

# STRUCTURAL PLY

wood products **bbi**



CD AND DD STRUCTURAL PLY

STRUCTURAL FLOORING

STRUCTURAL ROOFING

## SUSTAINABILITY

The plantation forests that supply wood for bbi AraucoPly are certified as compliant with the CERTFOR sustainable forest management standard.

CERTFOR is endorsed by PEFC (Programme for the Endorsement of Forest Certification Schemes). With some 187 million hectares under certification, PEFC is the world's largest forest certification programme.

## CERTIFICATIONS

bbi AraucoPly has been manufactured and tested to meet all requirements of Plywood Structural Standard AS/NZS 2269 in products that are stamped and labelled accordingly, as per the following licenses granted by SAI Global:

- Horcones Arauco Mill: Licence No. SMKB21663/1
- Ranquil Nueva Aldea Mill: Licence No. SMKB21663

## bbi ARAUCOPLY CD STRUCTURAL

bbi AraucoPly CD Certified Structural is a superior grade with no open face knotholes and no more than 8 wood patches with limited synthetic repairs on the face. A reasonably clean face veneer with any defects filled and finished with 150 grit sanding on the face veneer and 100 on the back veneer.

Certified to AS/NZS 2269 it gives you the assurance that it also has structural integrity, tested to the harsh New Zealand and Australian conditions.

The product is identified with a blue stripe down the middle of the short edge of the panel.

### APPLICATIONS

Concrete formwork to a F3 Standard NZS 3114-1987

Under roof decking, soffit linings, wall linings, ceiling linings

Plywood box beams or signage

General industrial applications, furniture, bracing, flooring, mobile homes, boat industry fittings



# ARAUCOPLY™

*MORE THAN JUST A PRETTY FACE™*

## **bbi ARAUCOPLY DD STRUCTURAL**

bbi AraucoPly DD Certified Structural is a grade primarily for use in non-visual applications where the end use is not intended to be seen. Certified to AS/NZS 2269 the DD grade also gives you the assurance of structural integrity.

With more face veneer imperfections than CD Structural, it is primarily for structural construction where it is in behind the finished product such as a bracing element in housing.

bbi AraucoPly DD has a solid face with tight knots, limited wood patches and synthetic repairs. The product is identified with a green stripe down the middle of the short edge of the panel. Finished on the face with at least a 100 grit sanding and 80 grit on the back veneer.

### APPLICATIONS

Hoardings around construction sites

Bracing elements in housing or commercial construction

Wall lining where you want a bit more knotty character than the CD Grade

Lining a shed or building a dog kennel

Plywood box beams, building crates or pallets

General industrial applications

Lining factory walls

## bbi ARAUCOPLY STRUCTURAL FLOORING

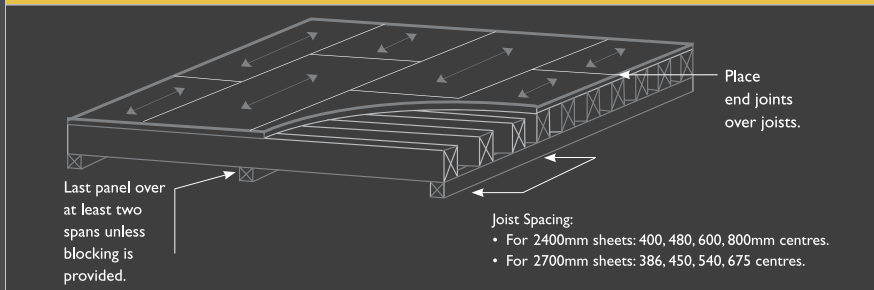
bbi AraucoPly Flooring Grade Structural is a product that is designed for use as a flooring substrate as well as an ideal substrate under roofing or decking rubber membranes.

Certified to AS/NZS 2269 to a strength grade of F11 gives you the assurance of structural integrity along with the knowledge that this is a product designed for use in New Zealand and Australia.

A plastic tongue and groove down the length of the board makes for easy joining of the product over joists and means that no support is needed on these joints unless otherwise specified by the engineer where roof diaphragm bracing or significant point loading is a consideration.

bbi AraucoPly Flooring should always be laid perpendicular to the joists to ensure the maximum strength of the product is maintained.

**FIGURE 1: FLOORING LAYOUT**



NOTE: For Span Tables please see technical information in Table 7: Flooring and Decking Strength/Stiffness Rating. For Fixings and Adhesives see Technical Information. It is important to note that when using bbi AraucoPly Flooring that has been treated you must seal any cut edges with a brush on remedial treatment. A product such as Metalex Green End Seal is ideal for this purpose.

### APPLICATIONS

Residential or commercial flooring

Flooring in wet areas, such as bathrooms toilets or kitchens

For use under rubber membranes to provide the best substrate

Decks, roofing, wall linings, and general industrial applications

Flooring for mezzanine floors

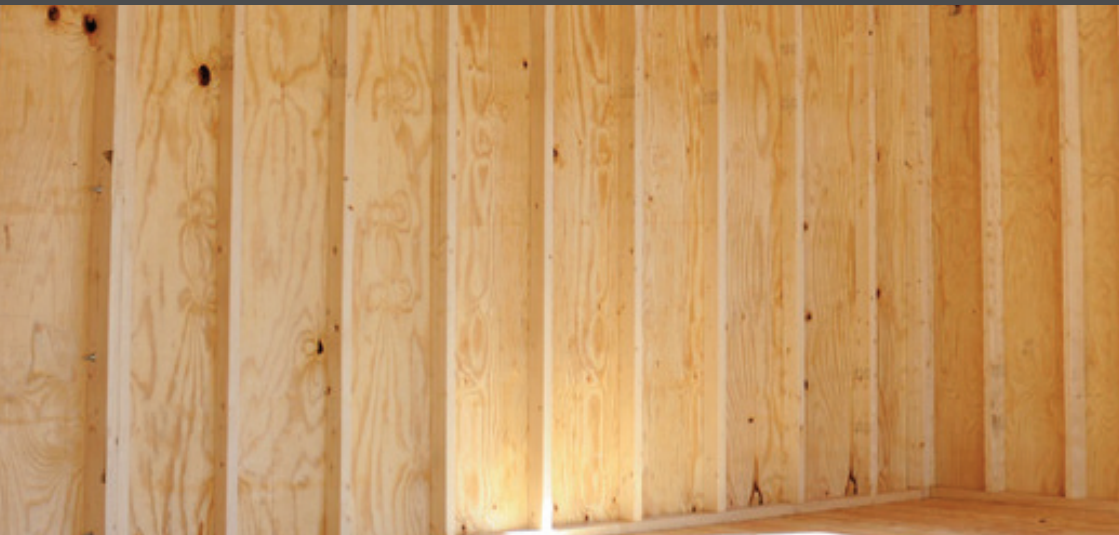
## **bbi ARAUCOPLY STRUCTURAL ROOFING**

bbi AraucoPly Roofing Grade Structural is a product that is designed for use as a roofing substrate primarily for use under shingles. Certified to AS/NZS 2269 to a strength grade of F11 gives you the assurance of structural integrity along with the knowledge that this is a product designed specifically for use in New Zealand and Australia.

This product has a plastic tongue and groove down the long edge of the sheet to allow for easy joining of the product over roof trusses. Sheets should always be laid perpendicular to the roof truss to ensure that the maximum strength of the product is maintained.

If treated bbi AraucoPly Roofing is installed after it has been cut, it is vital that the cut edge be sealed with a remedial preservative treatment such as Metalex Green End Seal. This also applies to any penetrations in the middle of the sheet such as pipes, vents or skylights. When fixing the sheets to the roof ensure that you stagger the joints of the sheets. 50mm ring shank or annular grooved 2.8mm nails at 150mm centres should be used when fixing the sheets and stainless steel fixings are recommended for any coastal areas. Around the edge of the roof, at gable ends, eaves or gutters, the sheets must be properly supported and fixings should be at 100mm centres. In high wind zones it is recommended that stainless steel screws are used.

**NOTE:** For Span Tables please see technical information in Table 8: Roofing Strength/Stiffness Rating.



## TECHNICAL INFORMATION

### ADHESIVES AND EMISSIONS

bbi AraucoPly is certified A-Bond using an Exterior Phenol-Formaldehyde resin, emission class Super E<sub>0</sub> in accordance with Standard AS/NZS 2098. - '11 Determination of Formaldehyde Emissions'.

While the Formaldehyde Emission limit in AS/NZS 2269.0:2012 is max 0.40 mg/L for Super E<sub>0</sub>, bbi AraucoPly's emission is typically below 0.03 mg/L.

**TABLE 1: EMISSION TABLE**

Emission Class / Product		Formaldehyde Emission	
		mg/L	ppm
AraucoPly	Typical Emission	0.03 avg	-
AS/NZS 2269.0:2012	Super E <sub>0</sub>	0.30 avg, 0.40 max.	0.024 avg, abt 0.032 max.
	E <sub>0</sub>	0.50 max.	abt 0.041 max.
	E <sub>1</sub>	1.00 max.	abt 0.080 max.
JIS A1460	Super E <sub>0</sub>	0.30 max.	-
	E <sub>0</sub>	0.50 max.	-
	E <sub>1</sub>	1.50 max.	-
CARB (USA)	Phase 2 (MDF)	-	0.110 max.
	Phase 1 (MDF)	-	0.210 max.
Natural Emission	Oak Tree	-	0.009
	Shell Fish	-	0.100
	Pork	-	0.020

### STORAGE AND HANDLING

bbi AraucoPly should be handled and stored with care. In order for you to get the finish and end result that you are looking for:

- The product should be stored until used in a dry area protected from the sun, rain, wind or snow
- The product should not be placed directly on the ground and should be supported with at least 3 but preferably 4 supports
- bbi AraucoPly should always be stored flat and not on the edge
- If possible store in the room for at least 24 hours prior to installation when using bbi AraucoPly inside, this will give it time to reach equilibrium moisture content and reduce the potential for movement after installation

For further information about storage and handling recommendations, please refer to standard AS/NZS 2269. Additionally, a Material Safety Data Sheet is available on our website [www.bbi.net.nz](http://www.bbi.net.nz).

## FIRE TESTS ON BUILDING MATERIALS

bbi AraucoPly has been tested for ignitability, flame propagation, heat release and smoke release in accordance with AS/NZS 1530.3:1999.

Tested with a clean faced AraucoPly by CSIRO Materials Science and Engineering, Australia, February 2013.

Additionally, bbi AraucoPly 9 to 18mm has been tested at 50-kW/m<sup>2</sup> irradiance in accordance with AS/NZS 3837:1998 and classified as Group Number 3 in accordance with Specification A2.4 of the Building Code of Australia, with an average specific extinction area of 69.4 m<sup>2</sup>/kg.

Tested with a clean faced AraucoPly by CSIRO Materials Science and Engineering, Australia, January 2012.

**TABLE 2: EARLY FIRE HAZARD PROPERTIES FOR bbi ARAUCOPLY 6.5 to 25mm**

Regulatory Indexes	Result	Range
Ignitability Index	13	0 - 20
Spread of Flame Index	8	0 - 10
Heat Evolved Index	7	0 - 10
Smoke Developed Index	3	0 - 10

## STRUCTURAL PROPERTIES

In accordance with AS/NZS 2269 bbi AraucoPly Flooring and Roofing are rated F11, considering its outstanding performance in parallel bending and stiffness strength.

In 2014, Arauco expects to release F14 grade Flooring and Roofing with the start up of its new Nueva Aldea Mill.

**TABLE 3: F-GRADE VALUES PER AS / NZS 2269.0:2012**

		Strength (MPa)		Tensile (MPa)		Tensile (MPa)		Shear (MPa)		Compression in plane (MPa)	
		//	⊥	//	⊥	//	⊥	//	⊥	//	⊥
Square Edge F8	CD, DD	25	25	9,100	9,100	15	15	4.2	4.2	20	20
Flooring F11	CD T&G	31	-	10,500	-	-	-	-	-	-	-
Roofing F11	DD T&G	31	-	10,500	-	-	-	-	-	-	-

**TABLE 4: SECTION PROPERTIES OF bbi ARAUCOPLY STRUCTURAL PLYWOOD**

Nominal Thickness	ID Code	Mass	Section Properties per mm Width							
			Parallel to Face Grain				Perpendicular to Face Grain			
			Moment of Inertia $I$	Section Modulus $Z$	Shear Constant $I/Q$	Section Area $A$	Moment of Inertia $I$	Section Modulus $Z$	Shear Constant $I/Q$	Section Area, A
mm		kg/m <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>4</sup>	mm <sup>3</sup>	mm <sup>2</sup>	mm <sup>2</sup>
6.5	6.5-24-3	3.9	29.5	8.2	5.16	4.8	2.0	0.95	2.28	2.5
7	7-24-3	3.9	29.5	8.2	5.16	4.8	2.0	0.95	2.28	2.5
9	9-30-3	4.9	56.3	12.7	6.40	6.0	3.9	1.46	2.83	3.1
12	12-24-5	6.6	113	18.8	9.21	7.3	32.9	8.2	5.40	5.0
15	15-30-5	8.1	216	28.9	11.4	9.1	62.7	12.7	6.70	6.2
18	18-24-7	9.8	339	37.5	12.6	10.9	150	21.4	10.5	7.5
19	19-30-7	10.5	436	45.5	13.6	12.1	153	21.4	10.6	7.5
21	21-30-7	11.4	534	50.9	15.0	12.1	230	28.9	11.7	9.2
25	25-30-9	13.4	868	70.4	17.6	15.1	372	37.5	13.2	10.0

**TABLE 5: NOMINAL STRENGTHS OF bbi ARAUCOPLY SQUARE EDGE & T&G F8 PLYWOOD**

Nominal Thickness	ID Code	Weight	Nominal Strengths (Limit State) per mm Width							
			Parallel to Face Grain				Perpendicular to Face Grain			
			Bending Stiffness EI	Bending Moment fz	Rolling Shear fI/Q	Axial C Compression fOA	Bending Stiffness EI	Bending Moment fz	Rolling Shear fI/Q	Axial C Compression fOA
mm		Pa	kNm <sup>2</sup>	Nmm	N	N	kNm <sup>2</sup>	Nmm	N	N
6.5	6.5-24-3	37	269	206	9.8	97	18.4	23.8	4.3	50.6
7	7-24-3	37	269	206	9.8	97	18.4	23.8	4.3	50.6
9	9-30-3	46	512	317	12.2	120	35.0	36.5	5.4	62.8
12	12-24-5	62	1,030	470	17.5	146	299	206	10.3	100
15	15-30-5	77	1,964	723	21.7	181	570	317	12.7	124
18	18-24-7	93	3,084	937	24.0	218	1,365	535	20.0	150
19	19-30-7	99	3,971	1,137	25.8	241	1,392	535	20.1	150
21	21-30-7	108	4,862	1,273	28.5	242	2,093	723	22.2	185
25	25-30-9	127	7,901	1,761	33.4	302	3,383	939	25.2	200



**TABLE 6: NOMINAL STRENGTHS OF bbi ARAUCOPLY T&G F11 FLOORING & ROOFING PLYWOOD**

Nominal Thickness	ID Code	Weight	Nominal Strengths (Limit State) per mm Width							
			Parallel to Face Grain				Perpendicular to Face Grain			
			Bending Stiffness $EI$	Bending Moment $Z$	Rolling Shear $f/Q$	Axial Compression $f_{QA}$	Bending Stiffness $EI$	Bending Moment $f_z$	Rolling Shear $f/Q$	Axial Compression $f_{QA}$
mm		Pa	kNmm <sup>2</sup>	Nmm	N	N	kNmm <sup>2</sup>	Nmm	N	N
15	15-30-5	77	2,575	1,157	24.9	272	647	317	13.8	124
18	18-24-7	93	4,029	1,499	27.4	327	1,487	535	21.4	150
19	19-30-7	99	5,199	1,819	29.5	362	1,548	535	21.9	150
21	21-30-7	108	6,353	2,037	32.3	363	2,283	723	23.8	185

NOTE: - Material properties calculated in accordance with AS/NZS 2269  
 - Properties and strengths for other layups are available on request



## SPAN RATINGS FLOORING

Maximum recommended frame centres for bbi AraucoPly (mm)

TABLE 7: FLOORING AND DECKING STRENGTH / STIFFNESS RATING								
Flooring Application (UDL / Conc live load)		Maximum spacing of support framing (mm) Plywood thickness						
	Length	F grade	15	18	19	21	25	
Domestic Flooring 2.0 kPa / 1.8 kN	2,400	F8	400	480	600	600	800	
		F11		600			-	
		F14	480	-	-			
	2,700	F8	386	540	540	675	675	675
		F11	450		675		-	
		F14	-	-	-	-		
Domestic Garage 2.5 kPa / 9.0 kN	2,400	F8	-	-	-	343	480	
		F11				400	-	
		F14				-	-	
	2,700	F8	-	-	-	386	450	-
		F11					-	-
		F14					-	-
Office 3.0 kPa / 2.7 kN	2,400	F8	-	400	480	600	800	
		F11		480	600		-	
		F14		-	-	800	-	
	2,700	F8	-	386	540	540	675	675
		F11		450	540	675	-	
		F14		540	675	-	-	
Retail 4.0 kPa / 3.6 kN	2,400	F8	-	-	-	400	600	
		F11		400	480	480	-	
		F14		-	-	600	-	
	2,700	F8	-	-	-	386	675	675
		F11		386	450	540	-	
		F14		450	540	540	-	
Industrial 5.0 kPa / 4.5 kN	2,400	F8	-	-	-	-	480	
		F11			343	480	-	
		F14			400	-	-	
	2,700	F8	-	-	-	-	540	540
		F11			386	450	450	-
		F14			450	450	-	-

### TEST NOTES

- Design actions as defined in AS/NZS 1170. Refer to code for clarification of application, and for a more extensive list
- Tables designed for IL2 buildings, 50 year working life  
Specific design recommended for other applications
- Support framing width assumed to be 45mm
- Ply face grain perpendicular to support framing
- Staggered joints, minimum two spans per sheet
- Flooring applications designed for a 1.5mm deflection under a 1.0 kN point load. This is in the middle of the AS/NZS 1170 suggested range. For more sensitive applications, specific design is recommended
- Concentrated loads are applied over varying footprints, as defined in AS/NZS 1170
- Flooring tables assume a floor dead load of 0.4 kPa

## SPAN RATINGS ROOFING

Maximum recommended frame centres for bbi AraucoPly (mm)

TABLE 8: ROOFING STRENGTH / STIFFNESS RATING						
Flooring Application (UDL / Conc live load)		Maximum spacing of support framing (mm) Plywood thickness				
	Length	F grade	15	18	19	21
Sub-Sheating n.a. kPa & n.a. kN	2,400	F8	1,200	1,200	1,200	1,200
		F11				
		F14				
	2,700	F8	1,350	1,350	1,350	1,350
		F11				
		F14				
Non-Trafficable (45 deg) 0.25 kPa / 1.1 kN	2,400	F8	800	800	800	1,200
		F11				
		F14			1,200	
	2,700	F8	900	900	900	900
		F11				
		F14				1,350
Non-Trafficable (30 deg) 0.25 kPa / 1.1 kN	2,400	F8	600	800	800	800
		F11				
		F14				
	2,700	F8	675	675	900	900
		F11				
		F14				
Non-Trafficable (less than 10 deg) 0.25 kPa / 1.8 kN	2,400	F8	600	800	800	800
		F11				
		F14				
	2,700	F8	540	675	900	900
		F11				
		F14				

### TEST NOTES

- Design actions as defined in AS/NZS 1170. Refer to code for clarification of application, and for a more extensive list
- Tables designed for IL2 buildings, 50 year working life  
Specific design recommended for other applications
- Support framing width assumed to be 45mm
- Ply face grain perpendicular to support framing
- Staggered joints, minimum two spans per sheet
- Roofing tables assume design action from:
  - Snow Ground snow load  $S_g = 3.75$  kPa (sub-alpine to 900m)
  - Wind  $W_u = 5.80$  kPa,  $W_s = 3.93$  kPa, (winds to Extra High (55m/s),  $C_p(\text{in}) = 1.05$ ,  $C_p(\text{out}) = 1.6$ ,  $K_l = 2,0$ )
  - Dead load light roof = 0.2 kPa, heavy roof = 0.6 kPa

## BRACING RATINGS

In accordance with AS/NZS 2269, our Structural Square-edge and Bracing is rated F8 which includes testing for parallel and perpendicular bending, stiffness, tensile, shear and compression strength.

The following table shows bracing ratings according to P21 racking test.

**TABLE 9: BRACING RATINGS FOR bbi ARAUCOPLY CERTIFIED STRUCTURAL PLY AND CLADDING PRODUCTS**

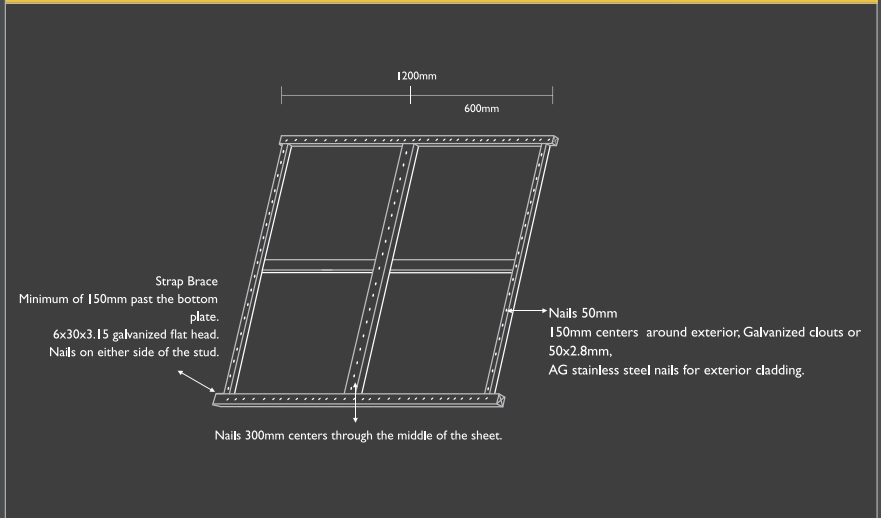
Arauco Code	Min Wall Length	Plywood Thickness	Max Stud Spacing	Wind*		Earthquake**	
	mm	mm	mm	BU/m	kN	BU/m	kN
AP1	1,200	6.5	600	130	6.5	132	6.6
AP2	1,200	7.0	600	142	7.1	144	7.2
AP3	1,200	12 Grooved	600	123	6.2	132	6.6

NOTE: 20 bracing units = 1 kN.

\* As limited by the serviceability load capacity

\*\* As limited by the ultimate load capacity

**FIGURE 2: BRACING TEST**



## TEST NOTES

- Walls were constructed using 90x45 MSG8 studs (600 centres), plates and noggs
- For 6.5mm and 7mm the plywood was fixed with 50x2.8 galvanised clouts at 150mm centres around the perimeter and at 300mm centres in the middle
- For the 12mm Plywood 50x2.8mm Annular Grooved Stainless steel fixings were used at the same centres as above
- Straps of 25x0.9mm around the bottom plate at each outside stud and extended a minimum of 150mm past the top of the bottom plate were used with at least 6 timber bracket galvanised 30x3.15mm FH nails on each side of the plate giving 6kN on each side of the stud
- Tested on a concrete floor with 2 M12 hold down bolts and 50x50x3 galvanised washers on each
- Tested by Scion, New Zealand April 2011

## ROOFS AND DECKS

It is important to always refer to the roofing and decking system supplier for installation, plywood selection and surface preparation requirements.

bbi does not recommend plywood as a substrate for exterior decks without a properly detailed barrier material, such as butyl rubber, vinyl or E.P.D.M to protect the surface from weathering.

Face checking is not a manufacturing fault and may occur when exposed to external environmental conditions. The risk of face checking can be reduced by protecting the ply surface from weather and moisture during the construction process. Designers and membrane suppliers must consider the suitability of plywood as a substrate for the membrane system if the potential for face checks onto the membrane surface is not acceptable.

While the information contained in this brochure may provide a starting point, designers must detail joints that allow for moisture expansion in accordance with practices recommended by the relevant membrane supplier.



## **CLADDING**

Although a CD Grade finish is an acceptable solution in the New Zealand and Australian Building code for the exterior cladding of housing, ARAUCO recommends the use of AraucoPly Cladding which has a bandsawn face to reduce surface bubbling and face checking, that can occur under extreme weather conditions. As face checks occur naturally and do not affect the structural integrity of the panel, they are not considered a manufacturing or product fault.

Plywood cladding should have a quality paint or stain system to protect the plywood. bbi does not recommend leaving the product uncoated.

## **FIXING AND ADHESIVES**

All fasteners used must be corrosion resistant to the appropriate specification level depending on the end use; a life expectancy of 15 to 50 years should be considered.

When fixing bbi AraucoPly Flooring it is important that you use glue and screws to minimise the potential chance of squeaking. Mechanical fixings must be either annular grooved stainless steel nails 50mm long or stainless steel screws at least 50mm in length. Fixings should be at 150mm centres at all points of contact with the framing.

Always allow an expansion gap when installing bbi AraucoPly Flooring. This gap will depend on the size of the floor but at least a 3mm gap is suitable for most applications.

## **HEALTH AND SAFETY**

For health and safety guidance, please refer to the Material Safety Data Sheet on our website, [www.bbi.net.nz](http://www.bbi.net.nz).

## **WARRANTIES AND LIMITATIONS**

For warranties and limitations on Arauco products, refer to Arauco's website [www.araucopy.com](http://www.araucopy.com). The warranties and limitations specified by Arauco apply to all sales of bbi AraucoPly and bbi's liability is limited to the scope of any warranties provided by Arauco.

The information contained in this brochure is current as at 8 June 2013. bbi has used its reasonable endeavours to ensure the accuracy and reliability of the information contained in this brochure and, to the extent permitted by law, will not be liable for any inaccuracies, omissions or errors in this information nor for any actions taken in reliance on this information.

bbi wholesales and distributes products through building supply merchants around New Zealand

The bbi product range includes:

- Plywood
- Hardwood Decking
- Steel Fence Standards, Farm Gates and Security Fencing
- Aluminium Composite Panel

Call us for advice on which product may best suit your needs. We have a wealth of knowledge and experience in offering reliable, creative and cost effective solutions - tailored to the needs of the project.

Check out our website for plenty of ideas, information and photos.

SUPPLIED BY:



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