Fibre Cement Sheet for External Applications

DURASHEET™

Fibre Cement Sheet for External Applications

A Product of Advanced Technology
Product Description

BGC Durasheet™ is a fibre cement sheet for external applications. It is recommended for cladding and for such features as gables, soffits, carport and verandah linings of timber or steel framed buildings.

Durasheet™ is manufactured in nominal thickness of 4.5 mm, 6.0 mm and 7.5 mm.

4.5 mm Durasheet™ must only be used in applications such as the lining of soffits, ceilings to carports and verandahs where it is unlikely to be subjected to impacts.

6.0 and 7.5 mm Durasheet™ should be used for general cladding applications or for commercial soffits and the like.

Product Information

Durasheet™ is manufactured from Portland cement, sand, finely ground silica, cellulose fibres and water. It is cured in a high-pressure steam autoclave to create a durable, dimensionally stable product.

Durasheet™ fibre cement sheets are manufactured to conform to the requirements of NZS/AS2908.2 Cellulose-Cement Products and are classified as Type A Category 2 sheet for external use.

Mass

The approximate weight of Durasheet™ at equilibrium moisture content (7% moisture) is as tabulated.

<table>
<thead>
<tr>
<th>Nominal Thickness</th>
<th>Approx. Weight (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5</td>
<td>7.1</td>
</tr>
<tr>
<td>6.0</td>
<td>9.5</td>
</tr>
<tr>
<td>7.5</td>
<td>11.8</td>
</tr>
</tbody>
</table>

Appearance

Durasheet™ is a smooth flat fibre cement sheet, cut to size and finished with square edges. It has a natural grey cement colour.

Sheet Sizes

Durasheet™ is available in the following sizes:

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Length (mm)</th>
<th>Width (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>450 600 750</td>
<td>900 1200</td>
</tr>
<tr>
<td>4.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2400</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>2700</td>
<td>✔</td>
</tr>
<tr>
<td></td>
<td>3000</td>
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<td>6.0</td>
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<td>✔</td>
</tr>
<tr>
<td></td>
<td>3000</td>
<td>✔</td>
</tr>
</tbody>
</table>

Quality Systems

Fire Resistance

Durasheet™ has been tested by the CSIRO (Building, Construction and Engineering Division) in accordance to Australian Standard AS1530.3 - 1989 (see report number FNE 7531). This report deemed the following Early Fire Hazard Indices:

<table>
<thead>
<tr>
<th>Index</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignitability Index</td>
<td>0</td>
</tr>
<tr>
<td>Spread of Flame Index</td>
<td>0</td>
</tr>
<tr>
<td>Heat Evolved Index</td>
<td>0</td>
</tr>
<tr>
<td>Smoke Developed Index</td>
<td>0 - 1</td>
</tr>
</tbody>
</table>

Handling and Storage

Durasheet™ sheets must be stacked flat, up off the ground and supported on level bearers.

The sheets must be kept dry, preferably by being stored inside a building. When stored outdoors they must be protected from the weather.

Care should be taken to avoid damage to the ends, edges and surfaces. Sheets must be dry prior to being fixed, or painted. Sheets must be carried on edge.

Health and Safety

BGC Durasheet™ is manufactured from New Zealand cellulose fibre, finely ground sand, Portland cement and additives. As manufactured the product will not release airborne dust, but during drilling, cutting and sanding operations cellulose fibres, silica and calcium silicate dust may be released.

Breathing in fine silica dust is hazardous, prolonged exposure (usually over several years) may cause bronchitis, silicosis or cancer.

Avoid Dust Inhalation

When cutting sheets, work in a well-ventilated area and use the methods recommended in this literature to minimise dust generation. If using power tools wear an approved (P1 or P2) dust mask and safety glasses.

These precautions are not necessary when stacking, unloading or handling fibre cement products.

For further information or a Material Safety Data Sheet contact the nearest BGC Fibre Cement Sales Office.

Sheet Cutting and Drilling

Durasheet™ may be cut to size on site. If using power tools they must be fitted with appropriate dust collection devices or alternatively an approved (P1 or P2) dust mask shall be worn.

It is recommended that work always be carried out in a well-ventilated location.

The most suitable cutting methods are:

- **Score and Snap**
  Score the sheet face 4 or 5 times with a ‘score and snap’ knife. Support the scored edge and snap the sheet upward for a clean break.

- **Hand Guillotine**
  Cut on the off-cut side of the line to allow for the blade thickness.

- **Notching**
  Notches can be made by cutting two sides of the notch. Score along the back edge, then snap upwards to remove the notch.

- **Hand Sawing**
  Durasheet™ sheet should be supported close to the cut. A fine toothed saw and a quick jabbing action gives best results.
  Mark out the cut lines on the face side of the sheet.

- **Drilling**
  Use normal high-speed drill bits, Do not use the drill’s hammer function.
  Small penetrations are made by drilling a series of small holes around the perimeter of the cut out. Tap out the waste piece from the sheet face with a hammer while supporting the underside of the opening to avoid damage. Clean up any rough edges with a rasp.
  Large rectangular openings such as for air conditioners, are formed by deeply scoring the perimeter of the opening with a ‘score and snap’ knife. Next, form a hole in the centre of the opening (see method above) then saw cut from the hole to the corners of the opening. Finally, snap out the four triangular segments to form the opening. Clean rough edges with a rasp.
**BRANZ Appraisal**

The durability and performance of Durasheet™ has been evaluated by BRANZ – See BRANZ Appraisal Certificate No. 391 (2000).

**New Zealand Building Code Compliance (NZBC)**

Durasheet™ must be used, installed and maintained in accordance with this technical literature to meet the following provisions of the New Zealand Building Code (NZBC).

**Clause B1 Structure**

Durasheet™ will meet performance provisions B1.3.1, B1.3.2, B1.3.3 and B1.3.4. Relevant information on the physical conditions pertaining to B1.3.3 is included in this literature.

**Impact Resistance**

4.5 mm thick Durasheet™ should not be used in situations where it is likely to be subject to impact.

6.0 and 7.5 mm thick Durasheet™ has good resistance to hard and soft body impacts likely to occur in residential and light commercial use. When used in commercial or industrial situations, or other high impact situations, the designer should consider protection measures such as the installation of barriers or bollards to vulnerable areas.

**Bracing**

6.0 and 7.5 mm thick Durasheet™ sheets can be used to provide racking resistance, to timber-framed walls, against wind and earthquake loads. The construction details and racking resistance values are included in the bracing notes commencing on page 9 of this literature.

**Wind Face Loads**

Durasheet™ sheets may be used in all Building wind Zones of NZS 3604, including Very High.

**Clause B2 Durability**

When used as an external cladding Durasheet™ will meet the following performance provisions of the NZBC.

B2.3.1(a) – Not less than 50 years for structural (bracing) applications.

Stainless steel fixings must be used for all bracing sheets.

B2.3.2(b) – 15 years for general applications.

Stainless steel fixings must be used in corrosive conditions such as geothermal hot spots or coastal zones (within 500 m of the sea).

Painting systems, seals and flashings must be maintained to ensure moisture does not penetrate the cladding system and sheets, and that fixings remain dry at all times.

Provided it is installed and maintained as specified in this literature Durasheet™ is expected to have a service life of at least 50 years.

**Clause E2 External Moisture**

Durasheet™, when installed and maintained as specified in this literature will meet performance E2.3.2.

Head flashings must be used at all joinery penetrations, and jambs must be sealed. Sill trays and jamb flashings are recommended to give good long-term protection.

**Clause F2 Hazardous Building Materials**

Durasheet™ is not considered a health hazard to people and will therefore meet the performance F2.3.1.
Construction Details

Framing

Framing must be constructed to comply with the New Zealand Building Code (NZBC).

Compliance with the NZBC can be met by timber framing designed and constructed in accordance with NZS 3604:1999 for non-specific design, or in accordance with NZS 3603 and NZS 4203 for specific design.

Steel framing must be to a specific design in accordance with NZS 4203 or AS/NZS 4600.

The framing must be set to a true plane to ensure a straight finish to the wall.

The moisture content of timber framing must be less than 24% when the cladding sheets are fixed. If sheets are fixed to ‘wet’ framing problems may occur at a later date due to excessive timber shrinkage. It is strongly recommended that kiln dried framing is used.

Timber framing, for sheet joints, must have a minimum actual width of 45mm (nominal 50mm).

Intermediate studs with a minimum of 35mm (nominal 40mm) may be used.

Durasheet™ may be fixed directly to lightweight steel framing. The steel framing must not exceed 1.6 mm in thickness and should provide some flexibility to accommodate any differential moisture and thermal movement of the Durasheet™.

Durasheet™ can be used with rigid steel framing provided it is battened on either timber or lightweight steel battens prior to fixing the Durasheet™.

Timber battens must have a minimum thickness of 40 mm to allow adequate nail penetration. Battens supporting sheet joints must have a minimum actual face width of 45 mm.

Steel battens are typically 72 mm wide x 23 mm deep x 0.55 mm thick with a minimum bearing surface of 38 mm.

Durasheet™ sheets must not be joined off the framing except for certain specific cases, which are soffit, carport and verandah linings, described in this literature.

Fasteners

For general applications, Durasheet™ is fixed to timber framing using 40 x 2.5mm galvanised flat head nails.

40x2.5mm Galvinised Flat Head Nail

For structural (bracing) applications or in corrosive conditions such as geothermal hot spots or coastal zones (within 500 m of the sea), 40 x 2.8mm flat head annular groove stainless steel nails must be used.

40x2.8mm Flat Head Annular Groove Stainless Steel Nail

Durasheets™ of 6.0mm and 7.5mm in thickness are fixed to lightweight steel framing using No.8 x 20 mm self-embedding head screws (30 mm screws must be used when fixing through thermal bridging)

No. 8x20mm Self Embedding Head Screw

No.8 x 20mm large Wafer Head Drill Point Screws must be used when fixing 4.5 mm Durasheet™ soffits.

No. 8x20mm Wafer Head Screw

Fixing Requirements

Sheets shall be fixed along all sheet edges, studs and nogging. Fixings centres are specified in the relevant sections.

Do not place fixings closer than 12mm from sheet edges, or closer than 50mm from the sheet corners.

Sheet fixing must commence at the centre of the sheet and work out to the edges to prevent ‘druminess’. The sheet must be held firmly against the framing when fixing to ensure breakout does not occur on the back.

Nailing Schedule

General: Maximum fastening centres at 250 mm. Use 40 mm x 2.5 mm galvanised flat-head nails.

Structural Bracing: Maximum fastening centres at 150 mm. Use 40 mm x 2.8 mm annular groove stainless steel flat-head nails.
Exterior Wall Cladding

Building Paper
Building paper, a weatherproofing membrane or sheathing must be installed between the framing and the Durasheet™ cladding (see Figure 1 - 4).

If building paper is used it must be a breather type complying with AS/NZS 4200. Alternatively, other membranes or building papers appraised by BRANZ as suitable for use with this cladding system.

Building papers and membranes must be installed in accordance with Section 11 of NZS 3604:1999.

A sheathing of Plywood or Wood-fibre Boards complying with NZS 3604 Section 8 is also deemed to be suitable.

Horizontal Surfaces
Durasheet™ must not be applied to nominal horizontal surfaces such as the tops of parapets, sills, decking up stands, etc. These surfaces must be sloped a minimum of 15°. The alternative is to install a fully sealed and waterproof membrane system immediately under the cladding of the horizontal surface, or install a capping.

Joint Details
Durasheet™ used for external cladding must be joined over a stud or continuous line of noggings. A PVC sheet jointer, batten or some similar architectural feature, must be fitted to protect joints from the ingress of moisture.

Horizontal fixing of sheets is not recommended. If used, adequate flashing must be fitted to prevent water ingress (see Figure 2). When fixing more than one sheet high, vertical joints must be offset (staggered).

A PVC sheet jointer, battens or some similar architectural feature, shall be fitted to both internal and external corners to prevent the ingress of moisture; see Figures 3 & 4.

Thermal Bridging
Steel framed walls clad with Durasheet™ sheets may require a thermal break between the framing and the cladding to achieve the minimum R-value required by the NZBC. This break may be achieved by fixing 10.5 mm thick Pinex Triple ‘S’ sheets or strips of high density polystyrene foam to the outside face of the framing. The length of the sheet fixing screws will need to be increased to allow for this extra thickness.
Ground Clearance

Durasheet™ must not be used in situations where it will be below grade or where it will be buried in the ground. The ground clearances as set in NZS 3604 must be adhered to at all times; see Figure 5.

Openings

All openings such as windows and doors must be designed to adequately prevent the ingress of moisture. Flashings, moulding and battens must be used wherever appropriate. Reliance on sealants alone is not considered satisfactory, although sealants may be used as rain screens in conjunction with other features. Figure 6 depicts some typical window details and are typical of design requirements.

Figure 4 - External Corner Detail

Round PVC Corner Moulding

Figure 5 - Ground Clearance

Timber Stud

Concrete Slab

Inseal 3109 10x6mm Sealing Strip or Silicone Sealant

Building Paper

Durasheet™

Ground Clearance

50mm Sheet Overhang

100 mm Minimum clearance to paving or 175 mm to landscaped ground level

Figure 6

Window Head Detail

Internal Wall Lining

Building Paper

Durasheet™

Compatible Flashing

Sealant

Figure 6 - Ground Clearance

Timber Stud

Concrete Slab

Inseal 3109 10x6mm Sealing Strip or Silicone Sealant

Building Paper

Durasheet™

Ground Clearance

50mm Sheet Overhang

100 mm Minimum clearance to paving or 175 mm to landscaped ground level

Figure 6

Window Jamb Detail

Internal Wall Lining

Building Paper

Durasheet™

Compatible Flashing

Sealant

Figure 6 - Ground Clearance

Timber Stud

Concrete Slab

Inseal 3109 10x6mm Sealing Strip or Silicone Sealant

Building Paper

Durasheet™

Ground Clearance

50mm Sheet Overhang

100 mm Minimum clearance to paving or 175 mm to landscaped ground level

Figure 6

Window Sill Detail

Sealant

Durasheet™

Compatible Flashing

Building Paper

Inseal 3109 10x6mm Sealing Strip or Silicone Sealant

Building Paper

Durasheet™

Ground Clearance

50mm Sheet Overhang

100 mm Minimum clearance to paving or 175 mm to landscaped ground level
**Soffits**

Figure 7 depicts the general feature of a boxed soffit lining.

**For soffits that are 600 mm wide or less:**

Soffit bearers (supporting framework) must be provided at a maximum of 900 mm centres.

The sheets may be joined off framing provided PVC jointers are used.

**Figure 7 - Boxed Soffit Lining Details**

*For soffits that are wider than 600 mm:*

Soffit bearers must be at a maximum of 600 mm centres.

The sheet sides must be supported either by nailing at 250 mm maximum centres or by a construction feature such as a grooved facia board.

**Verandah and Carport Linings**

Figure 8 depicts the Durasheet™ sheets aligned with the long edge perpendicular to the ceiling joists.

In this case longitudinal sheet edges may be joined off framing provided a PVC sheet jointer supports them.

**Figure 8 - Carport or Verandah Ceiling Sheets Fixing Details**

Ceiling Joists Max Centres

450 mm ~ 4.5 mm Durasheet

600 mm ~ 6.0 & 7.5 mm Durasheet

S = 250 mm Max. Fixing Centres

All Sheet joints to be supported by PVC Jointers

Stagger end joints

9 = 250 mm Max. Fixing Centres
Bracing

Durasheet™ can be used to provide bracing of a structure in accordance with NZS 3604:1990. Table 1 is a summary of the bracing ratings (racking resistance) as tested by BRANZ and published in their Appraisal Certificate No 388 (2000).

### Table 1

Bracing ratings for 2.4m high timber framed walls – clad with 6.0 or 7.5mm Durasheet™ and founded on either concrete or timber floors

<table>
<thead>
<tr>
<th>Element Type</th>
<th>Minimum Length Bracing Element (m)</th>
<th>Rating Wind (BU/m²) 6.0 mm</th>
<th>Rating Wind (BU/m²) 7.5 mm</th>
<th>Rating Earthquakes (BU/m²) 6.0 mm</th>
<th>Rating Earthquakes (BU/m²) 7.5 mm</th>
<th>Hold Down Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGC - DS1 (Timber Foundation)</td>
<td>1.2</td>
<td>140</td>
<td>140</td>
<td>130</td>
<td>130</td>
<td>The bottom plate shall be nailed through to 100 mm wide floor joists (or blocking) using pairs of 100 x 4 mm galvanized flat-head nails at 600 mm maximum centres. The nails must be equally spaced across the plate. Secure every second stud (@ sheet sides) to the floor joist with 260 x 25 x 1 mm galvanised mild steel straps. Fasten the straps with six 30 x 2.5mm galvanised flat head nails each end. Strap centres – 1200 mm typical. (See Figure 9).</td>
</tr>
<tr>
<td>BGC - DS2 (Timber Foundation)</td>
<td>2.4</td>
<td>100</td>
<td>100</td>
<td>85</td>
<td>85</td>
<td>The bottom plate shall be nailed through to 100 mm wide floor joists (or blocking) using pairs of 100 x 4 mm galvanized flat-head nails at 600 mm maximum centres. The nails must be equally spaced across the plate. (See Figure 9).</td>
</tr>
<tr>
<td>BGC - DS3 (Concrete Slab Foundation)</td>
<td>1.2</td>
<td>140</td>
<td>140</td>
<td>130</td>
<td>130</td>
<td>The bottom plate must be bolted to the floor slab with M12 galvanized bolts embedded at least 75mm into the concrete foundation. Bolt centres – 1200 mm typical (1400 mm maximum) A 50 x 50 x 3 mm galvanized square washer is required under the each nut. Secure every second stud (@ sheet sides) to the bottom plate with a 130 x 90 x 130 mm U shaped bracket formed from 25 x 1 mm galvanised mild steel strap, fitted under the bottom plate and fastened to the stud with six 30 x 2.5mm flat-head galvanised nails at each end. Strap centres – 1200 mm typical. (See Figures 10 &amp; 11).</td>
</tr>
<tr>
<td>BGC - DS4 (Concrete Slab Foundation)</td>
<td>2.4</td>
<td>100</td>
<td>100</td>
<td>85</td>
<td>85</td>
<td>The bottom plate must be bolted to the floor slab with M12 galvanized bolts embedded at least 75mm into the concrete foundation. Bolt centres – 1200 mm typical (1400 mm maximum) A 50 x 50 x 3 mm galvanized square washer is required under the each nut. (See Figure 10).</td>
</tr>
</tbody>
</table>

*Bracing units per metre of element length, in accordance with NZS 3604*
**Notes on Bracing**

**Wall Height**
For a wall height of H:
- Where H is greater than 2.4m the bracing ratings in Table 1 must be reduced by the factor 2.4/H (metre).
- Where H is less than 2.4 the bracing ratings in Table 1 shall be used.

**Cladding**
The walls must be clad on at least one side with 6.0 or 7.5 mm Durasheet™. Additional lining or cladding may be used without prejudice to the ratings.

**Construction**
Timber framing at least equivalent to machine stress graded 90 x 45 mm kiln dried Radiata pine, shall be used.

Framing joints shall be nailed as specified by NZS 3604:1990.

For bracing applications Durasheet™ must be fixed vertically.

**Fixing**
Durasheet™ bracing sheets must be nailed to the framing around all sheet edges and at all intermediate framing (studs and noggings) at 150 mm maximum centres.
Fixing continued
Fixings must not be placed:

- Closer than 50 mm from sheet corners.
- Closer than 20 mm from sheet top or bottom edges (top and bottom plates).
- Closer than 12 mm from sheet side edges.

To meet the NZBC requirement of at least 50 years durability for structural elements, external cladding sheets must be fixed with 40 x 2.8 mm stainless steel annular groove flat head nails.

For external walls, Durasheet™ must overhang the foundation slab or lower plate by 50 mm. The sheet overhang must not be nailed to the foundation or floor joists. See Figure 11.

Figure 11 - BGC - DS3 Sheet Overhang & Bracket Details

Hold Down Straps
End straps shall be fabricated from 25 x 1 mm mild steel strapping and be secured with 6 Off 30 x 2.5 mm galvanized flat head nails each end. End straps must be galvanized after punching and forming.

Straps that are exposed to the sub floor atmosphere (the sub floor is open to the weather or the sub floor has base boards with 20 mm maximum gap between boards) must be painted. Use a minimum of two coats of 100% acrylic paint applied as recommended by the paint manufacturer.

The paint should be checked every 8 to 10 years to ensure it remains serviceable. Paint that shows any signs of deterioration – flaking, cracking or pealing – must be repainted immediately.

Painting
To enhance both the appearance and performance of Durasheet™ BGC recommend that at least two coats of a water-based paint be applied. The paint manufactures recommendation on application and maintenance of the paint system should be followed.

Maintenance
Durasheet™ when used in accordance with this literature requires no direct maintenance.

To guard against water penetrating the structure and damaging the framework, annual inspections of the cladding system should be carried out. Check flashing, sealant, joints and paint work.

Flashing and sealants must continue to perform their design function.

Damaged sheets should be replaced as originally installed.
Warranty

Durasheet™ is a fibre cement sheet designed for external applications.

BGC Fibre Cement (NZ) warrants its products to be free from defects caused by faulty manufacture or materials. If any of its products are so defective the Company will at its option, repair or replace them, supply equivalent replacement products or reimburse the purchase price.

This warranty shall not apply to any loss or consequential loss suffered through or resulting from defects caused by faulty manufacture or materials.

Fittings or accessories supplied by third parties is beyond the control of BGC and as such is not warranted by BGC.

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