

Post Strengths

The strengths published by manufacturers for the different pipes used for fence posts appear to be based 1980's and 1990's building codes when a different method of calculation was used. Modern codes use a different safety factor and different section properties to determine the strength.

Published strengths $M_{allow} = 0.66 F_y S_x$ This is based on IBC 2000 and earlier codes

IBC 2003 and later codes $M_{allow} = F_y Z_x / 1.67$ Schedule 40, 80 & 120 posts \approx 15% stronger

$M_{allow} = S_x F_n / 1.67$ Thin wall Group IC & IV posts \approx 13% stronger

Examples of the strength increase from old to modern codes

30 ksi Schedule 40

							M _{allow} (kip-ft)		
Trade Size	O.D.	t _{nom}	t _{des}	S _x (in ³)	Z _x (in ³)	F _y	IBC 2000	Modern IBC	% increase
1-7/8"	1.900	0.145	0.135	0.33	0.42	30	0.54	0.63	16%
2-3/8"	2.375	0.154	0.143	0.56	0.71	30	0.92	1.07	16%
2-7/8"	2.875	0.203	0.189	1.06	1.37	30	1.75	2.05	17%
3-1/2"	3.500	0.216	0.201	1.72	2.19	30	2.84	3.28	16%
4"	4.000	0.226	0.210	2.39	3.03	30	3.94	4.54	15%
6-5/8"	6.625	0.280	0.260	8.50	10.60	30	14.03	15.87	13%
8-5/8"	8.625	0.322	0.299	16.81	20.80	30	27.74	31.14	12%

Group IC

							M _{allow} (kip-ft)		
Trade Size	O.D.	t _{nom}	S _x (in ³)	F _y (ksi)	F _n (ksi)	E (msi)	IBC 2000	Modern IBC	% increase
1-7/8"	1.900	0.111	0.20	50	62.5	29.5	0.55	0.62	13%
2-3/8"	2.375	0.120	0.28	50	62.5	29.5	0.77	0.87	13%
2-7/8"	2.875	0.130	0.49	50	62.5	29.5	1.35	1.53	13%
3-1/2"	3.500	0.160	0.88	50	62.5	29.5	2.42	2.74	13%
4"	4.000	0.160	1.34	50	62.5	29.5	3.69	4.18	13%
6-5/8"	6.625	0.160	1.78	50	62.5	29.5	4.90	5.55	13%