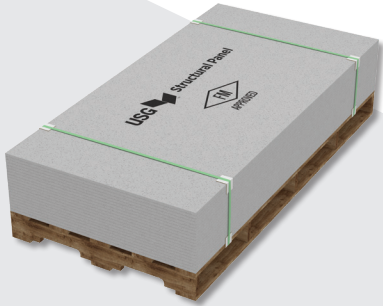


# USG STRUCTURAL PANEL CONCRETE ROOF DECK



## DESCRIPTION

**A concrete roof deck that can be combined with other noncombustible materials to create 1- and 2-hour fire-rated roof-ceiling assemblies.**

- The only cementitious structural panel approved by Factory Mutual (FM) — FM Approval Standard 4472
- Strong, durable concrete panel; great uplift ratings
- Dimensionally stable; panel will not buckle or warp like wood sheathing; no moisture issues like structural concrete
- Installs fast and easy with appropriate dust collection
- Meets the criteria of active ASTM standard E136 for use in all types of noncombustible construction
- Made in the USA

USG Structural Panel Concrete Roof Deck, also known as USG Structo-Crete® Panels, mechanically fastened to cold-formed steel joists, trusses or wood framing members; to create a structural substrate ideal as low- and steep-slope roof systems, canopies and/or balconies. This roof system is designed to carry gravity and lateral loads. Roof membranes may be applied directly over USG Structural Panel Concrete Roof Decks. For retrofit or renovation projects, Concrete Roof Deck can also be installed on wood-joists, trusses or bar joists. See [USG Structural Recommended Fasteners \(SCP95\)](#).

USG Structural Panel Concrete Roof Decks can carry a total load, live and dead, of 150 psf (7.2 kPa) on cold-formed steel framing is spaced 48 in. (1220mm) o.c.

USG Structural Panel Concrete Roof Decks 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.

Cutting USG Structural Panel Concrete Roof Decks require a carbide-tipped saw blade and a circular saw equipped with dust collection or suppression and control of 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).

Refer to roof system manufacturer's written instructions, local code requirements and Factory Mutual Global (FMG) and/or Underwriters Laboratories (UL) requirements for proper installation techniques. For the attachment of shingles, USG recommends the use of electro-galvanized collated roofing nails installed by a professional grade pneumatic nailer with an air supply between 100 to 120 psi.

## FIRE PERFORMANCE

- UL Classified (Type USGSP) for noncombustibility in accordance with active ASTM standard E136 (CAN/ULC-S114)
- UL Classified (Type USGSP) as to Surface Burning Characteristics in accordance with ASTM E84 (CAN/ULC-S102). — Flame Spread 0 and Smoke Developed 0
- Class A, in accordance with UL790 (CAN/ULC-S107). See the *UL Building Materials Directory* for more information

## SYSTEM PERFORMANCE

| Description                                 | Reference                                      |
|---|--|
| FM Approved                                 | Complies with requirements of FM 4472          |
| Meets FM Class 1                            |  |
| Code Report                                 | <a href="#">PER-14076</a>                      |
| Ultimate Uniform Load <sup>a</sup>          | 150psf (7.2kPa) @ 48" o.c. (1220mm). See Table |
| Shear Diaphragm Ratings                     | 1641plf <sup>b</sup> (23.9kN/m)                |
| UL 1-, 1.5-, 2-Hour Fire Resistance Designs | P561, P562, P573                               |
| UL Roofing System, Uplift Resistance        | TGIK.R25352                                    |

(a) On steel framing.

(b) Joists spaced 48" (1219.2mm) o.c. and fasteners spaced 4" (102mm) o.c. at the perimeter and 12" (305mm) o.c. in field, fully blocked. See the Progressive Engineering Inc. Product Evaluation Report [PER-14076](#).



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**WARNING**

USG Structural Panel Concrete Roof Decks should not be left in service without an appropriate roof, or weather-resistive membrane covering.

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**INSTALLATION**

To perform in the expected manner, USG Structural Panel Concrete Roof Decks 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.

Care must be taken when placing pallets of USG Structural Panel Concrete Roof Decks on roof framing. A pallet of USG Structural Panel Concrete Roof Decks consists of 20 sheets of our 3/4 in. x 4 ft. x 8 ft. panels (19mm x 1220mm x 2440mm) nominal [The T&G panels have an actual width of 47-3/4 in. (1213mm)], and weighs approximately 3,400 lbs. (1542 kg). Do not exceed limits when loading pallets or panels on open framing or completed roof assemblies. Store units next to structural walls where the joists meet the wall. See [USG Structural Panel Concrete Roof Deck Field Installation Guideline \(SCP43\)](#) for additional information.

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**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 Roof Deck. 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 Note:** In accordance with [PER-14076](#), 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.**

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**FRAMING**

The steel roof 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 in. (41mm) wide with at least 3/4 in. (19mm) of the panel bearing on the supporting flange. Metal framing must be a minimum 16 gauge (54 mils, or 0.0538 in. [1.36mm]) and spaced no greater than 48 in. (1220mm) o.c. Follow the contract documents and the steel framing manufacturer's recommendations for the proper installation and bracing of the framing.

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**TRAFFIC PROTECTION**

Place sheathing materials (i.e. additional layer of USG Structural Panel or plywood) on the roof in high traffic areas to protect newly installed concrete roof decks. See [USG Structural Panel Concrete Roof Deck Field Installation Guideline \(SCP43\)](#) for additional information.

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**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 limits 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.

## APPLICATION CONT.

Install USG Structural Panel Concrete Roof Decks 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 in. (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 1.36mm) 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 in. (41mm) wide and at least 3/4 in. (19mm) of the panel must bear on the supporting flange or edge. See [USG Structural Panel Concrete Roof Deck Field Installation Guideline \(SCP43\)](#) 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 Roof Decks, never expose the panels to direct flame for the purpose of snow removal and/or deicing efforts. At no time should salts, fertilizers or other chemicals be used on the panels for anti-icing and/or deicing purposes.

## ROOFING SYSTEM

Follow the contract documents and the roof system manufacturer's recommendations for the application of roof materials. Before the application of roof materials, ensure that all panels are properly fastened, with the fastener head driven flush or slightly below the surface of the panels.

## PRODUCT DATA

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

**Availability:** USG Structural Panel Concrete Roof Decks are 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 Roof Decks 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 Roof Decks 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. Never physically pry panels apart. Salt, fertilizer or other deicing 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 Roof Decks 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 Roof Decks that are secured following the fastening schedule prescribed in the original installation documents. The replacement panels must be a minimum of 24 in. (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 Roof Deck Field Installation Guideline \(SCP43\)](#) for additional information.

## TEST DATA

| Physical and Mechanical Properties                                | Test Standard                                       | Typical Values Standard (Metric)                    |
|---|---|---|
| Noncombustibility   | ASTM E136 (unmodified)<br>CAN/ULC-S114              | Passed  |
| Surface-burning characteristics<br>(flame spread/smoke developed) | ASTM E84<br>CAN/ULC-S102                            | 0/0   |
| Weight at 3/4 in. (19 mm) thickness                               | ASTM D1037  | 5.3 lbs./ft. <sup>2</sup> (26 kg/m <sup>2</sup> )   |
| Density <sup>a</sup>  | ASTM C1185  | 75 lbs./ft. <sup>3</sup> (1,201 kg/m <sup>3</sup> ) |
| Mold resistance   | ASTM D3273<br>ASTM G21                              | 10<br>0   |
| Termite resistance  | AWPA Standard E1-13                                 | 9.8   |
| Low VOC emissions   | CDPH/EHLB/Standard Method<br>V1.1-2010 <sup>b</sup> | Compliant   |

## TEST DATA CONT.

| Physical and Mechanical Properties                                      | Test Standard            | Typical Values Standard (Metric)   |
|---|--------------------------|--|
| Concentrated load   | ASTM E661                | 550 lbs. (2.45 kN) static 0.108 in. (2.7mm) max. deflection @ 200 lbs. (0.89 kN) |
| Fastener lateral resistance <sup>c</sup>                                | ASTM D1761, Sec. 10.2    | >210 lbs. (0.93 kN) dry<br>>160 lbs. (0.71 kN) wet                               |
| 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)   |
| Water absorption <sup>d</sup>   | ASTM C1185, Sec. 5.2.3.1 | <15.0%   |
| 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) Density measured at equilibrium conditioning per Section 5.2.3.1., 28 days after manufacturing.

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

(c) Fastener lateral resistance measured with #8, 1-5/8 in. (41mm), winged, self-drilling screw.

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

## LOAD TABLE

The following table represents the Load Capacity of USG Structural Panel Concrete Roof Decks. The uplift capacities in this table represent the attachment of the Concrete Roof Deck to the structural framing members. The values for a roofing system are obtained from the roofing system manufacturer's testing and specific installation instructions. For the most up-to-date load tables, see the Progressive Engineering Inc. report, [PER-14076](#). For technical questions, email [usgstructural@usg.com](mailto:usgstructural@usg.com). **A qualified architect or engineer should review and approve calculations, framing and fastener spacing for all projects.**

### Ultimate Load Capacity for USG Structural Panel Concrete Roof Deck

| Joist Spacing - inches (mm)        | Uniform Load - psf (kPa) <sup>1,2,3</sup> | Uplift Capacity - psf (kPa) <sup>1,2,3</sup> |            |             |             |
|------------------------------------|---|--|------------|-------------|-------------|
|                                    |   | Fastener spacing (edge/field)                |            |             |             |
|                                    |   | 8/12   | 8/8        | 6/6         | 4/4         |
| <b>12 inch (304.8mm)</b>           | 1320 (63.2)                               | 513 (24.6)                                   | 770 (36.9) | 1026 (49.1) | 1320 (63.2) |
| <b>16 inch (406.4mm)</b>           | 744 (35.6)                                | 385 (18.4)                                   | 557 (27.6) | 744 (35.6)  | 744 (35.6)  |
| <b>24 inch (609.6mm)</b>           | 330 (15.8)                                | 257 (12.3)                                   | 330 (15.8) | 330 (15.8)  | 330 (15.8)  |
| <b>32 inch (812.8mm)</b>           | 240 (11.5)                                | 192 (9.19)                                   | 240 (11.5) | 240 (11.5)  | 240 (11.5)  |
| <b>48inch (1219mm)<sup>4</sup></b> | 150 (7.2)                                 | 128 (6.1)                                    | 150 (7.2)  | 150 (7.2)   | 150 (7.2)   |

**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-14076](#)

(4) Blocking at all joints perpendicular to framing to be a minimum of 16 gauge (54 mils, or 0.0538 inch [1.37 mm]), 3-5/8 in (92 mm) wide track. For sheathing installation where a single span condition exists, additional track blocking is required perpendicular to the framing located mid-way between the edges of the panel.

### PRODUCT INFORMATION

See [usg.com](http://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](http://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 protection equipment. Read SDS and literature before specification and installation.



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Manufactured by  
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