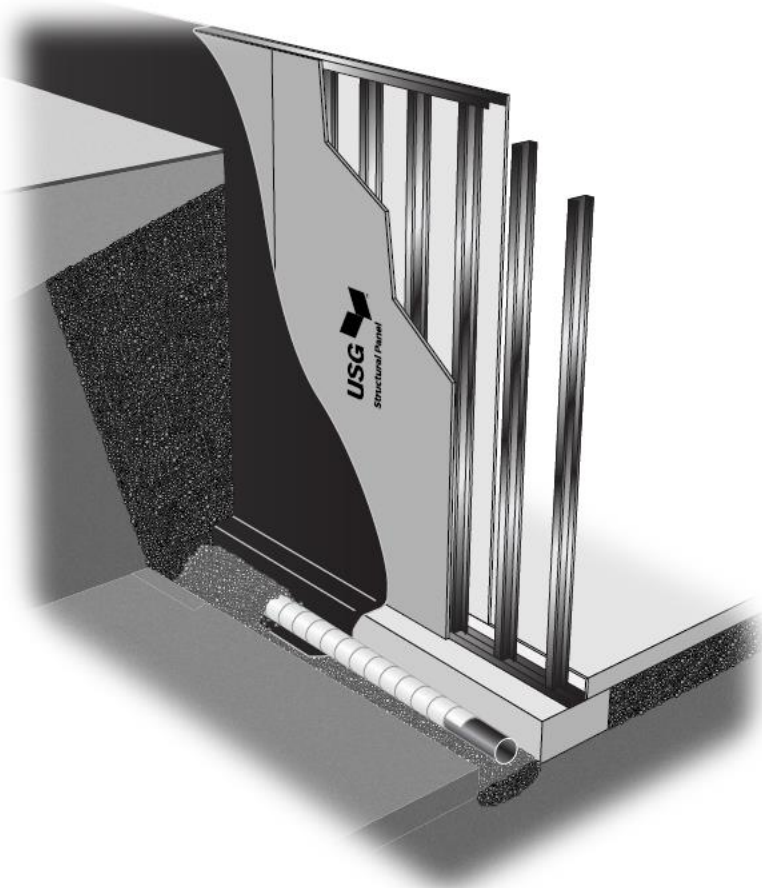


Figure 4—USG Structural Panel Concrete Foundation Wall XD Typical Installation

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 12 13—Cementitious Reinforced Panels

REPORT HOLDER:

USG CORPORATION

EVALUATION SUBJECT:**USG STRUCTURAL PANELS PRODUCT DESIGNATIONS:**

- **USG STRUCTO-CRETE® BRAND STRUCTURAL PANELS** (aka **USG STRUCTURAL PANEL CONCRETE SUBFLOOR**)
- **USG STRUCTO-CRETE® BRAND STRUCTURAL ROOF DECK PANELS** (aka **USG STRUCTURAL PANEL CONCRETE ROOF DECK**)
- **USG STRUCTO-CRETE® BRAND STRUCTURAL XTRA STRENGTH PANELS** (aka **USG STRUCTURAL PANEL CONCRETE FOUNDATION WALL XD**)

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the USG Structural Panels, described in ICC-ES evaluation report [ESR-1792](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The USG Structural Panels, described in Sections 2.0 through 7.0 of the evaluation report [ESR-1792](#), comply with the LABC and the LARC and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The USG Structural Panels described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-1792](#).
- The design, installation, conditions of use and identification of the USG Structural Panels are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-1792](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued January 2024.

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 12 13—Cementitious Reinforced Panels

REPORT HOLDER:

USG CORPORATION

EVALUATION SUBJECT:**USG STRUCTURAL PANELS PRODUCT DESIGNATIONS:**

- **USG STRUCTO-CRETE® BRAND STRUCTURAL PANELS** (aka **USG STRUCTURAL PANEL CONCRETE SUBFLOOR**)
- **USG STRUCTO-CRETE® BRAND STRUCTURAL ROOF DECK PANELS** (aka **USG STRUCTURAL PANEL CONCRETE ROOF DECK**)
- **USG STRUCTO-CRETE® BRAND STRUCTURAL XTRA STRENGTH PANELS** (aka **USG STRUCTURAL PANEL CONCRETE FOUNDATION WALL XD**)

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that the USG Structural Panels, described in ICC-ES evaluation report ESR-1792, have also been evaluated for the codes noted below.

Applicable code editions:

- 2022 *California Building Code* (CBC)

For evaluation of applicable Chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 *California Residential Code* (CRC)

2.0 CONCLUSIONS**2.1 CBC:**

The USG Structural Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1792, comply with CBC Section 104.11, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report, and the additional design and inspection requirements of the CBC Chapter 16 and Section 1705.1.1.

2.1.1 OSHPD: The USG Structural Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1792, comply with CBC amended Section 104.11, provided the design and installation are in accordance with the 2021 *International Building Code*® (IBC) provisions noted in the evaluation report, and the additional requirements in Sections 2.1.1.1 and 2.1.1.2 of this supplement:

2.1.1.1 Conditions of Use: Cold-formed steel framing must comply with the manufacturing tolerances specified in Section A5.4 of AISI S240-20, which is referenced in Section 2211.1 [OSHPD 1R, 2 & 5] or Section 2211A.1 [OSHPD 1 & 4] of the CBC, as applicable.

2.1.1.2 Special Inspection Requirements: Special inspection shall be required in accordance with Section 1705.1.1 [OSHPD 1R, 2 & 5] or Section 1705A.1.1 [OSHPD 1 & 4] of the CBC, as applicable.

2.1.2 DSA: The USG Structural Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1792, comply with CBC amended Section 104.11, provided the design and installation are in accordance with the 2021 *International Building Code*[®] (IBC) provisions noted in the evaluation report, and the additional requirements in Sections 2.1.2.1 to 2.1.2.2 of this supplement:

2.1.2.1 Conditions of Use: Cold-formed steel framing must comply with the manufacturing tolerances specified in Section A5.4 of AISI S240-20, which is referenced in Section 2211.1 [DSA SS/CC] or Section 2211A.1 [DSA-SS] of the CBC, as applicable.

2.1.2.2 Special Inspection Requirements: Special inspection shall be required in accordance with Section 1705A.1.1 [DSA-SS & SS/CC] of the CBC.

2.2 CRC:

The USG Structural Panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1792, comply with CRC Section R301.1.3, provided the design and installation are in accordance with the 2021 *International Building Code*[®] (IBC) provisions noted in the evaluation report, and the additional design and inspection requirements of the CBC Chapter 16 and Section 1705.1.1.

This supplement expires concurrently with the evaluation report, reissued January 2024.