USG Fiberock® interior linings transform basic buildings, into desirable and durable indoor environments.

The only safe and easy-to-install interior lining system that resists: toxic mould, sound, impact, fire and water absorption or seepage into wall cavities.
better for life  ...naturally
Healthy
• Surface is plaster so there is no layer of paper to feed toxic mould
• Contains no sand or cement, meaning no on-site carcinogenic silica dust risk
• More resistant to water absorption than both fibre cement and wet area plasterboard, reducing the risk of lingering unhealthy dampness

Durable
• Higher resistance to joint cracking than both plasterboard and fibre cement
• Significantly stronger and stiffer than same thickness standard plasterboard and similar fibre cement lining systems
• Transmits less water than both wet-area plasterboard and fibre cement; keeping wall cavities drier

Quiet & Safe
• High density to block sound
• Numerous wall designs to provide options for different environments such as health, education, apartments, aged care as well as residential.
• Choices of wall designs to comply with BCA requirements
• Fire resistant systems up to 2 hours

Eco-Preferred
• Suitable for demounting when no longer required, and subsequent reuse
• Recycled content 95% - certified
• Low embodied energy wall systems
• Resistance to toxic mould formation
• Less site waste. Extra tapers can be easily formed on site if required, so all joints are recessed and reinforced, and initial off-cuts are also used efficiently, rather than becoming waste
• Avoids carcinogenic crystalline silica dust risk on site.

The latest edition of USG Fiberock® literature is always available to view at www.powerscape.com.au
### Table of Contents

**Main Section**

- Contents .................................................. 2
- Introduction ............................................ 3
- Healthy Indoor Environments ............................ 4 - 5
- Durable In-Service Performance ........................ 6 - 13
- Liberating New Design Freedoms, and Easy Installation 14 - 15
- Eco-Preferred ........................................ 16 - 17
- Design Considerations .................................. 18 - 21
- Wet Area Details ....................................... 22 - 25
- Wall System Specifications ............................. 26 - 31
- Appendix A Wall System Table .......................... 32 - 35
- Appendix B Hospital & Education Wall Systems ........ 36
- Appendix C Apartment Wall Systems .................. 37

**Box Features**

<table>
<thead>
<tr>
<th>Box Features</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Range Table</td>
<td>2</td>
</tr>
<tr>
<td>Acoustics Comfort</td>
<td>5</td>
</tr>
<tr>
<td>USG Tuff-Hide® Coatings</td>
<td>7</td>
</tr>
<tr>
<td>Unique Fiberock® Technology</td>
<td>12</td>
</tr>
<tr>
<td>Solid Touch-and-Feel</td>
<td>13</td>
</tr>
<tr>
<td>Levels of Finish</td>
<td>15</td>
</tr>
<tr>
<td>Less Mining and Landfill</td>
<td>17</td>
</tr>
<tr>
<td>Green Star Ratings</td>
<td>19</td>
</tr>
</tbody>
</table>

**Product Range, and Key Properties and Main Applications**

The principle nominal properties of the range of USG Fiberock® products are documented below. Also shown are main applications for each product.

### USG Fiberock® Range & Applications

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Thickness mm</th>
<th>Size mm</th>
<th>Edge TE/SE</th>
<th>Density Kg/m³</th>
<th>Weight Kg/m²</th>
<th>Main Applications (both dry and wet areas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiberock</td>
<td>13</td>
<td>1200 x 3000</td>
<td>TE</td>
<td>950</td>
<td>12</td>
<td>Interior wall and ceiling linings - widely used in education, medical, aged care, institutions, office, and in quality residential.</td>
</tr>
<tr>
<td>Fiberock VHI</td>
<td>13</td>
<td>1200 x 3000</td>
<td>TE</td>
<td>950</td>
<td>12</td>
<td>Interior linings where ultra high impact resistance is needed - containment ceilings, institutional walls.</td>
</tr>
<tr>
<td>Fiberock</td>
<td>16</td>
<td>1200 x 3000</td>
<td>TE</td>
<td>950</td>
<td>12</td>
<td>Interior wall and ceiling linings- especially apartment tenancy &amp; corridor walls.</td>
</tr>
<tr>
<td>Fiberock</td>
<td>10</td>
<td>1200 x 2700</td>
<td>SE</td>
<td>1000</td>
<td>10</td>
<td>Tile backer wall lining; Lining of eaves, and canopies; Acoustic underlay on framed floors</td>
</tr>
<tr>
<td>Fiberock</td>
<td>6.5</td>
<td>900 x 1800</td>
<td>SE</td>
<td>1200</td>
<td>8</td>
<td>Inner layer lining for acoustic walls - especially aged care timber frame structures; Stabilizer layer on framed floors under tiles etc</td>
</tr>
</tbody>
</table>

Australia freephone 1800 226 215
www.powerscape.com.au
Introduction

Imagine working with wallboards that possess the impact toughness of masonry, combined with the design and installation convenience of plasterboard. This elusive ideal, together with leading ecological and health properties, have long been sought by designers, and all those responsible for keeping walls looking good longer.

Now it is reality. Called USG Fiberock® these linings create an entirely new class of highly desirable and durable indoor environments.

This breakthrough interior lining technology turns dreams into reality in four key ways:

Healthy
Caring for your health by resisting moisture, mould, noise transmission and being free from carcinogenic crystalline silica dust risk.

Quiet & Safe
Keeping noise and fire within or from entering.

Durable
Keeping indoor environments looking good longer, and reducing ongoing maintenance.

Eco-Preferred
95% recycled, demountable and reusable, leaving more wilderness, desert, and forest to sustain earth ecology and for future generations to enjoy.

Available in Australia since late 2004, Fiberock linings are now the preferred interior lining solution with many leading designers and builders. Application is widespread in buildings for education, health, justice, and aged care. Also in community facilities and eco-offices. More recently, as knowledge of the benefits of this new technology has spread, application has commenced in luxury and eco-homes, and in apartment tenancy and corridor walls.

This brochure is designed to help you understand the unique attributes of Fiberock interior linings, and to provide the information needed for design, specification, BCA (Building Code of Australia) compliance, installation, and when no longer required - demounting for subsequent reuse.
Healthy Indoor Environments

Caring for your health by resisting moisture, mould, noise transmission, and being free from carcinogenic crystalline silica dust risk.

How Indoor Environments Affect Your Health
Considering how much of our lives we spend inside built structures, it is easy to understand how the quality of those structures can play a major role in our physical and mental health. In fact a study in the US by the Environmental Protection Agency found that 50% of all illnesses are caused or aggravated by indoor air pollution. Excess noise is also well documented as adverse to good health, productivity, and living comfort. Fiberock is designed to care for your health, by resisting moisture, mould and noise transmission.

Resisting Moisture Absorption and Lingering Dampness
Because humidity fluctuates with the seasons, moisture in the air varies throughout the year. Most buildings also have periods during the day in which humidity levels are raised by the use of water; such as various cleaning activities, showers, cooking and washing up. These periods require effective moisture management to preserve a healthy environment.
Modern building methods create almost airtight environments which trap moisture inside. We can observe this situation when warm, wet air comes in contact with windows and condensation forms on the glazing. Less noticeable, but more important, is moisture that is absorbed into fabrics and building materials causing them to become damp. This moisture can result in serious mould and mildew health hazards for inhabitants. Apart from being unsightly and causing decay, mould and mildew are suspected triggers for asthma, and can aggravate chronic health problems such as respiratory diseases, colds and allergies.
Compared with other wall linings, Fiberock strongly resists the absorption of water into the lining material, leaving any surface dampness to dry with proper ventilation. Fiberock has robust water repellent properties, it is the ideal wall and ceiling lining material for use right throughout the structure.

Resisting Toxic Mould and Mildew
Mould requires three key conditions to be present for it to become established, either on walls and ceilings or in wall cavities; moisture, a food source, and mould spores. Of these, mould spores are effectively present everywhere in the air, so to control mould it is necessary to control moisture and potential food sources.
Plasterboard, with its paper face is an ideal food source for mould. Controlling mould on plasterboard relies on surface coatings, and on the effectiveness of any mouldicide chemicals that may be added to the surface or core of the material.
Fibre cement sheet is also known to readily foster mould growth. Moisture can be absorbed into fibre cement, and through it into the wall cavity providing lingering moist growing conditions for mould. Food supply options include its cellulose reinforcement and any dirt that has travelled into the fibre cement sheet along with the moisture. Fiberock is engineered to provide exceptional resistance to the development of mould. It has no surface paper sheet to act as a food source. It has high resistance to the ingress of moisture and dirt into the sheet meaning that everyday moisture stays on the surface where it can quickly dry.

Weight gain % after 24 hour soak in water
Fiberock resists severe water soak absorption, keeping home drier.

- Fiberock
- Wet area Plasterboard
- Fibre Cement sheet

Mould growing on the face of an alternative wet area lining.
The cellulose reinforcement within Fiberock is not a readily available food source for mould because it is processed under high temperature and pressure and also because it is dispersed throughout the material - away from everyday moisture which remains on the sheet surface. As a result Fiberock is the stand out leader in resistance to mould formation, scoring the top score of 10 in the ASTM D3273 test.

**Safe Material - Free from Carcinogenic Crystalline Silica Dust Risk**
Pollutants which can permeate the air from building products such as wall linings are major concerns for many building contractors and occupants. Because it is free from all known health hazards including respirable crystalline silica and formaldehyde, Fiberock is an ideal choice for all interior linings.

**Efficient Temperature Management**
The most comfortable indoor temperature is between 18 and 24 degrees C. For instance, the World Health Organisation recommends temperatures should not drop below 18 degrees C. When temperatures drop below 16 degrees C, there is an increased risk of respiratory disease, along with increased condensation, mould and mildew problems.

Fiberock directly assists in the process of efficiently achieving thermal comfort, by enhancing thermal mass. With a specific heat content of approximately 1.1kJ/kg, Fiberock interior linings will absorb heat from the daytime sun. During the night temperature drop this heat is released, moderating indoor temperature fluctuations.

Wall system thermal insulation is achieved by the whole wall system, in which the wall cavity and any included insulation materials provide room-to-room and room-to-outside thermal insulation.

**Acoustic Comfort - Freedom to Both Make and Escape Noise**
Fiberock is designed to effectively suppress room to room noise transmission creating new levels of freedom for occupants to both make and escape noise. Its extra high mass is the first and most important step to reducing airborne sound transmission. Cracks in wall linings act with sound just like cracks in a boat’s hull act with water. If cracks are present the sound will get through.

The superior joint strength of Fiberock (see fig. page 6) resists crack formation and as a result ensures ongoing effective acoustic comfort room to room. Designers need to consider all the possible pathways for sound transmission between sound separated regions or rooms. Good design will address these, taking into account doorways, windows, and even such fixtures as electricity outlets. Further acoustic performance information is included on Page 20. Specification pages commencing on page 22 show Fiberock acoustically rated wall systems.

Effective sound design will also limit horizontal transmission of sound through the floors (see footbox below). By combining Fiberock on the walls and ceilings, and on framed floors, sound can be mostly contained at source.

---

**Acoustic Comfort – Boosting Floor Performance**
Considerable acoustic benefits can be attained when insulated cavity walls lined with Fiberock are used with framed floors lined with Fiberock acoustic underlay.

**PARTICLE OR PLYWOOD FLOORS:**
Laying Fiberock 10mm over particleboard or plywood floors not only significantly reduces horizontal and vertical noise flows, it also reduces bounce and vibration creating the sense of a quality platform. This combination also greatly reduces the risk of fire burn down, and provides a solid, dimensionally stable foundation for tiles and other modern final floor finishes. Alternatively, if acoustic sound suppression is not required, using Fiberock 6.5mm flooring stabilizer can achieve a dimensionally stable floor for tiles or other final flooring materials.
**Durable In-Service Performance**

Keeping indoor environments looking good longer, and reducing ongoing maintenance.

**Introduction**

Achieving a wall system with long lasting good looks requires attention to the following five critical elements:

- Joint Strength
- Indentation Resistance
- Surface Abrasion Resistance
- Impact Resistance
- Ease of Repair

**Joint Strength**

The strength of sheet edge to sheet edge jointing is one of the most critical performance parameters for durable wall systems. The force placed on a wall during impact, results (amongst other things) in high stresses on sheet joints.

For this reason Fiberock wall systems are designed with extra joint strength. This is achieved through the following three unique features:

- **Enlarged taper dimensions.** Fiberock has taper edges of enlarged dimension, when compared with most other panels.
- **Stronger surface bonding.** The bonding of jointing compound to Fiberock is excellent due to the surface sealer being optimised for adhesion. The bond strength is not limited by any possibility of paper surface delaminating as Fiberock is of homogenous structure.
- **No surface wide-set butt-end jointing.** There is no need for any weak surface jointing (without taper edges) due to the ability to form additional tapers as required on site during installation.

The relative joint strength for different linings, tested with the manufacturer’s recommended jointing materials, is shown along side.

Whilst standard plasterboard compounds (as used above in testing) can be used, for optimum performance and compatibility the following USG products are recommended:

- **Setting Compounds:** USG Sheetrock® Durabond, or USG Sheetrock® Easy Sand™
- **Top Coats:** USG Sheetrock® Total, Total Lite™, or Plus 3™
Durable In-Service Performance

Indentation Resistance
Small, hard objects are the usual cause of indentation damage to walls. These can be carried objects, such as items of luggage, containers, tools and other equipment. Such damage is usually accidental, but if left in a state of disrepair, will attract more and more damage over time. A standard international test has been developed to simulate a very severe small hard body impact. A 1.0 kg steel ball is dropped through an arc to impact upon the lining material. The test reference is ISO 7892:1998 and the draft 2002 ASTM standard specification for abuse resistant interior panels.

Surface Abrasion Resistance
Whilst most consequential damage to walls arises from impact, consideration of abrasion damage is also important. The abrasion resistance of any finished wall system depends on the abrasion properties of the applied surface coating (see footbox below), rather than on the abrasion resistance of the lining material itself. This is because once the surface finishing material becomes abraded, further wear would result in dust from the substrate starting to be released. The wall surface has also become unsightly, and needs to be promptly repaired. The abrasion resistance level of the lining material itself will neither speed, nor hinder, this outcome in any way. To increase the wall system abrasion resistance, it is imperative to increase the abrasion resistance of the coating.

The most important property of the lining material is its reliable acceptance of, and good bonding to, the desired coating material. This is true whether the selected abrasion resistant coating is paint, paper or any other applied surface material. Fiberock interior linings, with their mineral rich smooth surface and factory applied clear acrylic sealer, are the ideal wall base on which to apply abrasion resistant finishing coatings. Their factory applied sealer normalises surface suction and aids the effective application of paint, or adhesives for tiles or other laminated surfaces.

Extra High Abrasion Resistance
Where very high ongoing levels of abrasion resistance are needed, a coating of USG Sheetrock® Tuff-Hide® Primer-Surfac er as part of the final finishing system can be specified.

Tuff-Hide® is a dual-purpose acrylic based coating especially formulated for application over interior linings, and providing in a single spray application what would normally be a two-step process for a Level 5 coating. In addition, one of its main attributes is its cured hardness and resistance to minor bumps, knocks and especially abrasion. This is further enhanced by the high density Fiberock linings providing an extremely rigid base.

This extra tough surface treatment should be complemented with an appropriate finish coat such as waterborne enamel.

Indentation Relative to 16mm Fiberock interior linings - Small Hard Body Impact Test
Fiberock dented less than all other materials

Extra High Abrasion Resistance

**Durable In-Service Performance**

**Impact Performance - Timber Frame**
Fiberock outperforms other tested interior linings when used in timber frame wall systems. Performance was examined from both soft and hard body impacts. The impact is repeated with increasing energy levels until failure is noted. Two failure points are important:

- **First surface cracking** — at which time visual damage to the wall was evident and the performance of the linings would likely have been impaired in terms of resisting further impact. Repair would be necessary at this point.
- **Penetration** — at which time the lining material was fully penetrated by the impact object. For impacts of this magnitude, where penetration occurs, repairs would typically become more complex and expensive.

**Soft Body Impact** Soft body testing was completed to BS 5234:1999, and involves a 50kg bag filled with glass beads swung on a rope. The test simulates human body impact. The following graphs show the lowest recorded impact energy for each lining type for tests undertaken with a minimum sample size of three specimens of each lining.

Typical energy exerted by the shoulder of an adult male when impacting a wall at speed is up to 120 joules.
**Durable In-Service Performance**

**Hard Body Impact** The test involves a 5.44 kg steel hammer swung on a 3.0m axis against the wall surface with increasing levels of energy. This test replicated the effect of various in-use exposures to either intentional or accidental damage from a large hard object. Again first surface cracking and full penetration were the two points of failure noted. Hard body testing was completed to the draft 2002 ASTM standard specification for abuse resistant interior panels. The following graphs show the lowest recorded impact energy for each lining type for tests undertaken with a minimum sample size of 3 specimens of each lining.

An example of hard body impact is an intentional solid kick on the wall with a boot, which will result in an impact energy of around 50 or 60 joules.

![Graph showing impact resistance for cracking and penetration]
Durable In-Service Performance

Impact Performance - Steel Frame
Fiberock outperforms other tested interior linings when used in steel frame wall systems. For this test, performance was examined for impact from both soft and hard bodies. The impacts were repeated with increasing energy levels until failure was noted. Three specimens of each material were tested, with the lowest result being reported. Two failure points are important:

- First surface cracking – at which time visual damage to the wall was evident and the performance of the linings would likely have been impaired in terms of resisting further impact. Repair would be necessary at this point.
- Penetration – at which time the lining material was fully penetrated by the impact object. For impacts of this magnitude, where penetration occurs, repairs would typically become more complex and expensive.

Soft Body Impact
Soft body testing was completed to BS 5234:1999, and involves a 50kg bag filled with glass beads swung on a rope. The test simulates human body impact. The typical impact energy exerted by an adult male when shoulder barging a wall at speed is up to 120 joules.

The following graphs show the lowest recorded impact energy for each lining type for tests undertaken.

First surface cracking, soft body, steel frame
Fiberock can handle twice the impact and still look good

Penetration, soft body, steel frame
Fiberock VHI uniquely, could not be penetrated, even at 500 joules
Durable In-Service Performance

**Hard Body Impact** Hard body testing was completed to the draft 2002 ASTM standard specification for abuse resistant interior panels. The test involved a 5.44 kg steel hammer swung on a 3.0m axis against the wall surface with increasing levels of energy.

This test replicated the effect of various in-use exposures to either intentional or accidental damage from a large hard object. Again first surface cracking and full penetration were the two points of failure noted.

An example of hard body impact is an intentional solid kick on the wall with a boot, which will result in an impact energy of around 50 or 60 joules.

---

**Single sheet deflection resistance relative to Powerscape Fibero**

**Fiberock is the Outstanding Leader**

![Graph showing comparison of different materials' resistance to deflection](image)

**Impact Resistance for Cracking (joules)**

- Regular Plasterboard 10mm
- Regular Plasterboard 13mm
- Scrim Plasterboard 13mm
- Fiberock Utility interior linings 13mm
- Fiberock Utility interior linings 16mm
- Fiberock VHI interior linings 13mm
- Fibre Cement 9mm

WEAKER  
STRONGER

**Penetration, large hard body, steel frame**

Fiberock VHI, uniquely, could not be penetrated, even at 140 joules

![Graph showing comparison of different materials' resistance to penetration](image)

**Impact Resistance for Penetration (joules)**

- Regular Plasterboard 10mm
- Regular Plasterboard 13mm
- Scrim Plasterboard 13mm
- Fiberock interior linings 13mm
- Fiberock interior linings 16mm
- Fiberock VHI interior linings 13mm
- Fibre Cement 9mm, Fibre Cement 9mm

WEAKER  
STRONGER
Durable In-Service Performance

Ease of Repair - Lower Maintenance Costs
Fiberock interior linings have important features that make repair, if and when needed, generally a straight-forward localised task:
- Fiberock interior linings have no surface paper to scuff, tear or delaminate.
- Fiberock, when it finally fractures under severe impact, typically fails locally. This means that standard drywall repair techniques can be utilised. Unless the impact is extreme, the failure region still maintains its integrity behind the plane of the wall, meaning that there is a reliable surface against which to fill, to complete the repair operation.

In this test programme, none of the test specimens of Fiberock demonstrated any tendency to fracture vertically or to distort the sheet surface. Some other lining materials have this tendency usually resulting in the need to replace a complete sheet along with associated trim materials.

Photographs of typical specimens (front and back) from hard body test series. Fiberock is not only stronger, but also easier to repair if damaged.

As well as being the standout performance leader in all the key durability consideration elements already reviewed, Fiberock interior linings are also the preferred lining option if and when repairs are needed.

Unique Fiberock Technology
In the manufacture of Fiberock interior linings a highly refined cellulosic fibre is heated, under pressure, in a ground gypsum rock slurry. During the process volatile materials are removed. The process mineralizes the fibre, with the gypsum rock nucleating into natural apertures in the fibre walls. As a result, exceptional strength and stiffness are achieved. The lining surface is formed by ‘floatation’. This process directly creates a smooth mineral rich surface, and avoids fibre fluff typically experienced with many other products that need to be sanded smooth during production. Fiberock interior linings are finished with a factory baked on clear sealer, which creates an even suction for subsequent jointing, painting and other finishing systems.

These three scanning electron microscope images show, with increasing magnification (from left to right), the close bonding of cellulose fibre strands to the gypsum rock crystals, including the formation of gypsum crystals within the natural apertures in the fibres themselves. It is this bonding, achieved through this new patented manufacturing process, that underpins the exceptional impact resistance and durability of Fiberock.
Durable In-Service Performance

Masonry Comparison
In terms of impact resistance, concrete masonry blocks (unfilled) were also tested under the large hard body test method. First cracking was observed at 44 joules, and penetration at 44-58 joules depending on position of impact. This means that Fiberock 13 and 16mm linings have greater hard body impact resistance than masonry, and Fiberock VHI 13mm very much greater penetration resistance.

Cost Comparison
The following estimated cost comparisons are provided as a general guide only, and hence should not be relied on for design, costing or other purposes without local verification.

- Fiberock 13mm is expected to have a broadly similar product cost to fibre cement 9mm sheet, and to scrim reinforced plasterboard. Large installation efficiency gains and labour savings should be anticipated for Fiberock compared with fibre cement sheet.
- Product cost for Fiberock VHI is expected to often be a little higher than 9mm fibre cement reflecting its superior strength and health features, but due to easier handling, cutting and installation to represent a roughly similar cost on an installed wall system basis.
- Fiberock VHI wall systems are estimated to typically be around half the cost of plastered precast or tilt slab concrete wall systems. They are also expected to be significantly less expensive than plastered masonry walls.

These price guidelines reflect the estimated relative price position that applied at publication date, and prices should be anticipated to vary over time according to the pricing decisions of individual product suppliers, as well as by region.

Enhanced Fire Safety
Fiberock provides excellent fire safety. The absence of a paper surface combined with the mineral core means that it has leading surface fire resistance properties, as well as being an effective room to room fire barrier. See pages 20, 21 and 26-29 for further detail on fire rated wall systems.

Not For Termite Consumption
Independent testing with Formosan Subterranean and Southeastern Drywood Termites shows that Fiberock is not tolerated by these termites as a source of food. There is no paper layer on the rear surface of Fiberock for termites to eat inside the wall cavity. And neither will termites eat through it to access a food source on the other side, giving a greater sense of security, longevity and investment value.

Solid Touch-and-Feel
When pressing on Fiberock there is very low deflection rather than the flimsiness associated with some other common lining materials. This stiffness adds an unmistakable air of quality to indoor environments. The chart below left shows wall system stiffness. Results are expressed relative to Fiberock on studs at 600mm centres. Clearly there is no longer a need to place studs at 450 centres with standard walls to try to improve stiffness. Using Fiberock at 600 centres will be 400% better than 10mm plasterboard at 600 centres, and almost twice as good as 13mm plasterboard at 450 centres.

Fiberock's inherent ability to hold nails and other fixings results in much higher wall bracing. This increases structure strength, which is reassuring during heavy wind, and any seismic events.
**Liberating - New Design Freedoms and Easy Installation**

Installs and finishes easily like plasterboard, but with an extended range of design and reliable surface finishing flexibilities.

**Best Substrate for Paint, Tile, Vinyl, and Laminate**

Until now, fibre cement was the first choice for use under tiles because it had no surface paper to delaminate. And the best choice for paint finishes was plasterboard with its smoother face. Both of these were less than ideal for wallpaper and vinyl finishes. As a result, walls or surfaces utilising multiple finishes created a challenge on site. Fiberock eliminates virtually all surface finish compatibility constraints. It is the ideal substrate for almost any surface finishing material:

- For paint finishes Fiberock provides stronger and flatter joints creating the necessary foundation for a quality finish. The pre-sealed surface provides even suction for the paint resulting in more even coverage.
- For tile finishes the pre-sealed surface gives excellent adhesive bonding and the high dimensional stability reduces any risk of grout or tile popping or cracking.
- For wallpaper and vinyl the pre-sealed surface enhances removal capability when renovating.
- Most laminates can also be bonded to Fiberock as there is no risk of the delamination of any surface paper.

**Available in Four Thicknesses**

USG Powerscape linings are available in four thicknesses, to satisfy a wide range of applications:

- **13mm** for interior walls and ceilings, in both dry and wet areas; widely used in education, medical, aged care, offices, community & recreation facilities, and also used in retail and residential (premium, eco, and institutional).
- **VHI 13mm** same as above but with ultra-high impact resistance, so typically used in institutions & gymnasiums, and for ceilings in containment facilities.
- **16mm** for interior walls and ceilings, in both dry and wet areas; predominantly in apartment tenancy and corridor walls, and other applications requiring 1 hour fire rating and high acoustic ratings.
- **10mm** suited for interior walls and ceilings, in dry and wet areas, predominantly as a square edge tile backer lining, but also (with site machined taper edges) for painted surfaces. Also used to line the underside of eaves and canopies which are free from direct rainfall and direct rain splash. Also used as an acoustic underlay on framed ply and particleboard floors.
- **6.5mm** suited for use with interior walls in dry and wet areas, as high acoustic performance inner layer lining; extensively used in timber frame aged care structures, and in other places requiring cost effective acoustic improvement beyond single lining layer wall system performance. Also used as a stabilising layer on framed ply and particleboard floors in preparation for tiles and other floor finishing products.

**Easy to Cut, Fix and Finish**

Powerscape Fiberock linings are gypsum based and hence install easily, in much the same way as plasterboard. Sheets can be sized by score and snap (except VHI 13mm) or wood working power tools can be used (with dust extraction). Fiberock sheets of thickness 13mm and 16mm come with factory formed tapers to long edges, and if desired additional tapers can be formed on off-cuts and sheet ends on site, to avoid weak wide-set butt-end jointing. Fixing to steel studs is with drywall screws which seat easily below the surface, and into timber studs with either drywall screws or with nails (gun or hand driven). Setting is carried out with paper tape and two coats of setting compound, following by one coat of finishing compound. Paint and tile finishing is similar to plasterboard. Specify desired level of finish as discussed in the footbox on Page 15. See additional installation and finishing detail on Page 21 of this brochure, and download the Fiberock Installation Guide from www.powerscape.com.au

**New Taper Edge Freedoms for Better Joints**

Fiberock 13mm and 16mm sheets come with factory formed tapers (or recesses) to both long edges of the sheet. Sheet ends, and site cut edges, can be easily tapered on site if desired with a hand plane, or electric plane or router with dust management. Fiberock 10mm sheets come with square edges for optimal performance as a tile backer board. Additional tapers are easily formed on site on sheet edges and or ends, or on parts of sheet edges, where reinforced tapered joints are required for paint or other finishes requiring such jointing. Fiberock 10, 13 and 16mm do not require sealing of any site cut tapers before the commencement of jointing.
The Creative Edge

Fiberock offers entirely new possibilities for edge finishing and display. Once again, its uniquely workable properties render the essentially two-dimensional limitations of plasterboard or fibre cement obsolete by adding a third dimension of depth.

Because of plasterboard’s make up, exposing the edge is not normally feasible due to roughness in the interfaces between the paper surfaces and the gypsum core. The lack of reinforcement throughout the brittle core also prevents the edge being profiled. This is not the case with Fiberock which can be worked with normal woodworking tools on site. A number of distinctive profiles can be achieved using either routers or planes, opening up many creative possibilities for the edge being profiled. This is not the case with Fiberock which can be worked with normal woodworking tools on site.

3D Surface Detailing

Fiberock allows interior designers to explore a new realm of 3D (three dimensional) surface treatments. No longer are walls rigidly flat; with this new material, walls can feature new details that were previously too difficult to achieve or simply not possible. For example:

- A simple site formed surface detail groove at dado height or higher on the wall, can capture the eye and bring focus without spoiling an overall minimalist look.
- Surface profiling applied more expansively, with vertical grooves formed in the wall and moving closer together towards a doorway or void can create movement.
- Patterns or curves can create distinctive personal design statements, create special visual effects, or even align with a brand logo.
- Surface profiles can visually integrate places together, and separate others.
- And, when it is time for a change, the existing profile can be filled and left flat, or be replaced with a fresh surface treatment.

Surface detailing requires precision machining, and extra attention during finishing.

Hang Wall Fixtures in Exactly the Right Place

Gone are the days of knocking on walls or ceilings to locate studs or something of substance to hang pictures, light fittings and other wall furniture. Gone also, are the days of having to hang art in a slightly off centre position because that happens to be where the stud is located.

With Fiberock there is no need for hammer drills to make holes in concrete or brick, and no unsightly chunks of concrete or brick breaking out through imprecise workmanship. Simply screw picture hooks and wall furniture directly into the lining, regardless of where the studs are. Powerscape 13mm linings can take loads of up to 15kg per screw at the screw head, (16mm 16kg, 10mm 10kg).

Levels of Finish - Getting the Finish You Want

Levels of Finish is an industry tool to assist in specifying the required quality of finish when installing and finishing interior linings. Level 4 and 5 finishes are commonly specified. These levels of finish are detailed in the standard AS/NZS 2589.

Level 4 finish is the generally accepted level of finish for regular domestic construction. It is used where non-critical lighting falls on satin/flat/low sheen paints, or where critical lighting illuminates wallpaper or textured finishes. Level 4 is the default if the level is not specified.

Level 5 finish is used in regions where gloss or semi-gloss paints are specified or where critical lighting conditions occur on satin, flat or low sheen paints.

The key difference between a Level 4 and Level 5 finish is that a Level 5 finish requires that the entire surface is covered with a thin layer of special compound, called a “skim or mist coat” to remove differential surface textures and porosity. USG Sheetrock® Tuff-Hide® Primer-Surfacer (see page 7) was developed specifically for this purpose. Stricter framing and installation requirements must also be addressed for a Level 5 finish.
Eco Preferred

95% recycled, demountable and reusable, leaving more wilderness, desert, and forest to sustain earth ecology and for future generations to enjoy.

Introduction
Good Environmental Choice Australia state that around 30% by weight of resources disposed of in landfills is construction and demolition waste. And, further, that a large proportion of this waste is gypsum plasterboard. Fiberock interior linings can deliver superior ecological (see footbox page 17), energy, and safety outcomes, surpassing traditional Australian lining alternatives such as paper-faced plasterboard, fibre cement sheet, and masonry products.

Outstanding Recycled Content
The Good Environmental Choice plasterboard Standard in Australia requires a minimum recycled content of a very modest 10%. Fiberock linings blitz this, as 95% of their raw materials come from recycled external waste streams:
• 85% is post industrial gypsum, a waste product obtained from an electricity generator. No open cast or underground mining of gypsum is needed for the manufacture of Fiberock linings;
• 10% is recycled cellulose, meaning no trees are harvested for the manufacture of Fiberock linings.
Using Fiberock linings achieves a recycled content almost 10 times greater than the Standard requires.

Minimisation of Site Waste
Using Fiberock interior linings can reduce site waste. This is due to the ability with Fiberock to reuse off-cuts during installation; machining in extra tapers to off-cuts as needed.
With plasterboard, depending on wall design, typically up to 10% of the purchased material ends up not being used for the intended lining purpose. This is because most plasterboard off-cuts do not have taper edges, and hence are not usable as lining material on subsequent wall sections.
Some fibre cement off-cuts can be theoretically tapered on site for re-use in subsequent stages, however in practical terms the abrasiveness of the material and its adverse dust characteristics mean that this process is seldom attempted. Again high waste levels to landfill often result.

Demounting and Reuse Now Possible
Fiberock linings can be demounted and recovered during demolition, and then be reused again on another structure. This is normally impossible with plasterboard and fibre cement as the original tapers in these sheets are not realistically able to be cleaned of jointing materials. Whereas Fiberock linings after demounting can have new edge tapers machined in, making reuse now practical. See the Fiberock linings Installation Instructions for additional details, and also for steps to take during initial installation, to make demounting and reuse an easier task.

Embodied Energy Savings - 24-265 MJ/m²
The embodied energy of Fiberock is around 5.5 MJ/kg (cradle to gate)\(^1\). If it is planned to demount and recycle Fiberock linings once during their lifecycle the embodied energy per use drops to 2.75 MJ/kg. Installing Fiberock 13mm linings, and planning for their eventual demount and reuse, saves around 24MJ/m\(^2\) of energy compared with scrim plasterboard 13mm (see graph next page). Switching double brick walls to Fiberock framed wall systems delivers even greater energy savings. From a wall performance viewpoint this is now feasible (as is the substitution of masonry & concrete walls) in most situations, given the outstanding strength, stiffness, water and fire resistance, and acoustic properties of Fiberock linings.
Using Fiberock Reduces Mining and Landfill Dumping by 1 to 2 Tonne Per Typical Office Sized Room

When Fiberock linings are used in place of plasterboard in Australia:

- Mining of raw gypsum is totally avoided because Fiberock linings are made from waste stream gypsum coming from an electricity generator.
- Disposal in landfills is substantially reduced because the electricity generator’s waste stream gypsum does not need to be dumped in a landfill.

When the effects of whole buildings are considered, substantial reductions in both mining and landfill activity are achieved.

Fiberock is currently sourced from a plant in the United States to develop the market in Australia sufficiently to warrant local plant establishment. Supply from this US plant involves two non-typical greenhouse gas elements; one a benefit and one detriment. Most of the electric energy applied at this plant is greenhouse gas beneficial, as the closest generator on the supply grid is nuclear, with very low CO2 emissions. Supply from this plant also involves a temporary energy increment for logistics to Australia, of around 2.5MJ/Kg. A local plant supplying Australia is unlikely to maintain this nuclear energy low CO2 emission benefit, but neither would it incur the current temporary logistics energy increment. Analysis is on a local plant expected energy basis, which the reader can adjust for the temporary nuclear benefit, and extra logistics energy increment, if deemed appropriate. Embodied energy data for other products sourced from www.greenhouse.gov.au, product manufacturers’ literature, and in the case of plasterboard other studies as well. The www.greenhouse.gov.au plasterboard value of 4.4 MJ/Kg seems low compared with other international values, especially when the coastal shipping of gypsum used in Australia is taken into account. So 5.5 MJ/Kg is used for plasterboard.

New Standard in Safety for Occupants and Installers

The new technology used to manufacture USG Fiberock linings has lifted the safety performance bar for interior linings; turning four key previous limitations of traditional products into new safety features:

- **No Carcinogenic dust risk, or onerous clean up requirements.** USG Fiberock has no risk from carcinogenic crystalline silica dust. This makes it easy to install safely, and to undertake subsequent repairs and renovations.
- **High resistance to toxic mould** Powerscape Fiberock does not have surface paper layers to act as food sources for toxic mould growth, as already discussed on pages 4 and 5.
- **Resistant to water absorption and transmission** A water repelling agent is distributed right throughout the homogeneous structure of Fiberock linings. The superior water resistance of USG Health, as already discussed on pages 4 and 5, helps to prevent lingering dampness, and associated disease.
- **Clean Indoor Air** Powerscape Fiberock linings have been tested in Japan for emission of aldehydes, VOCs and TVOCs, and awarded the four-star ministerial approval. This is one of the most demanding clean air tests available, providing peace of mind that a safe and healthy interior environment is being created.

Key Endorsements

**Good Environmental Choice and Green Building Council** The applicable products for Good Environmental Choice endorsement is shown on page 2. Good Environmental Choice accreditation links to Green Building Council ratings. Information to assist in the use of the rating tool is shown on page 19.

**Scientific Certification Systems** The 95% recycled content applies to all Fiberock interior linings sold in Australia. Scientific Certification Systems certify this claim, and the latest entry can be found on their web site, by searching either under USG, or Fiberock.

**Ecospecifier** Ecospecifier® is a leading group of independent eco-assessment professionals. For more details on Ecospecifier and the USG Fiberock products refer to www.ecospecifier.org
Design Considerations

USG Support Services
For assistance with product samples, design and specification, quotation and supply, and installation contact USG on Freephone 1800 226 215.

Intended Applications
Fiberock laminings are engineered for interior wall and ceiling lining applications in places requiring superior eco properties, sound control, solid touch-and-feel, strength, stiffness, dent and impact resistance, fire resistance or for effective furniture fixing capability.

Suitable for use in dry areas and wet areas such as bathrooms, kitchens, laundries, laboratories, garages and toilets. It’s outstanding water and mould resistance make it especially suited for demanding applications such as medical, aged care, education, rental and tourist accommodation, and for use in homes where maximum health care is sought.

Building Code of Australia
Fiberock wall systems described in this brochure exceed the requirements of the Building Code of Australia BCA Section C1.8. In particular:
• Multi-occupancy wall system designs are included which meet acoustic and fire requirements. All acoustic and fire ratings shown in this document are fully supported by expert opinion (available on request) from professional consultants and are based on independent tests for the actual (or a similar) system. Expert opinion is shown in the Building Code of Australia as a suitable way for compliance to be demonstrated;
• Wet area wall design detail and Building Code of Australia compliance requirements are shown in the relevant sections of this document including pages 4, 5.

Framing, Sheet Size and Layout
Fiberock is suitable for use with timber or steel frames. All framing should be detailed and installed in accordance with the requirements of the Building Code of Australia. Timber framing should be designed in accordance with AS 1684:1999 and steel framing in accordance with manufacturer’s specification. Fiberock is available throughout Australia in sheets of dimension shown in the table on page 2. Given that all joints can be tapered, mixed vertical and horizontal layout is also possible, as is fixing with joints off the framing as long as such joints are glued and back blocked. In regions of walls where high impact is likely to occur, all joints should be supported by nogs, or by screwed and glued back blocking using a strip of Fiberock lining.

Timber Frames:
• Timber frames must consist of kiln dried F5, MGP 10 or No.1 verified visually graded Radiata Pine studs with a minimum cross-section dimension of 70 by 35 mm. These studs must not be placed at a spacing greater than 600mm centres.
• The timber frames used in impact testing consisted of kiln dried, MGP 10, 90 mm x 45 mm studs placed at 600mm centres in a 2.4 m high wall.
• If fire rated wall design is required, see the requirements for the relevant fire rated wall design later in this brochure.

Steel Frames:
• For high level impact resistance studs used in steel frames should have a minimum thickness of 0.92 mm, a minimum depth of 92 mm, and a maximum spacing of 600mm.
• The steel framing used in testing consisted of 92mm deep by 1.15mm thick steel studs placed at 400mm centres in 1.15mm thick C section top and bottom plates.
• Testing showed steel studs with thickness less than 1.15mm tend to fail early under impact due to local buckling, regardless of selection of lining material.
• See steel stud manufacturers literature for further steel stud information and performance design parameters.

Key Material Properties (Typical Values from Testing)

<table>
<thead>
<tr>
<th></th>
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<td>Cross Direction</td>
<td>Machine Direction</td>
<td>Cross Direction</td>
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<td>3.1</td>
<td>5.9</td>
<td>4.7</td>
</tr>
</tbody>
</table>
Design Considerations

Use on Ceilings
Fiberock is ideal for use on ceilings, including in demanding interior wet area rooms. Maximum frame spacing is 450mm for 10mm, and 600mm for 13 and 16mm. Humidified sag testing of Fiberock to ASTM C630 standard showed 0 mm of sag, versus the allowable 5 mm for plasterboard.

Fiberock Interior Linings Adjacent to Plasterboard
Fiberock interior linings may be placed adjacent to plasterboard of similar thickness and the joint can be finished conventionally using paper reinforcing tape in the joint. Ensure that both materials have a taper edge for the full length of the joint.

Attachment of Fixtures
Fiberock provides an excellent foundation material for attaching a wide range of fixtures to the wall. Fiberock often eliminates the need for additional nogs or back blocking for attaching many fixtures and only seldom requires pre-drilling when attaching the fastener.
As a general guide, 13kg of static vertical (or any other direction) load can be supported by Fiberock 13mm when applied at the head of a single screw. With Fiberock 10mm linings 10kg, and Fiberock 16mm linings 16kg.
The screw can be either self tapping or high thread, and of gauge between 6 through 12 (8 gauge high thread is preferred). No pilot holes are needed, and screws should be inserted sufficiently to allow the parallel thread section of the screw to be in contact with the full depth of the 13mm Fiberock interior linings.

Green Star Eco Rating Systems – Green Building Council of Australia

USG Australia is a member of the Green Building Council of Australia, and USG Corporation one of the founding members of the Green Building Council in the United States.

The Green Building Council in Australia presently has rating tools, or pilot rating tools, for the following building types:
• Education • Healthcare • Shopping Centre • Office (new and existing, as well as office interiors).

In summary, the following categories and points (depending on tool) apply: Innovation (up to 5 points); Eco-preferred content 95% (up to 10 points); Durability 10 year warranty (up to 10 points); Designed for Disassembly (up to 10 points).

When using these rating tools, the following properties of Fiberock linings should be given consideration, for inclusion. This information is presented under the Green Rating Tool Heading codes.

Inn - Innovation Fiberock products are produced with a proprietary new manufacturing technology to achieve improved eco and health outcomes, versus regular plasterboard and fibre cement. The manufacturing process has many patents. The Environmental choice accreditation (see page 2 for applicable products) makes application for innovation points easy, in some of the tools.

Man - Waste Management Using USG Fiberock wall linings will assist with waste reduction management as most sheet off-cuts can have rebates formed on them on site and then be used, rather than going to dump.

Mat - Walls and Partitions Fiberock wall linings are independently certified as being made from 95% recycled raw materials content. Additional eco-advantages are documented in www.ecospecifier.org such as outstanding resistance to mould propagation, zero VOC emissions, effectively zero crystalline silica content, and low embodied energy.

IEQ - Internal Noise Levels Fiberock wall linings and wall system designs have documented sound transmission reduction ratings, compliant with the BCA (Building Code of Australia.) In most cases these are superior to same thickness plasterboard due to the stiffness and mass of the Fiberock linings.

IEQ - Volatile Organic Compounds The Fiberock products have no VOC emissions. The products are pre-coated in the factory with an acrylic sealer creating a surface suited for use with most low and non VOC paints and adhesives.

IEQ - Formaldehyde Minimisation The Fiberock products do not emit formaldehyde as they use an inorganic, rather than organic, binder, and normally use mechanical fixings rather than adhesives.

IEQ - Mould Prevention All Fiberock sheets achieve the maximum score of 10 in the demanding ASTM D3273 mould propagation tests – outperforming fibre cement and wet area plasterboard.

Ene - Energy Improvement (i) The use of timber framed structures with particleboard or plywood floors to replace high embodied energy concrete construction is sometimes made possible if Fiberock 10mm is used to stiffen the floor, improve acoustics, and reduce fire burn down risk. (ii) Thermal mass is improved by using Fiberock linings instead of plasterboard.
The thermal mass of Fiberock linings is approximately 1.1 kJ/kg. (iii) The use of Fiberock linings has lower embodied energy than most concrete and fibre cement wall systems, and can also be better than plasterboard (particularly if product demounting and reuse is included), as discussed earlier on page 17.
**Design Considerations**

**Use in Wet Rooms**
When specifying Fiberock for use in wet rooms, the details shown on the separate wet area brochures* should be followed, and the following points should be noted:

**Finishing Materials** In all areas of wet rooms (other than those subjected to regular direct water flows) the normal full choice of finishing materials applies, including paint, wallpaper and tiles, all of which can be used on the same wall. When used to line shower cubicles, or in shower over bath applications, Fiberock must be faced with ceramic tiles, or alternatively with heat welded flexible sheet vinyl.

**Special Framing Requirements for Wet Rooms** In wet rooms ensure that additional nog is included as shown in the wet room design detail drawings which follow. Nogs must be included: adjacent to pipe penetrations; between all studs above bath flanges and preformed shower bases; behind sink and tub flashings; and to support towel rails, grab rails and wall basin brackets with Fiberock 10mm linings, and for Fiberock 13mm and 16mm linings where the applied load will be greater than 13kg per screw at the screw head.

**Overall Moisture Control**
No matter what interior lining material is used attention is needed to moisture management during all stages of the construction cycle. Moisture needs to be controlled through effective design, good construction practice, and ongoing maintenance. This will include:
- Protection of Fiberock from water during transportation to ensure dry delivery to site.
- Use of water-protected site storage, with linings laid flat, and elevated from the floor.
- Installation to building structure when full weather protection (roof, exterior cladding, windows etc) is in place.
- Maintaining ventilation when moisture is introduced to the job site such as through wet cement or drying paint.
- Treating water infiltration from any source with urgency. Stopping leaks as soon as they appear.
- Creating building exteriors (roof, cladding, doors and windows) with multiple barriers to water intrusion, and providing drainage and drying to avoid trapping moisture.

The key to minimising moisture problems and mould growth is controlling moisture, as products alone can not control moisture or prevent mould.

**Enhanced Acoustic Performance**
Fiberock is very effective at reducing sound transmission, as it combines high mass with very high stiffness. This means for instance that:
- A medical, education, or office facility, or residence seeking enhanced acoustic privacy, whilst sticking with simple single steel studs and a single lining layer each side, can now achieve $R_w$ 46 using Fiberock 10mm linings, or $R_w$ 47 using Fiberock 13mm linings - see page 22.
- A typical apartment intertenancy or corridor wall requiring $R_w + C_{tr}$ of 50, (and fire -/60/60), simply utilises a single layer of Fiberock 16mm on each side of 76mm double steel studs, and regular R2.0 insulation; whereas plasterboard solutions typically have either more layers of linings, or an extra wide cavity, or both, to reach this high acoustic performance level - see page 31.
- An aged care occupancy steel stud separation wall requiring $R_w$ 45 minimum, simply utilises single steel 92mm studs, and one layer of Fiberock 13mm lining each side with regular insulation - see page 23.
- An aged care occupancy timber stud separation wall requiring $R_w$ 45, simply utilises 90mm single timber studs with three layers of linings; 1 x 13mm on one side, and 1 x 6.5mm and 1 x 13mm on the other side - see page 26

Because all USG Fiberock linings are suited to both dry and wet areas, there is no need to change lining type specification in wet areas, or to add a layer of fibre cement as is done in other competing systems. Less complexity means less product cost, less stock on site, less chance for site mistakes, and less rework. USG Powerscape Acoustic wall system designs are shown on pages 22-29 of this book.

**Enhanced Fire Safety**
Fiberock provides excellent fire safety. The absence of a paper surface combined with the mineral core means that it has leading surface fire resistance properties, as well as being an effective room to room fire barrier. Tested performance is as follows:

**Surface Properties** The Building Code of Australia Section 96 specification C1.10a requires that a material used as a finish, surface, lining or attachment to a wall or ceiling must be a Group 1, 2 or 3 material. In addition buildings not fitted with a sprinkler system must have a smoke growth rate index of not more than 100, or an average specific extinction area less than 250 m²/kg. Fiberock is a Group 1 material. The average specific extinction area in independent testing was reported at 32 m²/kg, which is clearly well under the 250m²/kg limit. BRANZ report FAR2265 details these results. For reference, under the previous regulations, Fiberock had ignitability, spread of flame and heat evolved indexes of 0, and a smoke developed index of 0-1.

**Fire Resistance** Most Fiberock wall specifications in the following pages have a minimum of 30 minutes of fire resistance (except PRSSiB on page 27) for the protection of occupants and structure. The wall system design table, on Pages 22-29 of this book outline an extensive range of wall designs using Fiberock with fire resistance ratings of up to 2 hours. BRANZ report FAR 2396 applies to these wall designs.

The system designs for fire rated walls utilise the specification number codes at the top of page 21.
Design Considerations

- Powerscape® interior linings
- Timber Frame wall
- Loadbearing (notation used only for loadbearing)
- Fire Resistance Level (Minutes) FRL
- Single Stud
- Staggered Stud (Discontinuous)
- Double Stud (Discontinuous)

Finishing

Fiberock is the ideal substrate to use underneath all typical modern wall finishing materials, enabling just one internal lining material to be used on site. The particular advantages of Fiberock as a substrate for jointing and for selected finishing materials are as follows:

Jointing Fiberock is jointed in the same manner as plasterboard, and using the same jointing materials. These should be selected according to personal preference and experience, and to maintain a high safety profile. As all edges of Fiberock are either factory tapered or can be site tapered there is no need for difficult and potentially unsightly raised surface joints to be used.

Paint Fiberock is ideal for use with high quality paint finishes. These should be applied following the paint manufacturer’s recommendations for plasterboard, and a pigmented oil based sealer or equivalent is recommended for areas that will be exposed to moisture. Backrolling (with a ‘dry’ roller) should be carried out after application of the first coat of paint, whether applied by spray or roller. By using Fiberock as substrate, a better quality of finish can be achieved due to stronger joints to resist cracking, and an absence of raised surface joints. The superior finish is also due to the pre-sealed surface providing even paint suction across the sheet. The stiffness of Fiberock also helps to minimise out of plane areas in the wall caused by minor variations in stud alignment. Skim coating or specialist Level 5 products like Sheetrock Tuff-Hide should be completed prior to painting when a Level 5 high quality finish is required (see footbox on page 15).

Tile Fiberock’s surface coating is optimised for the reliable bonding of tile adhesives, and of waterproof membranes when these are needed in direct water flow areas. Fiberock is of homogenous structure so there is no surface paper to delaminate under moist conditions, and it has excellent mould resistance to fight potential mould growth beneath tiles. Although widely compatible with construction adhesives, good trade practice should be followed, including all adhesives being tested for compatibility prior to use.

Wall Vinyl Apply to Fiberock in the same manner used for plasterboard. Stripping of wall vinyl from Fiberock is much easier than from plasterboard, when renovating.

Laminates When special laminate surfaces such as low pressure melamine veneers or carpet are desired for aesthetic or functional reasons, these materials can be reliably bonded to the Fiberock. Although widely compatible with construction adhesives, good trade practice should be followed, including all adhesives being tested for compatibility prior to use.

Installation Summary

Fiberock linings are installed, jointed and finished in a similar manner to plasterboard. Note the following added features:

- Sheets can be horizontally or vertically fixed. It is recommended that joints between sheets that are not supported with framing be back blocked (screw and glue) to improve joint strength;
- Can be fixed to timber frames with staples as well as nails (hand or power driven) and screws; or screws to steel frames;
- This product is much stronger than plasterboard, but other than Fiberock VHI, can be scored and snapped. Sheets can also be cut and shaped with traditional woodworking tools such as hand saws, drills, rasps, jig saws, sabre saws etc; using dust collection as necessary. For convenience and speed, some installers (especially of Fiberock VHI) choose to cut sheets to size using an 18 volt cordless low RPM thin blade power saw (e.g., DeWALT DW833 165 mm cordless saw). This helps to minimise dust generation. Specialist contractors will likely choose portable dust extractors and power tools including saws and planes (for tapers) from manufacturers such as Festool;
- In order to achieve flat strong sheet to sheet joints everywhere Fiberock has been engineered to allow the formation on site of tapers to sheets ends, and to cut sides, as needed. Several methods are available to form these tapers. If only a few are needed then coarse sandpaper or a hand plane (ideally rebate) can be readily used. A Fiberock blade for a rasp is also effective. If a greater number of rebates need to be formed then powered tools can be used, in which case a portable dust extraction unit should also be used. Particularly suitable equipment for this task includes the Festool powered plane and dust extraction unit. Routers also form good rebates. In all cases a rebate of similar profile to that on sheet edges should be formed, and the slightly rough surface that results will assist with bonding to the joint compound. Contact USG staff for additional assistance, if required;
- Joint with paper tape and two coats of setting compound, followed by finishing compound;
- Can be painted (see notes above), and tiled with confidence due to its high surface integrity;
- Polyurethane adhesive can be used on edge to edge and face to edge joints in alcoves etc for strong rigid connection. The above is only a summary of relevant installation points. The full installation instructions and specification pages for fire and acoustic rated systems should be consulted for detailed installation procedures*.

# Steel Frame Wall System Selector

<table>
<thead>
<tr>
<th>Wall System Code, and Diagram</th>
<th>$R_w$</th>
<th>$R_w + \frac{C}{L}$</th>
<th>Load Capability</th>
<th>Fire Resistance Level</th>
<th>Fiberock Linings (unless otherwise noted)</th>
<th>Insulation</th>
<th>Framing Size</th>
<th>Weight (~ kg/m²)</th>
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</thead>
<tbody>
<tr>
<td>PRS30SiA / PRSL30SiA</td>
<td>13</td>
<td>39</td>
<td>37</td>
<td>(30)/30/30</td>
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<td>PRSSiA</td>
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<td>51</td>
<td>38</td>
<td>-</td>
<td>1 layer of 10 mm each side</td>
<td>R2.0 glasswool, or polyester blanket</td>
<td>64mm deep by 0.5mm or larger, staggered</td>
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<tr>
<td>PRS30SiE / PRSL30SiE</td>
<td>13</td>
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<td>43</td>
<td>LB</td>
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<td>1 layer of 13 mm each side, plus 1 layer of 6.5mm on one side</td>
<td>92mm deep by 0.55mm thick or larger</td>
<td>35</td>
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# Steel Frame Wall System Selector

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<tr>
<th>Wall System Code, and Diagram</th>
<th>RW</th>
<th>RW + Ctr</th>
<th>Load Capability</th>
<th>Fire Resistance Level</th>
<th>Fiberock Linings (unless otherwise noted)</th>
<th>Insulation</th>
<th>Framing Size</th>
<th>Weight – kg/m²</th>
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<td>PRS30SiD / PRS30SiF</td>
<td>51</td>
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<td>1 layer of 13mm on one side, and 2 layers of 13mm on the other side</td>
<td>R2.0 glasswool, or polyester blanket</td>
<td>92mm deep by 0.55mm thick or larger</td>
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<td>63mm mineral wool with min. service temp. of 450°C</td>
<td>64mm deep by 0.55mm thick or larger, staggered</td>
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<td>64mm deep by 0.55mm thick or larger, staggered</td>
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<td>92mm deep by 0.55mm thick or larger, gapped double</td>
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<td>50</td>
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<td>1 layer of 13 mm plus 1 layer of 6.5mm each side</td>
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<td>64mm deep by 0.55mm thick or larger, staggered</td>
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<td>(60)/60/60</td>
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<td>Insulation</td>
<td>Framing Size</td>
<td>Weight $\text{kg/m}^2$</td>
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<td>Fire Resistance Level</td>
<td>Fiberock Linings (unless otherwise noted)</td>
<td>Insulation</td>
<td>Framing Size</td>
<td>Weight $\text{~kg/m}^2$</td>
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<td>63mm mineral wool with min. service temp. of 450$^\circ$C</td>
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<td>1 layer of R2.0 glasswool, or polyester blanket</td>
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<td>63mm mineral wool with min. service temp. of 450$^\circ$C</td>
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<td>-/120/120</td>
<td>2 layers of 16mm each side</td>
<td>2.0 glasswool, or polyester blanket</td>
<td>63</td>
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# Timber Frame Wall System Selector

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<th>Fire Resistance Level</th>
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<th>Insulation</th>
<th>Framing Size</th>
<th>Weight – kg/m²</th>
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<td>LB</td>
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<td>1 layer of 13 mm each side</td>
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<td>32</td>
<td>(60)/60/60</td>
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<td>63mm mineral wool with min. service temp. of 450°C</td>
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<td>R2.0 Glasswool or Polyester Blanket</td>
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<td>LB (30)/30/30</td>
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<td>63mm mineral wool with min. service temp. of 450°C</td>
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<td>2 layers of 16mm each side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
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<tr>
<td>PRT30SiE / PRTL30SiE</td>
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<td>41</td>
<td>LB (30)/30/30</td>
<td>1 layer of 13mm one side, &amp; 1 layer of 13mm plus 1 layer of 6.5mm other side</td>
<td></td>
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<td>LB</td>
<td>1 layer of 13mm one side, &amp; 2 layers of 13mm other side</td>
<td>70mm by 45mm or larger</td>
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</table>
## Timber Frame Wall System Selector

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<th>Fire Resistance Level</th>
<th>Fiberock Linings (unless otherwise noted)</th>
<th>Insulation</th>
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<th>Weight – kg/m²</th>
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<td>42</td>
<td>NLB</td>
<td>-/60/60</td>
<td>1 layer of 13mm one side, &amp; 2 layers of 13mm other side</td>
<td>63mm mineral wool with min. service temp. of 450°C</td>
<td>49</td>
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<tr>
<td>PRT60SiD / PRTL60SiD</td>
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<td>42</td>
<td>60/60/60</td>
<td>1 layer of 16mm one side, &amp; 1 layer of 16mm plus 1 layer of 13mm other side</td>
<td>R2.5 &amp; 450 rays or better</td>
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<td>30/30/30</td>
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<td>90/60/60</td>
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<td>R2.0 Glasswool or Polyester Blanket</td>
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<td>90/60/60/60</td>
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<td>90mm by 45mm stud and each of top &amp; bottom plates</td>
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<td>PRT60DoA / PRTL60DoA</td>
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<td>90/60/60/60</td>
<td>1 layer of 13mm each side</td>
<td>90mm by 45mm stud and each of top &amp; bottom plates</td>
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<td>(60)/60/60/60</td>
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<td>R2.0 Glasswool or Polyester Blanket</td>
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</table>
### Timber Frame Wall System Selector

<table>
<thead>
<tr>
<th>Wall System Code and Diagram</th>
<th>R_w</th>
<th>R_w + Ctr</th>
<th>Load Capability</th>
<th>Fire Resistance Level</th>
<th>Fiberock Linings (unless otherwise noted)</th>
<th>Insulation</th>
<th>Framing Size</th>
<th>Weight - kg/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRT30SIB / PRTL30SIB</td>
<td>61</td>
<td>50</td>
<td>LB</td>
<td>(30)/30/30</td>
<td>1 layer of 13mm on one side &amp; 2 layers of 13mm on other side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm stud and 2 each of 70 by 45 top &amp; bottom plates</td>
<td>59</td>
</tr>
<tr>
<td>PRT60SIB / PRTL60SIB</td>
<td>61</td>
<td>52</td>
<td>LB</td>
<td>(60)/60/60</td>
<td>1 layer of 16mm one side &amp; 1 layer each of 16mm and 13mm other side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm stud and 2 each of 70 by 45 top &amp; bottom plates</td>
<td>63</td>
</tr>
<tr>
<td>PRT30DoB / PRTL30DoB</td>
<td>62</td>
<td>54</td>
<td>LB</td>
<td>(30)/30/30</td>
<td>1 layer of 13mm on one side &amp; 2 layers of 13mm other side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm or larger</td>
<td>60</td>
</tr>
<tr>
<td>PRT60SC / PRTL60SC</td>
<td>64</td>
<td>55</td>
<td>NLB</td>
<td>/60/60</td>
<td>1 layer each of 16mm Fiberock and 10mm plasterboard each side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm or larger</td>
<td>65</td>
</tr>
<tr>
<td>PRT60DoC / PRTL60DoC</td>
<td>65</td>
<td>58</td>
<td>LB</td>
<td>(60)/60/60</td>
<td>1 layer of 16mm one side &amp; 2 layers of 16mm other side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm or larger</td>
<td>67</td>
</tr>
<tr>
<td>PRT60DoD / PRTL60DoD</td>
<td>66</td>
<td>58</td>
<td>LB</td>
<td>(60)/60/60</td>
<td>1 layer each of 16mm Fiberock and 10mm plasterboard each side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm or larger</td>
<td>66</td>
</tr>
<tr>
<td>PRT90SIB</td>
<td>67</td>
<td>56</td>
<td>NLB</td>
<td>/90/90</td>
<td>2 layers of 13mm each side</td>
<td>63mm mineral wool with min. service temp. of 450°C</td>
<td>90mm by 45mm stud and 2 each of 70 by 45 top &amp; bottom plates</td>
<td>73</td>
</tr>
<tr>
<td>PRT90SA / PRTL90SA</td>
<td>67</td>
<td>57</td>
<td>LB</td>
<td>(90)/90/90</td>
<td>1 layer each of 13mm and 16mm on each side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm stud and 2 each of 70 by 45 top &amp; bottom plates</td>
<td>76</td>
</tr>
<tr>
<td>PRT120SA</td>
<td>69</td>
<td>59</td>
<td>NLB</td>
<td>/120/120</td>
<td>2 layers of 16mm each side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90mm by 45mm stud and 2 each of 70 by 45 top &amp; bottom plates</td>
<td>80</td>
</tr>
</tbody>
</table>
## Timber Frame Wall System Selector

<table>
<thead>
<tr>
<th>Wall System Code and Diagram</th>
<th>$R_W$</th>
<th>$R_W^{+}$</th>
<th>Load Capacity</th>
<th>Fire Resistance Level</th>
<th>Fiberock Linings (unless otherwise noted)</th>
<th>Insulation</th>
<th>Framing Size</th>
<th>Weight $\text{kg/m}^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRT90DoA</td>
<td>69</td>
<td>61</td>
<td>NLB</td>
<td>$-90/90$</td>
<td>2 layers of 13mm on each side</td>
<td>63mm mineral wool with min. service temp. of $450^\circ$C</td>
<td>90mm by 45mm or larger</td>
<td>74</td>
</tr>
<tr>
<td>PRT90DoB</td>
<td>69</td>
<td>62</td>
<td>NLB</td>
<td>$-90/90$</td>
<td>1 layer each of 13mm and 16mm on each side</td>
<td>R2.0 Glasswool or Polyester Blanket</td>
<td>90 by 45mm or larger</td>
<td>79</td>
</tr>
<tr>
<td>PRT120DoA</td>
<td>71</td>
<td>64</td>
<td>NLB</td>
<td>$-120/120$</td>
<td>2 layers of 16mm on each side</td>
<td>83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lining
One or two layers of USG Fiberock interior lining each side of the steel frame to the system specification.
Vertical or horizontal sheet fixing is permitted. Sheet joints must be formed over framing or back blocked (screw and glue). Sheets shall be touch fitted.
Offset joints between sheets by 600mm (300mm for Staggered Stud systems) on opposite sides of the frame, both vertically and horizontally.
For systems with two layers of Fiberock per side, and where horizontal fixing is preferred for plastering joints, the inner layer may be fixed vertically to simplify offsetting joints.
A 5mm gap shall be left between the linings and the floor.
All gaps must be sealed with a fire and/or acoustic sealant aligned to the wall rating.

Fasteners
(0.55 BMT – 0.9 BMT = needlepoint)
(0.50 BMT = high thread)
Single layer side and the inner layer of a two layer side:
25mm x 6g drywall screws at 300mm centres

The outer layer of a two layer side:
13mm Fiberock – 41mm x 6g drywall screws at 300mm centres
16mm Fiberock – 51mm x 7g drywall screws at 300mm centres.
No fixing to top and bottom channel sections.

Services
Holes may be drilled or pre-punched in the metal studs to allow installation of electrical service lines and plumbing supply lines.

Jointing
All fastener heads stopped and all sheet joints paper tape reinforced and stopped in accordance with the standard procedures for plasterboard. For maximum system strength, it is recommended to use USG Sheetrock paper tape and compounds.

Insulation
Sound control insulation shall be a minimum of R 2.0 glasswool or polyester blanket installed between the studs. Where mineral wool is specified, it shall have a minimum service temperature of 450_C and minimum thickness of 63mm. Mineral wool attached to the sides of steel studs with daubs of Koagrip at 300mm centres.

Framing – single stud
A minimum stud size to system specification.
Channel runners are fixed to the floor and ceiling/soffit in true alignment. Stud spacing at 600mm maximum.
The studs are held in place by the “grip” of the channel runners. Light locating fasteners that fail at high temperatures, such as single aluminium rivets, may be used. Otherwise positive fixing to either channel must be avoided.
Non Loadbearing Walls – install studs to allow a 15mm gap at the top of the frame. Recommended maximum height is 3000mm, higher walls are subject to specific design.
Loadbearing Walls – the steel frame must be designed to meet the structural criteria for serviceability and strength under dead and live loads. Frame height as determined by specific design.

Framing – staggered stud
A minimum stud size to system specification.
The 40 x 40 x 0.5mm thick angle runners are fixed to the floor and ceiling/soffit in true alignment.
Stud spacing at 600mm maximum.
The studs are held in place by the Rondo Stud/Track clip to the angle runners. Positive fixing to either angle must be avoided. Studs on each side of the partition to be offset by half the stud spacing.
Non Loadbearing Walls – install studs to allow a 15mm gap at the top of the frame. Recommended maximum height is 3000mm, higher walls are subject to specific design.

Framing – double stud
A minimum stud size to system specification.
Channel runners are fixed to the floor and ceiling/soffit in true alignment.
Stud spacing at 600mm maximum.
The studs are held in place by the “grip” of the channel runners.
Light locating fasteners that fail at high temperatures, such as single aluminium rivets, may be used. Otherwise positive fixing to either channel must be avoided.
Minimum gap between frames is to be 5mm or 20mm subject to system specification.
Non Loadbearing Walls – install studs to allow a 15mm gap at the top of the frame. Recommended maximum height is 3000mm, higher walls are subject to specific design.
Loadbearing Walls – the steel frame must be designed to meet the structural criteria for serviceability and strength under dead and live loads. Frame height as determined by specific design.
Wall System Installation - Steel Stud

**Single Stud System example**

<table>
<thead>
<tr>
<th>PRS30SiC / PRSL30SiC</th>
<th>13 x 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRS30SiD / PRSL30SiD</td>
<td>13 x 13</td>
</tr>
</tbody>
</table>

**Single Stud Horizontal fixing**

- PRS30SiC / PRSL30SiC
  - 64 x 0.5
  - Joints staggered
  - Maintain 3mm gap between bottom and top of studs and angles
  - Allow a 15mm expansion gap at top of frame

- PRS30SiD / PRSL30SiD
  - 64 x 0.5
  - Joints staggered
  - Maintain 3mm gap between bottom and top of studs and angles
  - Allow a 15mm expansion gap at top of frame

**Single Stud Vertical fixing**

- PRS30SiC / PRSL30SiC
  - 64 x 0.5
  - Joints staggered
  - Maintain 3mm gap at top of frame
  - Clip

- PRS30SiD / PRSL30SiD
  - 64 x 0.5
  - Joints staggered
  - Maintain 3mm gap at top of frame
  - Clip

**Staggered Stud System example**

<table>
<thead>
<tr>
<th>PRS30SIA</th>
<th>13 x 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRS30SIB</td>
<td>13 x 13</td>
</tr>
</tbody>
</table>

**Staggered Stud Horizontal fixing**

- PRS30SIA
  - 64 x 0.5
  - Half/full Joints staggered
  - All joints staggered
  - Maintain 3mm gap between bottom and top of studs and angles
  - Allow a 15 expansion gap at top of frame

- PRS30SIB
  - 64 x 0.5
  - Half/full Joints staggered
  - All joints staggered
  - Maintain 3mm gap between bottom and top of studs and angles
  - Allow a 15 expansion gap at top of frame

**Staggered Stud Vertical fixing**

- PRS30SIA
  - 64 x 0.5
  - Joints staggered
  - Maintain 3mm gap at top of frame
  - Clip

- PRS30SIB
  - 64 x 0.5
  - Joints staggered
  - Maintain 3mm gap at top of frame
  - Clip

**Double Stud System example**

<table>
<thead>
<tr>
<th>PRSD0aA</th>
<th>10 x 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRSD0aB</td>
<td>10 x 10</td>
</tr>
</tbody>
</table>

**Double Stud Horizontal fixing**

- PRSD0aA
  - 60 x 0.5
  - Half/full Joints staggered
  - All joints staggered
  - Allow a 15 expansion gap at top of frame

- PRSD0aB
  - 92 x 0.55
  - Half/full Joints staggered
  - All joints staggered
  - Allow a 15 expansion gap at top of frame

**Double Stud Vertical fixing**

- PRSD0aA
  - 60 x 0.5
  - Joints staggered
  - Maintain 3mm gap at top of frame
  - Clip

- PRSD0aB
  - 92 x 0.55
  - Joints staggered
  - Maintain 3mm gap at top of frame
  - Clip
Wall System Installation - Timber Stud

Lining
One or two layers of USG Fiberock interior lining each side of the timber frame to the system specification.
Vertical or horizontal sheet fixing is permitted. Sheet joints must be formed over framing or back blocked (screw and glue). Sheets shall be touch fitted.
Offset joints between sheets by 600mm (300mm for Staggered Stud systems) on opposite sides of the frame, both vertically and horizontally.
For systems with two layers of Fiberock per side, and where horizontal fixing is preferred for plastering joints, the inner layer may be fixed vertically to simplify offsetting joints.
A 5mm gap shall be left between the linings and the floor. All gaps must be sealed with a fire and/or acoustic sealant aligned to the wall rating.

Fasteners
Single layer side and the inner layer of a two layer side:
13mm Fiberock - 25mm x 6g drywall high thread screws at 300mm centres or 25 x 2.8mm plasterboard nails at 200mm centres.
16mm Fiberock – 32mm x 7g drywall high thread screws at 300mm centres or 30 x 2.8mm plasterboard nails at 200mm centres.
The outer layer of a two layer side:
51mm x 8g drywall high thread screws at 300mm centres or 50 x 2.8mm plasterboard nails at 200mm centres.

Services
Holes may be drilled to allow installation of electrical service lines and plumbing supply pipes, subject to fire and acoustic requirements.

Jointing
All fastener heads stopped and all sheet joints paper tape reinforced and stopped in accordance with the standard procedures for plasterboard. For a complete system and maximum strength, it is recommended to use USG Sheetrock paper tape and compounds.

Insulation
Sound control insulation shall be a minimum of R 2.0 glasswool or polyester blanket installed between the studs, or just on one side for staggered and double stud walls.
Where mineral wool is specified, it shall have a minimum service temperature of 450_C and minimum thickness of 63mm.

Framing – single stud
F5 or MGP 10 framing.
A minimum stud size to system specification.
Stud spacing at 600mm maximum.
Nogs at 800mm centres maximum for vertical sheet fixing or 1200mm centres maximum for horizontal sheet fixing.
Non Loadbearing Walls – framing dimensions and height as determined by AS1684 stud tables for non-loadbearing walls.
Loadbearing Walls – framing dimensions and height as determined by AS1684 stud tables for loadbearing walls.

Framing – staggered stud
F5 or MGP 10 framing.
90 x 45 studs are fixed to two 70 x 45 top and bottom plates in true alignment.
Stud spacing at 600mm maximum.
Studs on each side of the partition to be offset by half the stud spacing.
Minimum gap between the 70 x 45 plates is to be 5mm.
Non Loadbearing Walls – framing dimensions and height as determined by AS1684 stud tables for non-loadbearing walls.
Loadbearing Walls – framing dimensions and height as determined by AS1684 stud tables for loadbearing walls.

Framing – double stud
F5 or MGP 10 framing.
90 x 45 studs (minimum) are fixed to top and bottom plates in true alignment.
Stud spacing at 600mm maximum.
Nogs at 800mm centres maximum for vertical sheet fixing or 1200mm centres maximum for horizontal sheet fixing.
Minimum gap between frames is to be 5mm.
Non Loadbearing Walls – framing dimensions and height as determined by AS1684 stud tables for non-loadbearing walls.
Loadbearing Walls – framing dimensions and height as determined by AS1684 stud tables for loadbearing walls.
## Wall System Installation - Timber Stud

### Single Stud System example

- **PRT30SiB / PRTL30SiB**
- **PRT30SiD / PRTL30SiD**
- **PRT30StB / PRTL30StB**
- **PRT30SiD / PRTL30SiD**

### Single Stud Horizontal fixing

- Double System
- Staggered System

### Single Stud Vertical fixing

- Double System
- Staggered System

### Staggered Stud System example

- **PRT30SiA / PRTL30SiA**
- **PRT30SiB / PRTL30SiB**

### Staggered Stud Horizontal fixing

- Double System
- Staggered System

### Staggered Stud Vertical fixing

- Double System
- Staggered System

### Double Stud System example

- **PRT30doA / PRTL30doA**
- **PRT30doB / PRTL30doB**

### Double Stud Horizontal fixing

- Double System
- Staggered System

### Double Stud Vertical fixing

- Double System
- Staggered System

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**Notes:**
- Frames to be 5mm min.
- 5mm minimum at all points.
- Gap between two top plates and two bottom plates to be 600 max.
- Joints staggered.
- Fixing 200 - Nails 300 - Screws.
TOP: Office building for the Commercial Bank of Australia (Green Star Rated), using USG Fibrock wall linings throughout.

MIDDLE: One of three Super Clinics / Hospitals in Victoria, with USG linings for all wall and ceilings throughout.

BOTTOM: Gold Coast Stadium with USG interior linings throughout.

Subject to change without notice - check website for latest version.

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