

DATA SHEET

Curved Knee Portals



Overview

Effects that can only be achieved by the versatility of Glulam are available using Red Stag TimberLab's Curved Knee Portals. These members represent the 'top of the line' in portal construction. Their laminations run continuously from base to pinned apex and give a clean sweeping appearance.

Benefits / Features

Appearance - No external plates or gussets clutter the continuity and beauty of the natural timber grain. The natural warmth and softness produced will add to the pleasant atmosphere of any building. Colour staining of portals to contrast with sarking or ceiling further highlights appearance

Variety of shape -An extensive variety of shape and pitch is possible using curved Glulam portals. Tapering of column and rafter sections allows shaping to take advantage of lesser stressed areas at base and apex. Clerestory roof section and eave cantilevers may all be catered for in Red Stag TimberLab's Curved Knee Portals.

Knee Curve - Radius of curvatures sets the lamination thickness requirement and therefore influences costs. The thinner the laminate, the greater the cost. For minimum radii of curvature, see table.

Simplicity - All base and apex fittings can be pre-fitted in our factory. On-site assembly simply means fixing of pre-fitted members, lowering portal halves



Site Assembly - Members arrive on site in the form of half portals; with the use of a mobile scaffold to support the apex. Erection is quickly achieved by lifting the half portals into position onto holding down bolts and aligning the simple bolted apex joint. An average of 6 to 10 portals can be fully erected in a working day. Each frame can be temporarily braced longitudinally so that a secure structure is available for cladding and roofing.

With the convenience of nailing directly to the timber frames, no specialist labour is required.

Table: Minimum Radius of Curvature

Lamination Thickness (mm)	Member with constant - Radius (mm)	Member with tangent ends - Radius (mm)
10	1400	1200
13	2200	1800
16	3000	2300
19	3800	2800
45	12000	9700

Designs

Reverse Curve - An elegant “swan neck” sweep is provided with this style of portal. The continuous laminations are curved in two directions. This most attractive portal has been used in churches and halls.



Open Knee - This style allows the curved knee section to follow a parallel form through the curve. Many school halls and swimming pools feature this type of portal.



Solid Knee - The gap left between the curved knee section in the open knee portal and the upper wall and roof line is eliminated in this style. The shape of this portal follows the wall and roof profile on the top side, while giving a sweeping curve on the inside.



Indicative Span Tables

Span (m)	Spacing (m)	Light Roof & Ceiling LL=0.25kPa Tangent Depth	Heavy Roof & Ceiling LL=0.25kPa Tangent Depth
8	3	320x90	360x90
	4	320x90	380x90
	5	340x90	400x90
9	3	340x90	400x90
	4	360x90	455x90
	5	400x90	475x90
10	3	360x90	455x90
	4	400x90	495x90
	5	455x90	530x90
11	3	400x90	495x90
	4	455x90	530x90
	5	495x90	530x115
12	3	455x90	530x90
	4	495x90	530x115
	5	530x90	590x115
13	4	530x90	590x115
	5	530x115	630x115
	6	530x115	665x115
14	4	530x115	630x115
	5	530x115	665x115
	6	590x115	720x115
15	4	530x115	665x115
	5	590x115	720x115
	6	630x115	720x135
16	4	590x115	720x115
	5	630x115	720x135
	6	665x115	760x135
17	4	630x115	720x135
	5	665x115	760x135
	6	720x115	800x135
18	4	655x115	760x135
	5	720x115	800x135
	6	720x135	855x135
19	4	720x115	800x135
	5	720x135	855x135
	6	760x135	

Nothing contained in this material shall be construed as a warranty or otherwise as to the accuracy or safety of the information provided. Specific design work should be carried out by qualified Engineers. Design information for structural laminated timber is fully contained in NZS 3603, chapter 8.