## Adhesive Recommendation for FRP to Various Substrates

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Titebond® GREENchoice™ Advanced Polymer Panel Adhesive</th>
<th>Titebond® GREENchoice™ Fast Grab FRP Adhesive</th>
<th>Titebond® Solvent-Based FRP Adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Unfaced Drywall</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard Unfaced Plywood</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Treated Plywood</td>
<td>No</td>
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<tr>
<td>Fire-Rated Plywood</td>
<td>No</td>
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<tr>
<td>Cement Board</td>
<td>Yes</td>
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<td>Yes</td>
</tr>
<tr>
<td>Mineral-Faced Cement Board</td>
<td>No</td>
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<tr>
<td>Faceless Core Drywall</td>
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<td>Ceramic Tile</td>
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<td>Stainless Steel</td>
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<td>Metal</td>
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<td>MDF</td>
<td>No</td>
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<td>Plywood</td>
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<td>Foam Insulation</td>
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<tr>
<td>FRP</td>
<td>No</td>
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<tr>
<td>Mold &amp; Mineral-Faced Drywall</td>
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<td>No</td>
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<tr>
<td>Greenboard Moisture-Resistant</td>
<td>Yes*</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Moisture-Resistant Drywall</td>
<td>No (may have longer drying time &amp; FRP may have to be braced)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Medium-Density Fiberboard</td>
<td>No (may have longer drying time &amp; FRP may have to be braced)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Particle Board</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Cement Block</td>
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<td>No</td>
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<td>No</td>
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<td>Aluminum</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>FRP</td>
<td>Yes (may have longer drying time &amp; FRP may have to be braced)</td>
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<td>Yes</td>
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</table>

**NOTE:** This list should not be considered fully exhaustive. It represents Franklin International’s adhesive recommendations for specific materials and substrates. For questions regarding adhesive application for specific substrates please call Franklin International’s Technical Service at 1-800-347-4583.

*For faceless FRP with less paper that contains borates, use Titebond® GREENchoice Advanced Polymer Panel Adhesive.

Visit Titebond.com for the most up-to-date product information.

**Tips**
- Travel adhesive to the back of the panel (not the wall surface).
- Check wall surface for irregularities that might affect adhesion: dents, spalls, dust, oil, paint, excessive joint compound, etc.
- Activate panels to reach temperature and lay panels flat for 24 hours before installation.
- Check to make sure the climate of the room, adhesive, panel, and wall surface are all above 50°F during 24 hours before, during, and after installation. Avoid large temperature swings during the first 24 hours after installation.
- Do not correct errors as recommended by the manufacturer.
- Drill the top and bottom moldings for proper expansion space.
- Create oversized holes to allow for panel movement if any permanent fixtures are drilled through the panel, such as done for drop ceilings, cabinets, sinks and machinery.
- Press and roll entire panel against wall substrate.
- Change Climate for all our adhesives when they are new. Titebond® GREENchoice™ Fast Grab FRP dries up with moisture. Titebond® Advanced Polymer Panel and Titebond Solvent-Based FRP should be cleaned up with mineral spirits or an equivalent solvent. Follow all the solvent vendor’s precautions.
- Make sure it will not affect the surface being cleaned.
- Use the correct trowel size as recommended by the manufacturer.
- Check to make sure the climate of the room, adhesive, panel, and wall surface are all above 50°F during 24 hours before, during, and after installation. Avoid large temperature swings during the first 24 hours after installation.
- Do not correct errors as recommended by the manufacturer.
- Drill the top and bottom moldings for proper expansion space.
- Create oversized holes to allow for panel movement if any permanent fixtures are drilled through the panel, such as done for drop ceilings, cabinets, sinks and machinery.
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Troubleshooting

If you are experiencing bubbles or other weak bonding points on the FRP panels, reinstallation may be required. To help determine the cause of these problems and to prevent future occurrence, please review the information below. If you cannot identify the cause of the problem, check the affected area with a permanent marker and take photos before taking down the panel. Send samples of the affected area to the manufacturer along with the samples of the adhesive and a lot number to have the issue analyzed by an expert.

Vertical & Horizontal Bubbles
- If there are long horizontal bubbles down the sides, check right and left grade for proper vapor spaces. (See E)
- If there are long horizontal bubbles, check the top aesthetics molding for proper vapor space. (See B)

Incorrect Trowel Ridges
- Do not trowel or gap the adhesive to correct trowel size and finished height on the panel. If there are open spaces or low spots on the panel, then the adhesive was applied on wall, not the panel as is distant in the instructions. (See E)
- Look for dips in the adhesive traverse. Low trowel ridges. Low trowel depth below the adhesive where more contact with the wall substrate could cause a void in the installation. (See D)

Undulated Ridges
- If there are ridges that repeat undulated ridges that never reached the wall, look for presence of pressure or adhesive in the wall that provided a good bond between the wall substrate and the panel. (See E)

Flattened Beads
- Do not use Titebond® GREENchoice FRP Adhesive with fire rated or pressure treated plywood substrates. Only use Titebond Advanced Polymer Panel Adhesive or Titebond Modified Polymer Panel Adhesive.
- Do NOT use Titebond® GREENchoice FRP Adhesive or Titebond 100% Silicone Sealant for non-pressure wall surfaces. Only use Titebond Modified Polymer Panel Adhesive.

Improper Rolling
- Adhesive needs to come in contact over the entire substrate. First, the adhesive may not bond, and create bubbles. (See D)

Flattened Spots
- Flattened beads in a flat bead of the panel with no adhesive transfer shows that the open space of the adhesive was not sealed and the panel was not applied. The panel should be removed and the panel should be applied more rigidly to the adhesive. (See C)

Loose Particles
- Do not use Titebond® GREENchoice FRP Adhesive with fire rated panel substrates. Only use Titebond Advanced Polymer Panel Adhesive or Titebond Modified Polymer Panel Adhesive.
If you are experiencing bubbles or other weak bonding points on the FRP panel, restickulation may be required. To help determine the cause of these problems and to prevent future occurrences, please review the information below. If you cannot identify the cause of the problem, seek the affected area with a permanent marker and take photos before taking down the panel. Seed samples of the affected area to the manufacturer along with the samples of the adhesive and a lot number to have the issue analyzed by an expert.

### Vertical & Horizontal Bubbles
- If there is an angular bubble, draw the outline, check for void or air pocket or improper spacing. (See E)
- If there are long horizontal bubbles draw the outline, check for void or air pocket or improper spacing. (See F)

### Incorrect Trowel Ridges
- Do not trowel coverage or spacing as required to ensure proper application. (See D)
- FRP changes dimension with temperature and grows as temperature increases. Allow for adequate space for expansion to prevent adhesion failure. (See E)

### Undulated Ridges
- Do not use Frances that are not undulated ridges that never exceed the wall, where lack of pressure or improper adhesion was not a problem, or over the adhesive (See F)
- The adhesive notched trowel patterns should be clean and free of adhesive build-up to ensure proper adhesive transfer. (See F)

### Improper Rolling
- Adhesive needs to come in contact over the entire wall surface. If not, the adhesive may not bond, and create bubbles. (See F)

### Flattened Beads
- Flattened bead at the back of the panel with no adhesive transfer shows that the latex edge of the adhesive was not coated and the panel was not applied properly. (See F)
- Panels with gaps between the wall and the FRP panel will not bond properly. (See F)

### Loose Particles
- Do not use Frances that have dried joint compound or other debris or dust. (See F)
- The strut, carrier wire or flange of the adhesive is a strong bond (See F)

### Common Installation Errors

**Preparing Wall Surface for Optimal Adhesion:**
- Make sure that both surfaces are clean and free of loose material that would affect adhesion, including excessive amounts of joint compound.
- The wall surface must be free of dust so the adhesive bead will properly transfer from the FRP panel surface to the wall surface.
- Do not apply adhesive directly to the wall. Poor adhesion by the FRP panel. (See D)

**Choosing an Appropriate Adhesive:**
- Failure to choose the right adhesive could result in adhesion not showing or curing.
- Do not use Titebond 6251 or 6252 FRP Adhesive with the standard pressure treated yellowish substrates. Do not use Titebond Advanced GREENchoice FRP Adhesive or Titebond Advanced Misaligned Panel Adhesive.
- Do not use Titebond Advanced GREENchoice FRP Adhesive or Titebond Advanced GREENchoice FRP Adhesive for non-pressure.

**Inappropriate Trowel Selection & Use:**
- The trowel must be high enough to ensure proper trowel coverage. (See D)
- The trowel must be the correct size for the application. (See D)

**Product Comparison:**
- Use Titebond GREENchoice FRP Adhesive with fire rated or pressure treated plywood.
- Use Titebond Advanced GREENchoice FRP Adhesive with green choice substrates (See D)
- Use Titebond Advanced Misaligned Panel Adhesive.

**Surface Preparation:**
- Concrete surfaces must be fully cured or the adhesive can properly dry (GREENchoice Fast Grab FRP Adhesive only).

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**Features:**
- **Features:**
- **Special Package**
- **Coverage:**
- **Temperature:**
- **Open Time:**
- **Cure Process:**
- **Application Temperature:**
- **Coverage:**
- **Cleanup:**
- **Specifications:**
- **FPR can be adhered to the following substances:**
- **Advantages of Polymer FPRs:**
- **Advantages of Polymer FPRs on a painting panel with six pouches:**
- **The do, carry away from the adhesive to a tray:**
- **Common Installation Errors:**
- **Preparing Wall Surface for Optimal Adhesion:**
- **Choosing an Appropriate Adhesive:**
- **Inappropriate Trowel Selection & Use:**
- **Product Comparison:**
- **Surface Preparation:**
Troubleshooting

If you are experiencing bubbles or other weak bonding points on the FRP panels, restorations may be required. To help determine the cause of these problems and to prevent future occurrences, please review the information below. If you cannot identify the cause of the problem, seek the affected area with a permanent marker and take photos before taking down the panel. Send samples of the affected area to the manufacturer along with the samples of the adhesive and a lot number to have the issue analyzed by an expert.

Vertical & Horizontal Bubbles

- If there are large vertical bubbles down the middle, check right and left side for proper spacing (See A).
- If there are long horizontal bubbles along the panel, check the top and bottom molds for proper spacing (See B).

Incorrect Trowel Ridges

- Do not trowel ripples and spalling during the cure. If current trowel ripples are not removed, they will be visible on the panel. Use a 4’ X 8’ panel or use a V-notch trowel to remove the ridges (See A).
- Look for bubbles in the adhesive between panels. Low trowel ridges (less than full depth) allow for the adhesive to seep into the ridge, allowing for a good bond between the substrate and the panel (See B).

Undulated Ridges

- Do not use if there are undulated ridges that never reached the wall, and lack of pressure or adhesive on the wall prevented a good bond between the wall substrate and the panel (See A).

Allowing for Expansion Space Around Panels

- FRP changes dimension with temperature and pressure. Areas between and around the panel, allow for proper expansion and contraction. Always refer to the manufacturer’s spacing guidelines before the installation (See B).

Improper Rolling

- Adhesive needs to make contact over the entire substrate. First, the adhesive must be spread, and then roll over it (See A).

Flattened Beads

- If flattened beads are on the back of the panel, the adhesive or the wall substrate could never bond, and create bubbles. Inappropriate Trowel Selection & Use

- Adhesive or trowel selection could result in incorrect trowel ridges and spacing, creating bare spots or drag spots on the back of the FRP panel. Length of travel surfaces need to accommodate undulations and ridges, gaps between the wall surface and in cast-in-place FRP panel. The travel continuos will help accommodate small imperfections. Use the adhesive product for adhesive working time. Make the second hand, the third time perfect. Please refer to the comparative guide for proper trowel coverage.

Specifications

<table>
<thead>
<tr>
<th>Application Temperature</th>
<th>50 - 90°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage</td>
<td>3/16&quot; W x 1/4&quot; D x 1/2“ c-c V-notch (50 sq. ft. per gallon)</td>
</tr>
</tbody>
</table>

Cleaning Tools and adhesive may be cleaned with water while the adhesive was not clean and adhesive bonded to only the loose particles. Inappropriate Trowel Composition & Use

- Do not apply adhesive directly to the wall. Only apply adhesive to the FRP panel. Do not use more than the manufacturer recommended amount of adhesive in one trowel. FRP panels were not clean and adhesive bonded to only the loose particles. Inappropriate Trowel Selection & Use

- Adhesive or trowel selection could result in incorrect trowel ridges and spacing, creating bare spots or drag spots on the back of the FRP panel.

- Length of travel surfaces need to accommodate undulations and ridges, gaps between the wall surface and cast-in-place FRP panel. The travel continuos will help accommodate small imperfections. Use the adhesive product for adhesive working time. Make the second hand, the third time perfect.

- Please refer to the comparative guide for proper trowel coverage.

Applications of Adhesive

- Do not use adhesive directly to the wall. Only apply adhesive to the FRP panel.
- Do not use more than the manufacturer recommended amount of adhesive in one trowel. FRP panels were not clean and adhesive bonded to only the loose particles. Inappropriate Trowel Selection & Use

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- Please refer to the comparative guide for proper trowel coverage.

Product Comparison

<table>
<thead>
<tr>
<th>FRP Panel Selection</th>
<th>Adhesives</th>
<th>Bead Depth</th>
<th>Bubbles/Undulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>STANDARD</td>
<td>Titebond ADVANCED</td>
<td>1/16&quot;</td>
<td>2/3</td>
</tr>
<tr>
<td>SPECIAL</td>
<td>Titebond ADVANCED</td>
<td>1/8&quot;</td>
<td>1/3</td>
</tr>
</tbody>
</table>

Common Installation Errors

Preparing Wall Surface for the FRP Adhesive

- Make sure that both surfaces are free and line of material that would affect adhesive, including moisture amounts of joint compound.
- The wall surface must be flat enough that the adhesive bond will properly transfer from the FRP panel to the wall surface.
- Contour surfaces must be flatly trimmed or cut in adhesive carry-up property (GR42W Solvent-Based FRP Adhesive only).

Choosing an Appropriate Adhesive

- Failure to choose the right adhesive could result in adhesive not setting or curing.
- Do not use Titebond Advanced Polymer FRP Adhesive with the 5711 pretreated primer/polymer substrates. Only use Titebond Advanced Polymer FRP Adhesive or Titebond Advanced Polymer Panel Adhesive.
- Do not use Titebond GREENchoice FRP Adhesive or Titebond GREENchoice-Bonded FRP Adhesive for non-porous wall surfaces. Only use Titebond Advanced Polymer Panel Adhesive.

Inappropriate Trowel Selection & Use

- For appropriate trowel of travel, a trowel must be in trowel ridges and spacing, creating bare spots or drag spots on the back of the FRP panel.
- Length of travel surfaces need to accommodate undulations and ridges, gaps between the wall surface and cast-in-place FRP panel. The travel continuos will help accommodate small imperfections. Use the adhesive product for adhesive working time. Make the second hand, the third time perfect.

- Please refer to the comparative guide for proper trowel coverage.

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Troubleshooting

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Vertical & Horizontal Bubbles

- If there are large vertical bubbles down the middle, check right and left side for proper spacing (See A).
- If there are long horizontal bubbles along the panel, check the top and bottom molds for proper spacing (See B).

Incorrect Trowel Ridges

- Do not trowel ripples and spalling during the cure. If current trowel ripples are not removed, they will be visible on the panel. Use a 4’ X 8’ panel or use a V-notch trowel to remove the ridges (See A).
- Look for bubbles in the adhesive between panels. Low trowel ridges (less than full depth) allow for the adhesive to seep into the ridge, allowing for a good bond between the wall substrate and the panel (See B).

Undulated Ridges

- Do not use if there are undulated ridges that never reached the wall, and lack of pressure or adhesive on the wall prevented a good bond between the wall substrate and the panel (See A).

Allowing for Expansion Space Around Panels

- FRP changes dimension with temperature and pressure. Areas between and around the panel, allow for proper expansion and contraction. Always refer to the manufacturer’s spacing guidelines before the installation (See B).

Improper Rolling

- Adhesive needs to make contact over the entire substrate. First, the adhesive must be spread, and then roll over it (See A).

Flattened Beads

- If flattened beads are on the back of the panel, the adhesive or the wall substrate could never bond, and create bubbles. Inappropriate Trowel Selection & Use

- Adhesive or trowel selection could result in incorrect trowel ridges and spacing, creating bare spots or drag spots on the back of the FRP panel.

- Length of travel surfaces need to accommodate undulations and ridges, gaps between the wall surface and cast-in-place FRP panel. The travel continuos will help accommodate small imperfections. Use the adhesive product for adhesive working time. Make the second hand, the third time perfect.

- Please refer to the comparative guide for proper trowel coverage.

Applications of Adhesive

- Do not apply adhesive directly to the wall. Only apply adhesive to the FRP panel.
- Do not use more than the manufacturer recommended amount of adhesive in one trowel. FRP panels were not clean and adhesive bonded to only the loose particles. Inappropriate Trowel Selection & Use

- Adhesive or trowel selection could result in incorrect trowel ridges and spacing, creating bare spots or drag spots on the back of the FRP panel.

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### Installation Guide

#### Titebond® FRP Adhesive

**Notes:**
- For a full list of substrates, visit FranklinInternational.com.
- Titebond® FRP Adhesive is recommended for use with Titebond® GREENchoice™ Advanced Polymer Panel or Titebond Greenchoice™ Fast Grab FRP Adhesive.
- For additional installation instructions, please see FranklinInternational.com.

**Adhesive Recommendation for FRP to Various Substrates**

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<td>Yes</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Stainless Steel</td>
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<tr>
<td>Moisture Resistant Cement Board</td>
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<tr>
<td>Female Face Plywood</td>
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<td>Medium Density Fiberboard</td>
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**Tips for Installation:**
- **Trowel adhesion to the back of the panel (not the wall surface).**
- **Check wall surface for irregularities that might create adhesion: high/low spots, dust, oil, paint, excessive joint compound, etc.**
- **Allow panels to reach room temperature and lay panels flat for 24 hours before installation.**
- **Check to make sure the climate of the room, adhesives, panel and wall surface are all above 50°F and 24 hours before, during, and after installation. Avoid large temperature swings during the first 24 hours after installation.**
- **Do not exceed panel sizes as recommend by the manufacturer.**
- **Check the top and bottom millings for proper expansion space.**
- **Create overlap holes to allow for panel movement.**
- **Drill holes through the panel, such as done for ceiling, cabinets, sinks and machinery.**
- **Panel and wall surface are all above 50°F and 24 hours before, during, and after installation.**
- **Use Titebond® FRP Adhesive.**
- **Bonds porous substrates.**
- **Dries as solvents leave adhesive.**
- **Meets ASTM C557 specification.**

**FRP Adhesive**

- Titebond® GREENchoice™ Advanced Polymer Panel Adhesive
- Titebond® GREENchoice™ Fast Grab FRP Adhesive
- Titebond® Solvent-Based FRP Adhesive

**Titebond® FRP Adhesive**

- **Installation Guide**
- **Application Guide**
- **Storage & Handling Guide**
- **Titebond.com**

**Visit Titebond.com for the most up-to-date product information.**
**Installation Tips**

- Travel adhesion to the back of the panel (not the wall surface).
- Check wall surface for irregularities that might deter adhesion: High spots, holes, dust, oils, paint, excess joint compound, etc.
- Activate panels to near temperatures and lay panels for 24 hours before installation. Check to make sure the climate of the room, adhesive, panel and wall surface are all above 50°F and 24 hours before, during, and after installation. Avoid large temperature swings during the first 24 hours after installation.
- Do not correct trim as recommended by the manufacturer.
- Check the top and bottom moldings for proper expansion space.
- Create oversized holes to allow for panel movement if any permanent fasteners are through the panel, such as done for op ceilings, cabinets, sinks and machinery.
- Press and roll entire panel against wall substrate.
- Change is easier for all adhesives when they are new. Titebond® GREENchoice™ Fast Grab FRP comes up with ease. Titebond® Advanced Polymer Panel and Titebond Tactile Bonded FRP should be cleaned up with mineral spirits or equivalent solvent. Follow all the solvent vendor’s precautions.

**Adhesive Recommendation for FRP to Various Substrates**

<table>
<thead>
<tr>
<th>Substrate</th>
<th>Titebond® GREENchoice™ Advanced Polymer Panel Adhesive</th>
<th>Titebond® GREENchoice™ Fast Grab FRP Adhesive</th>
<th>Titebond® Solvent-Based FRP Adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Unpainted Drywall</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard Unpainted Plywood</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard Unpainted FRP</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire-Resistant Drywall</td>
<td>Yes</td>
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<td>Yes</td>
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<tr>
<td>Fire-Resistant Plywood</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Moisture Resistant Cement Board</td>
<td>Yes</td>
<td>No (may have longer drying time &amp; FRP may have to be braced)</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire-Resistant Cement Board</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Ceramic Tile</td>
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<tr>
<td>Stainless Steel</td>
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<td>Metal</td>
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<td>Wood</td>
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<tr>
<td>Foam</td>
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<tr>
<td>FRP</td>
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<td>Yes</td>
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<tr>
<td>Mold &amp; Moisture Resistant Drywall</td>
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<tr>
<td>DensGlass &amp; Fiberglass</td>
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<td>Firecode Core Drywall</td>
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<tr>
<td>Aluminum</td>
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<td>Galvanized Metal</td>
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<td>Foil Faced Insulation</td>
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<tr>
<td>Polyurethane Foam</td>
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<td>Polypropylene Foam</td>
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<td>Extruded Aluminum</td>
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<tr>
<td>Medium Density Fiberboard</td>
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<tr>
<td>Particle Board</td>
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<tr>
<td>Cement Block</td>
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<td>Yes</td>
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<tr>
<td>Ceramic Tile</td>
<td>No</td>
<td>Yes (may have longer drying time &amp; FRP may have to be braced)</td>
<td>No</td>
</tr>
</tbody>
</table>

**Notes:**
- For fire rated panels (FRP) are required, see Franklin International’s FRP Adhesive.
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