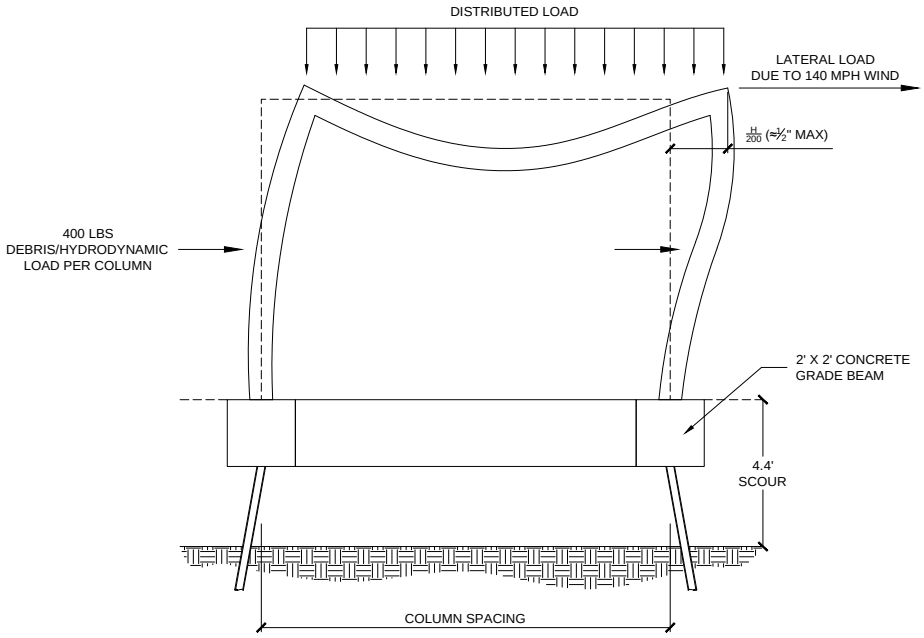
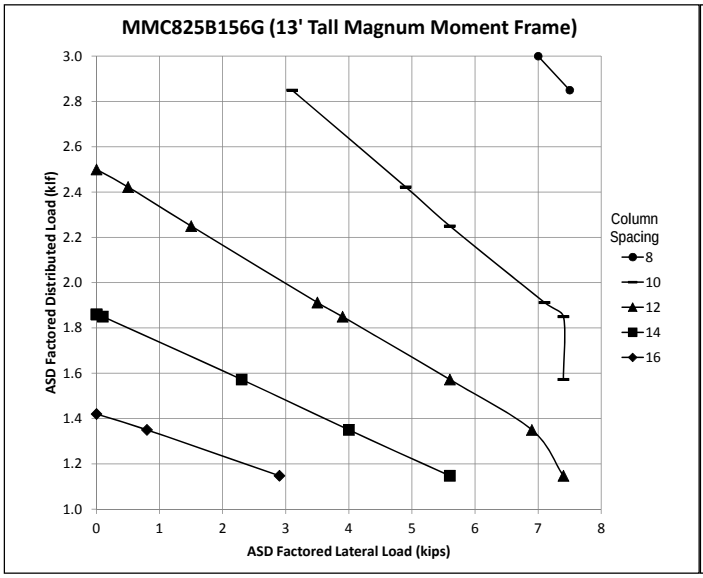
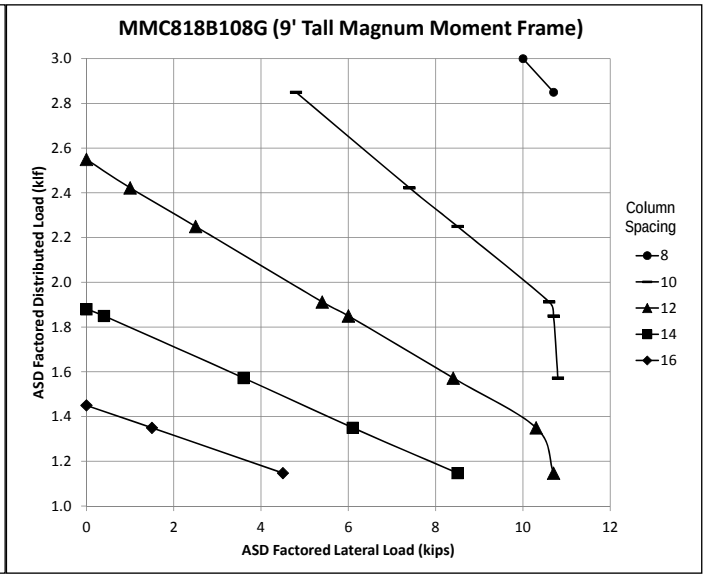
MAGNUM® Moment Frame
Design Considerations

Description

Moment frames are sized and spaced for live load and dead loads distributed along the beams and also lateral wind load to be resisted by the frames. Frames with higher distributed load resist lower lateral loads. The relationship between maximum factored allowable distributed load and maximum allowable factored wind load for Magnum Moment Frames™ are given in the charts. For example, the 9' tall moment frame with 12' column spacing can resist a factored wind load of 8 kips and a factored distributed load of 1.6 klf. These charts were derived by applying various combinations of load to a model of the moment frame and checking allowable flexural strength of the beam and combined flexure and buckling of the columns. The charts can be used to size moment frames for support of homes. Frames need to be checked for wind loads in both directions.







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U.S. Patents 6,058,662 and 5,234,287; Other Patents Pending.

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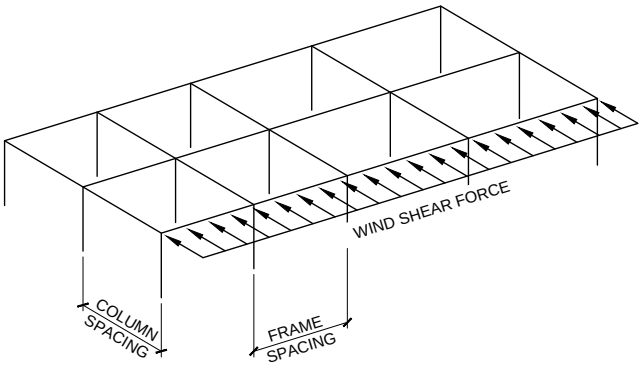
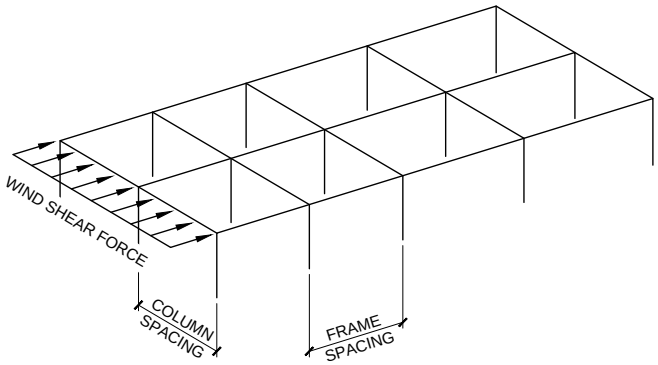
Description

A number of example home sizes have been worked out for reference. These examples are contained in the tables. The examples are for 1-story, 2-story, 3-story, and 3.5-story homes. Exposure height used in these examples are given in the second column of the tables. Typical total distributed loads and wind loads are given in the next two columns. Per the allowable stress load combinations contained in ASCE 7, the load case combining dead (D), live (L), and wind (W) loads on structures is given by D+0.75L+0.75W. Factored distributed loads for this combination (D+0.75L) are given in the 5th column and factored wind loads (0.75W) are given in the 6th column. The remaining columns contain maximum frame spacing for different column spacings.

Primary Wind Direction



Secondary Wind Direction



MMC818B108G (9' TALL) MAGNUM MOMENT FRAME™ COLUMN AND FRAME SPACING GUIDE									
Load Case	Exposure **Height, H (ft)**	Typical Total Loads		Factored Loads		Column Spacing (ft)			
		Distributed Load w/ Grade Beam [D+L] (klf)	Lateral Load[1] [W] (klf)	Distributed Load[2] **[D+0.75L] (klf)**	Lateral Load **[0.75W] (klf)**	10	12	14	16
						Maximum Frame Spacing (ft)			
1-story	12	1.8	0.24	1.15	0.18	16	16	16	16
2-story	20	2.3	0.40	1.57	0.30	14	14	12	N/A
3-story	28	2.7	0.56	1.91	0.42	12	12	N/A	N/A
3.5-story	32	3.3	0.64	2.42	0.48	10	N/A	N/A	N/A

[1]Wind pressure times exposure height (20 psf x H)
[2]Factored weight of home without grade beam

MMC825B156G (13' TALL) MAGNUM MOMENT FRAME™ COLUMN AND FRAME SPACING GUIDE									
Load Case	Exposure **Height, H (ft)**	Typical Total Loads		Factored Loads		Column Spacing (ft)			
		Distributed Load w/ Grade Beam [D+L] (klf)	Lateral Load[1] [W] (klf)	Distributed Load[2] **[D+0.75L] (klf)**	Lateral Load **[0.75W] (klf)**	10	12	14	16
						Maximum Frame Spacing (ft)			
1-story	12	1.8	0.24	1.15	0.18	16	16	16	16
2-story	20	2.3	0.40	1.57	0.30	12	12	N/A	N/A
3-story	28	2.7	0.56	1.91	0.42	10	8	N/A	N/A
3.5-story	32	3.3	0.64	2.42	0.48	10	N/A	N/A	N/A

[1]Wind pressure times exposure height (20 psf x H)
[2]Factored weight of home without grade beam

The tables show that a 9' tall moment frame with column and frame spacing of 16 feet can be used for the example 1-story home with 12' exposure height. The 2-story example home can be supported with a 9' moment frame with frame spacing of 12 feet and a column spacing of 14 feet.

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