



- 1 Braced rafter spans (see table for dimensions and details). Tables are based on use of #2 Douglas fir lumber protected from weather, low human occupancy and other farm building conditions.
- 2 Lower rafter. Wall and attachment to it must be strong enough to resist thrusts caused by wind in relation to dead load (roof weight) (25). It also must be strong enough to resist vertical and horizontal combinations of snow and dead load, (17) and (21). NOTE: If roof snow loads are adjusted by formula in 11th edition of Midwest Plan Service Structures and Environment Handbook, horizontal and vertical reactions at the heel of the rafter will be less than indicated in table.
- 3 Rise of lower roof rafter
- 4 Run of lower roof rafter.
- 5 Upper rafter
- 6 Rise of upper rafter
- 7 Run of upper rafter
- 8 Brace
- 9 Position of brace (8)
- 10 Ridge gusset; all gussets use 1/2" sheathing fir plywood nailed to front and back of rafters.
- 11 Nails, ridge gusset; number in table is number of 2x concrete nails from each side into each frame member, typical of all gusset joints.
- 12 Hip gusset
- 13 Nails, hip gusset
- 14 Brace gusset
- 15 Nails, brace gusset
- 16 Shape and location of larger gusset (14) and larger rafters (2), (5) when required.
- 17 Maximum ground snow load with rafters 2'0" oc, (psf). 65 psf ground snow load design is adequate for almost all of the U.S.
- 18 Maximum 1/10 hourly wind pressure with rafters 2'0" oc, (psf). 15 psf should be adequate wind design for most areas of the U.S. A few small interior areas and some areas along the coast will require 20 psf. NOTE: The Southern tip of Florida and ocean islands may require as much as 30 psf. Generally, the higher wind load requirement can be attained with larger gusset plates and more nails/plate.
- 19 Horizontal reaction (lb/rafter) based on snow load (17) + dead load (25).
- 20 Vertical reaction (lb/rafter) based on snow load (17) + dead load (25).
- 21 Vertical reaction (lb/rafter) based on wind (18) blowing perpendicular to long walls and dead load (25); when numbers are negative, net reaction is uplift.
- 22 Total number of 2x concrete nails per braced rafter (to order allow 74 nails/1b).
- 23 Roof purlins not over 2'0" throughout, or use continuous sheathing.
- 24 1" x 3" brace stiffeners, continuous.
- 25 For 2" x 10" and 2" x 12" rafters only, 1" x 3" stiffeners, not over 2'0" oc continuous.
- 26 For wet service conditions, reduce allowable loads (17) to (21) inclusive by 25%.
- 27 All joints must fit tight; fit all pieces together to assure the fit and dimensions are true, then use these pieces to pattern remaining members.
- 28 Roof dead load assumed to be 6 psf roof surface.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18	19	20	21	22
20'	2"x6"x8'0"	6'-6 5/8"	4'-7"	2"x6"x6'0"	2'-7"	5'-5"	2"x4"x6'0"	3'-0"	4"x12"	2	6"x12"	4	6"x19"	5	91.6	21.3	777	1332	-172	120
22'	2"x6"x8'0"	6'-11 1/8"	4'-0"	2"x6"x8'0"	3'10 1/2"	7'-0"	2"x4"x6'0"	3'-0"	4"x12"	2	6"x12"	4	6"x19"	5	76.3	17.5	701	1169	-103	120
24'	2"x10"x8'0"	6'-6 5/8"	4'-7"	2"x6"x8'0"	3'-0"	7'-5"	2"x4"x6'0"	3'-0"	4"x12"	2	6"x12"	4	6"x19"	5	68.2	19.6	853	1189	-209	120
26'	2"x8"x10'0"	8'-2 1/4"	5'-8 7/8"	2"x8"x8'0"	3'-4 1/4"	7'-3 1/8"	2"x4"x7'0"	3'-6"	4"x12"	2	8"x12"	5	8"x24"	7	100.9	22.5	1146	1824	-283	160
28'	2"x8"x10'0"	8'-5 3/4"	5'-3 5/8"	2"x8"x10'0"	4'-11 1/8"	8'-8 3/8"	2"x4"x7'0"	3'-6"	4"x12"	2	8"x12"	6	8"x24"	8	76.6	18.3	916	1502	-145	184
30'	2"x8"x10'0"	8'-2 1/4"	5'-8 7/8"	2"x8"x10'0"	3'-9 1/8"	9'-3 1/8"	2"x4"x7'0"	3'-6"	4"x12"	2	8"x12"	5	8"x24"	7	76.2	21.1	1175	1632	-406	160
32'	2"x8"x12'0"	9'-10"	6'-10 5/8"	2"x8"x10'0"	4'-1 3/8"	9'-1 3/8"	2"x4"x9'0"	4'-6"	4"x12"	2	6"x12"	4	6"x19"	5	67.5	15.9	1011	1557	-188	120
34'	2"x10"x12'0"	10'-0 3/4"	6'-6 1/2"	2"x10"x12'0"	5'-10 1/4"	10'x5 1/4"	2"x6"x9'0"	4'-6"	4"x12"	2	8"x16"	8	8"x24"	10	83.2	21.4	1223	1965	-272	232

COOPERATIVE EXTENSION SERVICE  
 AGRICULTURE AND HOME ECONOMICS

AND  
 UNITED STATES DEPARTMENT OF AGRICULTURE COOPERATING

BRACED RAFTER DESIGN DATA  
 20' - 34' SPANS

C.P.S. '88      6410      SHEET 1 OF 1