

USG STRUCTURAL PANEL CONCRETE SUBFLOOR



DESCRIPTION

A concrete subfloor that can be combined with other noncombustible materials to create 1- and 2-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 ASTM E136-12 for use in all types of noncombustible construction

USG Structural Panel Concrete Subfloors are mechanically fastened to cold-formed steel joists, trusses or framing members. A noncombustible ceiling assembly is attached to the bottom of the floor joists to complete the construction. This floor system is designed to carry gravity and lateral loads. Finished floor materials, such as residential carpet and pad, may be applied directly over USG Structural Panel Concrete Subfloors.

USG Structural Panel Concrete Subfloors can carry a total load, live and dead, of 330 psf (15.8 kPa) when cold-formed steel framing is spaced 24" (610mm) o.c. Shear diaphragm design ratings 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.

When applied over steel framing, covered with carpet and pad, with a double-layer drywall ceiling attached to resilient channels below the framing, a floor system using USG Structural Panel Concrete Subfloors can achieve a 56 STC and a 65 IIC sound performance rating. Additional acoustically rated systems for various floor and ceiling finishes are available.

USG Structural Panel Concrete Subfloors have a linear variation with change in moisture content of less than 0.10%. This means that the panels will not buckle or warp like wood sheathing. Do not gap USG Structural Panel Concrete Subfloors.

Cutting the concrete subfloor requires a 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 No. 8-gauge screws. 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).

LIMITATION

USG Structural Panel Concrete Subfloors should not be left in service without an appropriate finish floor covering such as ceramic tile, vinyl, wood, carpet or other approved materials. Without an underlayment, future removal of these floor coverings may damage the structural subfloor. The only floor coverings that do not require an underlayment are residential carpet and pad. Do not gap USG Structural Panel Concrete Subfloors.

INSTALLATION

To perform in the expected manner, USG Structural Panel Concrete Subfloors must be installed according to USG specifications, using only the listed materials and components. For a complete set of specifications, email 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 Subfloors on floor framing. A pallet of USG Structural Panel Concrete Subfloors, 20 sheets, 3/4" x 4' x 8' (19mm x 1220mm x 2440mm) weighs approximately 3,400 lbs. (1542kg). 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 Installation Guideline* (form SCP14) for additional information.

INSTALLATION CONT.

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" (41mm) wide with at least 3/4" (19mm) of the panel bearing on the supporting flange. Metal framing must be a minimum 16 gauge and spaced no greater than 24" (610mm) o.c. Follow the contract documents and the steel framing manufacturer's recommendations for the proper installation and bracing of the framing.

FASTENERS FOR COLD-FORMED STEEL

USG recommends either of the following Grabber screws for fastening our Structural Panel Concrete Subfloors to cold-formed steel:

Structural Concrete Panel Screw 8 x 1-5/8" (41mm) with GrabberGard—Collated

Item Numbers	CGH8158LG, CHS8158JBWG2
Size	#8 (do not use a larger size unless specifically specified by the structural engineer)
Minimum Length	1-5/8 in. (41mm)
Finish	GrabberGard (required)
Extras	Winged drill, "reamer nibs" under head (for countersink)

Note: In accordance with PER-13067, the minimum screw pattern is 6" (153mm) o.c. along the perimeter of the panels and 12" (305mm) o.c. in the field of the panels. The structural engineer should specify the recommended pattern for each application.

TRAFFIC PROTECTION

Place sheathing materials (i.e. additional layer of USG Structural Panel or plywood) on the floor in high traffic areas to protect newly installed concrete subfloors. See *USG Structural Panel Concrete Subfloor Installation Guideline* (form SCP14) for additional information.

APPLICATION

Cut panels to size with a circular saw equipped with 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 Subfloors 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. 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. **Tongue and groove joints should be free of debris and fitted tightly without any gapping.** For all panels less than 24" (610mm) 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 1.37mm) 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" (41mm) wide and at least 3/4" (19mm) of the panel must bear on the supporting flange or edge. See *USG Structural Panel Concrete Subfloor Installation Guideline* (form 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 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 Subfloors, 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 Core gypsum panel 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.

PRODUCT DATA

Sizes and Packaging: 3/4" x 4' x 8' (19mm x 1220mm x 2440mm) panels. Each panel weighs approximately 170 lbs. (77kg) and is intended to be handled by two people. USG Structural Panel Concrete Subfloors are packaged in 20 piece units.

Availability: USG Structural Panel Concrete Subfloors are sold through any USG distributor. Email usgstructural@usg.com for information on availability and a dealer in your area.

Storage: USG Structural Panel Concrete Subfloors are 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 Subfloors 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 Subfloors do 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" (610mm) 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 Installation Guideline* (form SCP14) for additional information.

TEST DATA

Physical and Mechanical Properties	Test Standard	Approximate Values Standard (Metric)
Moment capacity (3/4" (19mm) thick panel)	ASTM C1185, Sec. 5	1,585 lb-in/ft (588 N-m/m)
Bending stiffness (3/4" (19mm) thick panel)	ASTM C1185, Sec. 5	315,000 lb-in ² /ft (3kN-m ² /m)
Concentrated load	ASTM E661	550 lbs (2.45 kN) static 0.108" (2.7mm) max. deflection @ 200 lbs (0.89 kN)
Fastener lateral resistance ^a	ASTM D1761, Sec. 10.2	> 210 lbf (0.93 kN) dry > 160 lbf (0.71 kN) wet
Density ^b	ASTM C1185	75 lbs./ft ³ (1,201 kg/m ³)
Weight at 3/4" (19mm) thickness	ASTM D1037	5.3 lbs./ft ² (26 kg/m ²)
pH value	ASTM D1293	10.5
Linear variation with change in moisture (25% to 90% relative humidity)	ASTM C1185, Sec. 8	<0.10 %
Thickness swell	ASTM D1037, B	max. 3.0 %
Freeze / thaw resistance	ASTM C1185	Passed (50 cycles)
Mold resistance	ASTM D3273 ASTM G21	10 0
Water absorption ^c	ASTM C1185, Sec. 5.2.3.1	<15.0 %
Noncombustibility	ASTM E136-12 (unmodified) CAN/ULC-S114	Passed Passed
Surface-burning characteristics (flame spread/smoke developed)	ASTM E84 CAN/ULC-S102	0/0
Long-term durability	ASTM C1185, Sec. 13	min. 75% retention of physical properties
Water durability	ASTM C1185, Sec. 5	min. 70% retention of physical properties

(a) Fastener lateral resistance measured with #8, 1-5/8" (41mm) 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.

SYSTEM PERFORMANCE

Description	Reference
Code Reports	ICC ESR-1792; PER-13067
City Code Approvals	Los Angeles: LARR # 25682
Ultimate Uniform Load ^a (total DL and LL)	See table below
Shear Diaphragm Ratings	1,468 plf (21.4 kNm) ^b
UL 1-, 1.5-, 2-Hour Fire Resistance Designs ^d	G535, G536, G556, G557, G558, G562, G588, L521, L541, L550, L569, L570, M502, M506, M515, M521
ULC 1-, 1.5-, 2-Hour Fire Resistance Designs ^d	I526, I527, I528, I529, M520, M521
UL 2-, 3-Hour Load-Bearing Walls ^d	V465, V471
UL/ULC Metal and Plastic Through-Penetration Firestop Systems ^d	F-E-1023, F-E-1032, F-E-2045, SP1105, SP1106
Acoustical Ratings	>65 IIC ^c >56 STC ^c

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

LOAD TABLE

The following table represents the load carrying capacity of USG Structural Panel Concrete Subfloors. For the most up-to-date load tables, see the Progressive Engineering Inc. Product Evaluation Report PER-13067, or for technical questions, email usgstructural@usg.com.

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

Ultimate Uniform Load for USG Structural Panel Concrete Subfloor

Joist Spacing - inches (millimeters)	12" (305mm)	16" (406mm)	24" (610mm)
Capacity - psf (kPa)	1,320 psf (63.2 kPa)	744 psf (35.6 kPa)	330 psf (15.8 kPa)

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

- (1) **Ultimate Load Values have no safety factor included.**
 (2) Two framing spans minimum per panel piece.
 (3) Ultimate Uniform Load Table for general reference only.
 For complete load capacities, consult Progressive Engineering Inc. Product Evaluation Report PER-13067.

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.

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We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by applications of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within 30 days from date it was or reasonably should have been discovered.

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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