

Technical Supplement

Australia April 2021

Floor Loading Solutions

Introduction

This supplement is based on selection of available James Hardie flooring systems against Table 3.1 of AS/NZS 1170-2002 "Structural Design Actions Part 1 - Permanent, Imposed and Other Actions". This standard provides designers the magnitude of the permanent actions and likely maximum imposed actions due to use and occupancy and other actions appropriate to the type of structure for use in structural design. Table 3.1 is in relation to imposed actions of flooring only, namely a referenced uniformly distributed load and a concentrated load for each type of activity.

This Technical Supplement is suitable to be used with the following James Hardie flooring products:

- Secura™ Interior or Exterior Flooring
- HardiePanel™ Compressed Sheets

Below are some example applications extracted from the Tables on pages 2, 3 and 4. Always refer to the tables for the loading requirements on specific applications.

Optimised Applications



RESIDENTIAL				
Application	Product	Max. Joist Spacing	Maximum Load	
			Distributed	Concentrated
Private kitchens, laundries, balconies, bedrooms and other general areas. (Cat. A)	Secura™ 19mm	450mm	2.0kPa	1.8kN



OFFICE AND WORK AREAS				
Application	Product	Max. Joist Spacing	Maximum Load	
			Distributed	Concentrated
Offices for general use, without storage. (Cat. B)	Secura™ 19mm	450mm	3.0kPa	2.7kN

NOTES

The imposed actions shall be no less than the greater of:

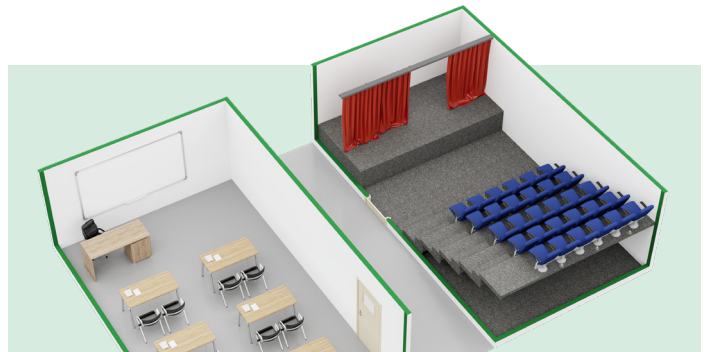
1. The actions resulting from the intended use of the structure (e.g. specialised loadings from equipment)

2. Imposed actions given in AS/NZS 1170.1:2002 Section 3

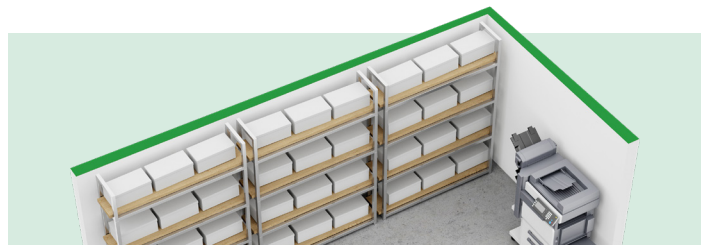
The imposed actions given in this supplement include sufficient allowance for the effects of vertical impact arising from the usual movement of people and shifting of furniture. This allowance does not cover dynamic effects due to highly active crowds. Refer to AS/NZS 1170.1:2002 Clause 3.7 for dynamic effects due to vibrating machinery.

IMPORTANT NOTES

1. The information in this document is given as a guide only and must be read in conjunction with the respective current James Hardie installation guide, relevant NCC requirements and any other relevant literature. This is not a standalone document for the installation of James Hardie products.
2. The designer is responsible to undertake special design and detailing to ensure the products use is fit for purpose. The table below suggests James Hardie products based on loading only. Extra consideration for product suitability needs to be taken into account for other specialised factors (chemical exposure, special impact requirements).
3. For specification, installation and warranty terms of James Hardie™ products, ensure that you have the current technical information and guides. If in doubt, or you need more information, visit www.jameshardie.com.au or Ask James Hardie™ on 13 11 03.



EDUCATION				
Application	Product	Max. Joist Spacing	Maximum Load	
			Distributed	Concentrated
Classrooms, theaters and other assembly areas with fixed seats. (Cat. C)	Secura™ 19mm	450mm	4.0kPa	2.7kN
Corridors, hallways, aisles, stairs and other areas without obstacles for moving people. (Cat. C)	Secura™ 22mm	450mm (Sheet edges fully supported)	5.0kPa	4.5kN



STORAGE AREAS				
Application	Product	Max. Joist Spacing	Maximum Load	
			Distributed	Concentrated
File rooms, office storage space, vaults and strong rooms. (Cat. E)	Secura™ 22mm	450mm (Sheet edges fully supported)	5.0kPa	4.5kN

AS 1170.1-2002 TABLE 3.1: REFERENCE VALUES OF IMPOSED FLOOR ACTIONS

Specific uses	Reference values of imposed floor actions based on AS/NZS 1170.1:2002		James Hardie Flooring Products Max. Joist Spacing (mm)				
	Uniformly distributed actions (kPa)	Concentrated actions ⁽⁶⁾ (kN)	Secura™ Flooring		HardiePanel™ Compressed		
			19mm	22mm	15mm	18mm	24mm
A. DOMESTIC AND RESIDENTIAL ACTIVITIES (SEE ALSO CAT C)							
A1. SELF-CONTAINED DWELLINGS							
General areas, private kitchens and laundries in self-contained dwellings	1.5	1.8 ⁽¹⁾	450	600	600	600	600
Balconies used for floor type activities in self-contained dwellings: (a) Less than 1m above ground level	1.5	1.5kN/m run along edge	450	600	600	600	600
(b) Other	2.0	1.8 ⁽¹⁾	450	600	600	600	600
Stairs ⁽²⁾ and landings in self-contained dwellings (Ed: interior or protected)	2.0	2.7	450	600	600	600	600
Stairs ⁽²⁾ and landings in self-contained dwellings (Ed: exterior or unprotected)	2.0	2.7	x	600	600	600	600
Non-habitable roof spaces in self-contained dwellings	0.5	1.4	450	600	600	600	600
A2. OTHER							
General areas, bedrooms, hospital wards, hotel rooms, toilet areas	2.0	1.8 ⁽¹⁾	450	600	600	600	600
Communal kitchens (Ed: Potential wet area)	3.0	2.7	450*	600	600	600	600
Balconies used for floor-type activities with community access	Same as areas providing access but not less than 4.0	1.8	450	600	600	600	600
B. OFFICES AND WORK AREAS NOT COVERED ELSEWHERE							
Operating theatres, X-ray rooms, utility rooms	3.0	4.5	x	450 (Sheet edges fully supported)	400	600	600
Work rooms (light industrial) without storage	3.0	3.5	x	450	450	600	600
Offices for general use	3.0	2.7 ⁽³⁾	450	600	600	600	600
Offices for general use with allowance for a safe	3.0	6.7	x	x	x	x	600
Communal kitchens (Ed: Potential wet area)	3.0	2.7	450*	600*	600	600	600
Commercial / institutional kitchens (Ed: Potential wet area)	5.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600
Laundries (Ed: Wet area)	3.0	4.5	x	x	x	450	600
Laboratories (Ed: Potential wet area)	3.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600
Factories, workshops and similar buildings (general industrial) (Ed: Potential wet area)	5.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600
Balconies used for floor-type activities	Same as areas providing access but not less than 4.0	1.8	450	600	600	600	600
Fly galleries (in theatres etc)	4.5kN/m run uniformly distributed over width	–	To be calculated specifically and selection made		To be calculated specifically and selection made		
Grids (over areas of proscenium width by stage depth)	2.8	–	To be calculated specifically and selection made		To be calculated specifically and selection made		

Specific uses	Reference values of imposed floor actions based on AS/NZS 1170.1:2002		James Hardie Flooring Products Max. Joist Spacing (mm)				
	Uniformly distributed actions (kPa)	Concentrated actions ⁽⁸⁾ (kN)	Secura™ Flooring		HardiePanel™ Compressed		
			19mm	22mm	15mm	18mm	24mm

C. AREAS WHERE PEOPLE MAY CONGREGATE

C1. AREAS WITH TABLES

Public, institutional & communal dining rooms & lounges, cafes & restaurants	2.0	2.7	450	600*	600	600	600
Reading rooms with no book storage	2.5	4.5	x	450 (Sheet edges fully supported)	400	600	600
Classrooms	3.0	2.7	450	600	600	600	600

C2. AREAS WITH FIXED SEATS⁽⁶⁾

Institutional assembly areas such as classrooms, lecture theatres & similar	3.0	2.7	450	600	600	600	600
Public assembly areas such as public halls, theatres, courts of law, auditoria, conference centres & similar	4.0	2.7	450	600	600	600	600
Places of worship	4.0	2.7	450	600	600	600	600

C3. AREAS WITHOUT OBSTACLES FOR MOVING PEOPLE

Corridors, hallways, aisles, stairs ⁽²⁾ , landings ⁽²⁾ , concourses, terraces, plazas etc not subject to wheeled vehicles (Ed: Potential wet area)	4.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600
Corridors, hallways, aisles, stairs ⁽²⁾ , landings ⁽²⁾ etc subject to wheeled vehicles, trolleys etc (Ed: Potential wet area)	5.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600
Footpaths, terraces and plazas at ground level subject to wheeled vehicles	5.0	31 ⁽⁴⁾	x	x	x	x	x
Museum floors and art galleries for exhibition purposes	4.0	4.5	x	450 (Sheet edges fully supported)	400	600	600
Balconies and roofs used for floor-type activities	Same as areas providing access but not less than 4.0	1.8	450	600	600	600	600

C4. AREAS WITH POSSIBLE PHYSICAL ACTIVITIES

Dance halls and studios, gymnasias	5.0	3.6	x	450	450	600	600
Drill halls and drill rooms (Ed: Potential wet area)	5.0	9.0	x	x	x	450*	600

C5. AREAS SUSCEPTIBLE TO OVER-CROWDING

Assembly areas without fixed seating (concert halls, bars, vestibules, public lounges, places of worship, shopping malls) and grandstands (Ed: Potential wet area)	5.0	3.6	x	450*	450*	600	600
Stages in public assembly areas (Ed: Potential wet area)	7.5	4.5	x	450* (Sheet edges fully supported)	400*	600*	600

D. SHOPPING AREAS

Shop floors for the sale and display of merchandise (Ed: Potential wet area)	4.0	3.6	x	450*	450*	600	600
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E. WAREHOUSING & STORAGE AREAS. AREAS SUBJECT TO ACCUMULATION OF GOODS. AREAS FOR EQUIPMENT AND PLANT

Reading rooms with book storage e.g. libraries	4.0	4.5	x	450	400	600	600
General storage other than those specified in this table	2.4 for each metre of storage height	7.0	x	x	x	x	600*
Free rolling office compactus, for general filing, up to 2m high	3.0 for each metre of storage height	To be calculated	x	x	To be calculated specifically		
File rooms, office storage space, vaults and strongrooms	5.0	4.5	x	450 (Sheet edges fully supported)	400	600	600
Stack rooms (books)	3.3 for each metre of storage height	7.0	x	x	x	x	600
Paper storage for printing plants and stationery stores, packed book storage	4.0 for each metre of storage height	9.0	x	x	x	x	450
Mobile stacking, mechanically operated heavy shelving (wheels on rails e.g. compactus)	4.0 for each metre of storage height, but not less than 10.0	To be calculated	x	x	To be calculated specifically		
Cold storage	4.5 for each metre of storage height, but not less than 15.0	9.0	x	x	x	x	450*
Plant rooms, fan rooms etc, including weight of machinery. (Ed: Potential wet area)	5.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600
Areas around equipment in boiler rooms (Weight of equipment to be determined) (Ed: Potential wet area)	5.0	4.5	x	450* (Sheet edges fully supported)	400*	600*	600

F. LIGHT VEHICLE TRAFFIC AREAS

Parking, garages, driveways and ramps restricted to cars, light vans etc not exceeding 2500kg gross mass	2.5	13 ⁽⁷⁾ or 9 for domestic garages	x	x	x	x	400 for domestic garages, 300 elsewhere
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G. MEDIUM VEHICLE TRAFFIC AREAS

Vehicles exceeding 2500kg and not exceeding 10,000kg. Driveways, ramps, repair workshops, footpaths with vehicle access, and car parking	5.0	31 ⁽⁴⁾	x	x	x	x	x
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* Saturation of the fibre cement sheet in these applications is likely to affect structural integrity of the floor. Please refer to our relevant installation guides for waterproofing requirements.

NOTES

- The concentrated load shall be applied over an area of 350 mm² for calculation of punching or crushing.
- Where a stair tread or landing is structurally independent of the adjoining elements, it shall be capable of withstanding a line load of 2.2 kN/m of span of tread or landing.
- A concentrated load of 6.7 kN shall be used where a general allowance for safes is made.
- The concentrated load shall be applied over an area of 0.025 m² for calculation of punching or crushing.
- Where these same areas may be subjected to loads due to physical activities or overcrowding (for example a hotel dining room used as a dance floor), imposed loads shall be based on occupancy C4 or C5, as appropriate.
- Fixed seating is seating where the removal of the seating and the use of the space for other purposes is not likely.
- For domestic garages with timber floors, this may be reduced to 9 kN applied over an area of 0.3 m × 0.3 m.
- A concentrated imposed action shall be applied as follows:
 - As it's known position or where its position is not known, in the position giving the worst case scenario
 - Distributed over the actual area of application or if the actual area is not known or otherwise mentioned in Tables 3.1, over an area of not greater than 0.01m² for floors.

The structural adequacy for use of HardiePanel™ Compressed Flooring and Scyon™ Secura™ Flooring, based on Table 3.1 of AS/NZS 1170.1, has been determined on the basis of the David Beneke Consulting letter of certification dated 1st April 2021 (Ref 2014-15-LO-20).