American Institute of Timber Construction

Design Table for Pitched and Curved Beams

This design table contains the widths, depths, radii, and reinforcing requirements of pitched and curved beams of constant cross section with mechanically attached haunches for commonly used roof slopes, spans, and loading.

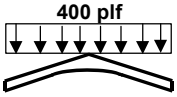
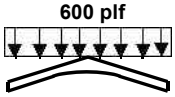
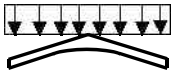
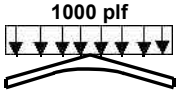
Design Load Roof dead load plus roof live load	Roof Slope	40 Ft Span		50 Ft Span		60 Ft Span		80 Ft Span	
		SIZE	R	SIZE	R	SIZE	R	SIZE	R
		Lag Screws	Rebar	Lag Screws	Rebar	Lag Screws	Rebar	Lag Screws	Rebar
400 plf 	2/12	5-1/8 x 22-1/2	61'- 0"	5-1/8 x 28-1/2	76'- 3"	6-3/4 x 33	91'- 6"	8-3/4 x 43-1/2	121'- 11"
		None Required		None Required		None Required		None Required	
	3/12	5-1/8 x 22-1/2	41'-3"	5-1/8 x 28-1/2	51'- 6"	6-3/4 x 34-1/2	61'-9"	8-3/4 x 43-1/2	82'- 4"
		22 -- 3/4 in.	22 -- #3	22 -- 3/4 in.	22 -- #3	None Required		None Required	
	4/12	5-1/8 x 22-1/2	***32'- 0"**	5-1/8 x 28-1/2	39'- 6"	6-3/4 x 33	47'- 6"	8-3/4 x 43-1/2	63'- 3"
		22 -- 3/4 in.	22 -- #3	22 -- 3/4 in.	22 -- #3	22 -- 3/4 in.	22 -- #3	23 -- 3/4 in.	23 -- #3
	5/12	5-1/8 x 22-1/2	***32'- 0"**	5-1/8 x 28-1/2	32'- 6"	6-3/4 x 33	39'- 0"		
		22 -- 3/4 in.	22 -- #3	22 -- 3/4 in.	22 -- #3	22 -- 7/8 in.	22 -- #3		
600 plf 	2/12	5-1/8 x 31-1/2	61'- 0"	6-3/4 x 30	76'- 3"	6-3/4 x 37-1/2	91'- 6"	8-3/4 x 49-1/2	121'- 11"
		None Required		None Required		None Required		None Required	
	3/12	5-1/8 x 27	41'-3"	6-3/4 x 30	51'- 6"	6-3/4 x 37-1/2	61'-9"	8-3/4 x 49-1/2	82'- 4"
		18 -- 3/4 in.	18 -- #3	20 -- 3/4 in.	20 -- #3	20 -- 3/4 in.	20 -- #3	20 -- 3/4 in.	20 -- #4
	4/12	5-1/8 x 27	***32'- 0"**	6-3/4 x 30	39'- 6"	6-3/4 x 37-1/2	47'- 6"	8-3/4 x 49-1/2	63'- 3"
		18 -- 3/4 in.	18 -- #3	20 -- 3/4 in.	20 -- #3	20 -- 3/4 in.	20 -- #4	20 -- 7/8 in.	20 -- #4
	5/12	5-1/8 x 28-1/2	***32'- 0"**	6-3/4 x 31-1/2	32'- 6"	6-3/4 x 37-1/2	39'- 0"		
		17 -- 3/4 in.	17 -- #3	20 -- 3/4 in.	20 -- #4	20 -- 3/4 in.	20 -- #4		
800 plf 	2/12	5-1/8 x 31-1/2	61'- 0"	6-3/4 x 36	76'- 3"	6-3/4 x 43-1/2	91'- 6"	8-3/4 x 54	121'- 11"
		16 -- 3/4 in.	16 -- #3	17 -- 3/4 in.	17 -- #3	17 -- 3/4 in.	17 -- #3	None Required	
	3/12	5-1/8 x 31-1/2	41'-3"	6-3/4 x 36	51'- 6"	6-3/4 x 43-1/2	61'-9"	8-3/4 x 54	82'- 4"
		16 -- 3/4 in.	16 -- #3	17 -- 3/4 in.	17 -- #3	17 -- 3/4 in.	17 -- #4	20 -- 3/4 in.	20 -- #4
	4/12	5-1/8 x 31-1/2	***32'- 0"**	6-3/4 x 36	39'- 6"	6-3/4 x 43-1/2	47'- 6"	8-3/4 x 54	63'- 3"
		16 -- 3/4 in.	16 -- #3	17 -- 3/4 in.	17 -- #4	17 -- 7/8 in.	17 -- #4	20 -- 7/8 in.	20 -- #4
	5/12	5-1/8 x 33	***32'- 0"**	6-3/4 x 36	32'- 6"	6-3/4 x 43-1/2	39'- 0"		
		15 -- 3/4 in.	15 -- #4	17 -- 7/8 in.	17 -- #4	17 -- 7/8 in.	17 -- #4		
1000 plf 	2/12	6-3/4 x 30	61'- 0"	6-3/4 x 39	76'- 3"	8-3/4 x 45	91'- 6"	8-3/4 x 58-1/2	121'- 11"
		16 -- 3/4 in.	16 -- #3	16 -- 3/4 in.	16 -- #3	None Required		20 -- 3/4 in.	20 -- #3
	3/12	6-3/4 x 31-1/2	41'-3"	6-3/4 x 39	51'- 6"	8-3/4 x 42	61'-9"	8-3/4 x 58-1/2	82'- 4"
		16 -- 3/4 in.	16 -- #3	16 -- 3/4 in.	16 -- #4	18 -- 7/8 in.	18 -- #4	20 -- 7/8 in.	20 -- #4
	4/12	6-3/4 x 31-1/2	***32'- 0"**	6-3/4 x 40-1/2	39'- 6"	8-3/4 x 43-1/2	47'- 6"	8-3/4 x 58-1/2	63'- 3"
		16 -- 3/4 in.	16 -- #4	15 -- 7/8 in.	15 -- #4	17 -- 7/8 in.	17 -- #4	20 -- 1 in.	20 -- #5
	5/12	6-3/4 x 31-1/2	***32'- 0"**	6-3/4 x 40-1/2	32'- 6"	8-3/4 x 43-1/2	39'- 0"		
		16 -- 7/8 in.	16 -- #4	15 -- 7/8 in.	15 -- #4	17 -- 1 in.	17 -- #5		

Table Specifications:

* Tangent points are greater than 1/4 of span from centerline. Except as noted, the tangent points on the soffit face of the beam are located at the 1/4 points. Beams with radial reinforcement should be manufactured from lumber which has a maximum moisture content of 12%.
Lag screws must be fully threaded. Rebar and epoxy must conform to AITC 404-92 (found in AITC 200 Inspection Manual).
Reinforcement shall be equally spaced in curved portions.
Deflection limit is 1/180 of the span for total load. Total load includes the weight of the beam. Beams shall be laterally supported with adequate bracing along the length at the top and at the bottom at the ends.
Designs are based on uniformly distributed loads using load duration factor for construction live loads, $C_D = 1.25$.

Design values used for this table are:

F_{bx} = 2400 psi F_{vx} = 165 psi
F_{rt} = 15 psi E_x = 1,800,000 psi
F_{rt} = 55 psi, when radial reinforcement is provided

While these designs have been prepared in accordance with recognized engineering principles and are based on accurate technical data available, designs should not be used without competent professional examination and verification of the accuracy, suitability, and applicability by a licensed design professional.

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