



Subfloor Installation Manual





NOTE: ALL INFORMATION CONTAINED IN THIS DOCUMENT ALSO APPLIES TO EXTREMEGREEN® BRANDED MAGNESIUM OXIDE CEMENT PANELS MANUFACTURED AFTER MARCH 30, 2020.

Installation Manual Overview

This manual is intended to provide general information to the designer, contractor, and end user. The following instructions will help you properly install EXACOR™ subfloor panels. We urge you, and anyone installing this product, to read these instructions in their entirety prior to installation. This manual is general in nature and does not cover every installation condition. Proper installation shall be deemed to mean the most restrictive requirement specified by Huber Engineered Woods LLC ("Huber Engineered Woods"), applicable building code(s), engineer or architect of record or other authority having jurisdiction. You are fully and solely responsible for all safety requirements and code compliance. For additional information contact Huber Engineered Woods.

It is the responsibility of the engineer of record to specify location of required blocking between floor framing members. Detail(s) shall be provided illustrating blocking materials and installation method(s). The truss fabricator shall incorporate blocking requirements in their truss design and shop drawings.

EXACOR™ Subflooring Product Overview

EXACOR subfloor panels are fire resistant¹, high-density, structural magnesium oxide cement panels. When used as a subfloor, EXACOR™ panels can replace plywood or OSB subflooring, and can remove the need for poured gypsum cement flooring underlayment in specific published fire-resistant-rated and sound attenuation floor/ceiling assemblies. These instructions apply to nominal 3/4-in. (20mm) thickness.

EXACOR subflooring has been evaluated as a structural subflooring panel to support evenly distributed uniform loading. Line and points loads are outside the evaluation scope of EXACOR and shall be accounted for by the engineer-of-record.



Available Sizes & Dimensions

- EXACOR subfloor panels are nominally 3/4-in. thick by 48-in. face width and 96-in. length (20mm x 1220mm x 2440mm).
- Panels feature tongue-and-groove profile on 96-in. edges.

Uses & Limitations

- Panels can be exposed to weather during construction for up to 200 days, depending on the warranty registration.²
- Panels are intended for use in subflooring applications that will only be exposed to weather during construction. They are not intended for use on permanently exposed areas such as balconies, breezeways, decks or other outdoor or exterior applications.
- Panels can be used in certain sound attenuation and fire-resistant-rated assemblies. See **Sound Attenuation and Fire-Resistant-Rated Assemblies** section in this manual for information.
- Panels not approved for use on Type I or Type II buildings.
- EXACOR subfloor panels are installed in a similar fashion to traditional plywood and OSB subfloor panels.
- Always consult local building codes and designer of record for fire-resistant-rated design requirements.
- Fasteners and bare metal components in direct contact with EXACOR panels shall be inherently resistant to corrosion, coated for corrosion resistance (performance equal to or better than Class D, ASTM A153 Hot-Dipped Galvanized) or permanently separated by a non-metallic material.
- Project site should be kept clean. Frequently blow off floors, walls, tools and other areas that may collect dust residue from cutting EXACOR panels.
- Not intended to support bearing or non-load bearing walls that run parallel to framing without blocking or framing between floor framing members.
- Concentrated point loads and line loads shall be supported with framing and blocking in accordance with the engineer-of-record.
- Any special inspections shall be at the discretion of the local building code, designer-of-record or authority having jurisdiction.
- Good framing practices are necessary for flat and level finished floors.

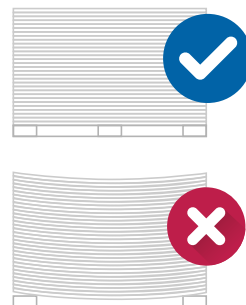
1. EXACOR panels may be used in specific published fire-resistance-rated assemblies as tested in accordance with ASTM E119/ANSI UL 263. Follow published fire-resistance rated assembly requirements and consult local building codes and designer of record for fire-resistant design requirements.

2. Limitations and restrictions apply. See applicable EXACOR Limited Warranty for details.

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Storage

- EXACOR panels shall be stored in a cool, dry environment and remain in the manufacturer's packaging.
- EXACOR panels shall be stored on the manufacturer's pallets off the ground with full support underneath (image right). To protect edges from damage, do not store EXACOR panels vertically.
- To prevent the risk of injury, do not stack EXACOR panels higher than 11 feet high (6 units, level, aligned and stacked).
- Panels should not be stored loosely or near standing water.
- When not contained in original packaging, cover EXACOR panels with a waterproof tarp or similar material when stored outdoors or on site to protect against weather, surface contamination, and construction traffic.



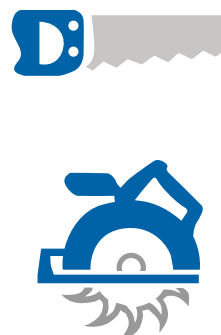
Precautions + Safe Handling

- Always consult the Safety Data Sheet (SDS) for safety, hazard, and first aid instructions.
- Wear appropriate personal protective equipment for the job. Suggested safety gear includes:
 - Gloves and long sleeves.
 - Dust masks and/or respirators to minimize dust inhalation during cutting, drilling, or notching.
 - Safety glasses or goggles.
- Use work practices that minimize the creation of dust. Adequate ventilation, dust collection for power saws and frequent jobsite cleanup are recommended.
- Wash hands after handling.
- Observe good industrial hygiene practices.
- Ensure that forklift or similar equipment is rated as capable of lifting and moving loads. Forks must extend completely under the entire load. Proper care and precautions should be taken not to damage panels and panel edges during handling.
- For Handling:
 - Two persons are recommended when loading or handling individual EXACOR™ panels.
 - Panels are heavier than typical structural panels. Always use proper lifting techniques.
 - Hold panels with hands spaced apart along the long-length of panel to prevent excessive bending/flexing (image right).
- Proper design and planning of material staging is required to avoid unforeseen loading of subflooring and framing during construction. Structural support of special loads that may occur during construction or staging are the responsibility of the design professional-of-record.



Cutting

- Do not cut panels that are stacked one on top of another. This can lead to scoring of the panel below which could damage it.
- A fine-tooth handsaw, gypsum board (drywall) saw, or power saw are all recommended to cut EXACOR panels. For power saws, using a fiber-cement blade may result in cleaner edge cuts, less dust, and longer blade life. Support both ends of the board when cutting.
- To perform cut-outs in EXACOR panels, for plumbing, electrical outlets, light switches, etc., carefully measure and mark the location of the opening on the smooth side of the panel before making a cut. If using a jigsaw, drill a starter hole in the corner of the proposed cut-out and start cut from there. Alternatively, cut-outs can be removed using a hole saw, rotary tool, or equivalent hand tool. Carbide tip blades may provide longer service life when cutting EXACOR panels.
- Blow EXACOR panel dust residue off of tools frequently.



Physical Properties

Width & Tolerances	nom. 48-in. (1200mm) +/- 5/64-in. (2mm)
Length & Tolerances	nom. 96-in. (2440mm) +/- 5/64-in. (2mm)
Thickness & Tolerances	nom. 3/4-in. (20mm) +/- 1/16 in. (1mm)
Weight	approx. 4.50 lbs/sf
Edge Profile	Tongue & Groove
Surface Burning Characteristics (ASTM E84 / UL 723) Flame spread index/smoke developed	$\leq 10 / \leq 5^1$
Fire Resistance (ASTM E119)	Fire resistant ²
Water Vapor Permeable (ASTM E96 Method B) ≥ 13 perms ³ (ASTM E96 Method A) ≥ 5 perms ³	≥ 13 perms ³ ≥ 5 perms ³
Mold Resistance (ASTM G21)	0 Mold Growth Observed ⁴
Thermal Resistance R-value (ft ² •h•°F/Btu)*	0.34

1. ASTM E84 Standard Method for Surface Burning Characteristics of Building Materials conducted on 1/2-in, 5/8-in and 3/4-in EXACOR™ panel thicknesses.
2. EXACOR panels may be used in specific published fire-resistance-rated assemblies as tested in accordance with ASTM E119/ANSI UL 263. Follow published fire-resistance rated assembly requirements and consult local building codes and designer of record for fire-resistant design requirements.
3. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials conducted on 1/2-in and 3/4-in EXACOR™ products.
4. ASTM G21 Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi conducted on 1/2-in EXACOR™ product.

Structural Design Values

Maximum Allowable Uniform Loading (satisfies L/360 LL and L/240 TL deflection)

Joists/Trusses spaced 16-in. oc maximum 100 psf LL / 120 psf TL

- Panels must be supported by three or more joists with long dimension perpendicular to the floor framing.
- All panel edges must be supported.
- EXACOR subflooring has been evaluated as a structural subflooring panel to support evenly distributed uniform loading. Line and points loads are outside the evaluation scope of EXACOR and shall be accounted for by the engineer-of-record.

Maximum Allowable Diaphragm Capacity (unblocked)

	Load Applied Parallel to Framing (Case 1 per 2015 SDPWS)	Load Applied Perpendicular to Framing (Case 3 per 2015 SDPWS)
Allowable Diaphragm Shear, v_s	360 plf	320 plf
Apparent Shear Stiffness, G_a	10,512 lbf/inch	4,724 lbf/inch

*Reported values are based on 75°F mean temperature for 16mm EXACOR tested in accordance with ASTM C518. Values extrapolated for 12mm and 20mm EXACOR panels.

- Based on floor framing having a minimum specific gravity of 0.55, spaced at 16-in. oc and fastened using 0.131-in. x 3-in. long hot-dipped galvanized ring-shank nails. Fasteners shall be spaced 6-in. oc along panel edges and 12-in oc in the field.
- Diaphragm values are for wind and seismic controlled designs. Seismic controlled designs are limited to seismic design categories A, B and C.
- Length to width aspect ratio must be not greater than 3:1.



Panel Edge Support

- Panels with tongue and groove profiled edges are self-supporting and do not require additional blocking.
- Do not install panels with damaged tongue-and-groove edges unless proper edge support is being provided by other means. Flat-wise 2x blocking between framing members directly under unsupported subfloor panel edges is an acceptable means to provide panel edge support.
- Blocking must be installed with the top surface flush with the top of floor framing members in order to provide uniform support for all subfloor panel edges where required. Subflooring edge support to be provided in accordance with the requirements of applicable building code, joist/truss manufacturer, designer of record and other authority(ies) having jurisdiction.

Panel Allowable Bearing Stress ($F_c \perp$)

- Allowable bearing stress ($F_c \perp$) is greater than or equal to allowable bearing stress for OSB or plywood wood structural panels.

Non-Load Bearing Walls

- Non-load bearing walls are intended to ONLY support their own weight during construction and in service. DO NOT apply load (construction or otherwise) to non-load bearing walls on EXACOR subflooring. Do not allow trusses or other framing to bear on non-load bearing walls during placement and installation.
- For non-load bearing walls that run parallel to framing, use screws and install blocking at 16-inches on center below the EXACOR and fasten into the blocking.
- Any non-load bearing wall that is parallel to framing shall be supported by continuous structural framing or blocking. Construction drawings shall include location of required support and blocking details.
- Bottom plate of non-load bearing wall above shall attach through the EXACOR subflooring panel and into the framing or blocking below. Attachment to EXACOR panel alone is not sufficient.
- The truss fabricator shall incorporate blocking requirements in their truss design and shop drawings.

Installing EXACOR™ Subflooring

General

- DO NOT STAGE MATERIALS IN SUCH A MANNER TO CREATE CONCENTRATED LOADS ON MEMBERS THAT WERE NOT DESIGNED TO SUPPORT THESE TYPES OF CONSTRUCTION LOADS. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO ENSURE MATERIALS ARE STAGED SAFELY AND PROPERLY. This includes applying load to non-load bearing walls resting on EXACOR subflooring.
- EXACOR subfloor panels must be installed in accordance with instructions contained in this Installation Manual and the applicable fire resistance rated design assembly. Should these instructions contradict, the most stringent requirements shall govern.
- When EXACOR panels have been installed, HEW requires laying a temporary sheet of plywood or OSB over all high traffic areas and point loads such as ladders, scaffolding and drywall carts, to protect the subfloor surface during construction.
- Panels with tongue and groove edges do not require additional edge support. See **Panel Edge Support** Section.
- Panels should be butted tight to one another.
- EXACOR subfloor panels shall not be installed less than 8 in. from exposed earth unless an approved method of protection against termites and decay is approved by the local building official.

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Framing:

- Panels must be supported by three or more joists with long dimension perpendicular to the floor framing. All 4 ft. (short) edges must be supported by framing below.
- Joists/trusses must be square and level to achieve a smooth and level floor installation. Replace warped, bowed or crooked joists/trusses.
- Install EXACOR subfloor panels **smooth side up**. The rough, grid side must be in contact with the framing member.
- Framing width shall not be less than 1 1/2-in. wide for wood framing.
- Framing members shall be in plane of the adjacent framing. EXACOR panels will not correct out-of-plane irregularities in floor framing members.

Adhesive

- Ensure the proper subfloor adhesive is selected for the job. Huber Engineered Woods recommends a solvent or polyurethane-based construction adhesive that meets the requirements of APA AFG-01 or ASTM D3498.
- Framing surface must be clean and free from oil, dirt, and contamination.
- Adhesive must be applied in accordance with the manufacturer's instructions.
- Mechanical fasteners must be used in addition to adhesive.
- Do not allow adhesive to form a "skin" prior to EXACOR panel installation and fastening.

Fastening:

- Gypsum screws are not recommended for any subflooring applications.
- Ensure that EXACOR subfloor panels are flush against the top of the joist/truss surface to which they are being fastened.
- Maximum fastening pattern shall be 6-in. o.c. edge and 12-in. o.c. field spacing.
- Fasteners must be spaced 1/2-in. from all edges and no closer than 2-in. from a corner. Panels and fasteners used to resist diaphragm loading have additional requirements. See **Maximum Allowable Diaphragm Capacity** section for more information.
- Fasteners must be code-recognized and shall be inherently resistant to corrosion or coated for corrosion resistance (performance equal to or better than Class D, ASTM A153 Hot-Dipped Galvanized).

Screws

- Install fasteners straight and perpendicular to subfloor panels and joists/trusses.
- Countersink screws just below the surface of the EXACOR™ subfloor panels. Do not overdrive screws.
- Start at one corner and work your way to the remaining edges.
- Min. 2 in. screws must be used when attaching nom. 3/4-in.(20mm) EXACOR subfloor panels to wood framing.

Nails

- Drive nails in straight and perpendicular to EXACOR™ panels and framing members.
- Nails shall be set flush or just below the panel surface.
- Start at one corner and work your way to the remaining edges.
- Code approved min. 2-in. deformed shank nails must be used when attaching nom. 3/4-in. (20mm) EXACOR subfloor panels to wood framing.

Fastener	Fastener Length	Description	Application
	Min. #8 x 2-in. (50.8mm)	Performance equal to or better than Class D, ASTM A153 Hot-Dipped Galvanized	EXACOR™ subflooring to wood framing and EWP-ply for multi-ply trusses.
	Min. #6 (0.113-in.) x 2-in. (50.8mm)	Performance equal to or better than Class D, ASTM A153 Hot-Dipped Galvanized	EXACOR™ subflooring to wood framing.

Panels and fasteners used to resist diaphragm loading have additional requirements. See Maximum Allowable Diaphragm Capacity section for more information.

Repair

- Small divots and imperfections in EXACOR subfloor panels can be patched with an elastomeric patching compound that is intended to be used over concrete/masonry substrates. Following patching compound manufacturer's recommendations for gap filling limitations and applications. Use minor sanding to smooth.
- For damage that creates a hole through the panel, the area around the damage must be replaced with a new piece of EXACOR subfloor. Replacement panels must be no less than 24-in. in width and cover a minimum of two floor spans (three floor joists). Add nominal 2x blocking at the panel seams to support edges.



Product Application

Finish Floor Coverings

Surface Preparation

- To prepare the surface for finished floor coverings, remove all dust, dirt and debris from the EXACOR™ panel surface. Ensure surface is free from water, oil, grease and other contaminants.
- Ensure that fasteners used to install EXACOR panels sit flush or just below the panel surface.
- Identify and correct any imperfections in the surface of the panels and repair any damage in accordance with these instructions.
- As with any surface to receive floor finishes, EXACOR panels should be flat and free from excessive high and low areas. For the purposes of these instructions, a floor is considered to be flat when the difference in height between two points does not exceed 3/16-inch in 10-feet or 1/8-inch in 6-feet. Floor flatness requirements may vary depending on type of floor covering. Follow all finish flooring manufacturer requirements. If finish flooring type requires substrate flatness tolerances to be more restrictive, consider using a quality self-leveling product. HVAC system should be running at end-use conditions for a minimum of 48-hours prior to finish floor installation.
- Many finish flooring types have restrictions on how far apart floor truss/joist spacings can be. Ensure finish floor covering installation method is suitable for truss/joist oc framing. If floor framing exceeds allowable truss/joist spacing in accordance finish flooring manufacturer's installation requirements, contact the professional designer-of-record.

Underlayment

If installing underlayment on EXACOR subflooring, adhere to the following guidelines:

- Underlayment must be minimum 1/4-inch thick plywood and stamped as underlayment grade.
- Plywood shall be oriented in the same directions as the EXACOR panels (perpendicular to framing) and offset minimum 24-inches in both directions.
- Plywood underlayment shall be fully adhered and mechanically attached. Adhesive shall be fully troweled. Fasteners shall be #8 x 1.5-inch corrosion resistant (performance equal to or better than Class D, ASTM A153 Hot-Dipped Galvanized) coarse thread screws spaced 3-inches oc along the edges and 6-inches oc in the field.
- Install one panel at a time. Do not allow adhesive to "skin" prior to installation.
- When installing fasteners, start from one corner and work your way to the opposite corner. DO NOT picture frame around the perimeter and then fill in the middle.
- Fastener heads shall be flush with plywood surface.

Floor Coverings

General Note: Before applying any floor covering, check flooring manufacturer's installation requirements and compatibility with substrate. Follow all flooring manufacturer's requirements for primers, adhesives, mortars, underlayments, etc. Floating systems generally require a backer material such as foam or cork to be installed over the subfloor prior to installation or may feature a backer material pre-bonded to the flooring.

Carpet

Carpet and pad can be installed over EXACOR panels using adhesive tack strips. Use hotmelt glue adhesive to secure strips to the surface of EXACOR panels. For commercial carpet tile, or other adhered carpets, follow all flooring manufacturer's requirements for adhesives, primers and substrates. For best results, the use of a primer is recommended.

Ceramic Tile

EXACOR panels are not intended to be used as a replacement for tile backer, uncoupling or crack isolation products. Do not install ceramic tile directly to the EXACOR™ subflooring panel surface. Follow all manufacturer's requirements for installation.

Engineered Wood Flooring

Engineered wood flooring can be installed over EXACOR™ underlayment panels in floating or adhered applications. Follow all flooring manufacturer's requirements for adhesives, primers and underlayments.

Natural Hardwood Flooring

Natural hardwood flooring can be installed directly on EXACOR subflooring only when using full-coverage adhesive. Mechanical fasteners alone are not sufficient. Ensure subfloor is within flatness tolerances for hardwood flooring.

Vinyl

Vinyl products such as luxury vinyl plank (LVP), and luxury vinyl tile (LVT) may be installed over EXACOR subflooring in accordance with manufacturer's installation requirements. Vinyl sheet products and vinyl composite tile (VCT) are typically fully adhered applications. For adhered vinyl floor finishes, ensure substrate compatibility with finished flooring manufacturer and follow all installation requirements including any requirement for additional underlayment. For best results, it is recommended to patch and feather all seams and apply primer to the area to receive the floor covering.

Sound Attenuation and Fire-Resistant-Rated Assemblies

- EXACOR subflooring has been evaluated in specific fire-resistance rated designs in accordance with ASTM E119/ANSI UL 263. Please refer to the EXACOR Sound & Fire Assemblies Handbook for additional information. Follow all local building code requirements for fire-resistance rated construction.



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