

DURAGAL[®]
FLOORING SYSTEM

DURAGAL[®] FLOORING SYSTEM

THE PERFECT SOLUTION FOR SLOPING SITES



onesteel
market mills

Letter of Certification



◆ STRUCTURAL ◆ CIVIL ◆ HOUSING ◆ FORENSIC ◆

MORGAN CONSULTING
ENGINEERS PTY LTD
ABN 82 009 859 081
1 GREAT GEORGE STREET
PADDINGTON QLD 4064

Monday, 12 August 2002

OneSteel Market Mills
PO Box 156
NEWCASTLE NSW 2300

Dear Sir,

**RE: Structural Engineers Certification
DuraGal Flooring Tables**

We hereby certify that we have checked the structural aspects of the design tables 1 to 28 in the DuraGal Flooring System Brochure dated August 2002.

The tables and accompanying information must be strictly followed, or structural adequacy or statutory compliance may be compromised.

We certify that members designed using these tables are structurally adequate and in accordance with the Building Code of Australia and relevant SAA Codes of Practice.

Yours Faithfully,
MORGAN CONSULTING ENGINEERS PTY LTD

Robert N Morgan CPEng



**For further information please contact OneSteel Direct
Telephone: 1800 1 STEEL (1800 1 78335) Facsimile: 1800 101 141
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This brochure contains general information about the use of the DuraGal Flooring System in single storey residential buildings. This information is a guide only and not a substitute for expert advice on how to successfully design and construct a residential building or install a flooring system. Successful design, construction and installation depends on many factors beyond the scope of this brochure, including, for example, correct site preparation, proper care of product prior to installation, workmanship during installation and engineering judgments specific to each installation. Product specification and other information in this brochure may change at any time without further notice. OneSteel does not accept any responsibility for other products named in, for any error in, or omission from, this brochure or for any loss or damage or other consequence arising from the use of this brochure by any person.

DuraGal®

DURAGAL® Flooring System

Now you can build a better floor with the DuraGal Flooring System

Difficult or sloping site construction can be easily handled by the DuraGal Flooring System. Developed by OneSteel Market Mills, the DuraGal Flooring System is a steel flooring system utilising the higher strength and lighter weight advantages of DuraGal Hollow sections. The DuraGal Flooring System is suitable for a wide range of single storey residential homes, decks and commercial floors.

The DuraGal Flooring System has been developed by OneSteel to provide a simple, strong and lightweight modular system to handle difficult or sloping site construction. The system utilises the higher strength and lighter weight advantages of DuraGal hollow sections to produce a floor system that's suitable for a wide range of building applications.

Features

User friendly – Requires only normal trade and electrical tools, no welding is involved.

Fast and accurate levelling of the floor during or after construction is a great feature, and compensates for variations in the footings, now or later.

Surface Protection – Internally painted DuraGal hollow sections have an In-line hot dip, galvanized coating with a minimum average coating mass of 100g/m² applied to the external surface, the internal surface is coated with a 35 micron thick Zinc Phosphate coating. Recommended for use in non-aggressive environments*.

Quality – OneSteel's commitment to quality means you can depend on DuraGal products to deliver reliable & consistent quality to site.

Versatility – New span tables for live loads of 1.5kPa, 3.0kPa and 5.0kPa, means the DuraGal Flooring System is now more versatile than ever.

The many benefits offered by the DuraGal Flooring System has seen it adopted by many leading housing construction companies as their preferred system for sloping sites.

Suitable for single storey residential homes, decks and commercial floors, it offers the flexibility and ease of installation that can substantially reduce your on site construction costs.

Why you should use the DuraGal® Flooring System: -

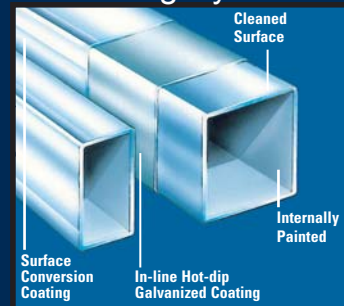
- Simple and straightforward installation.
- No welding required.
- Unaffected by termites.
- DuraGal won't shrink, rot or warp like timber, helping to reduce expensive callbacks.
- Larger spans, which can open up under-floor areas for use as workshop or storage.
- Improved underfloor access and ventilation. (less piers)
- The costs of site preparation such as, cut and fill, retaining walls and drainage can be minimised.
- Has the advantage of higher strength, lightweight, and corrosion resistant* DuraGal hollow steel sections.
- Manufactured to tight tolerances.
- Longer lengths.
- Comprehensive range of standard fittings to suit most applications.
- Floor sheets can still fixed by traditional methods.
- Australian made and available nationally

* Refer to pages 22 to 29 of this publication for more details on corrosive environments & appropriate precautions during installation of exposed floors members.

The DuraGal Flooring System is yet another example of the innovative building solutions developed by OneSteel Market Mills.

Isn't it time you started building a better floor with the DuraGal Flooring System?

DURAGAL® Coating System



Selection of materials

In the construction of a floor system, building products manufactured by OneSteel Market Mills, and building products manufactured by other companies will be used. The product information in this publication relates solely to the products manufactured by OneSteel Market Mills.

It is strongly recommended that only DuraGal Internally painted hollow sections manufactured by OneSteel be specified for use when using the design information in this publication. Testing using only OneSteel Products has validated the design criteria contained within this publication. It is recommended a note to this effect is included on any design documentation.



DuraGal®

DURAGAL®

Flooring System

What the Users Say

Mr. Bruce Louis

Production & Design Manager,
AV Jennings Homes, Wyong NSW.

"With fluctuating timber prices and instability of supply, we looked for an alternative system to the traditional timber bearers and joists for construction of elevated floors on sloping sites. After trialing several systems we adopted the DuraGal® Flooring System as our preferred option as it offers the best and most cost effective solution for our company."

"An added benefit provided by this system is that it offers extra useable space under the floor which is used as a real selling feature."

Mr. Dennis McColl

Managing Director, Aus Steel, Beresfield, NSW.

"It enables you to keep the floor nice and straight. We have also used the system a lot in patios, especially where there is no underfloor lining. It is a good, neat section that finishes off well."

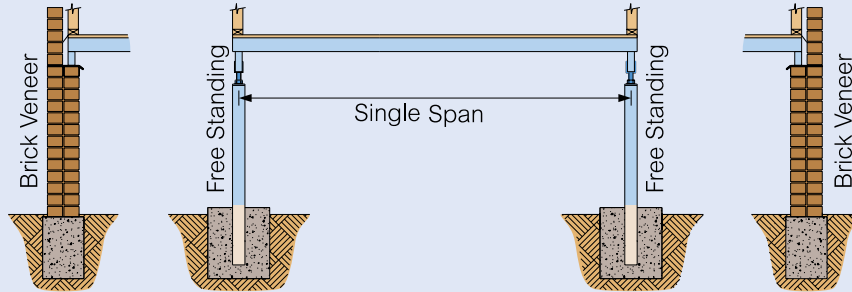
Mr. Jason Watts

Production Manager, Executive Homes, Country Victoria and Southern NSW.

"The DuraGal® Flooring System provides us with a flexible building system well suited to a wide range of home designs and site conditions. The major benefits to us include, being galvanized steel, being resistant to termite attack, easy to install, and providing a strong low maintenance system. Whenever an elevated floor is required we would recommend the DuraGal® Flooring System to our clients."

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Single Span

DURAGAL C450LO	JOIST SPACING (mm)	
	450 ¹	600
RHS SIZE ²	MAXIMUM JOIST SPAN (m)	
75 x 50 x 1.6	2.14	2.05
x 2.0	2.30	2.20
100 x 50 x 1.6	2.78	2.65
x 2.0	3.00	2.85
150 x 50 x 2.0	4.44	4.16
x 2.5	4.81	4.49
x 3.0	5.13	4.77
x 4.0	5.52	5.20
x 5.0	5.65	5.41
x 6.0	5.73	5.50

¹ OneSteel Market Mills recommend 450mm joist spacing.

² Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

³ This table also applies to decks with floor areas greater than 40m²

1.5kPa

Continuous Span

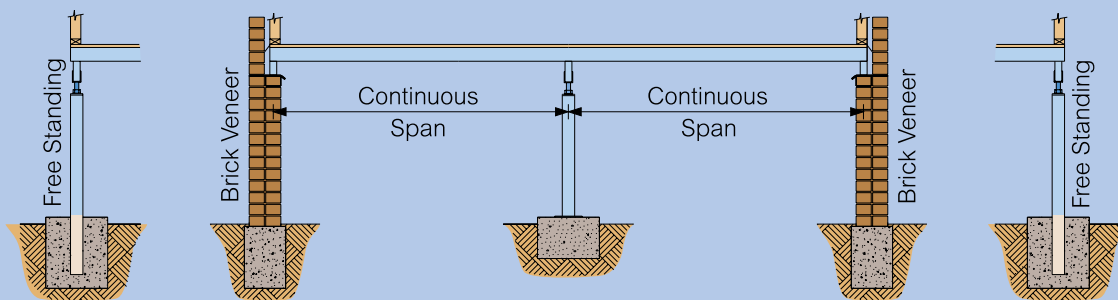
(SEE NOTE 2 - DESIGN CRITERIA)

DURAGAL C450LO	JOIST SPACING (mm)	
	450 ¹	600
RHS SIZE ²	MAXIMUM SPAN (m)	
75 x 50 x 1.6	2.52	2.39
x 2.0	2.72	2.57
100 x 50 x 1.6	3.31	3.10
x 2.0	3.59	3.34
150 x 50 x 2.0	5.46	4.95
x 2.5	5.74	5.34
x 3.0	5.98	5.56
x 4.0	6.31	5.88
x 5.0	6.45	6.14
x 6.0	6.55	6.28

¹ OneSteel Market Mills recommend 450mm joist spacing.

² Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

³ This table also applies to decks with floor areas greater than 40m²



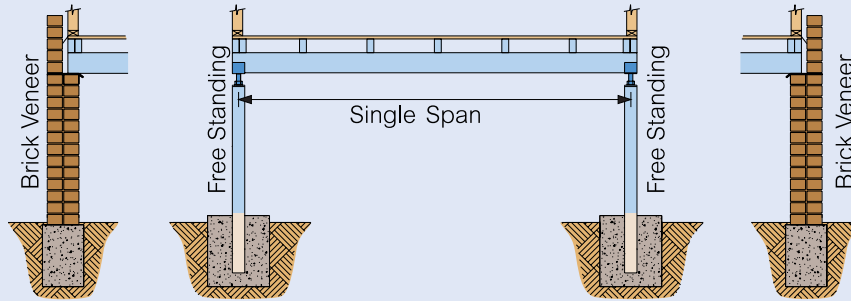
DESIGN CRITERIA

- Span Tables 1 to 4 & 13 to 16 have been calculated in accordance with AS 3623: Domestic metal framing, AS 4100: Steel Structures, AS1170.1: Dead and Live Loading, with Live Load, Q equal to 1.5kPa, and Dead Load, G equal to 0.4kPa.
- For continuous span where the variation between adjacent spans exceeds 30% of the larger span, the single span tables must be used.
- Tables are available on request for:
 - Live loads other than 1.5, 3 & 5kPa
 - DuraGal sizes not given in Table 1 to 6
- If additional loads are applied the advice of a Structural Engineer must be sought.

FLOOR STIFFNESS

- The maximum spans given in Table 1 to 4 comply with the Australian Standard AS 3623 - Domestic Metal Framing.
- The spans given for the joists in Tables 1 and 2 are the maximum recommended spans and as such not all users will be satisfied with the stiffness of the floor. For those desiring a stiffer floor either the spans tabulated can be reduced, the joist spacing reduced, or both.
- Joist spacing of 450mm spans calculated using 19mm particle board or 15mm F14 plywood floor sheeting. Joist spacing of 600mm spans calculated using 22mm floor sheeting.

- If you need guidance for large open areas, areas not supporting roof and wall loads, or to achieve the floor stiffness you require, consult your DuraGal Flooring System Supplier who can provide advice on the floor design to meet your needs.



Single Span

TABLE 3 – BEARERS FOR 1.5 kPa FLOORS										
DURAGAL C450LO RHS SIZE ¹	JOIST SPAN (m)									
	1.80	2.10	2.40	2.70	3.00	3.60	4.20	4.80	5.40	6.00
100 x 50 x 2.0	1.98	1.88	1.80	1.73	1.67	1.57	1.49			
125 x 75 x 2.0	2.60	2.47	2.36	2.27	2.19	2.06	1.95	1.87		
x 2.5	2.78	2.64	2.52	2.43	2.34	2.20	2.09	2.00	1.93	
x 3.0	2.93	2.78	2.65	2.55	2.46	2.32	2.20	2.11	2.03	1.96
150 x 50 x 2.0	2.78	2.64	2.53	2.43	2.35	2.21	2.10	2.01	1.93	1.86
x 2.5	2.97	2.82	2.70	2.60	2.51	2.36	2.24	2.14	2.06	1.99
x 3.0	3.14	2.98	2.85	2.74	2.65	2.49	2.37	2.26	2.18	2.10
x 4.0	3.38	3.21	3.07	2.95	2.85	2.68	2.55	2.44	2.34	2.26
x 5.0	3.58	3.40	3.25	3.13	3.02	2.84	2.70	2.58	2.48	2.40
x 6.0	3.74	3.55	3.40	3.27	3.15	2.97	2.82	2.70	2.59	2.50

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

² Refer notes on load bearing walls below.

³ This table also applies to decks with floor areas greater than 40m²

Continuous Span (SEE NOTE 2 - DESIGN CRITERIA PAGE 5)

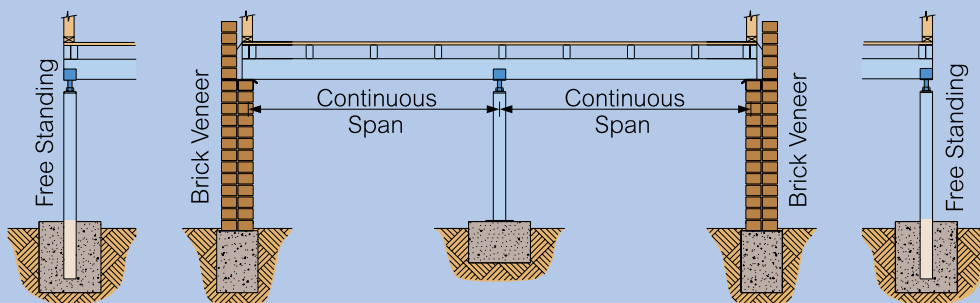
1.5kPa

TABLE 4 – BEARERS FOR 1.5 kPa FLOORS										
DURAGAL C450LO RHS SIZE ¹	JOIST SPAN (m)									
	1.80	2.10	2.40	2.70	3.00	3.60	4.20	4.80	5.40	6.00
100 x 50 x 2.0	2.65	2.52	2.41	2.32	2.24	2.10	1.99			
125 x 75 x 2.0	3.48	3.30	3.11	2.94	2.79	2.54	2.35	2.20		
x 2.5	3.72	3.54	3.38	3.25	3.14	2.95	2.80	2.61	2.47	
x 3.0	3.93	3.72	3.55	3.42	3.30	3.11	2.95	2.83	2.72	2.63
150 x 50 x 2.0	3.73	3.54	3.39	3.26	3.14	2.88	2.66	2.49	2.35	2.23
x 2.5	3.99	3.79	3.62	3.48	3.36	3.16	3.00	2.87	2.75	2.61
x 3.0	4.21	4.00	3.82	3.68	3.55	3.34	3.17	3.03	2.92	2.82
x 4.0	4.53	4.31	4.12	3.96	3.82	3.60	3.42	3.27	3.14	3.03
x 5.0	4.80	4.56	4.36	4.19	4.05	3.81	3.62	3.46	3.33	3.21
x 6.0	5.01	4.76	4.56	4.38	4.23	3.98	3.78	3.62	3.48	3.36

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

² Refer notes on load bearing walls below.

³ This table also applies to decks with floor areas greater than 40m²



PREFERRED BEARER AND JOIST SIZES

In typical applications, the most economical DuraGal Floor will result from the use of 150x50x2.0 bearers and joists of either 100x50x1.6 or 75x50x1.6. To ensure optimal floor performance, joists spaced at 450mm centres are recommended.

When selecting bearer and joist sizes refer to page 19 of this guide for availability of standard joiners.

PERIMETER BEARERS ON ADJUSTABLE PIERS

The sizes and bearer spans given in tables 3 and 4 are suitable for use under load bearing walls for single storey construction providing the following criteria is satisfied:

The pier adjustable top connection and U-Bracket is used to

support the bearer, and

The bearer span is determined with a **minimum joist span of 3.6m** even if the actual joist span is less, and

The maximum roof load width is 4m for tile roof, and 6m for steel sheet roof, and

The bearer is on the perimeter, parallel and directly beneath the load-bearing wall and is not subjected to concentrated loads from jambing studs.

PERIMETER BEARERS ON BRICK PIERS

The range of sizes suitable for bearers under load bearing walls when supported over brick piers for a 1.5kPa floor live load are restricted to 125x75 and 150x50 of 2.0mm or thicker as given in tables 3 and 4, and for a joist span of

3.6m or less. For joist spans greater than 3.6m up to 6m suitable bearer sizes are 125x75, 150x50 of 2.5mm or thicker. In addition, the following criteria must also be satisfied:

The maximum brick pier spacing is 2m for continuous spans and a maximum of 1.8m for single spans, and

At least 200mm of support for the full width of the bearer at each brick pier, and

The maximum roof load width is 5m for tile roof and 8m for steel sheet roof (refer page 12), and

The bearer is on the perimeter, parallel and directly beneath the load-bearing wall and is not subjected to concentrated loads from jambing studs.

Single Span

TABLE 5 – JOISTS FOR 3 kPa FLOORS		
DURAGAL C450L0	JOIST SPACING (mm)	
	450 ¹	600
RHS SIZE ²	MAXIMUM JOIST SPAN (m)	
75 x 50 x 1.6	2.14	2.05
x 2.0	2.30	2.20
100 x 50 x 1.6	2.78	2.65
x 2.0	3.00	2.85
150 x 50 x 2.0	4.29	3.99
x 2.5	4.51	4.20
x 3.0	4.69	4.37
x 4.0	4.96	4.62
x 5.0	5.18	4.82
x 6.0	5.36	4.98

¹ OneSteel Market Mills recommend 450mm joist spacing.

² Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

³ This table also applies to decks with floor areas less than 40m²

3kPa

Continuous Span

(SEE NOTE 2 - DESIGN CRITERIA)

TABLE 6 – JOISTS FOR 3 kPa FLOORS		
DURAGAL C450L0	JOIST SPACING (mm)	
	450 ¹	600
RHS SIZE ²	MAXIMUM SPAN (m)	
75 x 50 x 1.6	2.52	2.39
x 2.0	2.72	2.55
100 x 50 x 1.6	3.24	2.71
x 2.0	3.54	3.22
150 x 50 x 2.0	4.59	3.83
x 2.5	4.83	4.49
x 3.0	5.03	4.68
x 4.0	5.32	4.95
x 5.0	5.55	5.17
x 6.0	5.73	5.34

¹ OneSteel Market Mills recommend 450mm joist spacing.

² Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

³ This table also applies to decks with floor areas less than 40m²

Single Span

TABLE 7 – JOISTS FOR 5 kPa FLOORS		
DURAGAL C450L0	JOIST SPACING (mm)	
	450 ¹	600
RHS SIZE ²	MAXIMUM JOIST SPAN (m)	
75 x 50 x 1.6	2.02	1.84
x 2.0	2.16	1.96
100 x 50 x 1.6	2.55	2.32
x 2.0	2.73	2.48
150 x 50 x 2.0	3.77	3.48
x 2.5	3.97	3.69
x 3.0	4.13	3.84
x 4.0	4.37	4.07
x 5.0	4.56	4.25
x 6.0	4.71	4.39

¹ OneSteel Market Mills recommend 450mm joist spacing.

² Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

5kPa

Continuous Span

(SEE NOTE 2 - DESIGN CRITERIA)

TABLE 8 – JOISTS FOR 5 kPa FLOORS		
DURAGAL C450L0	JOIST SPACING (mm)	
	450 ¹	600
RHS SIZE ²	MAXIMUM SPAN (m)	
75 x 50 x 1.6	2.21	1.87
x 2.0	2.37	2.15
100 x 50 x 1.6	2.37	1.96
x 2.0	2.99	2.70
150 x 50 x 2.0	3.31	2.69
x 2.5	4.25	3.83
x 3.0	4.42	4.12
x 4.0	4.68	4.35
x 5.0	4.88	4.55
x 6.0	5.05	4.70

¹ OneSteel Market Mills recommend 450mm joist spacing.

² Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

DESIGN CRITERIA

- Span Tables 5 to 12 & 17 to 24 have been calculated in accordance with AS 3623: Domestic metal framing, AS 4100: Steel Structures, AS1170.1: Dead and Live Loading, with 3kPa Tables, Live Load Q=3kPa, Dead Load G=0.657kPa
5kPa Tables, Live Load Q=5kPa, Dead Load G=1.0kPa
- For continuous span where the variation between adjacent spans exceeds 30% of the larger span, the single span tables must be used.
- Tables are available on request for:
 - Live loads other than 1.5, 3 & 5kPa
 - DuraGal sizes not given in Table 1 to 12
- If additional loads are applied the advice of a Structural Engineer must be sought.

FLOOR STIFFNESS

- The maximum spans given in Table 1 to 4 comply with the Australian Standard AS 3623 - Domestic Metal Framing.
- The spans given for the joists in Tables 5 to 8 are the maximum recommended spans and as such not all users will be satisfied with the stiffness of the floor. For those desiring a stiffer floor either the spans tabulated can be reduced, the joist spacing reduced, or both.
- Joist spacing of 450mm spans calculated using 19mm particle board or 15mm F14 plywood floor sheeting. Joist spacing of 600mm spans calculated using 22mm floor sheeting.

- If you need guidance for large open areas, areas not supporting roof and wall loads, or to achieve the floor stiffness you require, consult your DuraGal Flooring System Supplier who can provide advice on the floor design to meet your needs.

Single Span

TABLE 9 – BEARERS FOR 3 kPa FLOORS

DURAGAL C450LO RHS SIZE ¹	JOIST SPAN (m)									
	1.80	2.10	2.40	2.70	3.00	3.60	4.20	4.80	5.40	6.00
100 x 50 x 2.0	1.57	1.49	1.43	1.37	1.33	1.25	1.18	1.13	1.09	1.05
125 x 75 x 2.0	2.06	1.95	1.87	1.80	1.74	1.63	1.55	1.48	1.43	1.38
x 2.5	2.20	2.09	2.00	1.92	1.86	1.75	1.66	1.59	1.53	1.47
x 3.0	2.32	2.21	2.11	2.03	1.96	1.84	1.75	1.68	1.61	1.56
150 x 50 x 2.0	2.21	2.10	2.00	1.93	1.86	1.75	1.66	1.59	1.53	1.48
x 2.5	2.36	2.24	2.14	2.06	1.99	1.87	1.78	1.70	1.64	1.58
x 3.0	2.49	2.37	2.26	2.18	2.10	1.98	1.88	1.80	1.73	1.67
x 4.0	2.68	2.55	2.44	2.34	2.26	2.13	2.02	1.94	1.86	1.80
x 5.0	2.84	2.70	2.58	2.48	2.40	2.26	2.14	2.05	1.97	1.90
x 6.0	2.97	2.82	2.70	2.59	2.50	2.36	2.24	2.14	2.06	1.99

3kPa

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

² Refer notes on load bearing walls below

³ This table also applies to decks with floor areas less than 40m²

Continuous Span

(SEE NOTE 2 - DESIGN CRITERIA PAGE 7)

TABLE 10 – BEARERS FOR 3 kPa FLOORS

DURAGAL C450LO RHS SIZE ¹	JOIST SPAN (m)									
	1.80	2.10	2.40	2.70	3.00	3.60	4.20	4.80	5.40	6.00
100 x 50 x 2.0	2.11	2.00	1.91	1.81	1.72	1.57	1.45	1.36	1.28	1.22
125 x 75 x 2.0	2.59	2.40	2.24	2.12	2.01	1.83	1.70	1.59	1.50	1.42
x 2.5	2.95	2.81	2.65	2.50	2.37	2.17	2.01	1.88	1.77	1.68
x 3.0	3.12	2.96	2.83	2.72	2.63	2.47	2.32	2.17	2.05	1.94
150 x 50 x 2.0	2.93	2.71	2.53	2.39	2.27	2.07	1.92	1.79	1.69	1.60
x 2.5	3.16	3.01	2.87	2.76	2.66	2.43	2.25	2.10	1.98	1.88
x 3.0	3.34	3.17	3.03	2.92	2.82	2.64	2.44	2.28	2.15	2.04
x 4.0	3.60	3.42	3.27	3.14	3.03	2.86	2.71	2.58	2.43	2.30
x 5.0	3.81	3.62	3.46	3.33	3.21	3.03	2.87	2.75	2.64	2.53
x 6.0	3.98	3.78	3.62	3.48	3.36	3.16	3.00	2.87	2.76	2.67

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

² Refer notes on load bearing walls below

³ This table also applies to decks with floor areas less than 40m²

Single Span

TABLE 11 – BEARERS FOR 5 kPa FLOORS

DURAGAL C450LO RHS SIZE ¹	JOIST SPAN (m)									
	1.80	2.10	2.40	2.70	3.00	3.60	4.20	4.80	5.40	6.00
100 x 50 x 2.0	1.60	1.52	1.45	1.39	1.34	1.22	1.13	1.06	1.00	
125 x 75 x 2.0	2.02	1.87	1.75	1.65	1.57	1.43	1.32	1.24	1.17	1.11
x 2.5	2.24	2.12	2.03	1.95	1.85	1.69	1.57	1.46	1.38	1.25
x 3.0	2.36	2.24	2.14	2.06	1.99	1.87	1.78	1.69	1.60	1.52
150 x 50 x 2.0	2.24	2.11	1.98	1.86	1.77	1.61	1.49	1.33	1.18	1.06
x 2.5	2.40	2.28	2.18	2.09	2.02	1.89	1.75	1.64	1.55	1.47
x 3.0	2.53	2.40	2.30	2.21	2.13	2.01	1.90	1.78	1.68	1.59
x 4.0	2.73	2.59	2.48	2.38	2.30	2.16	2.05	1.97	1.89	1.80
x 5.0	2.89	2.74	2.62	2.52	2.43	2.29	2.18	2.08	2.00	1.93
x 6.0	3.02	2.86	2.74	2.63	2.54	2.39	2.27	2.17	2.09	2.02

5kPa

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

² Refer notes on load bearing walls below

Continuous Span

(SEE NOTE 2 - DESIGN CRITERIA PAGE 7)

TABLE 12 – BEARERS FOR 5 kPa FLOORS

DURAGAL C450LO RHS SIZE ¹	JOIST SPAN (m)									
	1.80	2.10	2.40	2.70	3.00	3.60	4.20	4.80	5.40	6.00
100 x 50 x 2.0	1.73	1.60	1.50	1.41	1.34	1.22	1.13	1.06	1.00	
125 x 75 x 2.0	2.02	1.87	1.75	1.65	1.57	1.43	1.32	1.24	1.17	1.11
x 2.5	2.39	2.21	2.07	1.95	1.85	1.69	1.57	1.46	1.38	1.31
x 3.0	2.59	2.46	2.35	2.26	2.14	1.96	1.81	1.69	1.60	1.52
150 x 50 x 2.0	2.28	2.11	1.98	1.86	1.77	1.61	1.49	1.40	1.32	1.19
x 2.5	2.63	2.48	2.32	2.19	2.07	1.89	1.75	1.64	1.55	1.47
x 3.0	2.77	2.63	2.52	2.38	2.25	2.06	1.90	1.78	1.68	1.59
x 4.0	2.99	2.84	2.71	2.61	2.52	2.32	2.15	2.01	1.89	1.80
x 5.0	3.16	3.00	2.87	2.76	2.67	2.51	2.36	2.21	2.08	1.97
x 6.0	3.30	3.14	3.00	2.89	2.79	2.62	2.49	2.37	2.24	2.12

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

² Refer notes on load bearing walls below

PREFERRED BEARER AND JOIST SIZES

When selecting bearer and joist sizes refer to page 19 of this guide for availability of standard joiners.

PERIMETER BEARERS ON ADJUSTABLE PIERS

The sizes and bearer spans given in tables 9 to 12 are suitable for use under load bearing walls for single storey construction providing the following criteria is satisfied:

- The pier adjustable top connection and U-Bracket is used to support the bearer, and
- The bearer span is determined with a **minimum joist**

span of 3.6m even if the actual joist span is less, and

- The maximum roof load width is 4m for tile roof, and 6m for steel sheet roof, and
- The bearer is on the perimeter, parallel and directly beneath the load-bearing wall and is not subjected to concentrated loads from jaming studs.

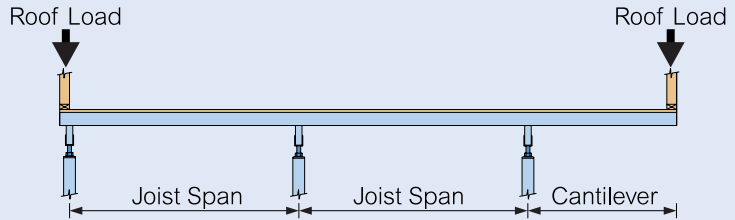
PERIMETER BEARERS ON BRICK PIERS

The range of sizes suitable for bearers under load bearing walls when supported over brick piers for a 1.5kPa floor live load are restricted to 125x75 & 150x50 of 2.5mm or thicker as given in tables 9 to 12, and for a joist span of 3.6m or less. For joist spans greater than

3.6m up to 6m suitable bearer sizes are 150x50 of 4.0mm or thicker. In addition, the following criteria must also be satisfied:

- The maximum brick pier spacing is 2m for continuous spans and a maximum of 1.8m for single spans, and
- At least 200mm of support for the full width of the bearer at each brick pier, and
- The maximum roof load width is 5m for tile roof and 8m for steel sheet roof (refer page 12), and
- The bearer is on the perimeter, parallel and directly beneath the load-bearing wall and is not subjected to concentrated loads from jaming studs.

Joists



Non Cyclonic

TABLE 13 – MAXIMUM SPAN OF CANTILEVER JOISTS – 1.5 kPa

DURAGAL JOIST C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)					
	Joist Spacing = 450mm			Joist Spacing = 600mm		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
75 x 50 x 1.6	0.53	0.18	0.10	0.47	0.15	0.08
x 2.0	0.58	0.20	0.12	0.51	0.17	0.09
100 x 50 x 1.6	0.74	0.27	0.16	0.65	0.22	0.13
x 2.0	0.81	0.30	0.18	0.72	0.25	0.14
150 x 50 x 2.0	1.29	0.52	0.31	1.14	0.44	0.26
x 2.5	1.39	0.59	0.36	1.25	0.49	0.29
x 3.0	1.45	0.65	0.40	1.33	0.55	0.33
x 4.0	1.55	0.75	0.47	1.43	0.63	0.38
x 5.0	1.62	0.85	0.54	1.50	0.70	0.43
x 6.0	1.67	0.93	0.59	1.55	0.76	0.48

*MAXIMUM ROOF LOAD WIDTH = 5m
¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

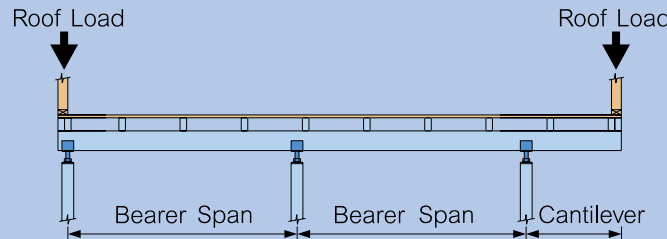
Cyclonic

TABLE 14 – MAXIMUM SPAN OF CANTILEVER JOISTS – 1.5 kPa

DURAGAL JOIST C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)					
	Joist Spacing = 450mm			Joist Spacing = 600mm		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
75 x 50 x 1.6	0.53	0.07	0.09	0.47	0.05	0.07
x 2.0	0.58	0.07	0.10	0.51	0.06	0.08
100 x 50 x 1.6	0.74	0.10	0.14	0.65	0.08	0.11
x 2.0	0.81	0.11	0.16	0.72	0.09	0.13
150 x 50 x 2.0	1.29	0.20	0.28	1.14	0.17	0.23
x 2.5	1.39	0.24	0.32	1.25	0.19	0.26
x 3.0	1.45	0.26	0.36	1.33	0.22	0.29
x 4.0	1.55	0.31	0.42	1.43	0.25	0.34
x 5.0	1.62	0.36	0.48	1.50	0.29	0.39
x 6.0	1.67	0.40	0.53	1.55	0.32	0.43

*MAXIMUM ROOF LOAD WIDTH = 5m
¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Bearers



Non Cyclonic

TABLE 15 – MAXIMUM SPAN OF CANTILEVER BEARERS – NON CYCLONIC - 1.5 kPa

DURAGAL BEARER C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
100 x 50 x 2.0	0.44	0.21	0.12
125 x 75 x 2.0	0.50	0.32	0.20
x 2.5	0.70	0.36	0.23
x 3.0	0.75	0.40	0.25
150 x 50 x 2.0	0.48	0.36	0.23
x 2.5	0.77	0.40	0.26
x 3.0	0.82	0.44	0.29
x 4.0	0.91	0.50	0.33
x 5.0	0.96	0.54	0.36
x 6.0	1.01	0.58	0.39

*MAXIMUM ROOF LOAD WIDTH = 1.8m
¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Cyclonic

TABLE 16 – MAXIMUM SPAN OF CANTILEVER BEARERS – CYCLONIC - 1.5 kPa

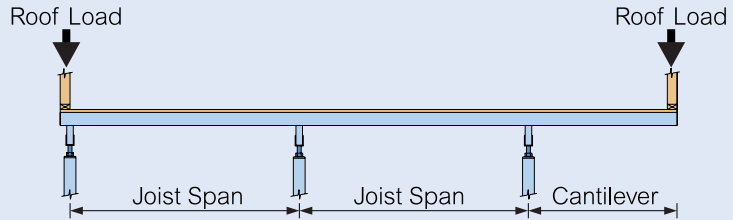
DURAGAL BEARER C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
100 x 50 x 2.0	0.44	0.08	0.11
125 x 75 x 2.0	0.50	0.14	0.18
x 2.5	0.70	0.15	0.21
x 3.0	0.75	0.17	0.23
150 x 50 x 2.0	0.48	0.15	0.21
x 2.5	0.77	0.18	0.24
x 3.0	0.82	0.19	0.26
x 4.0	0.91	0.22	0.30
x 5.0	0.96	0.25	0.33
x 6.0	1.01	0.27	0.36

*MAXIMUM ROOF LOAD WIDTH = 1.8m
¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Design Criteria

- Roof Dead Load, G used is 0.4kPa for Steel Roof and 0.9kPa for Tile Roof, and Roof Live Load used is 0.25kPa.
- Live Loads, Q used on cantilever are:
 - * 1.5kPa for cantilevers supporting Sheet and Tile Roof
 - * 3.0kPa & 1.5kN/m run on edge for "No Roof Load"
 Live Loads used on backspan:
 - * 0kPa for floors supporting Sheet and Tile Roof
 - * 0.3kPa for "No Roof Load"
- Wind Loads used in Tables 14 and 16 are determined in accordance with AS 4055: Wind loads for housing, for maximum "C3" wind category.
- Maximum roof load width is equal to 5m for joists and 1.8m for bearers.
- For cantilever balcony not supporting a roof use "No Roof Loading" column.
- Maximum bearer spacing for Table 15 and 16 is 3.6m.
- If additional loads are applied the advice of a Structural Engineer must be sought.

Joists



Non Cyclonic

TABLE 17 – MAXIMUM SPAN OF CANTILEVER JOISTS – 3 kPa

DURAGAL JOIST C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)					
	Joist Spacing = 450mm			Joist Spacing = 600mm		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
75 x 50 x 1.6	0.53	0.18	0.10	0.48	0.14	0.08
x 2.0	0.57	0.20	0.12	0.52	0.16	0.09
100 x 50 x 1.6	0.71	0.26	0.16	0.60	0.24	0.14
x 2.0	0.78	0.29	0.17	0.69	0.25	0.15
150 x 50 x 2.0	1.12	0.54	0.35	0.96	0.49	0.31
x 2.5	1.20	0.61	0.40	1.08	0.52	0.33
x 3.0	1.27	0.67	0.44	1.15	0.57	0.37
x 4.0	1.37	0.76	0.51	1.24	0.65	0.43
x 5.0	1.43	0.84	0.57	1.31	0.72	0.48
x 6.0	1.49	0.91	0.62	1.37	0.77	0.52

*MAXIMUM ROOF LOAD WIDTH = 5m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Cyclonic

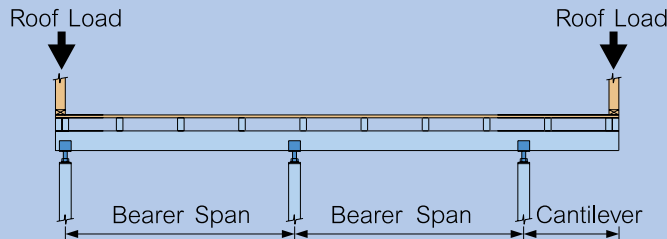
TABLE 18 – MAXIMUM SPAN OF CANTILEVER JOISTS – 3 kPa

DURAGAL JOIST C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)					
	Joist Spacing = 450mm			Joist Spacing = 600mm		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
75 x 50 x 1.6	0.54	0.07	0.10	0.49	0.06	0.08
x 2.0	0.59	0.08	0.11	0.53	0.07	0.09
100 x 50 x 1.6	0.73	0.11	0.15	0.62	0.10	0.14
x 2.0	0.80	0.12	0.17	0.71	0.10	0.14
150 x 50 x 2.0	1.14	0.26	0.34	0.99	0.23	0.31
x 2.5	1.22	0.29	0.39	1.11	0.24	0.32
x 3.0	1.29	0.33	0.44	1.17	0.27	0.36
x 4.0	1.37	0.38	0.51	1.26	0.31	0.42
x 5.0	1.43	0.43	0.56	1.33	0.35	0.47
x 6.0	1.49	0.47	0.61	1.37	0.39	0.51

*MAXIMUM ROOF LOAD WIDTH = 5m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Bearers



Non Cyclonic

TABLE 19 – MAXIMUM SPAN OF CANTILEVER BEARERS – NON CYCLONIC - 3 kPa

DURAGAL BEARER C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
100 x 50 x 2.0	0.40	0.22	0.14
125 x 75 x 2.0	0.35	0.35	0.24
x 2.5	0.61	0.37	0.26
x 3.0	0.65	0.40	0.28
150 x 50 x 2.0	0.31	0.38	0.26
x 2.5	0.56	0.41	0.29
x 3.0	0.71	0.45	0.32
x 4.0	0.78	0.50	0.36
x 5.0	0.83	0.54	0.40
x 6.0	0.88	0.57	0.42

*MAXIMUM ROOF LOAD WIDTH = 1.8m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Cyclonic

TABLE 20 – MAXIMUM SPAN OF CANTILEVER BEARERS – CYCLONIC - 3 kPa

DURAGAL BEARER C450LO RHS SIZE ¹	MAXIMUM CANTILEVER SPAN (m)		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
100 x 50 x 2.0	0.40	0.10	0.13
125 x 75 x 2.0	0.35	0.17	0.22
x 2.5	0.61	0.18	0.24
x 3.0	0.65	0.20	0.26
150 x 50 x 2.0	0.31	0.18	0.24
x 2.5	0.56	0.21	0.27
x 3.0	0.71	0.23	0.29
x 4.0	0.78	0.26	0.33
x 5.0	0.83	0.29	0.37
x 6.0	0.88	0.31	0.39

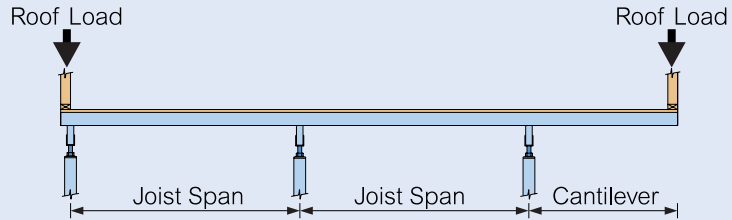
*MAXIMUM ROOF LOAD WIDTH = 1.8m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Design Criteria

- Roof Dead Load, G used is 0.4kPa for Steel Roof and 0.9kPa for Tile Roof, and Roof Live Load used is 0.25kPa.
- Live Loads, Q used on cantilever are:
 - * 3.0kPa for cantilevers supporting Sheet and Tile Roof
 - * 6.0kPa & 1.5kN/m run on edge for "No Roof Load"
 Live Loads used on backspan:
 - * 0kPa for floors supporting Sheet and Tile Roof
 - * 0.6kPa for "No Roof Load"
- Wind Loads used in Tables 18 and 20 are determined in accordance with AS 4055: Wind loads for housing, for maximum "C3" wind category.
- Maximum roof load width is equal to 5m for joists and 1.8m for bearers.
- For cantilever balcony not supporting a roof use "No Roof Loading" column.
- Maximum bearer spacing for Table 19 and 20 is 3.6m.
- If additional loads are applied the advice of a Structural Engineer must be sought.

Joists



Non Cyclonic

TABLE 21 – MAXIMUM SPAN OF CANTILEVER JOISTS – 5 kPa

DURAGAL JOIST C450LO RHS SIZE¹	MAXIMUM CANTILEVER SPAN (m)					
	Joist Spacing = 450mm			Joist Spacing = 600mm		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
75 x 50 x 1.6	0.48	0.19	0.11	0.42	0.17	0.10
x 2.0	0.52	0.21	0.13	0.47	0.18	0.11
100 x 50 x 1.6	0.59	0.31	0.20	0.52	0.28	0.18
x 2.0	0.69	0.31	0.20	0.61	0.27	0.17
150 x 50 x 2.0	0.92	0.61	0.43	0.81	0.57	0.39
x 2.5	1.06	0.60	0.42	0.95	0.53	0.36
x 3.0	1.12	0.66	0.46	1.02	0.56	0.39
x 4.0	1.21	0.74	0.53	1.10	0.64	0.45
x 5.0	1.28	0.81	0.59	1.16	0.70	0.50
x 6.0	1.33	0.87	0.64	1.21	0.75	0.54

*MAXIMUM ROOF LOAD WIDTH = 5m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Cyclonic

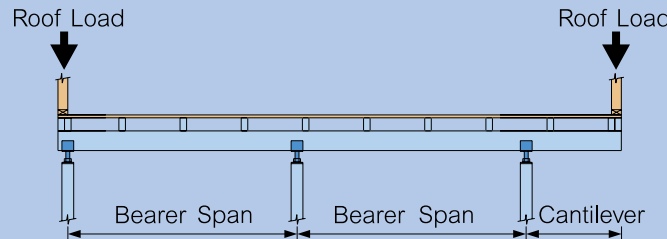
TABLE 22 – MAXIMUM SPAN OF CANTILEVER JOISTS – 5 kPa

DURAGAL JOIST C450LO RHS SIZE¹	MAXIMUM CANTILEVER SPAN (m)					
	Joist Spacing = 450mm			Joist Spacing = 600mm		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
75 x 50 x 1.6	0.49	0.08	0.11	0.43	0.07	0.10
x 2.0	0.54	0.09	0.12	0.48	0.08	0.10
100 x 50 x 1.6	0.61	0.15	0.20	0.53	0.13	0.18
x 2.0	0.70	0.14	0.19	0.63	0.12	0.16
150 x 50 x 2.0	0.95	0.33	0.42	0.84	0.30	0.39
x 2.5	1.08	0.32	0.41	0.97	0.27	0.35
x 3.0	1.14	0.36	0.46	1.04	0.29	0.38
x 4.0	1.23	0.41	0.53	1.12	0.34	0.44
x 5.0	1.29	0.46	0.59	1.19	0.38	0.49
x 6.0	1.34	0.50	0.63	1.24	0.42	0.53

*MAXIMUM ROOF LOAD WIDTH = 5m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Bearers



Non Cyclonic

TABLE 23 – MAXIMUM SPAN OF CANTILEVER BEARERS – NON CYCLONIC - 5 kPa

DURAGAL BEARER C450LO RHS SIZE¹	MAXIMUM CANTILEVER SPAN (m)		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
100 x 50 x 2.0	0.34	0.23	0.16
125 x 75 x 2.0	0.26	0.36	0.27
x 2.5	0.52	0.37	0.28
x 3.0	0.58	0.40	0.30
150 x 50 x 2.0	0.21	0.39	0.29
x 2.5	0.41	0.40	0.31
x 3.0	0.62	0.44	0.33
x 4.0	0.68	0.48	0.37
x 5.0	0.73	0.52	0.41
x 6.0	0.76	0.55	0.43

*MAXIMUM ROOF LOAD WIDTH = 1.8m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Cyclonic

TABLE 24 – MAXIMUM SPAN OF CANTILEVER BEARERS – CYCLONIC - 5 kPa

DURAGAL BEARER C450LO RHS SIZE¹	MAXIMUM CANTILEVER SPAN (m)		
	NO ROOF LOADING	SHEET ROOF*	TILE ROOF*
100 x 50 x 2.0	0.34	0.11	0.15
125 x 75 x 2.0	0.26	0.20	0.25
x 2.5	0.52	0.21	0.26
x 3.0	0.58	0.22	0.28
150 x 50 x 2.0	0.21	0.22	0.27
x 2.5	0.41	0.23	0.29
x 3.0	0.62	0.25	0.31
x 4.0	0.68	0.28	0.35
x 5.0	0.73	0.31	0.38
x 6.0	0.76	0.34	0.41

*MAXIMUM ROOF LOAD WIDTH = 1.8m

¹ Preferred internally painted sizes shown in bold print. For availability of other internally painted sizes we recommend you consult the DuraGal Flooring System supplier in your area.

Design Criteria

- Roof Dead Load, G used is 0.4kPa for Steel Roof and 0.9kPa for Tile Roof, and Roof Live Load used is 0.25kPa.
- Live Loads, Q used on cantilever are:
 - * 5.0kPa for cantilevers supporting Sheet and Tile Roof
 - * 10kPa & 1.5kN/m run on edge for "No Roof Load"
 Live Loads used on backspan:
 - * 0kPa for floors supporting Sheet and Tile Roof
 - * 1.0kPa for "No Roof Load"
- Wind Loads used in Tables 22 and 24 are determined in accordance with AS 4055: Wind loads for housing, for maximum "C3" wind category.
- Maximum roof load width is equal to 5m for joists and 1.8m for bearers.
- For cantilever balcony not supporting a roof use "No Roof Loading" column.
- Maximum bearer spacing for Table 23 and 24 is 3.6m.
- If additional loads are applied the advice of a Structural Engineer must be sought.

Assembly

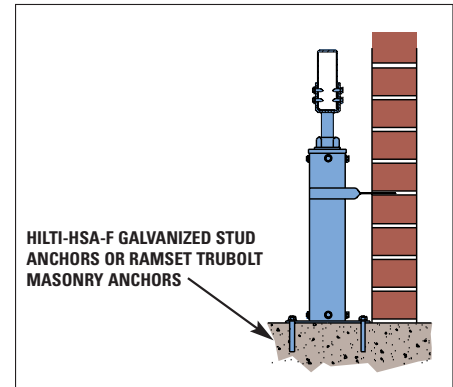


DURAGAL[®]
Flooring System

Brick Veneer
Non Cyclonic Regions

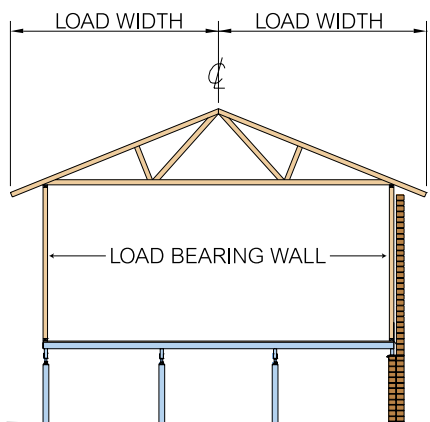
For brick veneer construction, there are many ways of fixing the DuraGal Flooring System to the brick work. The method used depends on the wind category and building preferences.

In the case of low wind only nominal fixing may be required, for example in a W33N wind category with tile roof. For higher wind situations more robust methods of fixing may be necessary. There are various proprietary systems available, including the one shown which uses a Z-bracket and threaded rod anchor to tie down the bearer.

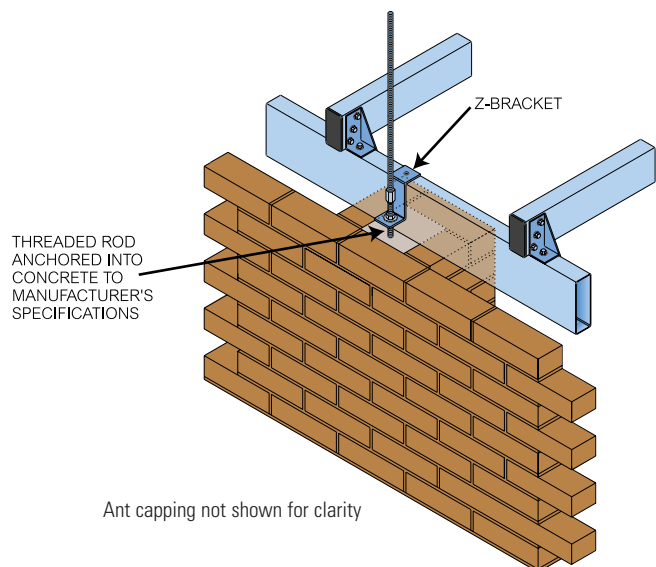


DuraGal[®] Adjustable Piers can also be used around the perimeter of brick veneer houses. This makes it possible to erect the floor, frame and roof prior to the bricklayer coming to site. To avoid restricting air flow the piers should not be located adjacent to vents in the brickwork.

Examples of Load Bearing Walls supported by Bearers



Example of fixing for High Wind



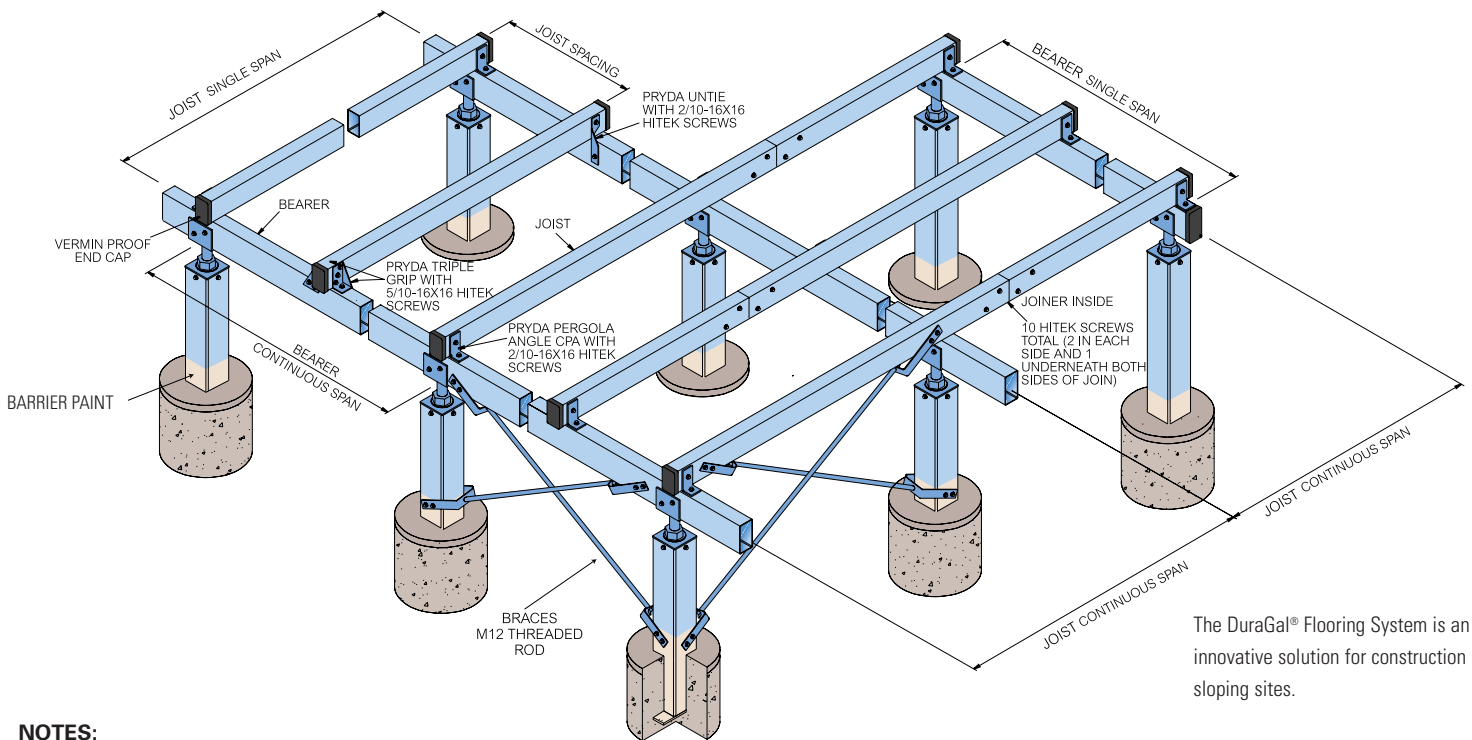


Assembly

DURAGAL[®]
Flooring System

Free Standing
Non Cyclonic Regions

Typical Floor Layout Detail

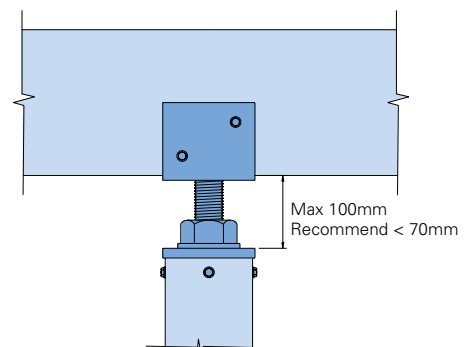


The DuraGal[®] Flooring System is an innovative solution for construction on sloping sites.

NOTES:

1. Refer also to page 24.
2. Span Details for bearers and joists are given in Tables on pages 5 to 11.
3. Unless noted, all HiTek screws are to be 14-20x22mm.
4. Unities, triple grips or pergola angles are to be staggered from side to side of joist at alternate bearers.
5. Joiners are to be staggered where possible.
6. For connection capacities refer to page 16.
7. For bracing details refer to page 15.
8. For footing details refer to page 17.

Maximum extension of pier adjustable top connection



The DuraGal® Flooring System is an innovative solution for construction on sloping sites.

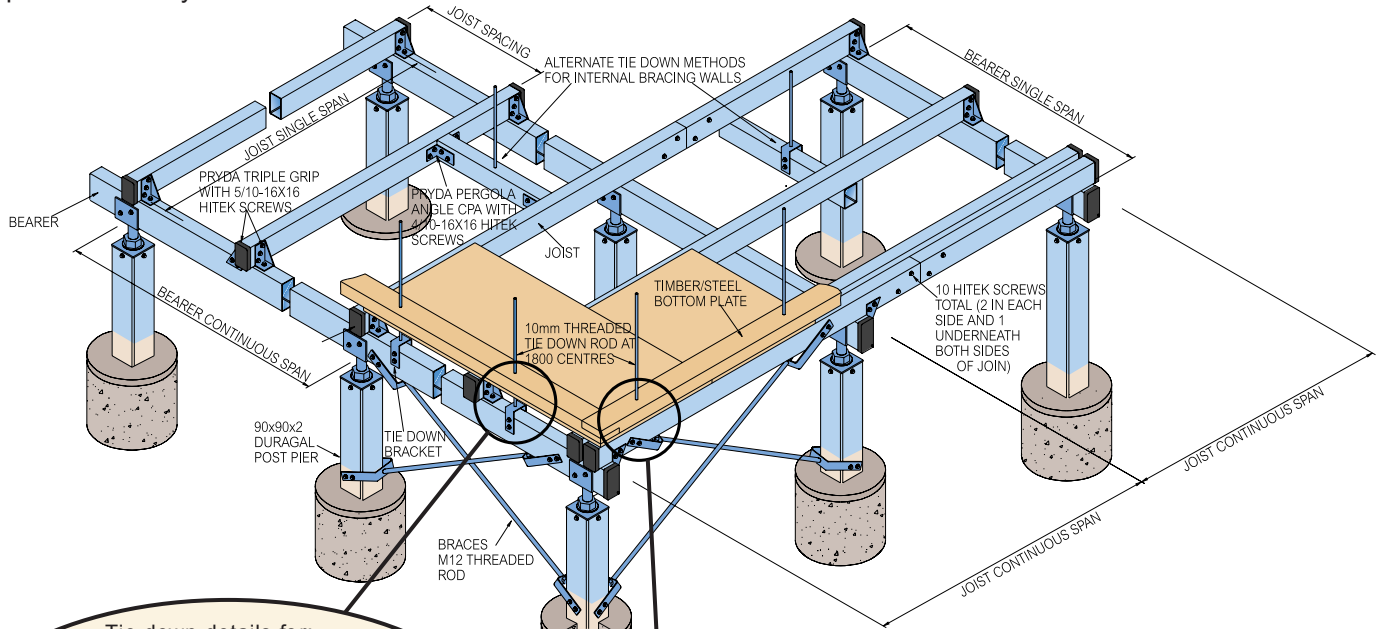


Assembly

DURAGAL®
Flooring System

**Free Standing
Cyclonic Regions**

Typical Floor Layout Detail



Tie down details for:

Steel Frame

Timber Frame

OR

Tie down details for:

Timber Frame

Steel Frame

OR

NOTES:

1. Refer also to page 24.
2. Span Details for bearers and joists are given in Tables on pages 5 to 11.
3. Unless noted, all HiTek screws are to be 14-20x22mm.
4. Unities or triple grips are to be staggered from side to side of joist at alternate bearers.
5. Joiners are to be staggered where possible.
6. For connection capacities refer to page 16.
7. For bracing details refer to page 15.
8. For footing details refer to page 17.



Bracing

DURAGAL[®]
Flooring System

Capacities

Wind pressure produces horizontal loads on DuraGal Flooring System. For free standing floors these loads are transferred to the footings through the use of sub-floor bracing.

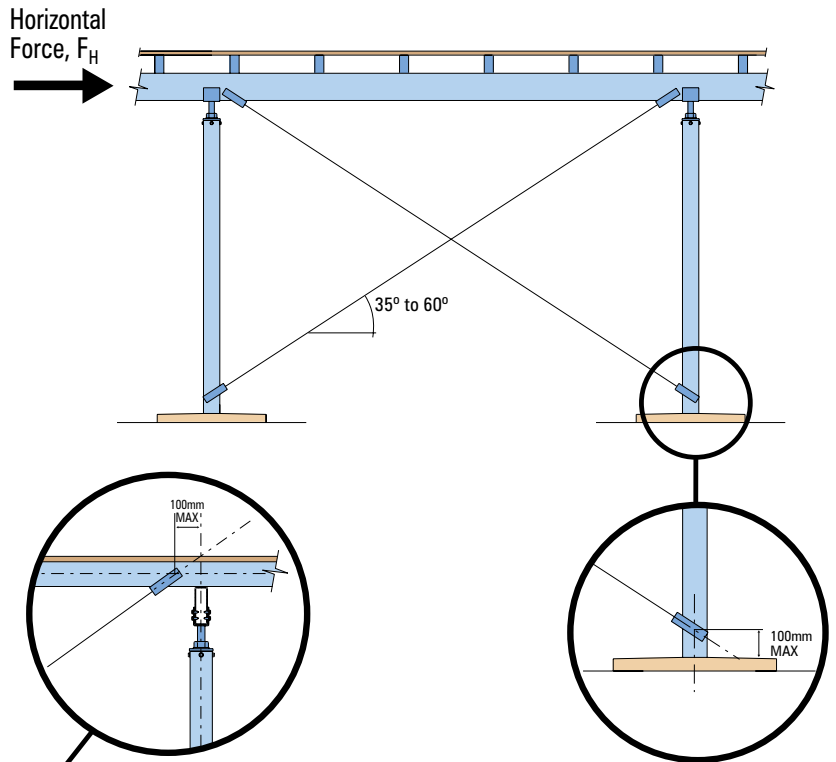
Galvanized cross bracing sets are available from your DuraGal Flooring Supplier. Each bracing set is made up of brackets, washers, M12 threaded rods and four nuts. The details of these items are shown on page 20. The bracing brackets are attached with 14-20x22 Tek screws c/w sealing washers, see Detail 8 page 28.

When installed, the bracing is attached to the bottom of the pier and then to either the bearer or joist, depending on the direction being braced, as shown in the diagrams on this page. Table 25 gives horizontal load capacities for a single bracing set when installed at various angles.

As differing wind load conditions apply throughout Australia, engineering certification is required for both the number of bracing sets required and where they are to be installed.

Advice must be sought from a professional structural engineer in regard to the location and number of bracing sets to be used.

Bracing from pier to Bearer



Bracing from pier to Joist

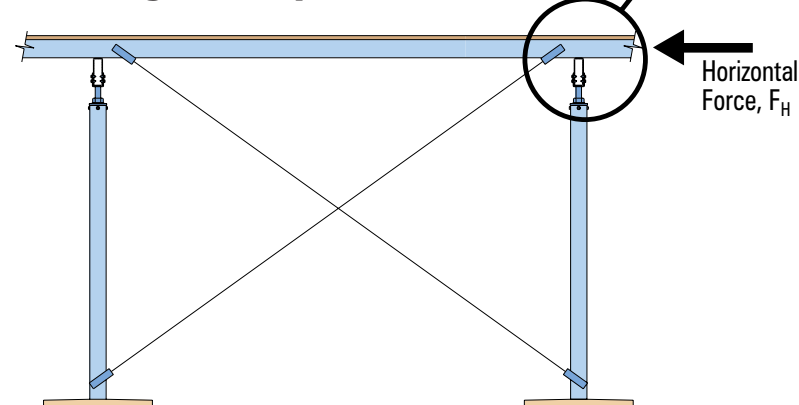


TABLE 25 – BRACING CAPACITIES		
BRACING ANGLE (degrees)	MAX. HORIZONTAL FORCE, F_H (kN)	
	ULTIMATE DESIGN	PERMISSIBLE STRESS DESIGN
35	13.0	8.69
40	12.2	8.13
45	11.3	7.50
50	10.2	6.82
55	9.13	6.08
60	7.95	5.30

Connections

DURAGAL[®]
Flooring System

Capacities



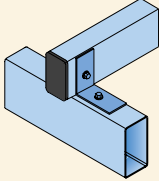
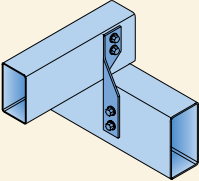
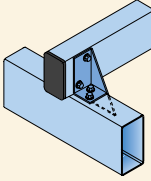
TABLE 26 – FLOOR JOIST TIE DOWN CAPACITY (kN)	
<p>PRYDA PERGOLA ANGLE</p>  <p>minimum 1/10-16x16 tek screw in each leg</p> <p>*joist lifts off before connection engages</p>	0*
<p>PRYDA UNITIE</p>  <p>4/10-16x16 tek screws 2 in each face</p>	3.86
<p>PRYDA TRIPLE GRIP</p>  <p>6/10-16x16 tek screws 2 in each face</p>	3.53

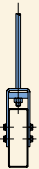
TABLE 27 – TIE DOWN CAPACITY* (kN)	
<p>U-BRACKET 50mm - WITH M12 ROD</p>  <p>4/14-20x20 tek screws 2 per leg</p> <p>*typically to tie down rafter/trusses to floor frame</p>	11.25

TABLE 28 – DURAGAL PIER & FITTING CAPACITY (kN) FOR HEIGHTS UP TO 4.5m		
CONSTRUCTION	AXIAL COMPRESSION	AXIAL TENSION
TOP FITTING		
4/14-20x22 Tek Screws	70	25
8/14-20x22 Tek Screws	70	35
BOTTOM FITTING		
4/14-20x22 Tek Screws / 2xM10 Anchors		25
8/14-20x22 Tek Screws / 2xM12 Anchors		35

NOTES:

- All loads are strength limit state design capacities.
- When fittings are used in exposed areas the procedures shown on pages 24-29 should be followed.

Footings

DURAGAL[®]
Flooring System

Details

Footings parameters will differ with varying soil conditions and wind loadings. Local building approval authorities have differing requirements for the size and depth of footings. It is important that anyone designing and constructing a building seek expert advice from a structural engineer on the requirements specific to each building.

The following information on footings is a general guide only and not a substitute for expert advice.

Brick veneer

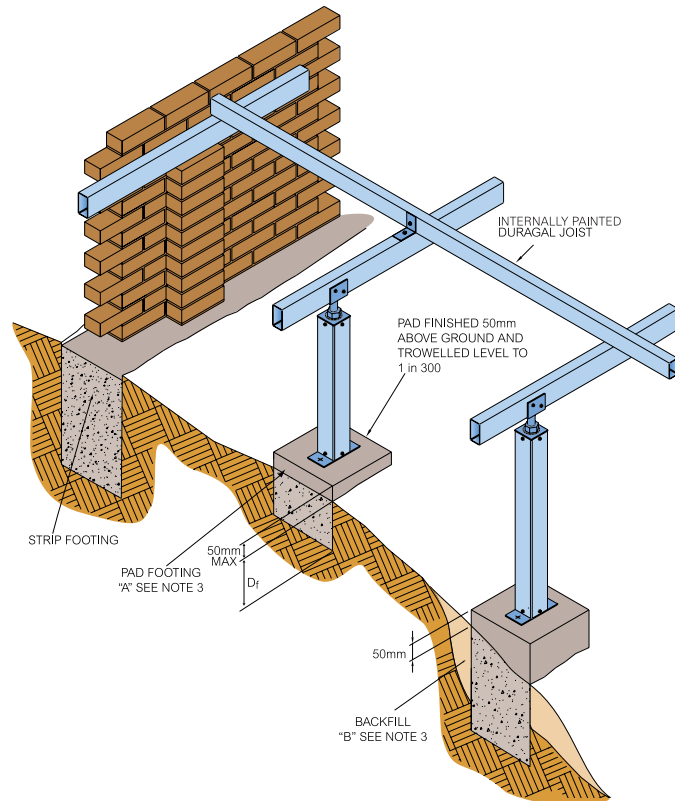
Guidance for engineers only

Pad Footing Sizes from AS2870 for Class A, S and M sites.

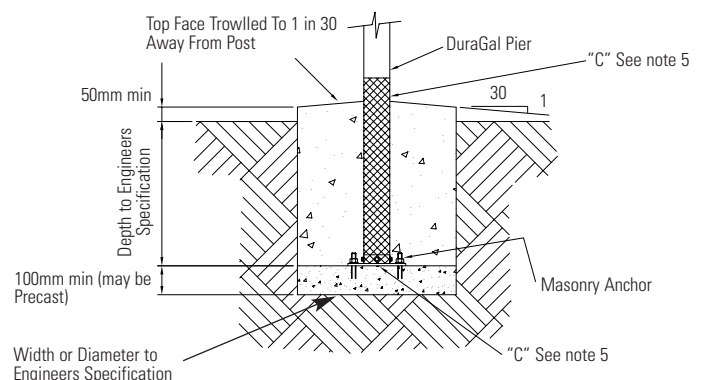
EFFECTIVE SUPPORTED AREA, m ²	WIDTH OF SQUARE PAD mm	DIAMETER OF CIRCULAR PAD, mm	THICKNESS (MIN) mm
10	400	500	200
20	500	600	200
40	600	750	250

NOTES:

- Footings to be designed to AS 2870: Residential slabs and footings. Depth of footing D_f from AS 2870
- The effective area supported by a pad footing is the sum of: (a) the supported floor area; (b) the supported roof area (if applicable); and (c) half the supported wall area in elevation (if applicable).
- Pad footings should be finished 50mm above ground level as shown by "A".
- Where backfilling is required (shown by "B") the concrete for the pad needs to be raised 50mm above the finish ground line.
- Where piers are embedded into the pads as shown by "C" it is required to apply a barrier coating to a minimum of 100mm above expected final concrete height. The pier bottom connection is also to be painted all round as specified above.
Suggested Coatings: Watty! DuraGal Supaprime (Chlorinated Rubber based). Preparation and application to paint manufacturer's specification .



Free Standing Typical Footing Detail



Construction

DURAGAL[®]
Flooring System

Procedure

Whether the DuraGal[®] Flooring System is used in brick veneer or free standing construction, assembly is straight forward and uncomplicated. The following is a typical step by step procedure.



No site welding necessary

1. For brick veneer construction, strip footings and pads are poured. Pads should be located according to the plan, finished 50mm above finished ground level and trowelled level to 1 in 300. Bricks then laid to floor level. The DuraGal pier bottom fittings are fixed to the isolated pads using masonry anchors.

2. In free standing construction approximately 100mm of mass concrete is placed at the base of pad footings, the floor built, then the pier cast in concrete.

3. It is important to determine the appropriate sealing method to prevent corrosion from the ingress of water dependent upon the particular circumstances of the application (refer to pages 24-29).

4. With the foundations in place, accurately measure all pier heights to underside of bearer. Subtract 75mm from each measurement, then cut the piers to length.

5. Attach the proprietary top and bottom pier fittings with Tek screws, and where necessary apply the recommended paint to the pier at least 100mm above finished ground level.

6. Establish a bearer length and cut to suit or use joiners to achieve longer lengths. Don't forget to place the proprietary end caps in the bearers.

7. Place bearers on to the piers, then Tek screw the bearer to the top fitting. For free standing construction temporary bracing may be required. For bearers placed over engaged brick piers, ensure continuous ant capping is in place prior to construction of the floor.

8. Plumb DuraGal piers, check the height is correct then fix pier bottom fitting with appropriate masonry anchors. The remaining DuraGal piers can now be installed.

9. Repeat steps for all remaining bearers and check squareness/level, adjusting where necessary.

10. Measure the joist lengths against the plan, and cut and/or join as previously carried out with the bearers. Then place end caps into position. To avoid later problems when nailing into the joist the joist seam weld (internal weld bead) should be placed facing down onto the bearer.

11. Fix the end joist into position, alternating the brackets at each bearer.

12. Measure and mark off balance of remaining joist positions and fix into place with the seam weld facing down.

13. For free standing construction, position and install bracing.

14. Do a final level check and adjust if necessary.

15. You are now ready to fix flooring.

Accessories

DURAGAL[®]
Flooring System

Details



JOINERS	RHS SIZE	CODE
STRAIGHT - Galvabond		
	75x50x1.6/2.0	JI-755020
	100x50x1.6/2.0	JI-1005020
	150x50x2.0	JI-1505020
	150x50x3.0	JI-1505030
90° ANGLE - Galvabond		
	75x50x1.6/2.0	JI-90-755020
	100x50x1.6/2.0	JI-90-1005020
	150x50x2.0	JI-90-1505020
45° ANGLE - Galvabond		
	75x50x1.6	JI-45-755020
	100x50x2.0	JI-45-1005020
	150x50x2.0	JI-45-1505020

MISCELLANEOUS	RHS SIZE	CODE
END CAP - Polypropylene		
	75x50x1.6/2.0	PC7550
	100x50x1.6/2.0	PC10050
	150x50x2.0	PC15050
PIER BOTTOM CONNECTION		
	90x90x2.0	SBC-90

Joiners

As the DuraGal[®] Internally Painted RHS sections are supplied in factory lengths, joiners will be necessary for longer lengths. A number of joiner sizes are available as detailed on this page.

Joiners for use in the flooring system are able to be placed anywhere within the span of the member. However, the location of the join should be alternated between adjacent joists.

When installing joiners, 10/14-20x22 Tek screws are used, two diagonally placed in each vertical face and one underneath on each side of the join. These details can be seen on Pages 13 and 14. See also pages 24-29 if joiners are being used in exposed areas.

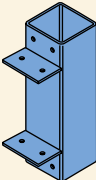
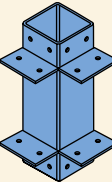
ADJUSTABLE CONNECTORS	RHS SIZE	CODE
PIER ADJUSTABLE TOP CONNECTION		
	90x90x2.0	SATC-90-50
PIER MULTI TOP ADJUSTABLE CONNECTION*		
	90x90x2.0	SATC-90-MT
*minimum order quantities may apply		
PIER UNI TOP ADJUSTABLE CONNECTION*		
	90x90x2.0	SATC-90-FP3
*minimum order quantities may apply		

Accessories



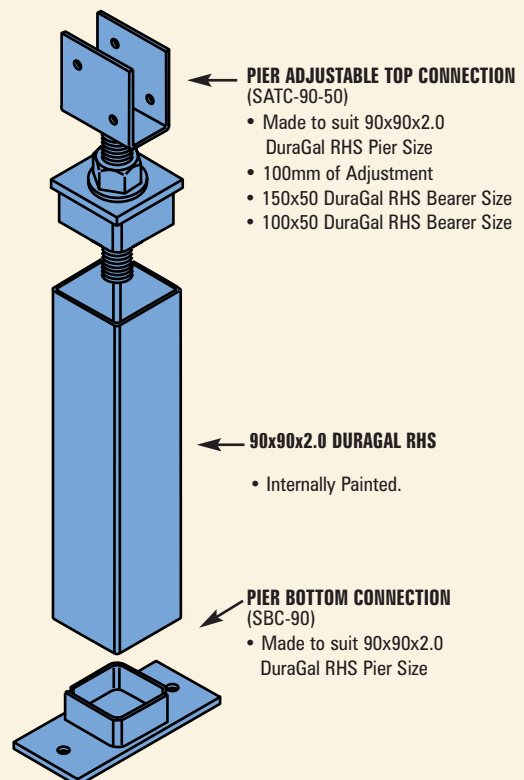
DURAGAL® Flooring System

Details

MISCELLANEOUS	DESCRIPTION	CODE
VERANDAH - 2 Lug		
	90x90	BS-90-2
VERANDAH - 4 Lug		
	90x90	BS-90-4
BRACKETS - Galvabond		
	PRYDA TRIPLE GRIP - LEFT	TG-L
	PRYDA TRIPLE GRIP - RIGHT	TG-R
	PRYDA UNITIE - LEFT	UNI-L
	PRYDA UNITIE - RIGHT	UNI-R
	PRYDA PERGOLA ANGLE	PAB
FASTENERS		
	PIER COMPONENTS - HITEKS 14-20x22*	142022
	PRYDA BRACKETS - HITEKS 10-16x16*	101616
	HARD STEEL TWIST FLOORING NAILS	
	PIER BASE - Galv. Masonry Anchors M10x90	M1095
	PIER BASE - Galv. Masonry Anchors M12x100	M12100
	* HiTeks c/w sealing washers should be used in exposed areas.	
SEALING		
	JOIST SEALING TAPE - (50mm W x 15m Roll)	FDP-B805015
	MOULDED PVC PLASTISOL BOOT	FDP-PB90

BRACING	DESCRIPTION	CODE
TO SUIT 50mm - Galvanized		
	BRACKET ASSEMBLY	BB A-50
	BRACKET	BB-50
	WASHER	BBw-50
	M12 COARSE THREAD	
	ROD 3m + 2/NUTS	M12x3M
TO SUIT 90mm - Galvanized		
	BRACING ASSEMBLY	BBA-90
	BRACKET	BB-90
	WASHER	BBw-90
	M12 COARSE THREAD	
	ROD 3m + 2/NUTS	M12x3M

ASSEMBLY OF THE DURAGAL ADJUSTABLE PIER



DuraGal®

Flooring System

DURAGAL®
Flooring System

**Requires No Further
Termite Barriers**

No Further Termite Barriers.

Australian Standard AS 3660.1: Protection of buildings from subterranean termites, requires that "Termite shields shall be installed on all substructures (piers and walls) below the underside of the lowest floor framing member to provide a continuous barrier for the protection of the building" (Clause 4.2.1). "Termites can build around barriers but they can then be detected more readily during routine inspection" (Note 1, Clause 1.1).

With masonry piers, this barrier is in the form of a galvanized sheet steel ant cap which, when placed on top of the masonry pier, forces the subterranean termites to build their tunnels around the steel and therefore can be seen in a visual inspection.

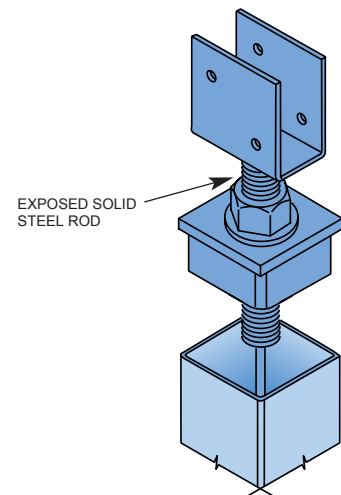
For tubular piers e.g. DuraGal piers, Clause 4.2.2 of AS 3660.1 states that termite caps may be omitted where welded metal tubular piers are used, provided that these piers are free from perforations, sealed at the top and remain fully exposed for inspection.

With the DuraGal Flooring System, termites would have to build a tunnel around the exposed solid steel threaded rod of the DuraGal pier adjustable top connection shown in the figure. This then offers a similar visual inspection

area to a traditional ant cap on a masonry pier and would be deemed to comply.

When using full continuous ant cap on brick dwarf walls, it is recommended that the same size bearer should be used throughout the DuraGal Flooring System to eliminate the need to step the ant capping.

AS 3660.1 stresses that termites can bridge physical barrier systems and that regular and thorough inspections are necessary.



The Site Environment.

The metallurgical bond between the steel and the Zinc coating of DuraGal generally imparts good corrosion resistance. However, there are some environments where the rate of corrosion is so high that any steel structure is at risk of rapid corrosion. The rate of corrosion is dependent upon environmental factors such as the amount of corrosive elements present and surface humidity. Sulphur compounds from heavy industrial sites and chloride from marine environments are two commonly known corrosive elements. Acid and alkaline conditions will also accelerate the depletion of the zinc coating leading to corrosion of the underlying steel.

While suitable for building applications in many environments found throughout Australia, the DuraGal Flooring System will not be suitable for all environments. We do not recommend its use in applications where there is a very high rate of corrosion, such as from marine or heavy industrial environments².

Table 29 details the situations where we do not recommend using the DuraGal Flooring System:

TABLE 29 – DO NOT USE THE DURAGAL FLOORING SYSTEM WITHIN THE FOLLOWING DISTANCES FROM THE SOURCE OF CORROSION ¹		
SOURCE OF CORROSION	Minimum Distance for Enclosed Floors (km)	Minimum Distance for Open Floors/Decks (km)
Surf beach	2	4
Sheltered bay	0.5	1.5
Rocky Coastline /Headlands	3	4
Heavy Industrial Area ²	3	4

¹ The distances recommended in this table are minimum distances and what is the appropriate distance from a source of corrosion will depend upon many factors such as prevailing winds, whether shielding exists (ie by trees & adjacent buildings), the topography of the surrounding area, and exposure to rain. In any building application, the specific micro climatic conditions must always be considered and taken into account. DuraGal is not recommended for decks or verandahs adjacent to the splash zone of swimming pools.

² "Heavy Industrial Areas" are locations where the environment may be acidic with a pH value less than 5, as per Section 2.3 of the Australian & New Zealand Standard AS/NZS 2312

Precautions to Reduce the Risk of Corrosion

Care must be taken to preserve the zinc coating on DuraGal Flooring System components and minimise the risk of corrosion to the underlying steel. It is recommended the following precautions be taken to reduce the risk of corrosion

• Storage of Floor Components

Most galvanized products including DuraGal sections are susceptible to "White Rust" or "Zinc Storage Stain". The following storage precautions should be observed to minimise the risk of this occurring:

DuraGal sections and components should be stored on site in a dry and well-ventilated position wherever possible.

If packs of DuraGal sections are to be left exposed to the weather for more than a few days, the individual sections should be separated by non-staining timbers such as dressed Radiata Pine (not Treated Pine) and arranged so that all surfaces are well ventilated and any water will readily run off and not pool either on the surface, or inside the section.

If these precautions are not followed, then White Rust may form very quickly. If this occurs, you should consult the DuraGal Easy Painting and Corrosion Guide for suitable remedial treatments, or consult your paint supplier for guidance.

Your DuraGal Flooring System supplier cannot be held responsible for deterioration as a result of poor storage practices on site.

• Partially Erected Floors

It is recommended that the ends and open tops of sections exposed to the weather be covered to prevent the filling of piers and the ponding of water in the joists and bearers from rain.

• Fasteners

Do not use any other fasteners other than those recommended in this guide. The use of the wrong type of fastener may lead to corrosion to occur at the contact area between the fastener and the DuraGal sections.

• Swarf

Swarf (steel filings) from saws are often initiation points for corrosion. It is recommended that saws be regularly cleaned and that any swarf be brushed from the DuraGal Flooring System components.

• Ponding of Water

The ponding of water within DuraGal Flooring System sections must be avoided.

Ponding of water may occur where the ends of sections have been incorrectly sealed, through top adjustable pier connections or by water ingress through fastener holes. Decks and areas of open floor directly exposed to outdoor weather conditions are most susceptible to ponding.

OneSteel have developed a number of techniques to reduce these risks. Pages 24 to 29 address these risks in greater detail.

• Soil Contact

Contact between DuraGal flooring components and soil should be avoided by proper design of the footings because soil contact markedly increases the corrosion rate of zinc. This is particularly true of clay soils. Please refer to page 17 for Footing Details.

• Concrete

An appropriate paint system should be applied at least 100mm above and below the concrete junction where floor components are embedded in concrete. Please refer to page 17 for Footing Details.

• Timber Contact (Exposed deck & verandahs)

Do not use treated pine in direct contact with the DuraGal sections as this will increase the corrosion rate of Zinc. Contact with some hardwood species will stain galvanized section. Although this staining is unsightly, it will not generally be detrimental to the performance of the product. The tape systems recommended in this brochure should be used as a barrier between all timber and DuraGal. Please refer to Detail 4 on page 26.

• Avoid Contact Between Dissimilar Metals

Contact between dissimilar metal may increase the corrosion rate of one of them. In particular, the use of copper pipes on galvanized surfaces will be detrimental to the galvanising. Water run off from one metal to another may also lead to corrosion of the galvanized metal.

• Painting Floors

Use the paint systems recommended in the "DuraGal Easy Painting and Corrosion Protection Guide" and the "DuraGal and Galtube Plus Powder Coating Guide" as a general guide for how to paint floor components.

For assistance, contact paint suppliers, or the paint manufacturers listed the "DuraGal Easy Painting and Corrosion Protection Guide" for advice on specific paint systems to suit the climatic conditions of your site and application.

Do not use solvent borne decking oils or paints because these solvents may be detrimental to the barrier tapes recommended in this brochure.

• Chemicals

Zinc corrosion is increased by acidic or alkaline conditions, and may occur where certain chemicals are present. A common example is the acid run off

which occurs from brick washing. Contact between these sorts of chemicals and the DuraGal Flooring System components must be avoided. If accidental contact occurs, immediately hose down the contaminated area with water. If the galvanizing is affected, repair of the coating will be required to restore the level of protection. Contact your DuraGal Flooring System supplier for advice.

Sealing of Fittings

To ensure the maximum life of a DuraGal floor it is recommended that fittings be sealed. Drawings on pages 24 to 29 give recommendations for three basic floor types.

1. Enclosed Sub Floors, Figure 1

Where The Sub floor is protected from the external environment. Eg Brick veneer construction

2. Open Sub Floors, Figure 2

Where the Sub floor is exposed to the external environment on the outer perimeters of the sub floor. Eg Free standing construction

3. External Decks, Figure 3

External decks cover a large range of construction types. Figure 3 deals with decks attached to a building with or without a covering roof. The sub floor is assumed to be open and the decking material is either hard wood or treated timber slats.

FIGURE 1. ENCLOSED SUBFLOOR

Exposed floor during construction. Refer to notes on partially erected floor on page 23.

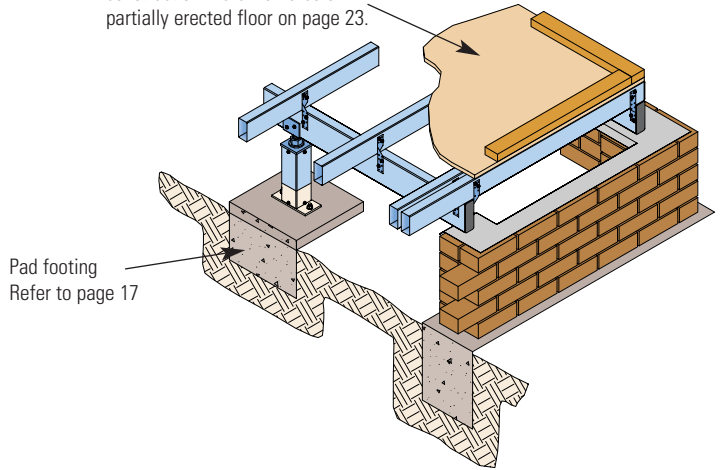
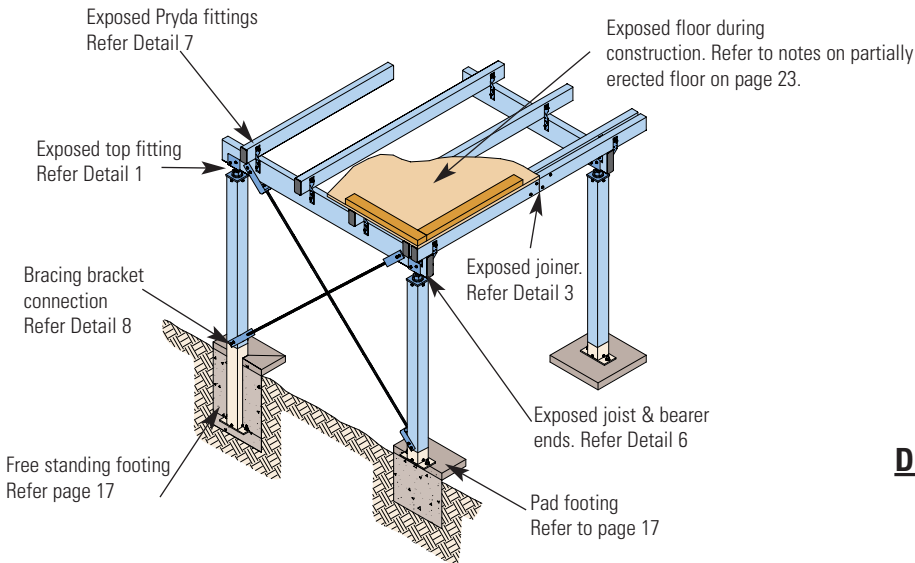


FIGURE 2. OPEN SUBFLOOR



DETAIL 1. TOP FITTING SEALING

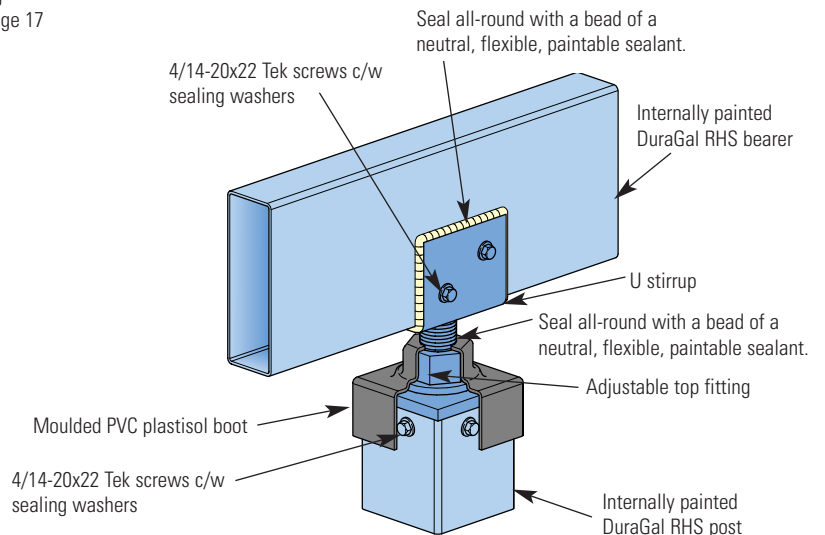
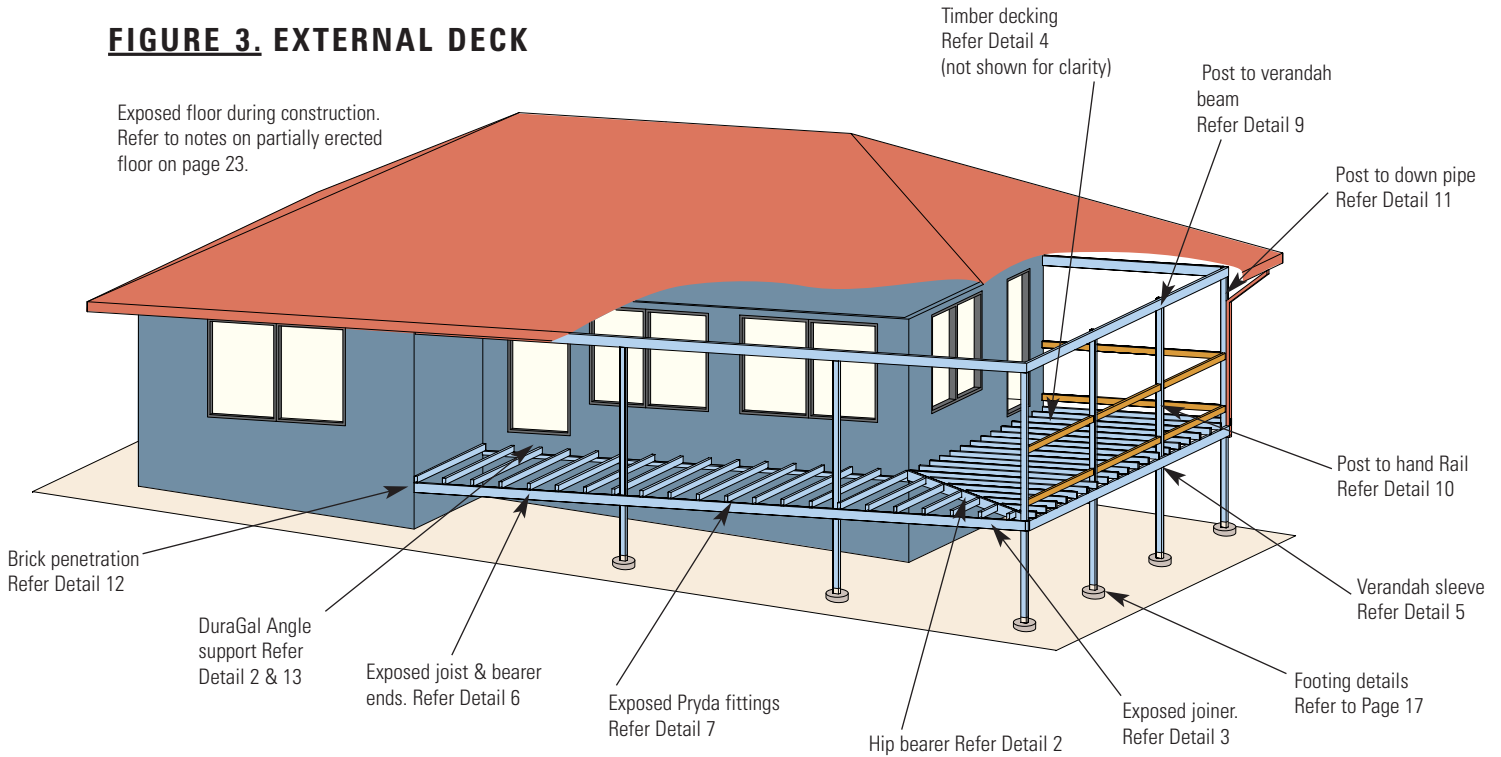
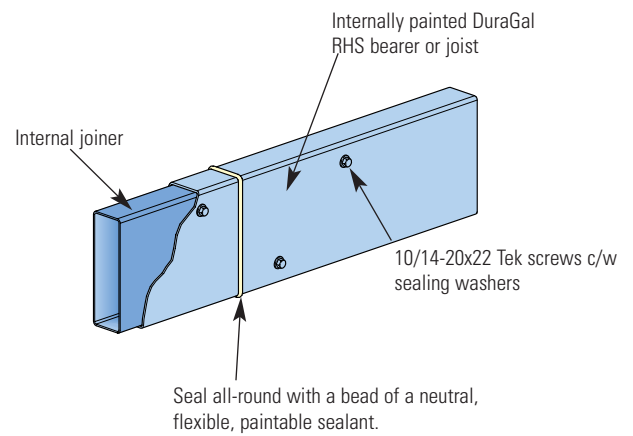


FIGURE 3. EXTERNAL DECK

Exposed floor during construction.
Refer to notes on partially erected floor on page 23.

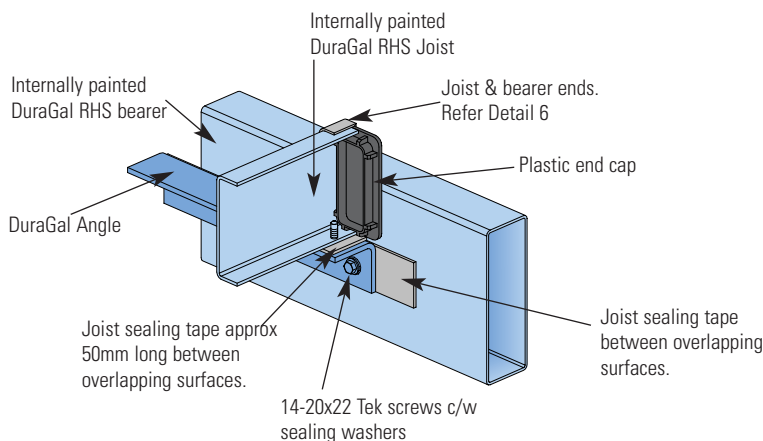


DETAIL 3. INTERNAL JOINER SEALING



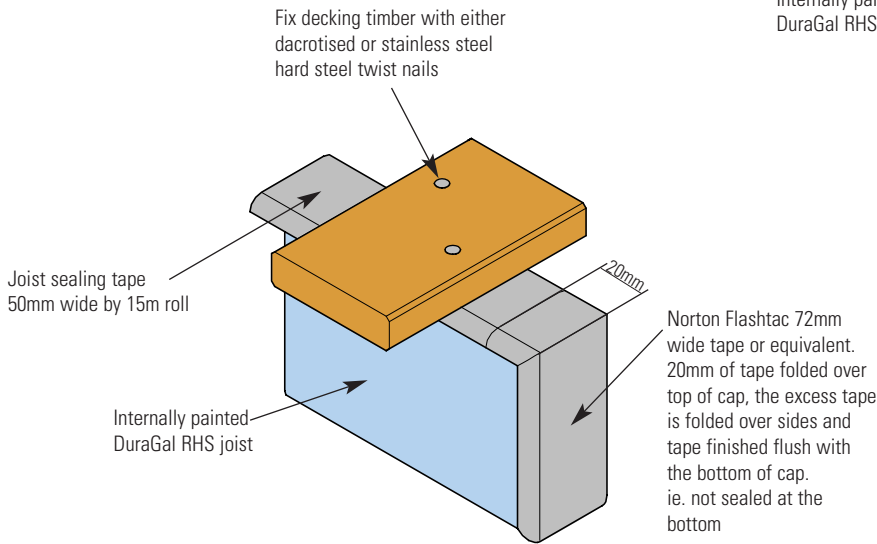
DETAIL 2. ANGLE SUPPORT TO BEARER SEALING

(Applies to Verandah Hip & Surround Bearers)

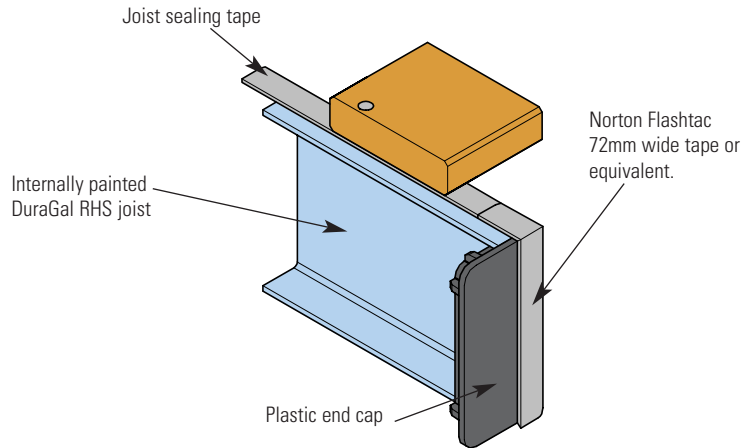


DETAIL 4. TIMBER DECKING TO JOIST SEALING

Joist sealing tape also acts as a barrier between the DuraGal joist and the treated timber.



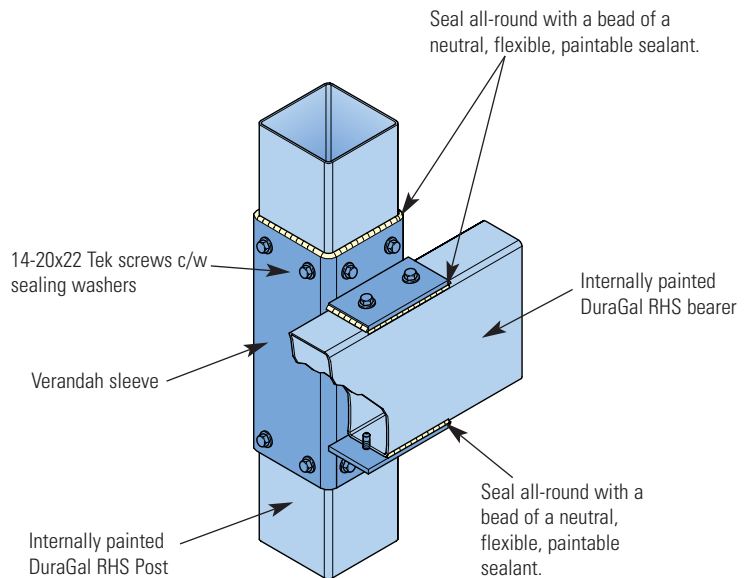
ISOMETRIC VIEW OF JOIST AND JOIST SEALING TAPE



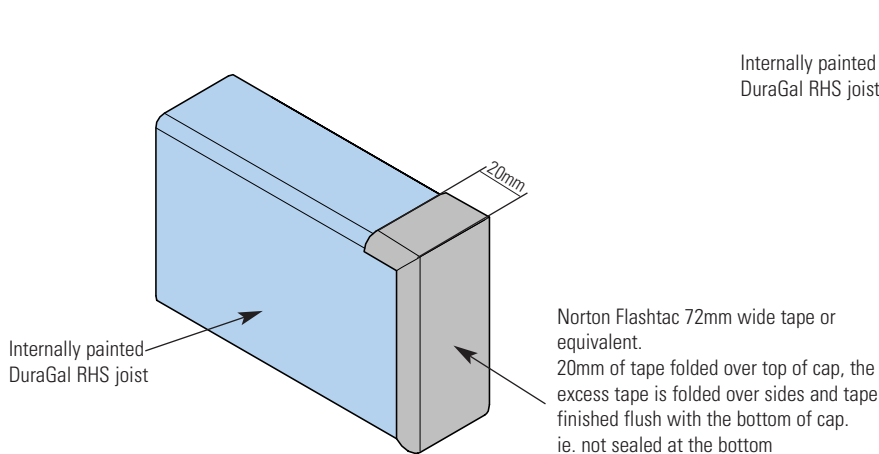
PART ISOMETRIC VIEW OF JOIST AND JOIST SEALING TAPE

Caution:
Do not use solvent borne decking oils or paints because these solvents may be detrimental to the barrier tapes.

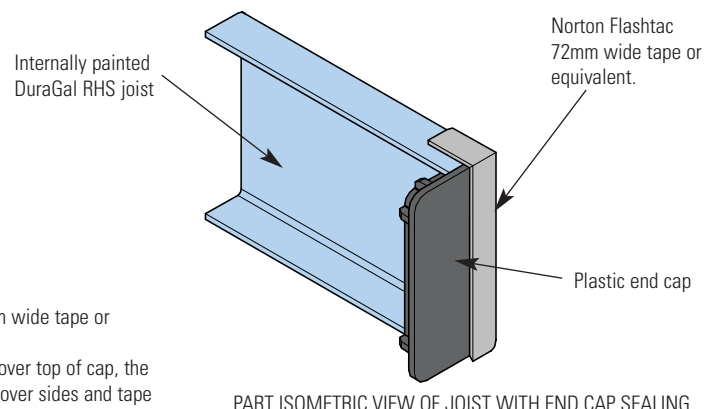
DETAIL 5. VERANDAH SLEEVE TO DURAGAL SEALING



DETAIL 6. END CAP SEALING

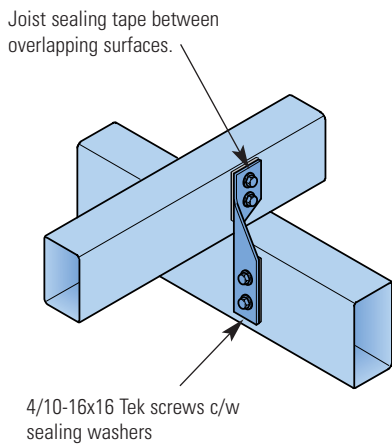


ISOMETRIC VIEW OF JOIST WITH END CAP SEALING

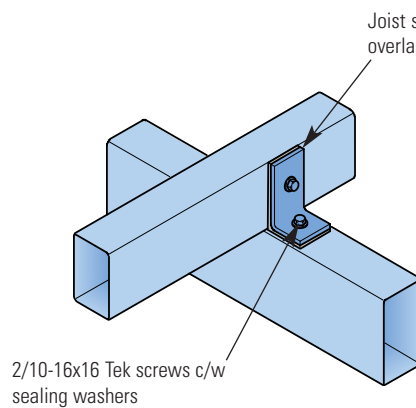


PART ISOMETRIC VIEW OF JOIST WITH END CAP SEALING

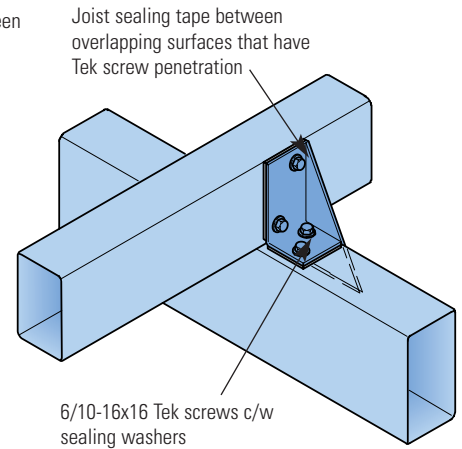
DETAIL 7. PRYDA FITTINGS TO DURAGAL SEALING



PRYDA UNITIE

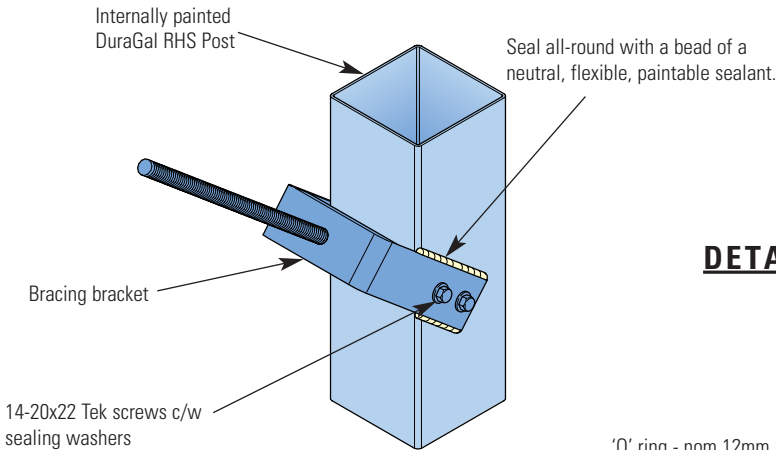


PRYDA PERGOLA ANGLE BRACKET

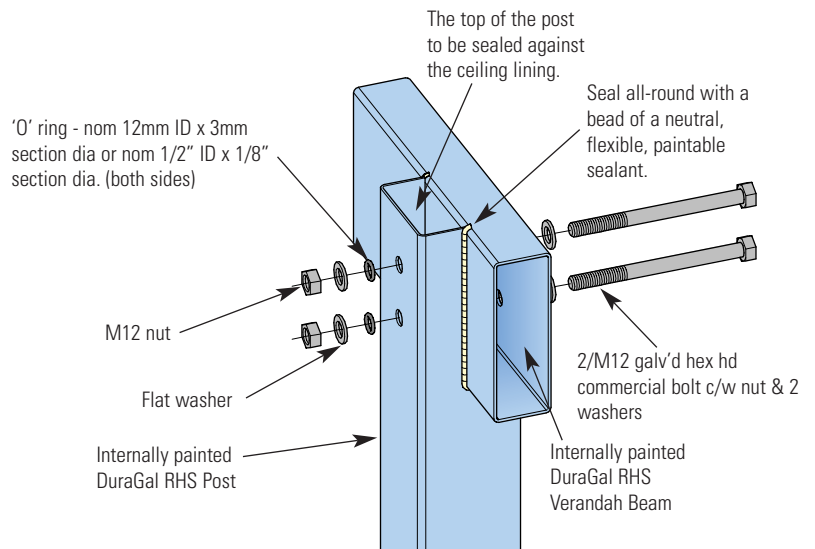


PRYDA TRIPLE GRIP

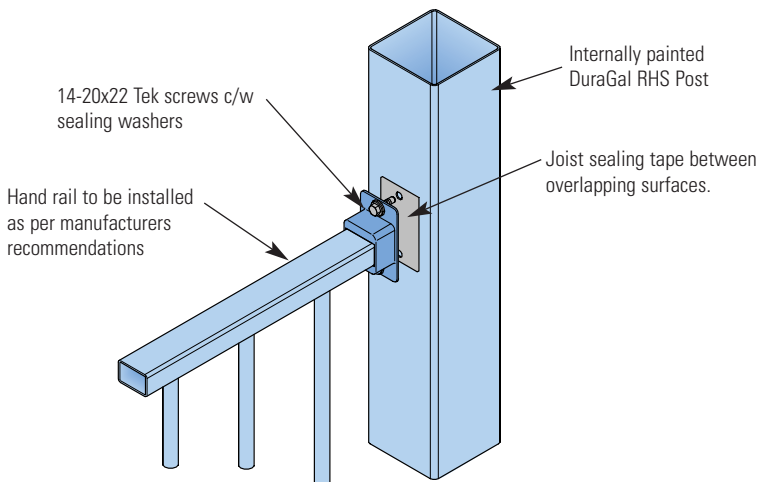
DETAIL 8. BRACING BRACKET CONNECTION SEALING



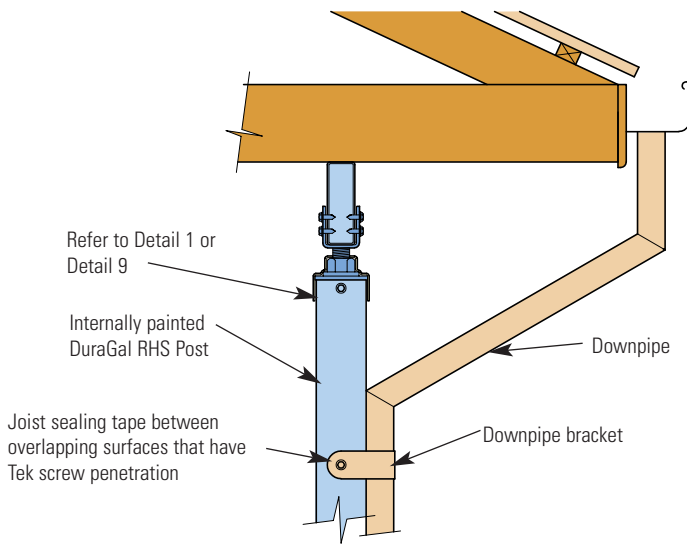
DETAIL 9. DURAGAL POST TO VERANDAH BEAM SEALING



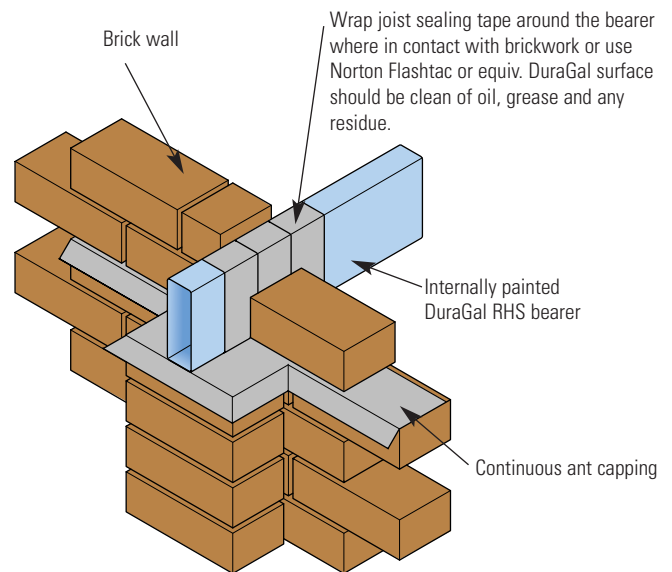
DETAIL 10. DURAGAL POST TO HAND RAIL SEALING



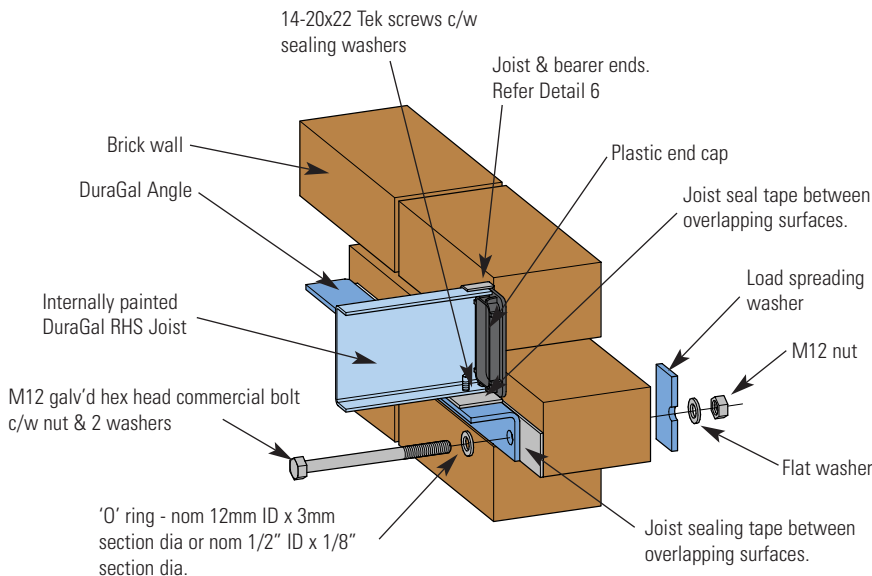
DETAIL 11. DURAGAL POST TO DOWNPIPE SEALING



DETAIL 12. BRICK PENETRATION SEALING



DETAIL 13. DURAGAL ANGLE TO BRICKWORK SEALING



DuraGal®



DURAGAL® Flooring System

Nailing & Cutting

Nailing of Sheet Flooring to DuraGal® Joists

Sheet flooring can be successfully glued and nailed to both 1.6 and 2.0mm DuraGal joists. Most nailing tools including Duo-Fast® and Max®, or equivalent, have been successfully trialed using the manufacturers recommended hard steel end twist nail.

Most reputable building adhesives work on steel joists and should be applied as per manufacturers recommendations to dry joists.

To date, the best results have been obtained by using the Duo-Fast coil nailing tool with a 32mm hard steel end twist nail.

Details are:-

TOOL: Duo-Fast® Model KD 655 BII, 665a or 750b

NAIL: Duo-Fast® C25 / 32 SH Dac Con Hard Steel Twist Nail.

Notes:

Sheet flooring can also be glued and screwed using Buildex® WingTek screws (or equivalent) and is the recommended method for joists with wall thickness greater than 2.0mm.

Nailing of Timber Decking to DuraGal® Joists

External timber decking can be nailed to both 1.6 and 2.0mm DuraGal Joists. When using hardwood or treated timber decking, the best results to date have been obtained from the Duo-fast® Coil nailing tool and also a Max® Coil nailing tool with 38mm long 304 stainless steel hardened twist nails.

Details for external fixing are:

TOOL: Max® Tool Model CN-650M-FAP50V9

NAIL: Max® Nail 2.5 x 38mm long 304 stainless steel hardened twist nail.

TOOL: Duo-fast® Model KD 650bII, 665a or 750b

NAIL: Duo-fast® C25 /32 SH Dac Con Hard Steel Twist Nail.

Notes:

1. To reduce the risk of corrosion, joist sealing tape should be used on the top of the joists for all external timber decks or verandahs as shown in Detail 4 page 26.
2. The use of screws to attach timber decking to joists on external decks and verandahs is not recommended.

Nailing Guidelines

- The joist weld seam, (internal weld bead), should be placed down onto the bearer, during installation.
- Do not attempt to nail through joiners, nail either side of them.
- The air pressure should be a constant 710 minimum to 800kPa maximum, (105 to 120 PSI).
- Nailing tool must be perpendicular to sheet and firmly held.
- Ensure nailing tool is on sequential action.
- Bump fire action must never be used.

Cutting DuraGal®

The cutting of steel on site has been made easier with the introduction of a new portable cold cut docking saw that has been introduced by Makita® (4130). The saw is lighter, and the cold cut produces a burr-free cut (therefore safer), without zinc burn.

For further information on the Makita® 4130 saw contact your local Makita® dealer. Other recommended methods include drop saws, circular hand saws and angle grinders fitted with the appropriate steel cutting disc.

DURAGAL[®]

Flooring System

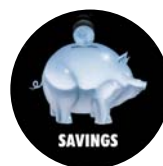


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