

Floor Systems

Design Considerations

Introduction

PrimeJoist® is a structural element within the floor assembly where the assembly consists of the PrimeJoist section, metal deck or sheathing attached to the top compression flange, and discrete or continuous bracing attached to the tension flange. As a result, the behavior of the PrimeJoist section is restrained within the floor assembly. The design of PrimeJoist should be in accordance with AISI S100, North American Specification for the Design of Cold-Formed Steel Structural Members, and AISI S240-15, North American Standard for Cold-Formed Steel Structural Framing. Based on the provisions of these two code-referenced documents, the PrimeJoist section would then be checked for the following potential strength and serviceability limit states:

- Initiation of yielding for major axis bending
- Distortional buckling
- Shear
- Web crippling
- Combinations of bending and shear and bending and web crippling
- Vertical deflection at mid-span
- Vertical vibration

Floor Joist Bracing:

Section B1.2.1 in AISI S240-20 Standard permits joist design on the basis of either discretely braced design or continuously braced design. Assumptions for the two methods of design are as follows:

- In discretely braced design, the joist shall be designed neglecting the structural bracing and/or composite action contribution of attached sheathing or deck. Discretely braced design includes assemblies where the sheathing or deck is not attached directly to the joist.
- In continuously braced design, AISI S240-20 Standard limits joist maximum depth to 14 inches, joist maximum thickness to 118 mil (12 ga) and joist maximum design yield strength to 50 ksi. It also requires that the engineering drawings shall identify the sheathing or deck as a structural element. Section B4.5 of AISI S240-20 states that the sheathing shall consist of a minimum of 3/8 inch wood structural sheathing that complies with DOC PS 1, DOC PS 2, CSA 0437 or CSA 0325, or steel deck with a minimum profile depth of 9/16 inch and a minimum thickness of 27 mil. The sheathing or deck shall be attached with minimum No. 8 screws at a maximum 12 inches on center. In addition, it is required that for joist spans that exceed 8 feet, the tension flange shall be laterally braced at a maximum spacing of 8 feet.

Web Crippling:

Web crippling strength is the resistance of a cold-formed steel section with a large web slenderness ratio to resist crippling due to high local intensity of the load or reaction. Sections B1.6 and B2.2.3 in the AISI S240-20 Standard state that web crippling of floor joists shall be evaluated by using Sections G5 and G6, as applicable, of the AISI S100-16 Specification, unless a bearing stiffener is used. The design of bearing stiffeners, other than clip angle bearing stiffeners, shall be in accordance with Section G5 and G6, as applicable, of the AISI S100-16 Specification. Clip angle bearing stiffeners shall be designed in accordance with Section B2.5.1 of the AISI S240-20 standard.

Vertical Deflection and Vibration:

The limitations on maximum vertical deflection and maximum vibration of cold-formed steel floor joists are typically specified in a project with the serviceability limits of the floor system. Vertical deflection limits are available in buildings codes as part of the general design requirements. A limit of L/360 for live load and L/240 for total dead and live load are typically used. However since building codes don't provide limits for floor vibration, it is recommended to use a limit of L/480 for live load to gain additional floor rigidity against any possible floor vibration.

Web Cutouts:

Web cutouts of cold-formed steel floor joists are sometimes required to run duct work or pipes through the floor system. A methodology for a reinforcement solution for the cutout can be engineered by the design professional of the project to restore the design bending capacity of the joist. One reinforcement methodology is to use cold-formed steel channel sections as web reinforcement above and below the cutout. Another methodology is to use a cold-formed steel track section back-to-back with the joist as web reinforcement. In either case, the web reinforcement piece(s) should be attached to the joist by either self-drilling screws or by weld. Some general recommendations about web cutouts are:

- Limit cutout size to a maximum of 1/2 the depth of the joist.
- Locate the cutout in the center 40% of the joist span, away from high shear zones. Cutouts closer to supports are not recommended, but could be designed if size is limited.



PrimeJoist® Section Dimensions							
Section (All Studs 50ksi)	Overall Depth	Flange Width	Return Lip 1	Return Lip 2	Inside Bend Radius	Design Thickness	Unit Weight (lbs/ft)
	D	B	d1	d2	R	t	
	(in)	(in)	(in)	(in)	(in)	(in)	(lbs/ft)
600PJ250-43	6	2.5	0.610	0.5	0.105	0.0451	1.94
600PJ250-54	6	2.5	0.633	0.5	0.105	0.0566	2.42
600PJ250-68	6	2.5	0.663	0.5	0.105	0.0713	3.04
600PJ250-97	6	2.5	0.723	0.5	0.105	0.1017	4.30
600PJ250-118	6	2.5	0.768	0.5	0.105	0.1242	5.22
600PJ300-54	6	3	0.6332	0.5	0.105	0.0566	2.616
600PJ300-68	6	3	0.6626	0.5	0.105	0.0713	3.284
600PJ300-97	6	3	0.7234	0.5	0.105	0.1017	4.649
600PJ300-97	6	3	0.7684	0.5	0.105	0.1242	5.646
600PJ350-68	6	3.5	0.6626	0.5	0.105	0.0713	3.527
600PJ350-97	6	3.5	0.7234	0.5	0.105	0.1017	4.995
600PJ350-118	6	3.5	0.7684	0.5	0.105	0.1242	6.069
800PJ250-43	8	2.5	0.6102	0.5	0.105	0.0451	2.244
800PJ250-54	8	2.5	0.6332	0.5	0.105	0.0566	2.809
800PJ250-68	8	2.5	0.6626	0.5	0.105	0.0713	3.527
800PJ250-97	8	2.5	0.7234	0.5	0.105	0.1017	4.995
800PJ250-118	8	2.5	0.7684	0.5	0.105	0.1242	6.069
800PJ300-54	8	3	0.6332	0.5	0.105	0.0566	3.001
800PJ300-68	8	3	0.6626	0.5	0.105	0.0713	3.769
800PJ300-97	8	3	0.7234	0.5	0.105	0.1017	5.342
800PJ300-118	8	3	0.7684	0.5	0.105	0.1242	6.492
800PJ350-68	8	3.5	0.6626	0.5	0.105	0.0713	4.012
800PJ350-97	8	3.5	0.7234	0.5	0.105	0.1017	5.688
800PJ350-118	8	3.5	0.7684	0.5	0.105	0.1242	6.914
1000PJ250-43	10	2.5	0.6102	0.5	0.105	0.0451	2.551
1000PJ250-54	10	2.5	0.6332	0.5	0.105	0.0566	3.194
1000PJ250-68	10	2.5	0.6626	0.5	0.105	0.0713	4.012
1000PJ250-97	10	2.5	0.7234	0.5	0.105	0.1017	5.688
1000PJ250-118	10	2.5	0.7684	0.5	0.105	0.1242	6.914
1000PJ300-54	10	3	0.6332	0.5	0.105	0.0566	3.387
1000PJ300-68	10	3	0.6626	0.5	0.105	0.0713	4.254
1000PJ300-97	10	3	0.7234	0.5	0.105	0.1017	6.034
1000PJ300-118	10	3	0.7684	0.5	0.105	0.1242	7.337
1000PJ350-68	10	3.5	0.6626	0.5	0.105	0.0713	4.497
1000PJ350-97	10	3.5	0.7234	0.5	0.105	0.1017	6.380
1000PJ350-118	10	3.5	0.7684	0.5	0.105	0.1242	7.760
1200PJ250-54	12	2.5	0.6332	0.5	0.105	0.0566	3.579
1200PJ250-68	12	2.5	0.6626	0.5	0.105	0.0713	4.497
1200PJ250-97	12	2.5	0.7234	0.5	0.105	0.1017	6.380
1200PJ250-118	12	2.5	0.7684	0.5	0.105	0.1242	7.760
1200PJ300-54	12	3	0.6332	0.5	0.105	0.0566	3.772
1200PJ300-68	12	3	0.6626	0.5	0.105	0.0713	4.740
1200PJ300-97	12	3	0.7234	0.5	0.105	0.1017	6.726
1200PJ300-118	12	3	0.7684	0.5	0.105	0.1242	8.182
1200PJ350-68	12	3.5	0.6626	0.5	0.105	0.0713	4.982
1200PJ350-97	12	3.5	0.7234	0.5	0.105	0.1017	7.072
1200PJ350-118	12	3.5	0.7684	0.5	0.105	0.1242	8.605
1400PJ250-54	14	2.5	0.6332	0.5	0.105	0.0566	3.964
1400PJ250-68	14	2.5	0.6626	0.5	0.105	0.0713	4.982
1400PJ250-97	14	2.5	0.7234	0.5	0.105	0.1017	7.072
1400PJ250-118	14	2.5	0.7684	0.5	0.105	0.1242	8.605
1400PJ300-54	14	3	0.6332	0.5	0.105	0.0566	4.157
1400PJ300-68	14	3	0.6626	0.5	0.105	0.0713	5.225
1400PJ300-97	14	3	0.7234	0.5	0.105	0.1017	7.418
1400PJ300-118	14	3	0.7684	0.5	0.105	0.1242	9.028
1400PJ350-68	14	3.5	0.6626	0.5	0.105	0.0713	5.468
1400PJ350-97	14	3.5	0.7234	0.5	0.105	0.1017	7.764
1400PJ350-118	14	3.5	0.7684	0.5	0.105	0.1242	9.450

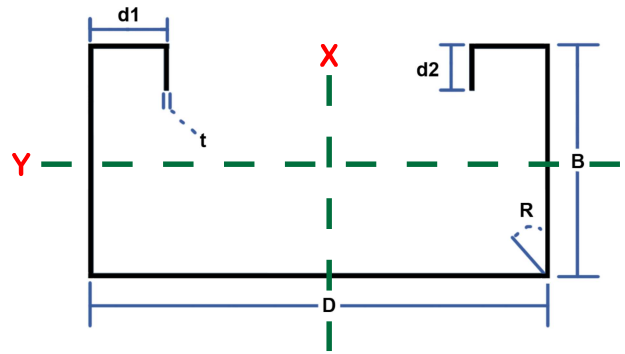
PrimeJoist® Section Dimensions (continued)							
Section (All Studs 50ksi)	Overall Depth	Flange Width	Return Lip 1	Return Lip 2	Inside Bend Radius	Design Thickness	Unit Weight (lbs/ft)
	D (in)	B (in)	d1 (in)	d2 (in)	R (in)	t (in)	(lbs/ft)
1600PJ250-68	16	2.5	0.6626	0.5	0.105	0.0713	5.468
1600PJ250-97	16	2.5	0.7234	0.5	0.105	0.1017	7.764
1600PJ250-118	16	2.5	0.7684	0.5	0.105	0.1242	9.450
1600PJ300-68	16	3	0.6626	0.5	0.105	0.0713	5.710
1600PJ300-97	16	3	0.7234	0.5	0.105	0.1017	8.110
1600PJ300-118	16	3	0.7684	0.5	0.105	0.1242	9.873

Material Properties

ASTM A1003/A1003M Structural Grade 50 (340) Type H, ST50H (ST340H): 50ksi (340MPa) minimum yield strength, 65ksi (450MPa) minimum tensile strength with ASTM A653/A653M G60 (Z180) hot dipped galvanized coating.

Important Notes

1. Calculated properties are based on AISI S100-16, "North American Specification for the Design of Cold-Formed Steel Structural Members."
2. Effective properties incorporate the strength increase from the cold-work of forming as applicable per AISI S100-16 Spec, Sec. A3.3.2 (3).
3. Tabulated gross properties are based on the full-unreduced cross section of the studs, away from punchouts.
4. Allowable moment is the lesser of M_{al} and M_{ad} . Stud distortional buckling is based on an assumed $k_{\phi} = 0$.
5. For deflection calculations, use the effective moment of inertia.
6. The effective moment of inertia for deflection is calculated at a stress which results in a section modulus such that the stress times the section modulus at that stress is equal to the allowable moment. AISI S100-16 Specification Procedure I for serviceability determination has been used. Increases in the effective moment of Inertia (I_{xe}) may be possible at lower stress levels. Any modified values would be required to be calculated by a qualified engineer.



Important Notes

1. Calculated properties are based on AISI S100-16 Spec, "North American Specification for the Design of Cold-Formed Steel Structural Members."
2. Effective properties incorporate the strength increase from the cold-work of forming as applicable per AISI S100-16 Spec, Sec. A3.3.2 (3).
3. Tabulated gross properties are based on the full-unreduced cross section of the studs, away from punchouts.
4. Allowable moment at the net section is the lesser of $M_{al(net)}$ and $M_{ad(net)}$. Stud distortional buckling is based on an assumed $k_{\phi} = 0$.
5. For deflection calculations, use the effective moment of inertia.
6. The effective moment of inertia for deflection is calculated at a stress which results in a section modulus such that the stress times the section modulus at that stress is equal to the allowable moment. AISI S100-16 Specification Procedure I for serviceability determination has been used. Increases in the effective moment of Inertia (I_{xe}) may be possible at lower stress levels. Any modified values would be required to be calculated by a qualified engineer.

PrimeJoist® Section Dimensions																					
Section (All 50 ksi)	Gross Properties							Effective Properties 50 ksi						Torsional Properties						L_u (in.)	
	Area	Weight	I_x	S_x	R_x	I_y	R_y	I_{xe}	S_{xe}	$M_{al(net)}$	$M_{ad(net)}$	V_a	$V_{a(net)}$	$J \times 10^3$	C_w	X_o	m	R_o	β		
	(in. ²)	(lb/ft)	(in. ⁴)	(in. ³)	(in.)	(in. ⁴)	(in.)	(in. ⁴)	(in. ³)	(in-k)	(in-k)	(lb)	(lb)	(in. ⁶)	(in. ⁶)	(in.)	(in.)	(in.)			
600PJ250-43	0.569	1.937	3.261	1.087	2.394	0.519	0.955	3.245	0.919	27.502	23.076	1,432	1,235	0.386	4.150	-2.088	1.266	3.317	0.604	53.32	
600PJ250-54	0.712	2.424	4.058	1.353	2.387	0.644	0.951	4.058	1.174	35.140	31.545	2,842	1,942	0.760	5.163	-2.082	1.263	3.307	0.604	53.38	
600PJ250-68	0.894	3.041	5.055	1.685	2.378	0.801	0.947	5.055	1.526	45.679	43.085	5,352	2,882	1.514	6.431	-2.074	1.259	3.295	0.604	53.47	
600PJ250-97	1.265	4.303	7.047	2.349	2.361	1.111	0.937	7.047	2.305	77.070	73.996	10,653	3,964	4.360	8.956	-2.058	1.250	3.269	0.604	53.76	
600PJ250-118	1.535	5.224	8.459	2.820	2.348	1.328	0.930	8.459	2.820	96.045	95.554	12,905	3,888	7.893	10.737	-2.045	1.244	3.249	0.604	54.05	
600PJ300-54	0.769	2.616	4.558	1.519	2.435	0.997	1.139	4.414	1.212	36.282	32.808	2,842	1,942	0.821	7.935	-2.545	1.519	3.702	0.527	62.53	
600PJ300-68	0.965	3.284	5.682	1.894	2.427	1.241	1.134	5.633	1.587	47.517	45.077	5,352	2,882	1.635	9.901	-2.538	1.515	3.690	0.527	62.67	
600PJ300-97	1.366	4.649	7.931	2.644	2.409	1.729	1.125	7.931	2.495	74.697	72.450	10,653	3,964	4.710	13.841	-2.521	1.507	3.665	0.527	63.07	
600PJ300-118	1.659	5.646	9.531	3.177	2.397	2.074	1.118	9.531	3.046	101.688	101.217	12,905	3,888	8.531	16.640	-2.509	1.501	3.646	0.526	63.46	
600PJ350-68	1.036	3.527	6.309	2.103	2.467	1.799	1.318	6.055	1.628	48.757	46.671	5,352	2,882	1.756	14.285	-3.006	1.771	4.106	0.464	71.51	
600PJ350-97	1.468	4.995	8.816	2.939	2.451	2.513	1.308	8.730	2.534	75.856	75.750	10,653	3,964	5.061	20.020	-2.990	1.763	4.081	0.463	72.01	
600PJ350-118	1.783	6.069	10.603	3.534	2.438	3.021	1.301	10.603	3.336	99.875	98.557	12,905	3,888	9.170	24.116	-2.978	1.757	4.063	0.463	72.48	
800PJ250-43	0.659	2.244	6.378	1.595	3.110	0.572	0.931	6.378	1.225	36.664	31.517	1,060	1,060	0.447	7.513	-1.869	1.159	3.746	0.751	52.27	
800PJ250-54	0.825	2.809	7.949	1.987	3.103	0.710	0.927	7.949	1.700	50.893	43.391	2,102	2,102	0.881	9.340	-1.862	1.156	3.736	0.752	52.24	
800PJ250-68	1.036	3.527	9.923	2.481	3.095	0.883	0.923	9.923	2.260	67.676	59.780	4,218	3,367	1.756	11.624	-1.854	1.151	3.724	0.752	52.23	
800PJ250-97	1.468	4.995	13.893	3.473	3.076	1.225	0.914	13.893	3.409	113.945	104.140	10,888	6,034	5.061	16.161	-1.838	1.142	3.698	0.753	52.24	
800PJ250-118	1.783	6.069	16.731	4.183	3.063	1.466	0.907	16.731	4.183	142.471	137.142	16,239	7,314	9.170	19.351	-1.825	1.135	3.679	0.754	52.29	
800PJ300-54	0.882	3.001	8.841	2.210	3.166	1.101	1.117	8.679	1.710	51.186	44.865	2,102	2,102	0.942	14.345	-2.298	1.404	4.069	0.681	61.53	
800PJ300-68	1.108	3.769	11.044	2.761	3.158	1.371	1.113	11.018	2.346	70.242	62.091	4,218	3,367	1.877	17.884	-2.290	1.399	4.056	0.681	61.54	
800PJ300-97	1.570	5.342	15.479	3.870	3.140	1.911	1.103	15.479	3.658	109.530	101.212	10,888	6,034	5.411	24.958	-2.274	1.391	4.031	0.682	61.64	
800PJ300-118	1.908	6.492	18.657	4.664	3.127	2.293	1.096	18.657	4.475	149.413	142.478	16,239	7,314	9.808	29.972	-2.261	1.384	4.012	0.682	61.76	
800PJ350-68	1.179	4.012	12.165	3.041	3.212	1.990	1.299	11.805	2.406	72.028	63.855	4,218	3,367	1.998	25.787	-2.733	1.648	4.413	0.616	70.53	
800PJ350-97	1.671	5.688	17.065	4.266	3.195	2.782	1.290	16.974	3.711	111.105	104.925	10,888	6,034	5.762	36.082	-2.717	1.640	4.388	0.617	70.69	
800PJ350-118	2.032	6.914	20.583	5.146	3.183	3.346	1.283	20.583	4.863	145.598	137.703	16,239	7,314	10.447	43.418	-2.705	1.633	4.370	0.617	70.87	
1000PJ250-43 ¹	0.750	2.551	10.814	2.163	3.798	0.611	0.903	10.814	1.532	45.859	39.691	842	842	0.508	12.166	-1.696	1.072	4.257	0.841	51.47	
1000PJ250-54	0.939	3.194	13.490	2.698	3.791	0.760	0.900	13.490	2.106	63.057	54.992	1,667	1,667	1.002	15.121	-1.690	1.068	4.247	0.842	51.40	
1000PJ250-68	1.179	4.012	16.864	3.373	3.782	0.945	0.895	16.864	3.055	91.457	76.339	3,343	3,343	1.998	18.812	-1.682	1.064	4.235	0.842	51.32	
1000PJ250-97	1.671	5.688	23.674	4.735	3.764	1.312	0.886	23.674	4.649	155.425	134.635	9,764	7,189	5.762	26.138	-1.666	1.055	4.210	0.843	51.19	
1000PJ250-118	2.032	6.914	28.570	5.714	3.750	1.569	0.879	28.570	5.714	194.624	178.952	16,239	9,736	10.447	31.285	-1.653	1.048	4.191	0.844	51.12	
1000PJ300-54	0.995	3.387	14.889	2.978	3.868	1.181	1.089	14.748	2.128	63.707	56.875	1,667	1,667	1.063	23.216	-2.100	1.308	4.534	0.785	60.80	
1000PJ300-68	1.250	4.254	18.621	3.724	3.859	1.471	1.085	18.621	3.089	92.482	79.197	3,343	3,343	2.118	28.935	-2.092	1.304	4.522	0.786	60.75	
1000PJ300-97	1.773	6.034	26.165	5.233	3.842	2.051	1.076	26.165	4.961	148.521	130.623	9,764	7,189	6.113	40.358	-2.076	1.295	4.497	0.787	60.69	
1000PJ300-118	2.156	7.337	31.598	6.320	3.828	2.462	1.069	31.598	6.074	202.789	185.028	16,239	9,736	11.086	48.447	-2.063	1.288	4.478	0.788	60.67	
1000PJ350-68	1.321	4.497	20.378	4.076	3.927	2.140	1.273	19.945	3.095	92.661	81.262	3,343	3,343	2.239	41.705	-2.513	1.545	4.833	0.730	69.88	
1000PJ350-97	1.875	6.380	28.656	5.731	3.910	2.993	1.263	28.651	5.030	150.590	134.865	9,764	7,189	6.463	58.323	-2.497	1.536	4.808	0.730	69.87	
1000PJ350-118	2.280	7.760	34.627	6.925	3.897	3.600	1.257	34.627	6.560	196.413	178.222	16,239	9,736	11.724	70.156	-2.484	1.529	4.789	0.731	69.89	
1200PJ250-54 ¹	1.052	1.052	20.909	3.485	4.459	0.799	0.871	19.943	2.417	72.373	65.871	1,382	1,382	1.123	22.624	-1.550	0.995	4.800	0.896	50.62	
1200PJ250-68	1.321	4.497	26.162	4.360	4.449	0.993	0.867	25.428	3.342	100.048	92.102	2,769	2,769	2.239	28.143	-1.542	0.991	4.788	0.896	50.51	
1200PJ250-97	1.875	6.380	36.799	6.133	4.430	1.379	0.858	36.695	5.692	170.411	152.901	8,078	7,419	6.463	39.093	-1.526	0.981	4.764	0.897	50.29	

PrimeJoist® Section Dimensions (continued)																					
Section (All 50 ksi)	Gross Properties							Effective Properties 50 ksi						Torsional Properties						L _c (in.)	
	Area	Weight	I _x	S _x	R _x	I _y	R _y	I _{xe}	S _{xe}	M _{pl(net)}	M _{stf(net)}	V _a	V _{e (net)}	Jx10 ³	C _w	X _o	m	R _o	β		
	(in. ²)	(lb/ft)	(in. ⁴)	(in. ³)	(in.)	(in. ⁴)	(in.)	(in. ⁴)	(in. ³)	(in-k)	(in-k)	(lb)	(lb)	(in. ⁴)	(in. ⁴)	(in.)	(in.)	(in.)	(in.)		
1200PJ300-54 ¹	1.108	3.772	22.927	3.821	4.548	1.245	1.060	22.868	2.548	76.292	68.452	1,382	1,382	1.184	34.744	-1.938	1.226	5.056	0.853	60.13	
1200PJ300-68	1.393	4.740	28.699	4.783	4.539	1.551	1.055	28.699	3.667	109.801	95.865	2,769	2,769	2.360	43.298	-1.930	1.222	5.044	0.854	60.04	
1200PJ300-97	1.976	6.726	40.398	6.733	4.521	2.163	1.046	40.398	6.401	191.634	159.837	8,078	7,419	6.814	60.378	-1.914	1.213	5.020	0.855	59.87	
1200PJ300-118	2.404	8.182	48.851	8.142	4.508	2.596	1.039	48.851	7.840	261.770	227.693	14,771	11,058	12.363	72.473	-1.901	1.206	5.001	0.855	59.77	
1200PJ350-68	1.464	4.982	31.235	5.206	4.619	2.261	1.243	30.690	3.689	110.448	98.487	2,769	2,769	2.481	62.405	-2.330	1.456	5.320	0.808	69.28	
1200PJ350-97	2.078	7.072	43.997	7.333	4.601	3.162	1.233	43.997	6.488	194.254	164.928	8,078	7,419	7.165	87.257	-2.314	1.447	5.296	0.809	69.16	
1200PJ350-118	2.529	8.605	53.231	8.872	4.588	3.804	1.227	53.231	8.426	252.273	219.291	14,771	11,058	13.002	104.953	-2.301	1.440	5.277	0.810	69.10	
1400PJ250-54 ¹	1.165	3.964	30.431	4.347	5.111	0.830	0.844	28.428	2.847	85.237	75.698	1,180	1,180	1.244	31.939	-1.433	0.932	5.375	0.929	49.87	
1400PJ250-68	1.464	4.982	38.103	5.443	5.102	1.032	0.840	36.379	3.948	118.208	106.579	2,363	2,363	2.481	39.728	-1.425	0.928	5.363	0.929	49.73	
1400PJ250-97	2.078	7.072	53.672	7.667	5.082	1.434	0.831	52.843	6.793	203.381	179.251	6,889	6,889	7.165	55.181	-1.410	0.918	5.339	0.930	49.46	
1400PJ250-118	2.529	8.605	64.935	9.276	5.068	1.716	0.824	64.886	8.634	258.514	238.603	12,590	11,302	13.002	66.037	-1.398	0.911	5.321	0.931	49.26	
1400PJ300-54 ¹	1.222	4.157	33.182	4.740	5.212	1.297	1.030	31.280	2.898	86.763	79.256	1,180	1,180	1.304	49.081	-1.801	1.155	5.610	0.897	59.44	
1400PJ300-68	1.535	5.225	41.562	5.937	5.203	1.616	1.026	39.947	4.052	121.330	111.616	2,363	2,363	2.602	61.164	-1.793	1.151	5.598	0.897	59.32	
1400PJ300-97	2.180	7.418	58.583	8.369	5.184	2.253	1.017	57.867	7.033	210.580	188.044	6,889	6,889	7.515	85.287	-1.777	1.141	5.574	0.898	59.09	
1400PJ300-118	2.653	9.028	70.913	10.130	5.170	2.705	1.010	70.913	9.216	275.920	250.851	12,590	11,302	13.640	102.371	-1.765	1.134	5.556	0.899	58.94	
1400PJ350-68	1.607	5.468	45.020	6.431	5.293	2.360	1.212	44.433	4.287	128.339	115.113	2,363	2,363	2.723	88.183	-2.174	1.378	5.850	0.862	68.66	
1400PJ350-97	2.282	7.764	63.494	9.071	5.275	3.301	1.203	63.494	7.930	237.411	194.426	6,889	6,889	7.866	123.298	-2.158	1.369	5.825	0.863	68.47	
1400PJ350-118	2.777	9.450	76.891	10.984	5.262	3.972	1.196	76.891	10.459	313.149	260.010	12,590	11,302	14.279	148.305	-2.146	1.362	5.807	0.863	68.34	
1600PJ250-68 ¹	1.607	5.468	52.973	6.622	5.742	1.065	0.814	49.675	4.553	136.326	119.534	2,061	2,061	2.723	53.658	-1.326	0.873	5.949	0.950	48.97	
1600PJ250-97	2.282	7.764	74.702	9.338	5.722	1.478	0.805	72.546	7.893	236.316	203.525	6,005	6,005	7.866	74.527	-1.311	0.864	5.925	0.951	48.66	
1600PJ250-118	2.777	9.450	90.455	11.307	5.707	1.769	0.798	89.400	10.093	302.172	273.159	10,970	10,970	14.279	89.188	-1.300	0.857	5.908	0.952	48.43	
1600PJ300-68 ¹	1.678	5.710	57.495	7.187	5.854	1.670	0.998	54.339	4.670	139.824	126.118	2,061	2,061	2.843	82.684	-1.676	1.088	6.170	0.926	58.60	
1600PJ300-97	2.383	8.110	81.128	10.141	5.835	2.328	0.988	79.123	8.154	244.141	214.626	6,005	6,005	8.216	115.296	-1.660	1.079	6.146	0.927	58.33	
1600PJ300-118	2.901	9.873	98.280	12.285	5.820	2.796	0.982	97.372	10.745	321.703	288.248	10,970	10,970	14.917	138.394	-1.648	1.072	6.128	0.928	58.13	
1600PJ350-68 ¹	1.749	5.953	62.018	7.752	5.954	2.443	1.182	58.472	4.736	141.796	130.789	2,061	2,061	2.964	119.278	-2.040	1.308	6.404	0.899	68.01	
1600PJ350-97	2.485	8.456	87.555	10.944	5.936	3.417	1.173	85.734	8.165	244.465	222.751	6,005	6,005	8.567	166.780	-2.024	1.299	6.380	0.899	67.77	
1600PJ350-118	3.025	10.296	106.106	13.263	5.922	4.112	1.166	105.380	11.331	339.256	299.554	10,970	10,970	15.556	200.614	-2.012	1.292	6.362	0.900	67.60	

¹Web-height-to-thickness ratio exceeds 200. Web stiffeners are required at all support points and concentric loads. Suitability of web holes must be evaluated independently.