

WEB CRIPPLING STRENGTH



Allowable Web Crippling Strength

Member	AISI Equation	20 gauge (33 ksi)			18 gauge (33 ksi)			16 gauge (33 ksi)			16 gauge (50 ksi)			14 gauge (50 ksi)			12 gauge (50 ksi)			10 gauge (50 ksi)		
		Base Width (in.)			Base Width (in.)			Base Width (in.)			Base Width (in.)			Base Width (in.)			Base Width (in.)			Base Width (in.)		
		1.5	3.5	6	1.5	3.5	6	1.5	3.5	6	1.5	3.5	6	1.5	3.5	6	1.5	3.5	6	1.5	3.5	6
358	End (1) Flange	0.1712	0.2341	0.2905	0.2835	0.3835	0.4730	0.4266	0.5713	0.7010	0.6464	0.8657	1.0621	0.9745	1.2912	1.5749	1.8348	2.3897	2.8668	2.7299	3.5163	4.2206
	Int (1) Flange	0.3390	0.4247	0.5015	0.5896	0.7286	0.8530	0.9029	1.1024	1.2810	1.3680	1.6703	1.9410	2.0924	2.5240	2.9106	4.0389	4.7839	5.4512	6.1104	7.1575	8.0953
	End (2) Flange	0.1253	0.1417	0.1563	0.2528	0.2826	0.3093	0.4191	0.4643	0.5048	0.6349	0.7035	0.7649	1.0372	1.1393	1.2307	2.1847	2.3703	2.5366	3.4664	3.7345	3.9747
	Int (2) Flange	0.2142	0.2703	0.3205	0.5162	0.6425	0.7557	0.8101	0.9963	1.1631	1.2275	1.5096	1.7623	1.8578	2.2572	2.6150	3.5330	4.2143	4.8244	5.2999	6.2509	7.1027
4	End (1) Flange	0.1689	0.2310	0.2867	0.2803	0.3791	0.4677	0.4224	0.5657	0.6940	0.6400	0.8571	1.0515	0.9659	1.2799	1.5611	1.8214	2.3724	2.8658	2.7121	3.4933	4.1930
	Int (1) Flange	0.3370	0.4222	0.4985	0.5866	0.7249	0.8487	0.8988	1.0974	1.2752	1.3618	1.6627	1.9321	2.0839	2.5138	2.8988	4.0251	4.7675	5.4325	6.0914	7.1352	8.0702
	End (2) Flange	0.1209	0.1367	0.1508	0.2455	0.2745	0.3005	0.4089	0.4531	0.4926	0.6195	0.6864	0.7464	1.0157	1.1156	1.2052	2.1483	2.3309	2.4944	3.4156	3.6798	3.9164
	Int (2) Flange	0.2141	0.2701	0.3204	0.5160	0.6422	0.7553	0.8098	0.9959	1.1626	1.2270	1.5090	1.7616	1.8571	2.2564	2.6140	3.5319	4.2129	4.8228	5.2984	6.2491	7.1006
6	End (1) Flange	0.1584	0.2166	0.2688	0.2654	0.3590	0.4429	0.4028	0.5394	0.6618	0.6102	0.8173	1.0027	0.9265	1.2277	1.4975	1.7600	2.2923	2.7691	2.6303	3.3880	4.0666
	Int (1) Flange	0.3277	0.4105	0.4848	0.5726	0.7076	0.8284	0.8797	1.0741	1.2482	1.3329	1.6274	1.8912	2.0447	2.4665	2.8442	3.9614	4.6921	5.3466	6.0046	7.0335	7.9551
	End (2) Flange	0.1004	0.1135	0.1253	0.2120	0.2370	0.2594	0.3618	0.4009	0.4359	0.5482	0.6074	0.6604	0.9162	1.0064	1.0871	1.9812	2.1496	2.3004	3.1830	3.4292	3.6497
	Int (2) Flange	0.2135	0.2695	0.3196	0.5148	0.6408	0.7536	0.8082	0.9940	1.1604	1.2245	1.5060	1.7581	1.8538	2.2524	2.6094	3.5266	4.2066	4.8156	5.2912	6.2406	7.0910
8	End (1) Flange				0.2529	0.3422	0.4221	0.3864	0.5174	0.6348	0.5854	0.7840	0.9619	0.8937	1.1842	1.4444	1.7090	2.2260	2.6890	2.5629	3.3011	3.9623
	Int (1) Flange				0.5609	0.6931	0.8115	0.8638	1.0547	1.2256	1.3088	1.5980	1.8570	2.0120	2.4270	2.7987	3.9086	4.6296	5.2753	5.9329	6.9496	7.8602
	End (2) Flange				0.1839	0.2056	0.2250	0.3224	0.3573	0.3884	0.4885	0.5413	0.5885	0.8333	0.9153	0.9888	1.8427	1.9993	2.1395	2.9910	3.2224	3.4296
	Int (2) Flange				0.5139	0.6396	0.7523	0.8069	0.9923	1.1584	1.2225	1.5035	1.7552	1.8511	2.2491	2.6056	3.5222	4.2014	4.8096	5.2852	6.2336	7.0830
10	End (1) Flange				0.3720	0.4982	0.6112	0.3720	0.4982	0.6112	0.5636	0.7548	0.9261	0.8649	1.1461	1.3979	1.6645	2.1681	2.6190	2.5041	3.2254	3.8714
	Int (1) Flange				0.8499	1.0377	1.2058	0.8499	1.0377	1.2058	1.2877	1.5722	1.8270	1.9833	2.3925	2.7589	3.8625	4.5750	5.2131	5.8705	6.8765	7.7775
	End (2) Flange				0.2879	0.3190	0.3469	0.2879	0.3190	0.3469	0.4362	0.4834	0.5256	0.7607	0.8356	0.9026	1.7217	1.8680	1.9990	2.8238	3.0422	3.2379
	Int (2) Flange				0.8057	0.9909	1.1568	0.8057	0.9909	1.1568	1.2208	1.5014	1.7527	1.8487	2.2462	2.6022	3.5184	4.1968	4.8044	5.2800	6.2275	7.0761
12	End (1) Flange													0.8390	1.1118	1.3560	1.6246	2.1160	2.5561	2.4513	3.1574	3.7899
	Int (1) Flange													1.9576	2.3614	2.7230	3.8211	4.6259	5.1572	5.8145	6.8108	7.7033
	End (2) Flange													0.6953	0.7638	0.8251	1.6129	1.7500	1.8727	2.6737	2.8805	3.0657
	Int (2) Flange													1.8466	2.2436	2.5992	3.5149	4.1927	4.7997	5.2754	6.2220	7.0698
14	End (1) Flange													0.8153	1.0803	1.3176	1.5879	2.0682	2.4984	2.4030	3.0952	3.7152
	Int (1) Flange													1.9339	2.3328	2.6901	3.7831	4.4810	5.1060	5.7632	6.7508	7.6353
	End (2) Flange													0.6354	0.6979	0.7539	1.5132	1.6418	1.7570	2.5362	2.7324	2.9082
	Int (2) Flange													1.8446	2.2412	2.5964	3.5118	4.1889	4.7954	5.2711	6.2170	7.0641
16	End (1) Flange																1.5539	2.0239	2.4449	2.3582	3.0375	3.6459
	Int (1) Flange																3.7479	4.4392	5.0584	5.7156	6.6950	7.5723
	End (2) Flange																1.4207	1.5415	1.6496	2.4088	2.5951	2.7620
	Int (2) Flange																3.5089	4.1854	4.7914	5.2672	6.2123	7.0588

APPLICATION: ALLOWABLE CONCENTRATED LOADS OR REACTIONS, (Kips) For determination of the web crippling capacity of a single unreinforced web subjected to concentrated loads or reactions.

USE: Compare the applied concentrated load or reaction to the maximum allowable values, Pa, listed above. Where the applied load exceeds the allowable, reinforcement with a web stiffener is required. For members with multiple webs (i.e. boxed or "I" shaped headers), Pa shall be computed for each individual web and the results added to obtain the allowable load or reaction for the multiple web. Due to the high degree of restraint against rotation of an "I" shaped section, web crippling strengths exceeding those shown above are attainable.

Consult AISI Specification Section C3.4, equations C3.4-3, 5, 7, and 9.

Notes:

1. H/t exceeds 200 where values have been omitted. When h/t exceeds 200, web stiffeners at concentrated load or reaction points are required.
2. Components with unreinforced flat webs, subjected to combined bending and web crippling, shall be designed to meet the requirements of the following interaction equations: $1.2 (P/Pa) + (M/Ma) < 1.5$ where
 P = Concentrated load or reaction in the absence of bending moment
 Pa = Allowable concentrated load or reaction in the absence of bending moment
 M = Applied bending moment at, or immediately adjacent to, the application of the concentrated load or reaction
 Ma = Allowable bending moment if bending alone exists
3. Avoid locating a web knockout within the shaded areas shown in the diagram. Should a knockout be located in this area, install a web stiffener, minimum 6" wide, centered over the knockout.

