



# USG STRUCTURAL PANEL CONCRETE SUBFLOOR

**A concrete subfloor that can be combined with other noncombustible materials to create 1-, 2- and 3-hour fire-rated floor-ceiling assemblies.**

- Strong, durable concrete panel
- Dimensionally stable; panel will not buckle or warp like wood sheathing
- Installs like wood sheathing; circular saw for cutting, screws for fastening
- Meets the criteria of active ASTM standard E136 for use in all types of noncombustible construction

## DESCRIPTION

USG Structural Panel Concrete Subfloor, also known as USG Structo-Crete® Panels, mechanically fastened to cold-formed steel joists, trusses or other framing members. A noncombustible ceiling assembly is attached to the bottom of the floor joists to complete the construction.

USG Structural Panel Concrete Subfloor can carry a total load, live and dead, of 120 psf (5.8 kPa) when support framing is spaced 24" (610 mm) o.c. Floor diaphragm design capacities up to 1,468 plf (21.4 kNm) allow this panel to be used as a shear diaphragm in the structural design of the building.

Cutting the concrete subfloor requires a standard framing, carbide-tipped saw blade and a circular saw equipped with dust collection or suppression to control airborne dust. Fastening is also conventional, using a screw gun and self-drilling, corrosion resistant, fasteners. Refer to [USG Structural Recommended Fasteners \(SCP95\)](#) for details. Because these panels are so durable, they may be installed in most weather conditions, including mild precipitation (rain or snow), and temperatures from 0°F to 125°F (-18°C to 52°C).

## LIMITATIONS

- USG Structural Panel Concrete Subfloor is not intended for use on balconies, roofs, or other exterior applications. Only to be used in protected interior locations.
- USG Structural Panel Concrete Subfloors should not be left in service without an appropriate floor covering such as ceramic tile, vinyl, wood, carpet or other approved materials.
- Adhesive application of floor covering directly to the panel is not recommended as future removal may damage the USG Structural Panel subfloor.
- Use of an underlayment is recommended under all flooring coverings except carpet and pad.
- Do not gap USG Structural Panels.
- Panel layout should be designed to minimize cutting and ensure that all square cut ends and panel openings greater than 6" in any direction are supported by appropriate framing.
- A qualified engineer should review and approve calculations, framing, and fastener spacing for all projects.

## INSTALLATION

To perform in the expected manner, USG Structural Panel Concrete Subfloor must be installed according to USG specifications, using only the listed materials and components. For a complete set of specifications, email [usgstructural@usg.com](mailto:usgstructural@usg.com).

As with all types of construction, appropriate safety procedures must be followed to protect installers from personal injuries resulting from lifting incorrectly, falling, and eye, hand and lung irritation from dust.

Care must be taken when placing pallets of USG Structural Panel Concrete Subfloor on floor framing. A pallet of USG Structural Panel Concrete Subfloor, 20 sheets, 3/4" x 4' x 8' (19 mm x 1,220 mm x 2,440 mm) weighs approximately 3,400 lb. (1,542 kg). Do not exceed floor limits when loading pallets or panels on open framing or completed floor assemblies. Store units next to structural walls where the joists meet the wall. See [USG Structural Panel Concrete Subfloor Field Installation Guideline \(SCP14\)](#) for additional information.

## FRAMING

The steel floor framing must be designed to meet the strength and deflection criteria specified in the contract documents. The attachment flange or bearing edge must be a minimum 1-5/8" (41 mm) wide, with at least 3/4" (19 mm) of the panel bearing on the supporting flange. The size of the framing flange required will vary based on the specified mil thickness/gauge and fastener selected. Metal framing must be a minimum 43 mil (18 gauge) and spaced no greater than 24" (610 mm) o.c. When significant diaphragm capacity is required, 54 mil (16 gauge) may be required. Follow the contract documents and the steel framing manufacturer's recommendations for the proper installation and bracing of the framing.

**INSTALLATION CONT.  
RECOMMENDED FASTENERS**

Refer to [USG Structural Recommended Fasteners \(SCP95\)](#) for specific fastener recommendations for the various types of framing used for installing USG Structural Panel Concrete Subfloor. The recommended fasteners meet several criteria to insure they have adequate pull-out, pull-through, and slip performance. These fasteners also meet or exceed 1000 hours corrosion resistance requirement when tested in accordance with ASTM B117. High corrosion resistance is critical because of the panel pH level. When coupled with any moisture exposure, including high humidity, this elevated pH may deteriorate a non-corrosion resistant fastener.

**General Fastener Notes:** In accordance with [PER-13067](#), the minimum screw pattern is 6 in. (153 mm) o.c. along the perimeter of the panels and 12 in. (305 mm) o.c. in the field of the panels. Do not use a larger size screw unless specified by the structural engineer.

**A qualified architect or engineer should review and approve calculations, framing and fastener spacing for all projects.**

**TRAFFIC PROTECTION**

Place sheathing materials (i.e. additional layer of USG Structural Panel or min 3/8 in [10 mm] plywood) on the floor in high traffic areas to protect newly installed concrete subfloors. See [USG Structural Panel Concrete Subfloor Field Installation Guideline \(SCP14\)](#) for additional information.

**APPLICATION**

Cut panels to size with a circular saw equipped with standard framing carbide-tipped blade and a dry dust collection device or a water-dispensing device that controls the amount of airborne dust. Wear safety glasses and a NIOSH-approved N95 dust mask when cutting this panel. Dispose of collected dust in a safe manner and in compliance with local, state and federal ordinances.

Install USG Structural Panel Concrete Subfloor with the long edges perpendicular to the framing. Apply the panel with the print markings facing up toward the installer. Fasten each panel after it has been placed following the fastening schedule listed in the contract documents. The use of adhesives in addition to screw attachment is not required. Install panels in a running bond pattern so that end joints fall over the center of the framing members and are staggered by at least two supports from where the end joints fall in the adjacent rows, except where panels less than 8 ft (2440 mm) are used, an offset of one framing member is allowed. Tongue and groove joints should be free of debris and fitted tightly without any gapping. For all panels less than 24" (610 mm) wide, all edges must be supported by blocking. Blocking must be cold-formed from steel complying with AISI-General, with a minimum 54 mils (0.0538 inch or 1.37 mm) base metal thickness (No.16 gauge) and a minimum G60 galvanized coating. The attachment flange or bearing edge must be at least 1-5/8" (41 mm) wide and at least 3/4" (19 mm) of the panel must bear on the supporting flange or edge. The size of the framing flange required will vary based on the specified mil thickness/gauge and fastener selected. See [USG Structural Panel Concrete Subfloor Field Installation Guideline \(SCP14\)](#) for additional information.

Installed panels shall not be exposed to weather for more than 90 days. Care must be taken to avoid accumulation of snow and/or ice on installed panels. Brooms or leaf blowers should be used for snow removal whenever possible. Excessive shoveling or scraping may damage installed panel surface.

In the event of significant accumulations of snow and/or ice, use indirect heat from temporary space heaters to melt the affected areas. To prevent damage to USG Structural Panel Concrete Subfloor, never expose the panels to direct flame for the purpose of snow removal and/or de-icing efforts. At no time should salts, fertilizers or other chemicals be used on the panels for anti-icing and/or de-icing purposes.

**FLOOR FINISH**

Follow the contract documents and the floor finish manufacturer's recommendations for the application of finished flooring. Note that most floor finishes will require an underlayment. Before the application of floor finish materials, ensure that all panels are properly fastened, with the fastener head driven flush or slightly below the surface of the panels.

**CEILING CONSTRUCTION**

For fire- and sound-rated assemblies, the installed ceiling must comply with the UL-listed Design and USG recommendations. Follow the contract documents and the ceiling manufacturer's instructions for the ceiling installations. A USG Sheetrock® Brand Firecode® C Panels (UL Type C), USG Sheetrock® Brand EcoSmart Panels Firecode® (UL Type ULIX™) or a plaster ceiling should be applied to resilient channels that are fastened to the joists. A drywall or acoustical suspended ceiling system may also be used to enhance sound performance. For a complete list of UL designs visit [USGStructuralUL.com](#) or see the [USG Structural Fire and Acoustic Manual \(SCP100\)](#).

**PRODUCT DATA**

**Sizes and Packaging:** 3/4" x 4' x 8' (19 mm x 1,220 mm x 2,440 mm) panels. Each panel weighs approximately 170 lb. (77 kg) and is intended to be handled by two people. USG Structural Panel Concrete Subfloor are packaged in 20 piece units.

**Availability:** USG Structural Panel Concrete Subfloor is sold through any USG distributor. Email [usgstructural@usg.com](mailto:usgstructural@usg.com) for information on availability and a dealer in your area.

**Storage:** USG Structural Panel Concrete Subfloor is shipped in 20 piece units. Panels should be stored in a horizontal position and uniformly supported. Panels must be covered when stored in unprotected areas.

Excessive moisture and freezing temperatures may result in panels sticking together within the units. Therefore, care should be taken to ensure units of USG Structural Panel Concrete Subfloor are not exposed to excessive moisture, ice and snow. In the event that panels do become frozen together within a unit, the unit needs to be brought to a temperature above 32°F (0°C) to allow the ice to melt naturally. Salt, fertilizer or other de-icing agents should not be used at any time. Covering the units completely with tarps or similar coverings is an easy way to avoid panels freezing together.

**Maintenance:** USG Structural Panel Concrete Subfloor does not require any regular maintenance except to remove standing water and repair damage from abuse. Any cracked or broken panels should be replaced with sound USG Structural Panel Concrete Subfloor that are secured following the fastening schedule prescribed in the original installation documents. The replacement panels must be a minimum of 24" (610 mm) wide and must span a minimum of two supports. If not, the replacement panel must be fully blocked on all sides. See [USG Structural Panel Concrete Subfloor Field Installation Guideline \(SCP14\)](#) for additional information.

**Repairs:** Installed USG Structural Panel Concrete Subfloor with T&G damage up to 10% of the edge length may be repaired using the recommendations located in [USG Structural Panel Concrete Subfloor Repair Manual \(SCP76\)](#). Panels with more significant damage shall be replaced.

**TEST DATA**

Physical and Mechanical Properties	Test Standard (Min. Values)	Test Values Standard (Metric)
Concentrated load	ASTM E661 (550 lb., .108")	804 lb. (3.58 kN) static 0.066" (1.7 mm) max. deflection @ 200 lb. (0.89 kN)
Fastener lateral resistance <sup>A</sup>	ASTM D1761, Sec. 10.2 (dry >210 lbf, wet >160 lbf)	776 lbf (3.45 kN) dry 800 lbf (3.56 kN) wet
Density <sup>B</sup>	ASTM C1185 (75 lb./ft <sup>3</sup> )	78.6 lb./ft <sup>3</sup> (1,258 kg/m <sup>3</sup> )
Weight at 3/4" (19 mm) thickness	ASTM D1037	5.3 lb./ft <sup>2</sup> (26 kg/m <sup>2</sup> )
pH value	ASTM D1293	10.5
Linear variation with change in moisture (25% to 90% relative humidity)	ASTM C1185, Sec. 8 (<.10%)	0.06 %
Thickness swell	ASTM D1037, B (≤3.0%)	0.04 %
Freeze / thaw resistance	ASTM C1185 (75%)	100% properties retention
Mold resistance	ASTM D3273 (10) ASTM G21 (≤1)	10 0
Water absorption <sup>C</sup>	ASTM C1185, Sec. 5.2.3.1 (<15%)	9.0 %
Noncombustibility	ASTM E136 (unmodified) CAN/ULC-S114	Passed Passed
Surface-burning characteristics (flame spread/smoke developed)	ASTM E84 (0/0) CAN/ULC-S102 (0/0)	0/0 0/0
Long-term durability	ASTM C1185, Sec. 13 (75%)	100% properties retention
Water durability	ASTM C1185, Sec. 5 (70%)	83% properties retention
Termite resistance	AWPA Standard E1-13	9.8
Low VOC emissions	CDPH/EHLB/Standard Method V1.1-2010 <sup>P</sup>	Compliant

(A) Fastener lateral resistance measured with #8, 1-5/8" (41 mm) Hi-Low screw.

(B) Density measured at equilibrium conditioning per Section 5.2.3.1., 28 days after manufacturing.

(C) Absorption measured from equilibrium conditioning followed by immersion in water for 48 hours.

(D) Reference Standard: California Department of Public Health CDPH/EHLB/Standard Method Version 1.1, 2010 (Emission testing method for CA Specification 01350).

## SYSTEM PERFORMANCE

Description	Reference
Code Reports	ICC ESR-1792; <a href="#">PER-13067</a>
City Code Approvals	Los Angeles: LARR # 25682
Ultimate Uniform Load (total DL and LL)	Refer to PER-13067
Shear Diaphragm Ratings	1,468 plf (21.4 kNm) <sup>A</sup>
UL 1-, 1.5-, 2-Hour Fire Resistance Designs <sup>C</sup>	G535, G536, G556, G557, G558, G562, G588, L521, L541, L550, L569, L570, M502, M506, M515, M521, M527, H505, <b>H501™</b>
ULC 1-,1.5-, 2-Hour Fire Resistance Designs <sup>C</sup>	I526, I527, I528, I529, M520, M521
UL 2-, 3-Hour Load-Bearing Walls <sup>C</sup>	V465, V471
UL/ULC Metal and Plastic Through-Penetration Firestop Systems <sup>C</sup>	F-E-1023, F-E-1032, F-E-2045,
Acoustical Ratings	>65 IICb >56 STC b

- (A) Joists spaced 24" (610 mm) o.c. and fasteners spaced 6" (153 mm) o.c. at the perimeter and 12" (305 mm) o.c. in field, blocked. See the Progressive Engineering Inc. Product Evaluation Report [PER-13067](#).
- (B) Carpet and pad over USG Structural Panel Concrete Subfloor attached to cold-formed steel framing with a ceiling consisting of resilient channels spaced 12" (305 mm) o.c., 3-1/2" (89 mm) of fiberglass insulation in the joist cavity and a single layer of 5/8" (16 mm) USG Sheetrock® Brand Firecode® C Gypsum Panel gypsum panel.
- (C) For the most up-to-date UL/ULC Designations, visit [USGStructuralUL.com](#).

## LOAD TABLE

For the most up-to-date load tables, see the Progressive Engineering Inc. Product Evaluation Report [PER-13067](#) ([www.PER13067.com](#)), or for technical questions, email [usgstructural@usg.com](mailto:usgstructural@usg.com).

## SUBMITTAL APPROVALS

Job Name	
Contractor	Date

### PRODUCT INFORMATION

See [usg.com](#) for the most up-to-date product information.

### DANGER

Causes skin irritation. Causes serious eye damage. May cause an allergic skin reaction. May cause respiratory irritation. May cause cancer by inhalation of respirable crystalline silica. Do not handle until all safety precautions have been read and understood. Avoid breathing dust. Use only in a well-ventilated area, wear a NIOSH/MSHA-approved respirator. Wear protective gloves/protective clothing/eye protection. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses and continue rinsing. Immediately call a poison center/doctor. If on skin: Wash with plenty of water. Take off contaminated clothing and wash before reuse. Contaminated work clothing should not be allowed out of the workplace. If skin irritation or rash occurs, or otherwise exposed or concerned: Get medical attention. Store locked up. Dispose of in accordance with local, state, and federal regulations. For more information call Product Safety: 800 507-8899 or see the SDS at [usg.com](#). **KEEP OUT OF REACH OF CHILDREN.**

### TRADEMARKS

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### SAFETY FIRST!

Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read SDS and literature before specification and installation.

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SCP3-USA-ENG/rev. 1-20  
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