

TECHNICAL BULLETIN

Impact resistant fibre cement



The information in this supplement and James Hardie's technical literature is only intended for use in relation to the relevant James Hardie products.



Impact Resistance

James Hardie offers a wide range of durable fibre cement building products suitable for a variety of applications. Our products are resistant to damage from moisture, rotting, cracking, fire and termites, when installed and maintained correctly and to the extent set out in James Hardie's published literature current at the time of installation.

An important factor to take into account when choosing a product, is the product's ability to resist impact and surface damage. Walls will be subject to impact from accidental collisions with people or moving objects and may also, occasionally, be subjected to deliberate vandalism which can create security issues. Insufficient impact resistance can reduce the life span of a building as if the building envelope does not provide sufficient impact resistance, this can cause weathertightness and durability issues. Additional maintenance costs are also a real consequence of poor impact performance.

Whichever James Hardie product, you choose, you can be sure it offers good impact resistance. Depending on your needs, some products in our range are particularly resistant to impact which may be important in some applications.

In order to provide designers and specifiers with information about the relative impact resistance of James Hardie and ScyonTM fibre cement products, we have conducted tests on our flat sheet products and weatherboard products.

There are a number of ways to quote the impact resistance of fibre cement and a number of test methods available. Two common methods and their typical comparative results for James Hardie products are discussed in this bulletin.

SOFT BODY SWINGING SANDBAG IMPACT TEST

This test is based on the method specified in ASTM E695 and is normally used to determine the impact resistance of a wall system and not just a material property.

This procedure entails building a typical wall segment and measuring the instantaneous deflection on impact of the overall system when subjected to impact from a 27.5kg mass soft body sandbag raised to a predetermined drop height.



FIGURE 1 SOFT BODY SWINGING SANDBAG IMPACT TEST ON SCYON LINEA WEATHERBOARD

The wall assembly is tested by incrementally increasing the bag drop height until failure occurs. Failure can be taken as a predetermined limit applied to the instantaneous deflection on impact depending on the configuration of the wall assembly or if not considered to be the governing factor then failure can be taken as being the height of the bag that causes the sheet to crack. While failure of a wall segment can be defined in a number of different ways such as instantaneous deflection of the system beyond a predetermined amount, for the purposes of our testing, we have taken failure to mean the appearance of a crack in the sheet. The result can also be quoted in Joules, the impact energy causing failure.

Impact Energy (Joules) $E = mgh$

Where: m = mass of body (kg)
 g = acceleration due to gravity (m/sec²)
 h = drop height (metres)

For more information visit our website
www.accel.com.au



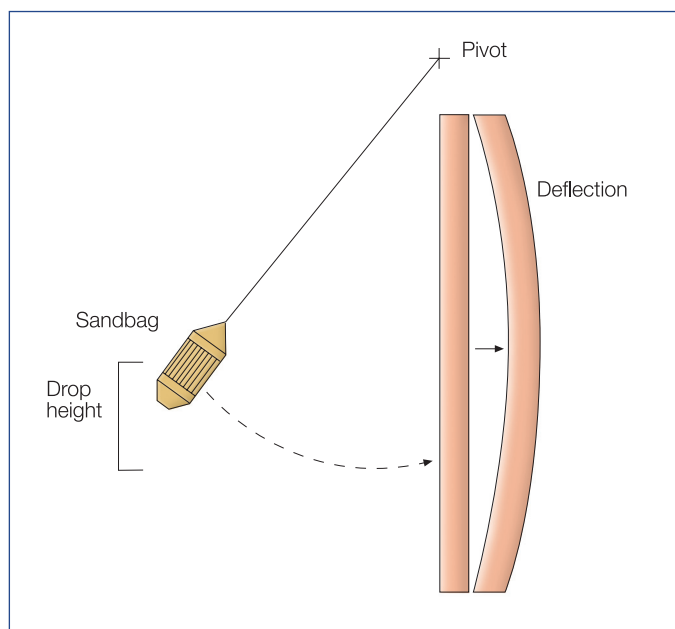


FIGURE 2 SOFT BODY IMPACT TEST

HARD BODY IMPACT TEST

Another method, which more closely provides us with an impact strength value for the material, is based on BS EN 1128: 1996 *Cement-bonded particleboards - Determination of hard body impact resistance*.

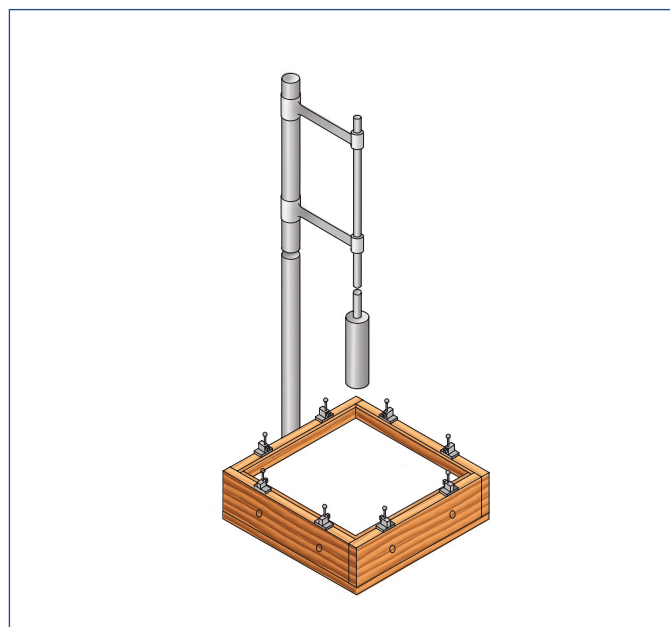


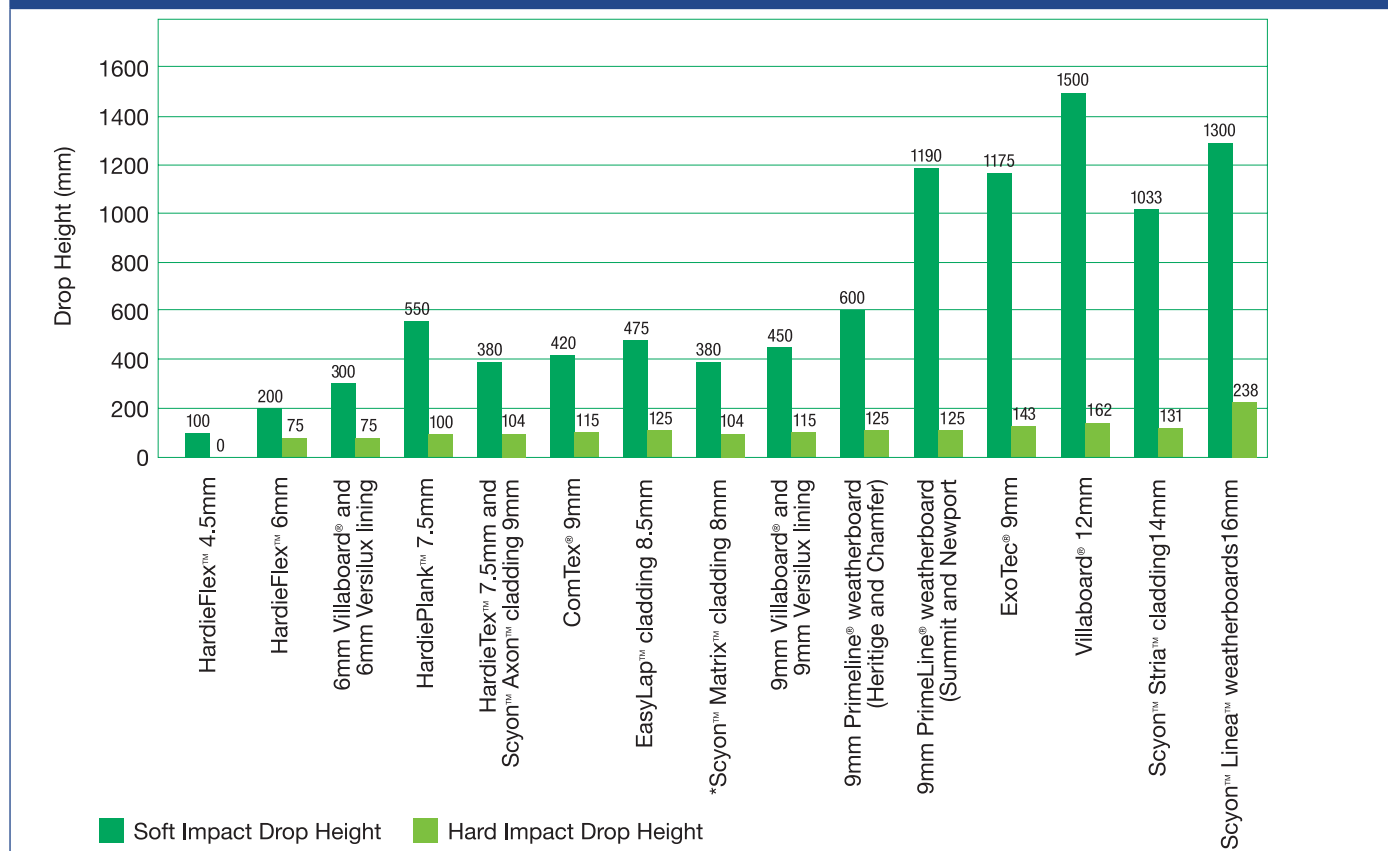
FIGURE 3 EXAMPLE OF HARD BODY - IMPACT TEST APPARATUS

This method calls for a small sample of material (approx 250mm x 250mm) to be rigidly clamped in a perimeter supporting cradle and then a rigid body of defined mass and shape to be dropped from a series of increasing heights until failure of the specimen occurs.

TYPICAL RESULTS

Tests have been conducted on a range of James Hardie fibre cement products. -typical results are presented below.

TABLE 1: IMPACT RESISTANCE OF JAMES HARDIE® PRODUCTS



* When cavity trims installed directly over a stud

SUMMARY

James Hardie offers a range of products with differing impact resistant characteristics to meet the different needs of external and internal cladding applications.

As can be seen from the results provided, significant increases in the impact resistance of fibre cement clad walls can be achieved by the use of:

1. Thicker sheets; or
2. Overlapping plank products/weatherboards; or
3. Thicker, overlapping plank products/weatherboards.

FURTHER INFORMATION

For further information on the wide range of impact resistant fibre cement building products visit www.accel.com.au or Ask James Hardie™ on 13 11 03.

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Additional installation information, warranties, and warnings are available at www.jameshardie.com.au

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