

American National Standard SJI 100 - 2020

STANDARD LRFD LOAD TABLE

LONGSPAN STEEL JOISTS, LH-SERIES

Based on a 50 ksi (345 MPa) Maximum Yield Strength
Adopted by the Steel Joist Institute May 1, 2000
Revised to April 27, 2020 – Effective July 1, 2020

The **BLACK** figures in the Load Table give the TOTAL safe factored uniformly distributed load-carrying capacities, in pounds per linear foot (kiloNewtons per meter), of **LRFD** LH-Series Steel Joists.

The approximate joist weights, in pounds per linear foot (kiloNewtons per meter), given in the Load Table may be added to the other building weights to determine the unfactored DEAD load. In all cases the factored DEAD load, including the joist self-weight, must be deducted from the TOTAL load to determine the factored LIVE load. The approximate joist weights do not include accessories.

The **RED** figures in the Load Table represent the unfactored, uniform load, in pounds per linear foot (kiloNewtons per meter), which will produce an approximate joist deflection of 1/360 of the span. This load can be linearly prorated to obtain the unfactored, uniform load for supplementary deflection criteria (i.e. an unfactored uniform load which will produce a joist deflection of 1/240 of the span may be obtained by multiplying the **RED** figures by 360/240). In no case shall the prorated, unfactored load exceed the unfactored TOTAL load-carrying capacity of the joist as given in the Standard **ASD** Load Table for Longspan Steel Joists, LH-Series.

User Note: For floor joists, the RED figures may control the joist selection, and for longer spans consideration shall be given to the effects of camber on slab thickness. If a deeper joist designation cannot be used, CJ-Series composite joists may also be considered to take advantage of increased stiffness available due to composite action.

The Load Table applies to joists with either parallel chords or pitched top chords. Joists can have a top chord pitch up to 1/2 inch per foot (42 mm per meter). If the pitch exceeds this limit, the Load Table does not apply. When top chords are pitched, the load-carrying capacities are determined by the nominal depth of the joists at the center of the span. Sloped parallel-chord joists shall use span as defined by the length along the slope.

Where the joist span is in the **RED SHADED** area of the Load Table, the row of bridging nearest the mid span shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until this row of bolted diagonal bridging is completely installed. The **RED SHADED** area extends up through 60'-0" (18288 mm).

Where the joist span is in the **BLUE SHADED** area of the Load Table, all rows of bridging shall be diagonal bridging with bolted connections at chords and intersections. Hoisting cables shall not be released until the two rows of bridging nearest the third points are completely installed. The **BLUE SHADED** area starts after 60'-0" (18288 mm) and extends up through 100'-0" (30175 mm).

The approximate gross moment of inertia (not adjusted for shear deformation) of a standard joist listed in the Load Table may be determined as follows:

$$I_j = 26.767(W)(L^3)(10^{-6}) \text{ in}^4 \quad \text{or} \quad 2.6953(W)(L^3)(10^{-5}) \text{ mm}^4, \text{ where } W = \text{RED figure in the Load Table, and}$$

$$L = (\text{span} - 0.33) \text{ in feet} \quad \text{or} \quad (\text{span} - 102) \text{ in millimeters}$$

Loads for span increments not explicitly given in the Load Table may be determined using linear interpolation between the load values given in adjacent span rows. For spans shorter than the first span listed in the Load Table, the capacity shall be equal to that of the shortest listed span.

LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	18LH02	18LH03	18LH04	18LH05	18LH06	18LH07	18LH08	18LH09	18LH10	18LH11	18LH12	18LH13	18LH14	18LH15	18LH16	18LH17	18LH18	18LH19	18LH20
Depth (in.)	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Approx. Wt. (lbs./ft.)	10	11	12	14	15	17	19	21	23	25	28	33	36	39	44	50	57	62	83
Span (ft.)																			
18	1207 805	1344 896	1558 1039	1762 1175	2157 1438	2293 1529	2592 1728	2983 1889	3346 2231	3733 2489	4126 2751								
19	1122 748	1249 833	1449 966	1639 1093	1993 1329	2121 1414	2397 1500	2746 1601	3081 2054	3436 2291	3799 2533								
20	1045 696	1164 774	1348 896	1527 1009	1846 1169	1965 1229	2220 1283	2532 1369	2842 1816	3171 2005	3505 2226	4207 2576							
21	973 600	1084 667	1257 772	1423 870	1714 1008	1824 1059	2059 1105	2343 1180	2628 1565	2932 1728	3241 1918	3880 2220	4237 2413						
22	909 520	1012 579	1174 670	1329 755	1594 874	1695 919	1915 959	2172 1024	2436 1358	2718 1500	3004 1664	3586 1926	3918 2094	4243 2276					
23	850 454	946 505	1098 585	1243 659	1485 764	1579 803	1783 838	2017 894	2262 1186	2524 1310	2790 1454	3324 1683	3630 1829	3933 1987					
24	796 399	886 444	1027 514	1164 579	1386 671	1473 705	1665 736	1875 786	2104 1042	2349 1151	2598 1277	3088 1478	3372 1607	3654 1746	4216 1922				
25	745 353	831 392	964 454	1092 511	1294 593	1377 623	1555 650	1750 694	1963 920	2191 1016	2422 1128	2874 1306	3139 1419	3402 1542	3880 1697	4425 1929			
26	702 313	781 348	906 403	1026 454	1213 526	1260 553	1314 577	1404 616	1834 817	2047 902	2263 1001	2682 1159	2929 1260	3172 1369	3585 1506	4087 1712			
27	663 284	739 317	856 367	972 414	1123 469	1213 513	1264 534	1351 571	1717 728	1917 804	2119 893	2506 1033	2737 1123	2967 1220	3321 1343	3786 1526	4374 1739		
28	627 259	700 289	802 329	921 378	1044 419	1170 476	1218 496	1302 527	1611 652	1797 720	1987 799	2347 925	2565 1006	2778 1093	3085 1203	3517 1367	4063 1557		
29	586 234	657 262	750 296	871 345	972 377	1089 428	1176 462	1257 491	1513 586	1689 647	1867 718	2203 832	2406 904	2607 982	2874 1081	3276 1229	3784 1400	4216 1538	
30	550 212	613 236	703 266	814 311	907 340	1017 386	1137 427	1215 458	1423 529	1588 584	1756 648	2070 750	2262 816	2451 886	2683 975	3058 1108	3534 1263	3936 1387	
31	517 193	573 213	660 242	762 282	849 307	952 349	1075 387	1174 418	1341 479	1494 529	1656 587	1950 679	2130 738	2307 802	2511 883	2863 1003	3307 1143	3684 1256	
32	486 175	538 194	619 219	714 256	796 280	892 317	1020 351	1138 380	1266 435	1401 480	1563 533	1839 617	2004 671	2176 729	2355 802	2685 911	3102 1038	3454 1141	4293 1402
33	459 160	505 177	582 200	672 233	748 254	838 288	961 320	1069 346	1197 396	1317 437	1470 485	1735 562	1882 611	2055 664	2212 731	2523 830	2914 946	3246 1039	4033 1277
34	433 147	475 161	547 182	631 212	705 232	789 264	906 292	1006 316	1131 362	1239 399	1384 443	1633 513	1773 558	1936 606	2083 667	2376 758	2743 864	3057 949	3798 1167
35	409 135	448 148	516 167	595 195	664 212	744 241	856 267	949 289	1066 331	1168 366	1305 406	1540 470	1671 511	1825 555	1965 611	2241 695	2587 791	2883 869	3582 1068
36	388 124	424 136	487 153	562 179	627 195	703 222	810 246	897 266	1008 304	1104 336	1233 373	1455 432	1579 469	1725 510	1855 561	2116 638	2445 727	2724 798	3384 981



LOAD TABLES

LRFD - LH-SERIES

LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	20LH02	20LH03	20LH04	20LH05	20LH06	20LH07	20LH08	20LH09	20LH10	20LH11	20LH12	20LH13	20LH14	20LH15	20LH16	20LH17	20LH18	20LH19	20LH20
Depth (in.)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Approx. Wt. (lbs./ft.)	10	11	12	14	15	17	19	21	23	25	28	34	37	40	45	55	61	69	87
Span (ft.)																			
↓																			
20	1068 680	1240 749	1365 910	1590 1020	1839 1226	2140 1427	2325 1487	2656 1620	2868 1747	3466 2311	3832 2555								
21	1005 586	1147 646	1276 820	1485 879	1719 1146	1990 1239	2163 1282	2461 1396	2658 1506	3211 2141	3550 2367	4270 2798							
22	940 509	1072 560	1194 712	1390 763	1606 1007	1854 1076	2014 1212	2286 1307	2467 1885	2982 2093	3297 2428	3954 2640	4318						
23	880 444	1005 489	1119 621	1297 666	1507 880	1731 939	1881 971	2127 1058	2295 1141	2775 1647	3067 1828	3670 2121	4008 2306	4342 2507					
24	826 390	943 430	1050 546	1216 585	1413 773	1618 825	1758 853	1983 930	2139 1003	2586 1447	2859 1606	3414 1863	3729 2026	4039 2202					
25	775 345	885 380	987 482	1134 517	1329 683	1516 729	1645 754	1851 821	1998 886	2415 1278	2670 1418	3181 1646	3475 1789	3765 1945	4371 2143				
26	663 306	703 337	861 428	924 459	1233 606	1317 647	1362 669	1485 729	1602 786	2259 1134	2497 1259	2971 1461	3246 1588	3516 1726	4036 1902				
27	655 303	694 333	849 406	913 437	1186 561	1267 599	1309 619	1429 675	1542 724	2116 1011	2341 1123	2779 1302	3037 1416	3291 1539	3739 1696	4269 1930			
28	646 298	687 317	837 386	903 416	1144 521	1221 556	1263 575	1377 626	1486 673	1987 905	2197 1005	2605 1166	2847 1268	3084 1378	3474 1519	3966 1728			
29	615 274	678 302	792 352	892 395	1084 477	1179 518	1219 536	1329 581	1434 626	1869 814	2067 904	2448 1048	2673 1140	2896 1239	3235 1365	3694 1554	4267 1771		
30	582 250	651 280	744 320	856 366	1018 427	1140 484	1177 500	1284 542	1386 585	1759 734	1947 815	2302 946	2515 1028	2725 1118	3021 1232	3448 1402	3985 1598	4447 1759	
31	547 228	621 258	700 291	816 337	952 386	1066 438	1140 468	1242 507	1341 545	1660 665	1836 738	2169 856	2370 931	2568 1012	2827 1115	3228 1269	3729 1447	4162 1592	
32	516 208	592 238	660 265	769 308	894 351	1000 398	1083 428	1203 475	1297 510	1567 604	1734 670	2046 778	2236 846	2422 919	2652 1013	3027 1152	3498 1314	3903 1446	
33	487 190	558 218	624 243	726 281	840 320	940 362	1030 395	1167 437	1258 479	1479 550	1641 610	1933 708	2113 770	2289 837	2491 922	2844 1050	3286 1197	3669 1317	
34	460 174	528 200	589 223	687 258	790 292	885 331	981 365	1132 399	1221 448	1392 502	1554 558	1830 647	1993 704	2166 765	2346 843	2677 959	3094 1093	3453 1203	4300 1483
35	436 160	499 184	558 205	651 238	745 267	834 303	931 336	1068 366	1186 411	1312 460	1465 511	1732 593	1881 644	2053 700	2212 772	2526 878	2919 1001	3256 1102	4056 1358
36	412 147	474 169	529 189	616 219	703 246	789 278	882 309	1009 336	1122 377	1240 422	1384 469	1636 544	1776 592	1941 643	2091 709	2386 806	2757 919	3076 1012	3831 1247
37	393 136	448 156	502 174	585 202	666 226	745 256	837 285	954 309	1060 346	1173 389	1309 432	1549 501	1681 545	1836 592	1978 652	2257 742	2608 846	2911 931	3625 1148
38	373 126	424 143	477 161	556 187	631 209	706 236	795 262	904 285	1005 320	1111 359	1242 398	1468 462	1593 502	1740 546	1873 602	2139 685	2472 781	2758 859	3435 1059
39	355 117	403 133	454 149	529 173	598 192	670 218	754 242	858 264	954 296	1054 331	1177 368	1393 427	1512 464	1651 505	1779 556	2029 633	2346 722	2617 794	3259 979
40	337 108	382 123	433 139	504 161	568 178	637 202	718 225	816 244	906 274	1002 307	1119 341	1323 395	1435 430	1569 467	1690 515	1929 586	2229 668	2487 735	3097 906

General Information Bridging & Acc. Economic Joist Guide Code of Standard Practice Standard Specification K & KCS LH & DLH Joist Girders Fire Ratings



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STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	24LH03	24LH04	24LH05	24LH06	24LH07	24LH08	24LH09	24LH10	24LH11	24LH12	24LH13	24LH14	24LH15	24LH16	24LH17	24LH18	24LH19	24LH20	24LH21
Depth (in.)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Approx. Wt. (lbs./ft.)	11	12	13	16	17	18	21	23	25	27	32	35	38	42	49	57	62	79	88
Span (ft.)																			
24	996 664	1084 723	1240 827	1561 1041	1821 1214	1930 1287	2491 1618	2676 1716	2922 1796	3352 2235	4032 2688	4404 2936							
25	939 598	1021 681	1168 779	1471 981	1710 1140	1812 1208	2332 1429	2505 1515	2736 1587	3139 2093	3766 2445	4114 2660	4458 2893						
26	885 530	963 642	1102 695	1387 925	1608 1020	1704 1083	2187 1268	2347 1345	2565 1408	2943 1864	3525 2171	3850 2361	4173 2568						
27	835 473	909 580	1041 620	1311 827	1513 910	1603 966	2053 1131	2203 1199	2410 1256	2764 1662	3304 1935	3610 2105	3912 2290						
28	790 423	859 519	984 555	1240 741	1422 814	1512 865	1932 1013	2073 1074	2266 1124	2601 1488	3103 1733	3390 1885	3673 2050	4252 2263					
29	747 381	813 467	931 499	1173 666	1342 732	1426 778	1824 910	1953 965	2134 1011	2449 1338	2919 1558	3189 1695	3456 1843	3961 2035					
30	708 343	771 421	882 450	1111 601	1272 661	1348 702	1716 821	1842 871	2011 912	2310 1207	2749 1406	3003 1529	3255 1663	3699 1836	4228 2094				
31	672 311	730 381	832 408	1054 544	1200 598	1275 635	1626 744	1740 789	1896 826	2182 1093	2593 1272	2833 1384	3070 1505	3462 1662	3957 1895				
32	637 282	693 346	781 370	1000 494	1122 543	1209 577	1530 675	1608 716	1749 750	2064 993	2449 1156	2677 1257	2901 1367	3246 1509	3711 1721	4290 1964			
33	606 257	660 315	738 337	952 450	1059 495	1146 525	1432 615	1492 652	1581 683	1956 904	2317 1053	2533 1145	2745 1245	3051 1375	3487 1568	4032 1790			
34	513 235	628 288	673 308	906 411	997 452	1060 480	1248 562	1323 596	1390 624	1854 826	2196 962	2400 1046	2601 1138	2872 1256	3283 1432	3795 1635	4248 1804		
35	508 226	597 265	669 297	868 382	957 421	1015 447	1212 530	1284 559	1350 588	1761 756	2083 881	2275 958	2466 1042	2709 1150	3096 1312	3579 1497	4006 1653		
36	504 218	568 246	660 285	832 356	919 393	973 416	1177 501	1248 528	1312 555	1672 695	1978 809	2161 880	2343 957	2559 1056	2925 1205	3382 1375	3784 1518		
37	484 204	540 227	628 264	795 331	882 367	933 388	1146 460	1213 500	1276 525	1591 639	1881 744	2055 810	2227 881	2421 972	2767 1109	3199 1265	3580 1397	4473 1729	
38	460 188	514 210	598 244	756 306	847 343	895 362	1096 424	1182 474	1243 498	1513 590	1789 687	1947 747	2119 812	2295 897	2623 1023	3031 1167	3393 1288	4239 1595	
39	439 175	490 195	570 226	720 284	811 320	858 338	1044 393	1152 439	1210 472	1435 545	1702 635	1848 690	2019 751	2176 829	2488 945	2877 1079	3220 1191	4023 1474	4489 1631
40	418 162	468 182	544 210	685 263	774 297	817 314	994 363	1105 406	1180 449	1365 505	1617 588	1755 639	1918 695	2068 768	2365 876	2734 999	3060 1103	3822 1365	4266 1510
41	400 152	447 169	520 196	655 245	736 276	780 292	948 337	1053 378	1152 418	1297 468	1539 545	1669 593	1825 645	1968 712	2250 813	2601 927	2911 1024	3636 1267	4059 1402
42	382 141	427 158	496 182	625 228	702 257	745 272	903 313	1002 351	1101 388	1236 435	1465 507	1591 552	1738 600	1875 662	2143 755	2478 862	2773 952	3463 1178	3867 1303
43	366 132	409 148	475 171	598 211	669 239	712 254	861 292	955 326	1051 361	1179 406	1398 472	1516 514	1657 559	1788 617	2044 704	2362 803	2644 886	3303 1097	3687 1214
44	351 124	393 138	456 160	571 197	639 223	682 238	822 272	912 304	1006 337	1126 378	1335 440	1449 479	1582 521	1707 575	1951 656	2256 749	2524 827	3154 1023	3520 1132
45	336 116	376 130	436 150	546 184	610 208	652 222	786 254	873 285	963 315	1075 353	1275 412	1384 448	1513 487	1632 538	1864 613	2155 700	2413 772	3013 956	3364 1058
46	322 109	361 122	420 141	522 172	583 195	625 208	751 238	834 266	924 294	1029 331	1219 385	1324 419	1447 456	1561 503	1785 574	2062 655	2308 723	2883 895	3219 990
47	310 102	346 114	403 132	501 161	559 182	600 196	720 223	799 249	885 276	985 310	1168 361	1267 393	1386 427	1494 471	1708 538	1975 614	2211 677	2761 838	3082 927
48	298 96	333 107	387 124	480 152	535 171	576 184	690 209	766 234	850 259	945 291	1120 339	1215 368	1329 401	1432 442	1638 504	1893 576	2118 636	2646 787	2953 870



LOAD TABLES

LRFD - LH-SERIES

LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	28LH05	28LH06	28LH07	28LH08	28LH09	28LH10	28LH11	28LH12	28LH13	28LH14	28LH15	28LH16	28LH17	28LH18	28LH19	28LH20	28LH21	28LH22	28LH23
Depth (in.)	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
Approx. Wt. (lbs./ft.)	13	16	17	18	21	23	25	27	30	35	38	42	49	56	63	79	88	102	111
Span (ft.)																			
↓																			
28	939 626	1246 831	1452 968	1554 1036	2013 1342	2157 1438	2355 1570	2758 1839	3051 1944	3688 2459	3997 2665								
29	894 596	1186 791	1380 920	1474 983	1906 1271	2043 1362	2230 1487	2611 1674	2883 1747	3486 2324	3777 2518	4443 2839							
30	852 568	1132 755	1311 874	1401 934	1806 1186	1936 1291	2113 1380	2476 1510	2727 1576	3298 2130	3574 2317	4197 2561							
31	813 542	1080 720	1246 818	1333 873	1714 1074	1837 1169	2005 1249	2349 1367	2583 1427	3124 1928	3385 2098	3970 2319							
32	775 499	1030 658	1186 743	1269 793	1627 975	1744 1062	1905 1134	2232 1242	2449 1296	2962 1751	3210 1905	3760 2106	4332 2406						
33	741 454	984 600	1129 727	1209 888	1548 967	1659 1033	1810 1131	2121 1181	2325 1595	2812 1735	3048 1918	3565 2192	4107						
34	708 415	940 548	1077 618	1152 660	1473 811	1578 883	1723 944	2019 1033	2211 1079	2673 1457	2896 1585	3385 1752	3888 2002	4404 2286					
35	676 380	900 502	1027 566	1099 604	1402 743	1503 809	1641 865	1923 946	2103 988	2542 1335	2755 1452	3205 1605	3667 1834	4186 2094					
36	648 349	861 461	981 520	1050 555	1338 682	1434 743	1564 794	1834 869	2002 907	2421 1226	2625 1333	3027 1474	3465 1684	3982 1923	4492 2127				
37	621 321	825 424	937 478	1003 511	1276 628	1368 684	1494 731	1749 800	1908 835	2308 1128	2502 1227	2865 1356	3279 1550	3790 1770	4249 1958				
38	594 296	790 391	897 441	960 471	1219 579	1306 631	1426 674	1670 738	1821 770	2202 1040	2386 1132	2715 1251	3106 1429	3592 1632	4027 1806				
39	570 274	757 362	859 408	918 435	1165 536	1249 583	1363 623	1597 682	1740 712	2103 962	2280 1046	2575 1157	2947 1321	3409 1509	3822 1670				
40	547 254	727 335	823 378	880 403	1114 496	1195 540	1305 577	1528 632	1662 659	2010 891	2179 969	2448 1071	2800 1224	3238 1398	3631 1546				
41	525 236	699 311	789 351	843 374	1062 460	1144 501	1249 536	1464 586	1590 612	1923 827	2085 899	2329 994	2665 1136	3082 1297	3454 1435	4326 1782			
42	505 219	672 289	757 326	810 348	1000 428	1093 466	1170 498	1285 545	1342 569	1842 769	1996 836	2218 924	2538 1056	2935 1206	3291 1334	4120 1657			
43	484 205	643 270	726 305	775 325	958 400	1056 439	1143 475	1255 520	1311 543	1765 716	1912 779	2115 861	2421 983	2799 1123	3138 1243	3930 1543	4387 1708		
44	465 192	618 253	696 285	744 305	918 375	1018 414	1104 448	1227 496	1281 518	1693 668	1834 726	2019 803	2311 917	2673 1048	2997 1159	3751 1439	4189 1593		
45	445 180	592 238	667 267	712 285	879 351	976 388	1066 423	1200 476	1252 495	1624 624	1761 679	1930 750	2209 857	2554 979	2863 1083	3585 1345	4003 1489	4404 1688	
46	429 169	568 223	640 251	684 268	844 329	937 364	1023 397	1173 454	1224 472	1560 584	1692 635	1846 702	2113 802	2443 916	2740 1013	3430 1258	3829 1393	4212 1579	
47	412 159	546 209	615 236	657 252	810 309	900 342	982 373	1149 435	1198 452	1498 547	1626 595	1768 658	2023 751	2340 858	2623 950	3285 1179	3667 1305	4033 1480	
48	397 150	525 197	591 222	630 236	778 291	864 322	943 351	1105 408	1173 433	1437 513	1564 558	1695 617	1939 705	2242 805	2514 891	3148 1106	3516 1225	3867 1389	4425 1510
49	382 142	505 186	568 209	604 222	748 274	831 303	907 331	1063 383	1149 415	1378 482	1506 525	1626 580	1860 663	2151 757	2412 837	3021 1040	3372 1151	3709 1305	4254 1419
50	367 133	486 175	547 197	580 209	721 258	799 285	873 312	1023 361	1126 396	1323 454	1446 493	1561 546	1786 623	2065 712	2316 788	2899 978	3238 1083	3561 1228	4090 1335
51	355 126	469 166	528 186	556 196	694 243	769 269	841 294	984 340	1083 373	1272 427	1389 465	1500 514	1716 587	1984 670	2226 742	2787 921	3111 1020	3421 1156	3937 1257
52	342 119	451 156	508 176	535 185	669 228	742 255	810 278	948 321	1041 352	1222 403	1336 438	1443 485	1651 554	1909 632	2140 700	2679 869	2992 962	3291 1090	3793 1186
53	330 113	436 148	490 166	516 175	645 216	715 241	781 263	913 303	1002 332	1176 380	1285 414	1387 457	1588 523	1837 597	2059 660	2578 820	2880 908	3166 1029	3655 1119
54	319 107	421 140	478 158	496 165	622 204	690 228	753 249	880 285	964 314	1132 359	1239 391	1336 432	1530 494	1770 564	1983 624	2484 775	2773 858	3049 973	3526 1058
55	309 102	406 133	457 150	478 156	601 193	666 215	727 236	849 270	930 297	1092 340	1194 370	1288 409	1474 467	1705 534	1912 591	2394 733	2673 812	2940 921	3403 1001
56	298 97	393 126	442 142	462 148	580 183	643 204	702 223	819 256	897 281	1053 322	1150 350	1242 387	1422 443	1644 505	1843 559	2308 695	2577 769	2835 872	3286 948

General Information Bridging & Acc. Economic Joist Guide Code of Standard Practice Standard Specification K & KCS LH & DLH Joist Girders Fire Ratings



LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	32LH06	32LH07	32LH08	32LH09	32LH10	32LH11	32LH12	32LH13	32LH14	32LH15	32LH16	32LH17	32LH18	32LH19	32LH20	32LH21	32LH22	32LH23	32LH24
Depth (in.)	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Approx. Wt. (lbs./ft.)	14	16	17	21	21	24	27	30	33	35	42	49	56	62	78	87	101	110	124
Span (ft.)																			
32	982 655	1102 735	1243 829	1648 1099	1776 1184	1944 1296	2283 1522	2683 1789	2874 1916	3075 2050	4036 2691								
33	943 629	1057 705	1189 793	1573 1049	1696 1131	1857 1238	2179 1453	2557 1705	2740 1827	2931 1870	3841 2553	4426 2920							
34	907 605	1017 678	1140 760	1504 1003	1620 1080	1774 1183	2082 1388	2440 1605	2613 1653	2796 1708	3660 2332	4218 2668							
35	871 581	976 651	1092 728	1438 938	1549 1033	1696 1131	1992 1323	2329 1470	2494 1514	2668 1564	3489 2136	4021 2443							
36	838 559	939 626	1047 689	1375 861	1483 950	1623 1040	1906 1215	2226 1350	2383 1391	2550 1437	3330 1961	3837 2244	4335 2563						
37	805 524	903 584	1005 634	1317 793	1420 875	1554 957	1825 1118	2128 1243	2278 1280	2439 1322	3180 1805	3664 2065	4140 2359						
38	775 484	870 539	964 585	1263 731	1360 807	1489 883	1749 1032	2037 1146	2181 1181	2332 1220	3039 1665	3502 1905	3957 2176						
39	747 447	837 498	925 540	1210 676	1305 746	1428 816	1677 954	1950 1060	2088 1091	2235 1127	2907 1539	3351 1761	3786 2012	4335 2230					
40	718 414	807 461	889 501	1161 626	1251 691	1369 756	1609 883	1869 981	2001 1011	2140 1044	2784 1426	3208 1631	3624 1863	4144 2066					
41	693 384	777 428	855 465	1114 581	1201 641	1315 701	1545 820	1792 911	1918 938	2053 969	2667 1323	3073 1513	3472 1729	3966 1917					
42	667 357	748 398	823 432	1071 540	1155 596	1263 652	1483 762	1719 847	1842 872	1971 901	2557 1230	2934 1407	3330 1608	3798 1782					
43	645 333	723 371	792 402	1030 503	1110 555	1215 607	1426 710	1651 789	1768 812	1893 839	2443 1146	2797 1310	3195 1497	3633 1660					
44	621 310	697 346	763 375	990 469	1068 518	1168 567	1372 662	1587 736	1699 758	1818 783	2332 1069	2671 1222	3069 1397	3468 1548	4350 1927				
45	600 290	673 323	735 351	954 439	1027 484	1125 529	1320 619	1525 687	1633 708	1749 731	2229 998	2553 1142	2949 1305	3315 1447	4156 1801				
46	579 271	649 302	709 328	918 410	990 453	1083 495	1272 579	1468 643	1572 663	1683 684	2133 934	2442 1069	2824 1221	3171 1354	3976 1685	4441 1866			
47	559 254	628 283	684 307	885 385	954 424	1044 464	1225 542	1414 603	1513 621	1620 641	2041 875	2338 1001	2704 1144	3037 1268	3808 1579	4252 1749			
48	541 239	607 266	660 288	849 361	919 398	1006 436	1182 509	1362 566	1458 583	1560 602	1957 821	2241 940	2593 1074	2910 1190	3649 1482	4077 1641	4485 1862		
49	523 224	586 250	637 271	816 339	886 374	970 409	1140 478	1312 531	1405 547	1504 565	1878 772	2151 883	2487 1009	2793 1118	3501 1392	3910 1542	4303 1750		
50	507 211	568 235	616 255	774 319	856 352	937 385	1101 450	1225 500	1264 515	1305 532	1803 726	2064 831	2388 949	2680 1052	3361 1310	3754 1451	4131 1646		
51	489 199	549 223	595 242	747 302	825 332	903 363	1068 428	1201 480	1239 495	1279 511	1732 684	1984 782	2295 894	2575 991	3231 1234	3607 1366	4077 1550	4477 1689	
52	472 189	529 211	574 229	720 285	796 315	870 343	1032 406	1177 461	1215 476	1255 492	1666 645	1908 738	2206 843	2478 935	3106 1163	3469 1288	3817 1462	4315 1593	
53	456 179	511 200	553 216	694 270	768 297	840 325	996 384	1156 444	1192 458	1231 473	1603 609	1836 697	2124 796	2383 882	2989 1098	3339 1216	3673 1380	4162 1504	4381 1628
54	441 169	493 189	535 205	670 256	742 282	811 308	961 364	1113 420	1170 440	1207 454	1543 575	1768 658	2046 752	2296 834	2880 1038	3216 1150	3538 1305	4018 1421	4219 1539
55	426 161	477 179	517 194	648 243	717 267	783 292	928 345	1072 397	1149 417	1186 438	1488 544	1704 623	1971 712	2212 789	2775 982	3099 1088	3409 1234	3880 1344	4066 1456
56	412 153	462 170	499 184	627 230	693 254	757 277	897 327	1035 376	1107 395	1164 422	1435 516	1644 590	1900 674	2134 747	2676 930	2989 1030	3288 1169	3748 1273	3921 1379
57	399 145	447 162	483 175	606 219	667 240	732 263	867 311	999 354	1069 374	1144 407	1384 489	1585 559	1834 639	2059 708	2583 882	2884 977	3174 1108	3624 1207	3784 1307
58	385 138	432 154	468 167	586 208	645 228	709 251	838 295	964 336	1032 355	1125 393	1336 464	1531 531	1771 606	1989 672	2493 837	2785 927	3064 1051	3505 1145	3654 1240
59	373 131	418 146	453 159	568 196	624 217	687 239	811 281	931 319	997 337	1087 374	1291 440	1479 504	1711 576	1921 638	2409 794	2691 880	2961 999	3393 1088	3531 1178
60	363 125	406 140	439 151	550 189	603 206	664 227	786 267	900 304	964 321	1051 355	1249 419	1431 479	1654 547	1857 607	2329 755	2601 836	2862 949	3285 1034	3412 1120
61	351 119	393 133	426 144	534 180	583 196	643 216	762 255	871 288	933 304	1017 338	1207 398	1383 456	1600 521	1797 577	2253 718	2517 796	2769 903	3183 984	3301 1065
62	340 114	381 127	412 137	517 172	564 186	624 206	738 243	843 275	903 290	984 322	1168 379	1339 434	1549 496	1738 549	2181 684	2436 758	2679 860	3085 937	3195 1014
63	330 108	370 121	400 131	502 164	546 178	604 196	715 232	816 262	874 276	952 306	1132 361	1296 413	1500 472	1684 524	2112 652	2358 722	2595 819	2991 892	3094 966
64	321 104	360 116	388 125	487 157	529 169	585 187	694 221	790 249	846 264	924 292	1096 344	1255 394	1453 450	1632 499	2046 622	2284 688	2514 781	2901 851	2997 922



LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	36LH07	36LH08	36LH09	36LH10	36LH11	36LH12	36LH13	36LH14	36LH15	36LH16	36LH17	36LH18	36LH19	36LH20	36LH21	36LH22	36LH23	36LH24	36LH25
Depth (in.)	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Approx. Wt. (lbs./ft.)	16	18	21	21	23	25	30	36	36	44	49	58	64	81	92	100	122	130	149
Span (ft.)																			
36	873 582	1002 668	1276 851	1509 1006	1596 1064	1909 1273	2299 1533	2533 1689	2742 1828	3511 2341	4048 2699								
37	843 562	966 644	1230 820	1450 967	1533 1022	1836 1224	2206 1471	2431 1621	2631 1754	3364 2243	3879 2586	4381 2921							
38	814 543	930 620	1170 780	1393 929	1474 983	1765 1177	2118 1412	2334 1556	2526 1684	3225 2139	3718 2449	4200 2799							
39	787 525	897 598	1143 762	1341 894	1419 946	1698 1132	2035 1357	2241 1494	2425 1592	3094 1977	3567 2264	4030 2587							
40	762 508	864 576	1102 735	1290 839	1365 910	1635 1088	1956 1275	2154 1401	2331 1475	2970 1831	3424 2097	3868 2396	4479 2661						
41	736 491	834 553	1065 704	1243 778	1314 847	1573 1009	1881 1183	2071 1300	2241 1369	2853 1699	3289 1946	3715 2224	4294 2469						
42	712 469	805 514	1027 655	1197 724	1266 787	1516 938	1809 1100	1993 1209	2157 1272	2742 1580	3162 1809	3571 2068	4122 2295						
43	690 437	777 479	991 610	1153 674	1221 733	1461 874	1741 1025	1918 1126	2076 1185	2637 1471	3040 1685	3435 1926	3957 2138						
44	667 408	750 447	958 569	1113 629	1177 684	1410 815	1677 956	1848 1050	1999 1106	2538 1372	2925 1572	3306 1796	3802 1994						
45	646 381	726 417	927 532	1074 587	1135 639	1360 762	1617 893	1780 981	1927 1033	2443 1282	2817 1468	3183 1678	3655 1863						
46	625 356	700 391	895 497	1036 550	1096 598	1312 713	1558 836	1717 918	1858 967	2353 1200	2713 1374	3066 1570	3517 1744	4423 2174					
47	606 334	678 366	867 466	1000 515	1059 560	1267 668	1503 783	1656 860	1792 906	2268 1124	2616 1287	2955 1472	3387 1634	4258 2038					
48	588 313	655 344	838 437	967 483	1023 526	1224 627	1450 735	1599 807	1729 850	2188 1055	2523 1208	2850 1381	3262 1533	4102 1912					
49	570 294	634 323	811 411	934 454	988 494	1183 589	1401 690	1543 759	1671 799	2110 991	2434 1135	2751 1297	3144 1440	3954 1797	4353 1991				
50	552 277	615 304	786 387	903 427	955 465	1144 554	1354 650	1491 714	1614 751	2038 933	2343 1068	2656 1221	3033 1355	3813 1690	4198 1873				
51	535 261	595 286	762 364	874 403	924 438	1107 522	1308 612	1441 672	1560 708	1965 878	2251 1006	2565 1150	2926 1276	3675 1592	4071 1764				
52	520 246	576 270	738 343	846 380	895 413	1072 492	1266 577	1395 634	1509 667	1888 828	2164 949	2479 1084	2814 1204	3534 1501	3912 1664	4344 1889			
53	505 232	559 255	715 324	819 358	867 390	1038 465	1224 545	1335 599	1459 630	1818 782	2083 896	2397 1024	2709 1136	3400 1417	3778 1571	4180 1783			
54	490 220	541 241	693 306	790 339	838 368	1005 439	1185 515	1306 566	1413 596	1750 739	2007 846	2319 967	2608 1074	3274 1340	3652 1484	4026 1685	4465 1838		
55	477 208	525 228	673 290	763 320	783 349	975 416	1147 487	1264 535	1368 563	1687 699	1933 801	2236 915	2514 1016	3156 1267	3526 1404	3880 1594	4317 1739		
56	463 197	510 216	652 275	736 303	789 330	945 394	1111 461	1225 507	1326 534	1627 662	1864 758	2157 867	2424 962	3043 1200	3400 1330	3742 1510	4174 1647	4471 1787	
57	450 187	495 204	634 260	711 288	765 313	916 373	1077 437	1188 481	1285 506	1570 628	1800 719	2082 822	2340 912	2937 1138	3282 1261	3612 1431	4038 1562	4315 1694	
58	438 177	481 194	616 247	681 273	742 297	889 354	1045 415	1152 456	1213 480	1516 596	1737 682	2010 780	2259 866	2836 1080	3168 1196	3487 1358	3909 1482	4167 1607	
59	424 168	466 185	597 235	660 260	720 283	862 338	1012 395	1132 434	1192 464	1465 566	1678 648	1942 740	2182 822	2740 1025	3061 1136	3369 1290	3786 1407	4026 1526	
60	411 160	453 176	579 224	639 248	697 269	835 322	981 376	1093 412	1171 448	1416 538	1623 616	1878 704	2110 781	2649 975	2959 1080	3258 1226	3669 1338	3892 1451	
61	399 153	439 168	561 214	619 236	676 257	810 307	951 359	1059 392	1153 434	1369 512	1570 586	1816 670	2041 743	2563 927	2863 1027	3151 1166	3556 1273	3765 1380	4456 1608
62	387 146	426 160	544 204	601 225	657 246	784 292	922 342	1024 373	1116 413	1326 487	1519 558	1758 638	1975 708	2481 883	2770 978	3049 1111	3448 1212	3643 1314	4312 1531
63	376 140	414 153	528 195	583 215	637 234	762 279	894 327	991 356	1081 394	1284 464	1471 531	1702 607	1912 674	2401 841	2683 932	2953 1058	3345 1155	3528 1252	4176 1458
64	366 134	402 146	513 186	567 206	618 224	739 267	868 312	961 339	1047 375	1243 443	1425 507	1648 579	1854 643	2326 802	2599 889	2860 1009	3247 1101	3418 1194	4045 1391
65	355 128	390 140	499 179	550 197	601 214	717 255	843 298	931 323	1015 358	1206 422	1381 484	1599 553	1797 614	2256 766	2520 848	2773 963	3153 1051	3313 1139	3922 1327
66	345 122	379 134	484 171	535 188	583 205	696 243	819 285	903 309	984 342	1168 403	1339 462	1549 528	1741 586	2187 731	2443 810	2689 920	3063 1003	3213 1088	3804 1268
67	336 117	369 128	471 163	520 180	567 196	675 232	796 273	876 295	955 327	1134 385	1300 441	1504 504	1690 560	2122 699	2370 774	2608 879	2976 959	3117 1040	3690 1211
68	327 112	358 123	459 157	507 173	552 188	655 222	774 262	850 283	927 312	1101 369	1261 422	1459 482	1641 536	2059 668	2301 740	2532 841	2893 917	3025 994	3582 1158
69	318 107	349 118	445 150	492 165	537 180	636 213	753 251	826 270	900 299	1069 353	1225 404	1417 462	1593 513	2001 639	2235 708	2460 804	2814 877	2938 952	3478 1109
70	310 103	340 113	433 144	480 159	522 173	618 204	732 240	802 259	874 286	1039 338	1191 387	1377 442	1548 491	1944 612	2170 678	2389 770	2737 840	2854 911	3379 1061
71	301 99	331 109	423 138	466 152	508 166	600 195	712 231	780 247	850 274	1009 323	1156 370	1338 423	1504 470	1888 587	2109 650	2322 738	2664 805	2775 873	3283 1017
72	294 95	322 104	412 133	454 146	495 159	583 187	694 222	757 237	826 263	981 310	1125 355	1302 406	1462 451	1836 562	2050 623	2257 707	2593 772	2698 837	3193 975

General Information Bridging & Acc. Economic Joist Guide Code of Standard Practice Standard Specification K & KCS LH & DLH Joist Girders Fire Ratings



LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)

Joist Designation	40LH08	40LH09	40LH10	40LH11	40LH12	40LH13	40LH14	40LH15	40LH16	40LH17	40LH18	40LH19	40LH20	40LH21	40LH22	40LH23	40LH24	40LH25
Depth (in.)	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Approx. Wt. (lbs./ft.)	16	21	21	22	25	30	35	36	42	51	56	64	81	93	100	121	127	148
Span (ft.)																		
↓																		
40	778 519	1057 705	1258 839	1318 879	1602 1068	1945 1297	2220 1480	2482 1655	2944 1963	3565 2377	4027 2685							
41	756 490	1023 662	1215 810	1275 850	1548 1032	1876 1251	2140 1427	2395 1597	2836 1891	3435 2290	3879 2586							
42	735 490	990 660	1174 783	1231 821	1495 997	1810 1207	2065 1377	2310 1540	2733 1822	3309 2206	3738 2492	4368 2874						
43	712 475	960 640	1135 757	1191 794	1446 964	1747 1165	1993 1329	2230 1487	2634 1756	3190 2106	3604 2403	4203 2677						
44	693 462	930 620	1098 732	1150 767	1398 932	1687 1125	1926 1284	2154 1436	2541 1694	3078 1965	3477 2246	4047 2497						
45	672 448	901 601	1062 686	1113 742	1353 902	1630 1061	1860 1217	2080 1357	2452 1490	2970 1836	3354 2099	3898 2333						
46	652 435	873 582	1027 642	1077 696	1309 847	1575 993	1797 1139	2010 1270	2367 1394	2866 1718	3238 1964	3757 2183						
47	634 418	846 546	994 602	1042 652	1267 794	1522 931	1738 1067	1944 1190	2286 1307	2769 1610	3129 1840	3624 2046						
48	616 392	820 512	963 565	1009 612	1227 745	1473 873	1681 1001	1881 1116	2209 1226	2676 1510	3022 1727	3496 1920	4399 2398					
49	600 368	796 482	933 531	978 575	1188 700	1425 821	1626 941	1819 1049	2136 1152	2586 1419	2922 1623	3376 1804	4248 2253					
50	583 347	772 453	904 499	948 541	1152 659	1380 772	1575 885	1761 967	2065 1084	2502 1335	2826 1527	3261 1697	4102 2120					
51	567 327	750 427	876 470	919 509	1116 620	1336 727	1524 834	1705 930	1998 1021	2421 1258	2734 1438	3151 1598	3964 1997	4365 2213				
52	552 308	729 402	849 443	891 480	1083 585	1294 686	1477 786	1651 877	1935 963	2343 1186	2647 1356	3046 1507	3834 1883	4221 2087				
53	537 291	708 380	823 419	864 454	1050 552	1254 647	1431 742	1600 828	1873 909	2269 1120	2563 1280	2947 1423	3708 1778	4083 1970				
54	522 275	687 359	799 396	838 429	1018 522	1216 612	1387 702	1552 782	1815 859	2197 1058	2484 1210	2851 1345	3588 1680	3951 1862				
55	508 260	669 340	777 374	814 406	988 494	1179 579	1345 664	1506 740	1758 813	2130 1001	2407 1145	2761 1272	3474 1590	3825 1762	4351 2001			
56	495 246	649 322	754 355	790 384	960 468	1144 548	1305 629	1461 701	1705 770	2065 948	2334 1084	2674 1205	3364 1505	3705 1668	4195 1895			
57	483 233	631 305	732 336	768 364	933 444	1110 520	1267 596	1417 664	1654 730	2004 899	2263 1028	2592 1142	3261 1427	3591 1582	4050 1797	4410 1962		
58	469 221	615 289	711 319	745 346	906 421	1078 493	1230 566	1377 631	1605 693	1944 853	2197 975	2512 1084	3160 1354	3481 1501	3910 1705	4273 1862		
59	457 210	598 275	691 303	724 328	880 400	1047 468	1195 537	1336 599	1557 658	1878 810	2133 926	2436 1029	3066 1286	3376 1425	3778 1619	4141 1768		
60	445 200	582 261	670 288	705 312	856 380	1017 445	1161 511	1299 569	1512 625	1816 770	2071 880	2362 979	2970 1222	3276 1355	3652 1539	4015 1681	4371 1825	
61	435 190	567 249	649 274	685 297	832 361	988 424	1128 486	1263 542	1470 595	1756 732	2011 837	2286 931	2872 1163	3178 1289	3532 1464	3895 1599	4228 1736	
62	424 181	552 237	628 261	667 283	810 344	961 403	1096 462	1227 516	1428 566	1699 697	1954 797	2212 886	2779 1107	3087 1227	3418 1394	3781 1523	4092 1653	
63	414 173	537 226	609 249	649 269	789 328	934 384	1066 441	1194 491	1387 540	1645 664	1900 760	2142 845	2692 1055	2998 1169	3310 1328	3670 1451	3963 1575	
64	403 165	523 215	591 237	631 257	768 313	909 366	1038 420	1161 469	1350 515	1594 634	1845 724	2076 805	2608 1006	2914 1115	3207 1267	3565 1383	3840 1502	
65	393 157	510 205	573 226	615 245	747 298	885 350	1009 401	1129 447	1312 491	1546 605	1788 691	2011 769	2527 960	2824 1064	3109 1209	3463 1320	3721 1434	4405 1671
66	381 150	498 196	550 216	598 234	729 285	859 334	984 383	1101 427	1212 469	1498 577	1734 660	1951 734	2451 917	2739 1016	3015 1154	3367 1261	3609 1369	4273 1596
67	370 144	484 188	535 207	582 224	708 273	835 320	957 367	1068 408	1194 455	1455 552	1683 631	1893 701	2379 876	2658 971	2925 1103	3274 1205	3501 1308	4146 1525
68	361 138	472 180	520 198	567 215	688 261	813 307	930 351	1036 390	1176 441	1411 528	1633 603	1837 671	2308 838	2580 929	2839 1055	3184 1152	3399 1251	4024 1458
69	351 132	459 173	507 190	552 207	670 251	792 295	904 336	1006 373	1158 428	1371 505	1585 577	1783 642	2242 802	2505 889	2757 1010	3099 1103	3300 1197	3907 1396
70	342 127	447 166	493 183	537 198	652 241	771 283	880 323	978 357	1141 416	1332 483	1540 553	1732 615	2178 768	2433 851	2679 967	3016 1056	3197 1146	3796 1336
71	333 122	436 160	481 176	523 190	636 231	750 271	856 309	949 342	1126 404	1294 463	1497 530	1684 589	2116 736	2365 815	2604 926	2937 1012	3117 1098	3690 1280
72	325 117	424 153	469 169	510 183	619 222	730 260	834 297	924 328	1095 387	1258 444	1456 508	1638 564	2058 705	2299 782	2532 888	2860 970	3030 1053	3586 1227
73	316 112	414 147	457 162	498 176	603 213	712 250	813 285	898 315	1065 371	1224 426	1416 487	1593 541	2002 677	2236 750	2461 852	2787 930	2947 1010	3489 1177
74	309 108	403 141	445 156	484 169	588 205	694 241	792 273	874 302	1036 356	1191 409	1378 468	1549 520	1948 649	2176 720	2395 818	2616 893	2868 970	3394 1130
75	301 104	394 136	435 150	472 163	573 197	676 231	772 263	850 290	1009 342	1159 393	1341 449	1509 499	1896 624	2118 691	2332 785	2647 858	2791 931	3304 1085
76	294 100	384 131	424 144	462 157	559 189	660 223	753 252	828 279	982 329	1129 377	1306 431	1468 480	1846 599	2062 664	2271 754	2583 824	2718 895	3217 1043
77	288 97	375 126	414 139	450 151	546 182	643 214	735 243	807 268	957 316	1099 363	1272 415	1431 461	1798 576	2008 638	2212 725	2520 802	2647 860	3135 1003
78	280 93	366 122	403 134	439 145	532 176	628 207	717 233	786 258	933 304	1071 349	1239 399	1395 443	1752 554	1957 614	2155 698	2458 762	2580 827	3054 964
79	274 90	358 118	393 129	429 140	519 169	613 199	699 225	766 248	909 292	1044 336	1209 384	1359 427	1708 533	1908 591	2101 671	2340 733	2514 796	2977 928
80	267 86	349 113	382 124	418 135	507 163	598 192	682 216	748 239	886 282	1018 323	1177 370	1324 411	1665 513	1820 569	2049 646	2343 706	2452 767	2902 893



LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES																	
Based on a 50 ksi Maximum Yield Strength - Loads Shown In Pounds Per Linear Foot (plf)																	
Joist Designation	44LH09	44LH10	44LH11	44LH12	44LH13	44LH14	44LH15	44LH16	44LH17	44LH18	44LH19	44LH20	44LH21	44LH22	44LH23	44LH24	44LH25
Depth (in.)	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Approx. Wt. (lbs./ft.)	19	21	22	25	30	31	36	42	47	57	64	82	93	101	118	127	147
Span (ft.)																	
44	877	967	1140	1345	1587	1890	2199	2595	2893	3582	4224						
	585	645	760	897	1058	1260	1466	1730	1929	2388	2816						
45	852	940	1107	1305	1539	1830	2130	2509	2799	3465	4077						
	568	627	738	870	1026	1220	1420	1673	1866	2310	2718						
46	828	913	1074	1266	1492	1773	2062	2428	2709	3352	3937						
	552	609	716	844	995	1182	1375	1619	1806	2235	2625						
47	805	888	1042	1228	1449	1719	1999	2350	2622	3246	3805						
	537	592	695	819	966	1146	1333	1567	1748	2164	2504						
48	783	864	1011	1192	1407	1666	1938	2277	2539	3142	3678						
	522	576	674	795	938	1111	1292	1518	1661	2095	2350						
49	762	840	982	1158	1365	1615	1879	2205	2460	3045	3556	4477					
	508	560	652	772	910	1077	1253	1460	1561	1984	2208	2762					
50	741	817	954	1125	1326	1567	1822	2136	2383	2950	3441	4332					
	494	545	613	750	884	1028	1194	1374	1468	1867	2077	2598					
51	721	795	927	1092	1288	1519	1768	2071	2310	2860	3330	4194					
	481	530	578	713	845	968	1125	1294	1383	1758	1957	2447					
52	702	774	900	1062	1252	1476	1717	2008	2239	2773	3225	4060	4470				
	458	504	545	672	797	913	1061	1220	1304	1658	1845	2308	2559				
53	682	753	874	1032	1216	1432	1666	1948	2172	2689	3124	3933	4330				
	432	476	514	635	753	862	1002	1152	1231	1566	1742	2179	2416				
54	664	736	854	1003	1183	1390	1618	1890	2109	2610	3027	3811	4197				
	409	450	486	600	711	815	947	1089	1164	1480	1646	2059	2283				
55	648	714	826	975	1150	1351	1572	1834	2046	2533	2934	3694	4068				
	387	426	460	568	673	771	896	1030	1101	1400	1558	1948	2160				
56	631	696	804	949	1119	1314	1528	1782	1987	2460	2845	3583	3945				
	366	403	436	538	637	730	848	976	1043	1326	1475	1845	2046				
57	615	678	783	924	1089	1276	1485	1731	1930	2389	2761	3477	3828	4486			
	347	382	413	510	604	692	804	925	989	1257	1398	1749	1939	2203			
58	598	660	762	898	1062	1242	1444	1681	1875	2322	2680	3373	3715	4333			
	329	363	392	484	573	657	763	878	938	1192	1327	1660	1840	2091			
59	583	643	741	874	1032	1207	1405	1633	1822	2257	2602	3276	3607	4186	4455		
	313	344	372	459	544	624	725	834	891	1133	1260	1576	1748	1986	2171		
60	568	627	721	852	1005	1174	1366	1588	1771	2194	2527	3181	3504	4047	4324		
	297	327	354	437	518	593	689	792	847	1077	1198	1498	1661	1887	2064		
61	555	612	703	829	978	1143	1330	1545	1723	2134	2455	3091	3405	3915	4198		
	283	312	337	415	492	564	655	754	806	1024	1140	1425	1580	1796	1963		
62	541	597	685	808	954	1113	1294	1503	1677	2076	2386	3004	3309	3789	4077		
	269	297	320	396	469	537	624	718	767	975	1085	1357	1505	1710	1869		
63	528	582	667	787	928	1083	1261	1462	1632	2020	2320	2922	3217	3669	3961	4398	
	257	283	305	377	447	512	595	684	731	929	1034	1293	1434	1629	1781	1936	
64	514	568	651	768	906	1056	1228	1423	1588	1966	2256	2841	3129	3555	3850	4260	
	245	270	291	359	426	488	567	652	697	886	965	1233	1367	1554	1699	1846	
65	502	555	634	748	883	1027	1197	1386	1546	1915	2196	2764	3043	3445	3744	4129	
	234	257	278	343	407	466	541	622	665	846	941	1177	1305	1483	1621	1762	
66	490	541	616	730	861	1002	1165	1350	1506	1866	2136	2691	2962	3342	3642	4005	
	223	246	265	328	388	445	517	594	635	807	898	1124	1246	1416	1548	1683	
67	478	528	598	712	840	976	1137	1315	1467	1818	2080	2619	2884	3241	3544	3885	
	213	235	254	313	371	425	494	568	607	772	859	1074	1191	1353	1479	1608	
68	468	516	582	694	819	952	1108	1282	1431	1771	2025	2550	2809	3147	3450	3771	4465
	204	225	243	299	355	406	472	543	581	738	821	1027	1139	1294	1415	1538	1793
69	456	504	565	678	799	928	1081	1249	1395	1726	1972	2484	2736	3055	3358	3663	4336
	195	215	232	286	340	389	452	520	556	706	786	983	1090	1238	1354	1471	1716
70	445	492	549	661	781	906	1054	1219	1359	1684	1918	2413	2667	2968	3271	3558	4213
	187	206	222	274	325	372	433	498	532	676	752	941	1043	1186	1296	1409	1643
71	436	481	534	646	762	883	1029	1188	1326	1642	1864	2344	2599	2884	3187	3457	4094
	179	197	213	263	312	357	415	477	510	648	721	902	1000	1136	1242	1350	1575
72	426	469	520	631	744	862	1005	1159	1294	1602	1813	2280	2533	2805	3105	3361	3981
	172	189	204	252	299	342	398	457	489	621	691	864	958	1089	1191	1294	1509
73	417	459	507	616	727	843	981	1131	1263	1564	1764	2218	2472	2728	3027	3270	3873
	165	181	196	242	287	328	381	439	469	596	663	829	919	1045	1142	1242	1448
74	408	450	487	603	715	823	958	1105	1185	1524	1716	2158	2410	2655	2952	3181	3760
	158	174	188	232	275	315	366	421	450	572	636	796	882	1003	1096	1192	1398
75	397	439	475	589	699	801	934	1078	1170	1483	1669	2100	2347	2584	2880	3097	3667
	152	168	181	224	265	302	352	405	438	549	611	764	847	963	1053	1144	1335
76	388	429	465	574	681	780	912	1051	1153	1444	1626	2046	2286	2517	2809	3016	3571
	146	162	175	215	254	291	339	390	426	528	587	734	814	925	1012	1100	1282
77	379	418	453	561	666	759	889	1026	1138	1407	1584	1992	2226	2451	2742	2938	3478
	141	155	168	207	246	279	326	375	415	507	564	706	783	889	973	1057	1233
78	370	408	442	547	649	739	868	1002	1125	1371	1543	1941	2169	2388	2677	2862	3390
	136	150	162	200	236	268	314	362	405	488	543	679	753	856	935	1017	1186
79	363	399	433	534	634	721	847	978	1098	1336	1504	1893	2115	2328	2614	2790	3304
	131	144	157	192	228	259	303	348	390	469	522	654	725	823	900	978	1141
80	354	390	423	520	619	703	826	955	1072	1303	1467	1845	2061	2269	2553	2721	3222
	127	139	151	185	220	249	292	336	376	452	503	629	698	793	867	942	1099
81	346	381	414	508	606	685	805	933	1048	1272	1431	1800	2011	2214	2494	2653	3142
	122	134	146	179	212	240	281	324	363	435	484	606	672	764	835	907	1058
82	339	373	403	496	592	669	786	912	1024	1240	1396	1756	1962	2160	2437	2589	3066
	118	130	140	172	205	231	271	313	351	420	467	584	648	736	805	875	1020
83	331	364	396	484	579	654	768	891	1000	1210	1362	1713	1914	2107	2382	2526	2992
	114	125	136	166	198												

LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES																
Based on a 50 ksi Maximum Yield Strength - Loads Shown in Pounds Per Linear Foot (plf)																
Joist Designation	48LH10	48LH11	48LH12	48LH13	48LH14	48LH15	48LH16	48LH17	48LH18	48LH19	48LH20	48LH21	48LH22	48LH23	48LH24	48LH25
Depth (in.)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Approx. Wt. (lbs./ft.)	21	22	25	29	32	36	42	47	57	62	79	87	101	109	124	144
Span (ft.)																
48	807 538	871 581	1134 756	1357 905	1653 1102	1896 1264	2242 1495	2517 1678	3211 2141	3805 2537						
49	787 525	849 566	1104 736	1320 880	1606 1071	1843 1229	2178 1452	2443 1629	3118 2079	3687 2458						
50	768 512	828 552	1075 717	1285 857	1561 1041	1791 1194	2113 1409	2371 1581	3028 2019	3573 2382						
51	748 499	807 538	1047 698	1252 835	1519 1013	1741 1161	2053 1369	2304 1536	2941 1961	3465 2310	4363 2909					
52	730 487	787 525	1020 680	1219 813	1477 985	1693 1129	1995 1330	2238 1492	2857 1905	3360 2217	4231 2776					
53	712 475	768 512	993 662	1188 792	1437 958	1648 1099	1938 1292	2175 1450	2776 1851	3259 2093	4105 2621					
54	694 463	750 500	967 645	1156 771	1398 932	1603 1069	1884 1251	2113 1399	2698 1776	3163 1978	3984 2477	4387 2747				
55	678 452	732 488	942 628	1126 751	1360 897	1560 1027	1831 1184	2055 1324	2623 1681	3070 1872	3868 2344	4260 2599				
56	661 441	714 476	918 603	1098 720	1324 849	1519 973	1782 1121	1999 1254	2551 1592	2982 1773	3757 2220	4137 2461				
57	646 422	697 455	895 572	1071 682	1290 805	1479 922	1732 1063	1944 1188	2482 1509	2898 1680	3649 2104	4018 2333				
58	630 400	681 432	873 542	1044 648	1255 764	1440 875	1686 1008	1891 1128	2416 1432	2815 1595	3547 1997	3906 2214				
59	615 380	664 410	850 515	1018 615	1222 726	1402 831	1641 958	1842 1071	2352 1360	2737 1514	3448 1896	3796 2103	4483 2390			
60	601 362	649 390	829 490	993 585	1192 690	1366 790	1597 910	1792 1018	2289 1293	2661 1439	3352 1803	3691 1999	4359 2272			
61	588 344	634 371	810 466	969 556	1161 656	1332 751	1555 866	1746 968	2229 1230	2589 1369	3261 1715	3591 1901	4240 2161	4458 2365		
62	573 327	619 353	790 444	945 530	1132 625	1299 715	1515 825	1701 922	2172 1171	2518 1304	3172 1633	3493 1810	4126 2058	4335 2252		
63	561 312	604 336	771 423	922 505	1104 595	1266 682	1476 786	1657 879	2116 1116	2451 1242	3088 1556	3400 1725	4017 1961	4215 2146		
64	547 298	591 321	753 403	900 481	1077 568	1234 650	1438 749	1615 838	2062 1064	2386 1185	3006 1484	3310 1645	3901 1870	4101 2046		
65	535 284	577 306	735 385	879 459	1050 542	1204 620	1402 715	1575 800	2010 1015	2323 1131	2928 1416	3225 1570	3781 1784	3991 1953		
66	523 271	565 292	717 367	858 439	1024 517	1176 592	1368 683	1536 764	1960 970	2263 1080	2853 1352	3141 1499	3667 1704	3885 1865	4401 2029	
67	511 259	552 279	700 351	838 419	1000 494	1147 566	1333 653	1497 730	1912 927	2206 1032	2779 1292	3060 1433	3558 1629	3783 1782	4269 1939	
68	501 248	540 267	684 336	819 401	976 473	1120 541	1302 624	1461 698	1866 886	2149 987	2709 1236	2983 1370	3454 1557	3685 1704	4144 1854	
69	489 237	528 256	669 321	799 384	952 453	1093 518	1270 597	1425 668	1821 848	2097 944	2641 1182	2908 1311	3354 1490	3591 1631	4024 1774	
70	478 227	516 245	654 308	781 367	931 433	1068 496	1239 572	1392 640	1777 812	2044 904	2575 1132	2836 1255	3258 1427	3499 1562	3909 1699	
71	468 218	505 235	639 295	765 352	909 415	1042 475	1210 548	1359 613	1735 778	1993 866	2512 1085	2767 1203	3166 1367	3411 1496	3799 1628	4500 1899
72	457 209	495 225	624 283	747 337	888 398	1018 456	1182 525	1326 587	1693 746	1945 831	2451 1040	2700 1153	3079 1311	3327 1434	3694 1560	4375 1821



LOAD TABLES

LRFD - LH-SERIES

LRFD

STANDARD LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 50 ksi Maximum Yield Strength - Loads Shown in Pounds Per Linear Foot (plf)

Joist Designation	48LH10	48LH11	48LH12	48LH13	48LH14	48LH15	48LH16	48LH17	48LH18	48LH19	48LH20	48LH21	48LH22	48LH23	48LH24	48LH25
Depth (in.)	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Approx. Wt. (lbs/ft.)	21	22	25	29	32	36	42	47	57	62	79	87	101	109	124	144
Span (ft.)																
73	448 200	484 216	610 271	730 324	868 382	996 437	1153 504	1296 564	1654 715	1899 797	2392 998	2635 1106	2995 1257	3244 1376	3594 1497	4255 1746
74	439 192	474 207	597 260	714 311	849 367	973 420	1128 484	1266 541	1617 687	1854 765	2335 958	2572 1062	2914 1207	3166 1321	3496 1437	4141 1676
75	429 184	463 199	583 250	699 298	829 352	951 405	1101 464	1236 519	1579 659	1810 734	2280 920	2512 1020	2836 1159	3090 1268	3403 1380	4030 1610
76	421 177	454 191	571 240	684 287	811 338	930 387	1077 446	1209 499	1543 634	1768 706	2227 884	2454 980	2761 1114	3016 1219	3313 1326	3925 1547
77	412 170	445 184	559 231	669 276	793 325	910 372	1053 429	1182 480	1509 609	1726 678	2176 849	2397 942	2691 1071	2946 1172	3228 1275	3823 1487
78	403 164	435 177	547 222	655 265	775 313	891 358	1029 413	1155 462	1476 586	1687 652	2127 817	2341 906	2622 1030	2877 1127	3145 1226	3726 1430
79	396 158	426 170	535 214	642 255	759 301	871 345	1006 397	1129 444	1443 564	1650 628	2076 786	2289 872	2556 991	2811 1084	3066 1180	3631 1376
80	387 152	418 164	525 206	628 246	742 290	852 332	984 382	1105 428	1411 543	1609 604	2025 757	2238 839	2491 954	2746 1044	2989 1136	3541 1325
81	379 146	409 158	514 198	615 237	727 279	834 320	963 368	1081 412	1381 523	1569 582	1975 729	2188 809	2430 919	2685 1006	2916 1094	3453 1277
82	369 141	399 152	504 191	603 228	712 269	817 308	943 355	1059 397	1351 504	1531 561	1926 703	2140 779	2371 886	2625 969	2845 1054	3369 1230
83	361 136	390 147	493 185	589 221	696 260	799 298	922 343	1035 383	1323 486	1494 541	1881 677	2094 751	2314 854	2566 934	2776 1017	3288 1186
84	354 132	382 142	483 179	576 213	681 251	781 287	901 331	1012 371	1296 468	1458 522	1836 653	2049 725	2259 824	2511 901	2710 981	3210 1144
85	346 127	373 137	472 173	564 206	666 243	765 278	882 320	990 358	1264 452	1425 504	1792 631	2002 699	2206 795	2457 870	2647 946	3135 1104
86	339 123	366 133	462 167	552 199	651 234	748 269	864 310	969 346	1236 436	1390 486	1750 609	1956 675	2154 767	2403 840	2586 913	3061 1066
87	331 119	358 129	451 161	540 193	637 227	732 260	844 299	948 335	1207 421	1359 469	1710 588	1911 652	2104 741	2352 811	2526 882	2992 1029
88	325 116	351 125	442 156	529 187	624 220	717 252	826 289	928 324	1179 407	1329 454	1672 568	1869 630	2058 716	2302 783	2469 852	2923 994
89	318 112	343 120	433 151	517 180	610 212	702 244	810 280	909 314	1153 394	1299 438	1635 549	1827 609	2011 692	2254 757	2413 824	2859 961
90	312 108	337 117	424 147	507 175	598 206	687 236	792 271	889 304	1128 381	1270 424	1597 531	1786 589	1966 669	2208 732	2359 797	2794 929
91	306 105	330 113	415 142	498 170	585 199	672 228	777 263	871 294	1102 368	1242 410	1563 513	1746 569	1923 647	2163 708	2308 770	2733 899
92	300 102	324 110	408 138	487 164	574 193	658 221	760 255	853 285	1078 356	1215 397	1528 497	1708 551	1881 626	2119 685	2257 745	2674 870
93	294 99	318 106	399 133	477 159	562 187	645 214	745 247	837 276	1056 345	1189 384	1497 481	1672 533	1842 606	2077 663	2209 722	2617 842
94	288 96	312 103	391 129	468 154	550 181	633 208	730 239	820 268	1033 334	1164 372	1464 466	1636 516	1801 587	2035 642	2163 699	2562 815
95	282 93	306 100	384 126	459 150	540 176	619 201	715 232	804 260	1011 323	1138 360	1434 451	1602 500	1764 568	1995 622	2116 677	2508 790
96	277 90	300 97	376 122	450 145	529 171	607 195	702 225	787 252	990 313	1116 349	1404 437	1569 485	1728 551	1956 603	2073 656	2455 765

General Information Bridging & Acc. Economic Joist Guide Code of Standard Practice Standard Specification K & KCS LH & DLH Joist Girders Fire Ratings



LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)

Joist Designation	18LH02	18LH03	18LH04	18LH05	18LH06	18LH07	18LH08	18LH09	18LH10	18LH11	18LH12	18LH13	18LH14	18LH15	18LH16	18LH17	18LH18	18LH19	18LH20
Depth (mm)	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457	457
Approx. Wt. (kN/m)	0.15	0.16	0.18	0.21	0.22	0.25	0.28	0.31	0.34	0.37	0.42	0.49	0.54	0.58	0.65	0.74	0.85	0.92	1.24
Span (mm)																			
5486	17.61 11.74	19.61 13.07	22.73 15.16	25.71 17.14	31.47 20.98	33.46 22.31	37.82 25.21	43.53 27.56	48.83 32.55	54.47 36.32	60.21 40.14								
5791	16.37 10.91	18.22 12.15	21.14 14.09	23.91 15.95	29.08 19.39	30.95 20.63	34.98 21.89	40.07 23.36	44.96 29.97	50.14 33.43	55.44 36.96								
6096	15.25 10.15	16.98 11.29	19.67 13.07	22.28 14.72	26.94 17.06	28.67 17.93	32.39 18.72	36.95 19.97	41.47 26.50	46.27 29.26	51.15 32.48	61.39 37.59							
6401	14.19 8.75	15.81 9.73	18.34 11.26	20.76 12.69	25.01 14.71	26.61 15.45	30.04 16.12	34.19 17.22	38.35 22.83	42.78 25.21	47.29 27.99	56.62 32.39	61.83 35.21						
6706	13.26 7.58	14.76 8.44	17.13 9.77	19.39 11.01	23.26 12.75	24.73 13.41	27.94 13.99	31.69 14.94	35.55 19.81	39.66 21.89	43.84 24.28	52.33 28.10	57.17 30.55	61.92 33.21					
7010	12.40 6.62	13.80 7.36	16.02 8.53	18.14 9.61	21.67 11.14	23.04 11.71	26.02 12.22	29.43 13.04	33.01 17.30	36.83 19.11	40.71 21.21	48.51 24.56	52.97 26.69	57.39 28.99					
7315	11.61 5.82	12.93 6.47	14.98 7.50	16.98 8.44	20.22 9.79	21.49 10.28	24.29 10.74	27.36 11.47	30.70 15.20	34.28 16.79	37.91 18.63	45.06 21.56	49.21 23.45	53.32 25.48	61.52 28.04				
7620	10.87 5.15	12.12 5.72	14.06 6.62	15.93 7.45	18.88 8.65	20.09 9.09	22.69 9.48	25.53 10.12	28.64 13.42	31.97 14.82	35.34 16.46	41.94 19.05	45.81 20.70	49.64 22.50	56.62 24.76	64.57 28.15			
7925	10.24 4.56	11.39 5.07	13.22 5.88	14.97 6.62	17.70 7.67	18.38 8.07	19.17 8.42	20.48 8.98	26.76 11.92	29.87 13.16	33.02 14.60	39.14 16.91	42.74 18.38	46.29 19.97	52.31 21.97	59.64 24.98			
8230	9.67 4.14	10.78 4.62	12.49 5.35	14.18 6.04	16.38 6.84	17.70 7.48	18.44 7.79	19.71 8.33	25.05 10.62	27.97 11.73	30.92 13.03	36.57 15.07	39.94 16.38	43.30 17.80	48.46 19.59	55.25 22.27	63.83 25.37		
8534	9.15 3.77	10.21 4.21	11.70 4.80	13.44 5.51	15.23 6.11	17.07 6.94	17.77 7.23	19.00 7.69	23.51 9.51	26.22 10.50	28.99 11.66	34.25 13.49	37.43 14.68	40.54 15.95	45.02 17.55	51.32 19.94	59.29 22.72		
8839	8.55 3.41	9.58 3.82	10.94 4.31	12.71 5.03	14.18 5.50	15.89 6.24	17.16 6.74	18.34 7.16	22.08 8.55	24.64 9.44	27.24 10.47	32.15 12.14	35.11 13.19	38.04 14.33	41.94 15.77	47.80 17.93	55.22 20.43	61.52 22.44	
9144	8.02 3.09	8.94 3.44	10.25 3.88	11.87 4.53	13.23 4.96	14.84 5.63	16.59 6.23	17.73 6.68	20.76 7.72	23.17 8.52	25.62 9.45	30.20 10.94	33.01 11.90	35.76 12.93	39.15 14.22	44.62 16.17	51.57 18.43	57.44 20.24	
9449	7.54 2.81	8.36 3.10	9.63 3.53	11.12 4.11	12.39 4.48	13.89 5.09	15.68 5.64	17.13 6.10	19.57 6.99	21.80 7.72	24.16 8.56	28.45 9.90	31.08 10.77	33.66 11.70	36.64 12.88	41.78 14.63	48.26 16.68	53.76 18.32	
9754	7.09 2.55	7.85 2.83	9.03 3.19	10.42 3.73	11.61 4.08	13.01 4.62	14.88 5.12	16.60 5.54	18.47 6.34	20.44 7.00	22.81 7.77	26.83 9.00	29.24 9.79	31.75 10.63	34.36 11.70	39.18 13.29	45.27 15.14	50.40 16.65	62.65 20.46
10058	6.69 2.33	7.36 2.58	8.49 2.91	9.80 3.40	10.91 3.70	12.22 4.20	14.02 4.67	15.60 5.04	17.46 5.77	19.22 6.37	21.45 7.07	25.32 8.20	27.46 8.91	29.99 9.69	32.28 10.66	36.82 12.11	42.52 13.80	47.37 15.16	58.85 18.63
10363	6.31 2.14	6.93 2.34	7.98 2.65	9.20 3.09	10.28 3.38	11.51 3.85	13.22 4.26	14.68 4.61	16.50 5.28	18.08 5.82	20.19 6.46	23.83 7.48	25.87 8.14	28.25 8.84	30.39 9.73	34.67 11.06	40.03 12.60	44.61 13.84	55.42 17.03
10668	5.96 1.97	6.53 2.15	7.53 2.43	8.68 2.84	9.69 3.09	10.85 3.51	12.49 3.89	13.84 4.21	15.55 4.83	17.04 5.34	19.04 5.92	22.47 6.85	24.38 7.45	26.63 8.09	28.67 8.91	32.70 10.14	37.75 11.54	42.07 12.68	52.27 15.58
10973	5.66 1.80	6.18 1.98	7.10 2.23	8.20 2.61	9.15 2.84	10.25 3.23	11.82 3.59	13.09 3.88	14.71 4.43	16.11 4.90	17.99 5.44	21.23 6.30	23.04 6.84	25.17 7.44	27.07 8.18	30.88 9.31	35.68 10.60	39.75 11.64	49.38 14.31



LOAD TABLES

LRFD - LH-SERIES

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)

Joist Designation	20LH02	20LH03	20LH04	20LH05	20LH06	20LH07	20LH08	20LH09	20LH10	20LH11	20LH12	20LH13	20LH14	20LH15	20LH16	20LH17	20LH18	20LH19	20LH20
Depth (mm)	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508	508
Approx. Wt. (kN/m)	0.15	0.16	0.18	0.20	0.22	0.25	0.28	0.31	0.34	0.36	0.41	0.50	0.54	0.58	0.66	0.80	0.89	1.01	1.27
Span (mm) ↓																			
6096	15.58 9.92	18.09 10.93	19.92 13.28	23.20 14.88	26.83 17.89	31.23 20.82	33.93 21.70	38.76 23.64	41.85 25.49	50.58 33.72	55.92 37.28								
6401	14.66 8.55	16.73 9.42	18.62 11.96	21.67 12.82	25.08 16.72	29.04 18.08	31.56 18.70	35.91 20.37	38.79 21.97	46.86 31.24	51.80 34.54	62.31 40.83							
6706	13.71 7.42	15.64 8.17	17.42 10.39	20.28 11.13	23.43 14.69	27.05 15.70	29.39 16.22	33.36 17.68	36.00 19.07	43.51 27.50	48.11 30.54	57.70 35.43	63.01 38.52						
7010	12.84 6.47	14.66 7.13	16.33 9.06	18.92 9.71	21.99 12.84	25.26 13.70	27.45 14.17	31.04 15.44	33.49 16.65	40.49 24.03	44.75 26.67	53.55 30.95	58.49 33.65	63.36 36.58					
7315	12.05 5.69	13.76 6.27	15.32 7.96	17.74 8.53	20.62 11.28	23.61 12.03	25.65 12.44	28.93 13.57	31.21 14.63	37.73 21.11	41.72 23.43	49.82 27.18	54.42 29.56	58.94 32.13					
7620	11.31 5.03	12.91 5.54	14.40 7.03	16.54 7.54	19.39 9.96	22.12 10.63	24.00 11.00	27.01 11.98	29.15 12.93	35.24 18.65	38.96 20.69	46.42 24.02	50.71 26.10	54.94 28.38	63.78 31.27				
7925	9.67 4.46	10.25 4.91	12.56 6.24	13.48 6.69	17.99 8.84	19.22 9.44	19.87 9.76	21.67 10.63	23.37 11.47	32.96 16.54	36.44 18.37	43.35 21.32	47.37 23.17	51.31 25.18	58.90 27.75				
8230	9.55 4.42	10.12 4.85	12.39 5.92	13.32 6.37	17.30 8.18	18.49 8.74	19.10 9.03	20.85 9.85	22.50 10.56	30.88 14.75	34.16 16.38	40.55 19.00	44.32 20.66	48.02 22.46	54.56 24.75	62.30 28.16			
8534	9.42 4.34	10.02 4.62	12.21 5.63	13.17 6.07	16.69 7.60	17.81 8.11	18.43 8.39	20.09 9.13	21.68 9.82	28.99 13.20	32.06 14.66	38.01 17.01	41.54 18.50	45.00 20.11	50.69 22.16	57.87 25.21			
8839	8.97 3.99	9.89 4.40	11.55 5.13	13.01 5.76	15.81 6.96	17.20 7.55	17.78 7.82	19.39 8.47	20.92 9.13	27.27 11.87	30.16 13.19	35.72 15.29	39.00 16.63	42.26 18.08	47.21 19.92	53.90 22.67	62.27 25.84		
9144	8.49 3.64	9.50 4.08	10.85 4.67	12.49 5.34	14.85 6.23	16.63 7.06	17.17 7.29	18.73 7.90	20.22 8.53	25.67 10.71	28.41 11.89	33.59 13.80	36.70 15.00	39.76 16.31	44.08 17.97	50.31 20.46	58.15 23.32	64.89 25.67	
9449	7.98 3.32	9.06 3.76	10.21 4.24	11.90 4.91	13.89 5.63	15.55 6.39	16.63 6.82	18.12 7.39	19.57 7.95	24.22 9.70	26.79 10.77	31.65 12.49	34.58 13.58	37.47 14.76	41.25 16.27	47.10 18.51	54.42 21.11	60.73 23.23	
9754	7.53 3.03	8.63 3.47	9.63 3.86	11.22 4.49	13.04 5.12	14.59 5.80	15.80 6.24	17.55 6.93	18.92 7.44	22.86 8.81	25.30 9.77	29.85 11.35	32.63 12.34	35.34 13.41	38.70 14.78	44.17 16.81	51.04 19.17	56.95 21.10	
10058	7.10 2.77	8.14 3.18	9.10 3.54	10.59 4.10	12.25 4.67	13.71 5.28	15.03 5.76	17.03 6.37	18.35 6.99	21.58 8.02	23.94 8.90	28.21 10.33	30.83 11.23	33.40 12.21	36.35 13.45	41.50 15.32	47.95 17.46	53.54 19.22	
10363	6.71 2.53	7.70 2.91	8.59 3.25	10.02 3.76	11.52 4.26	12.91 4.83	14.31 5.32	16.52 5.82	17.81 6.53	20.31 7.32	22.67 8.14	26.70 9.44	29.08 10.27	31.61 11.16	34.23 12.30	39.06 13.99	45.15 15.95	50.39 17.55	62.75 21.64
10668	6.36 2.33	7.28 2.68	8.14 2.99	9.50 3.47	10.87 3.89	12.17 4.42	13.58 4.90	15.58 5.34	17.30 5.99	19.14 6.71	21.38 7.45	25.27 8.65	27.45 9.39	29.96 10.21	32.28 11.26	36.86 12.81	42.59 14.60	47.51 16.08	59.19 19.81
10973	6.01 2.14	6.91 2.46	7.72 2.75	8.98 3.19	10.25 3.59	11.51 4.05	12.87 4.50	14.72 4.90	16.37 5.50	18.09 6.15	20.19 6.84	23.87 7.93	25.91 8.63	28.32 9.38	30.51 10.34	34.82 11.76	40.23 13.41	44.89 14.76	55.90 18.19
11278	5.73 1.98	6.53 2.27	7.32 2.53	8.53 2.94	9.71 3.29	10.87 3.73	12.21 4.15	13.92 4.50	15.46 5.04	17.11 5.67	19.10 6.30	22.60 7.31	24.53 7.95	26.79 8.63	28.86 9.51	32.93 10.82	38.06 12.34	42.48 13.58	52.90 16.75
11582	5.44 1.83	6.18 2.08	6.96 2.34	8.11 2.72	9.20 3.05	10.30 3.44	11.60 3.82	13.19 4.15	14.66 4.67	16.21 5.23	18.12 5.80	21.42 6.74	23.24 7.32	25.39 7.96	27.33 8.78	31.21 9.99	36.07 11.39	40.24 12.53	50.13 15.45
11887	5.18 1.70	5.88 1.94	6.62 2.17	7.72 2.52	8.72 2.80	9.77 3.18	11.00 3.53	12.52 3.85	13.92 4.31	15.38 4.83	17.17 5.37	20.32 6.23	22.06 6.77	24.09 7.36	25.96 8.11	29.61 9.23	34.23 10.53	38.19 11.58	47.56 14.28
12192	4.91 1.57	5.57 1.79	6.31 2.02	7.35 2.34	8.28 2.59	9.29 2.94	10.47 3.28	11.90 3.56	13.22 3.99	14.62 4.48	16.33 4.97	19.30 5.76	20.94 6.27	22.89 6.81	24.66 7.51	28.15 8.55	32.52 9.74	36.29 10.72	45.19 13.22

General Information | Bridging & Acc. | Economic Joist Guide | Code of Standard Practice | Specification K & KCS | LH & DLH Joist Girders | Fire Ratings



LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES																			
Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)																			
Joist Designation	24LH03	24LH04	24LH05	24LH06	24LH07	24LH08	24LH09	24LH10	24LH11	24LH12	24LH13	24LH14	24LH15	24LH16	24LH17	24LH18	24LH19	24LH20	24LH21
Depth (mm)	610	610	610	610	610	610	610	610	610	610	610	610	610	610	610	610	610	610	610
Approx. Wt. (kN/m)	0.16	0.18	0.19	0.23	0.25	0.26	0.31	0.34	0.36	0.39	0.47	0.51	0.55	0.61	0.72	0.83	0.90	1.15	1.28
Span (mm)																			
7315	14.53 9.69	15.81 10.55	18.09 12.06	22.78 15.19	26.57 17.71	28.16 18.78	36.35 23.61	39.05 25.04	42.64 26.21	48.91 32.61	58.84 39.22	64.27 42.84							
7620	13.70 8.72	14.90 9.93	17.04 11.36	21.46 14.31	24.95 16.63	26.44 17.62	34.03 20.85	36.55 22.10	39.92 23.16	45.81 30.54	54.96 35.68	60.03 38.81	65.05 42.22						
7925	12.91 7.73	14.05 9.36	16.08 10.14	20.24 13.49	23.46 14.88	24.86 15.80	31.91 18.50	34.25 19.62	37.43 20.54	42.94 27.20	51.44 31.68	56.18 34.45	60.90 37.47						
8230	12.18 6.90	13.26 8.46	15.19 9.04	19.13 12.06	22.08 13.28	23.39 14.09	29.96 16.50	32.15 17.49	35.17 18.32	40.33 24.25	48.21 28.23	52.68 30.72	57.09 33.42						
8534	11.52 6.17	12.53 7.57	14.36 8.09	18.09 10.81	20.75 11.87	22.06 12.62	28.19 14.78	30.25 15.67	33.06 16.40	37.95 21.71	45.28 25.29	49.47 27.50	53.60 29.91	62.05 33.02					
8839	10.90 5.56	11.86 6.81	13.58 7.28	17.11 9.71	19.58 10.68	20.81 11.35	26.61 13.28	28.50 14.08	31.14 14.75	35.74 19.52	42.59 22.73	46.53 24.73	50.43 26.89	57.80 29.69					
9144	10.33 5.00	11.25 6.14	12.87 6.56	16.21 8.77	18.56 9.64	19.67 10.24	25.04 11.98	26.88 12.71	29.34 13.30	33.71 17.61	40.11 20.51	43.82 22.31	47.50 24.26	53.98 26.79	61.70 30.55				
9449	9.80 4.53	10.65 5.56	12.14 5.95	15.38 7.93	17.51 8.72	18.60 9.26	23.72 10.85	25.39 11.51	27.67 12.05	31.84 15.95	37.84 18.56	41.34 20.19	44.80 21.96	50.52 24.25	57.74 27.65				
9754	9.29 4.11	10.11 5.04	11.39 5.39	14.59 7.20	16.37 7.92	17.64 8.42	22.32 9.85	23.46 10.44	25.52 10.94	30.12 14.49	35.74 16.87	39.06 18.34	42.33 19.94	47.37 22.02	54.15 25.11	62.60 28.66			
10058	8.84 3.75	9.63 4.59	10.77 4.91	13.89 6.56	15.45 7.22	16.72 7.66	20.89 8.97	21.77 9.51	23.07 9.96	28.54 13.19	33.81 15.36	36.96 16.71	40.06 18.16	44.52 20.06	50.88 22.88	58.84 26.12			
10363	7.48 3.42	8.16 4.20	9.82 4.49	13.22 5.99	14.55 6.59	15.46 7.00	18.21 8.20	19.30 8.69	20.28 9.10	27.05 12.05	32.04 14.03	35.02 15.26	37.95 16.60	41.91 18.32	47.91 20.89	55.38 23.86	61.99 26.32		
10668	7.41 3.29	8.71 3.86	9.76 4.33	12.66 5.57	13.96 6.14	14.81 6.52	17.68 7.73	18.73 8.15	19.70 8.58	25.69 11.03	30.39 12.85	33.20 13.98	35.98 15.20	39.53 16.78	45.18 19.14	52.23 21.84	58.46 24.12		
10973	7.35 3.18	8.28 3.59	9.63 4.15	12.14 5.19	13.41 5.73	14.19 6.07	17.17 7.31	18.21 7.70	19.14 8.09	24.40 10.14	28.86 11.80	31.53 12.84	34.19 13.96	37.34 15.41	42.68 17.58	49.35 20.06	55.22 22.15		
11278	7.06 2.97	7.88 3.31	9.16 3.85	11.60 4.83	12.87 5.35	13.61 5.66	16.72 6.71	17.70 7.29	18.62 7.66	23.21 9.32	27.45 10.85	29.99 11.82	32.50 12.85	35.33 14.18	40.38 16.18	46.68 18.46	52.24 20.38	65.27 25.23	
11582	6.71 2.74	7.50 3.06	8.72 3.56	11.03 4.46	12.36 5.00	13.06 5.28	15.99 6.18	17.24 6.91	18.14 7.26	22.08 8.61	26.10 10.02	28.41 10.90	30.92 11.85	33.49 13.09	38.27 14.92	44.23 17.03	49.51 18.79	61.86 23.27	
11887	6.40 2.55	7.15 2.84	8.31 3.29	10.50 4.14	11.83 4.67	12.52 4.93	15.23 5.73	16.81 6.40	17.65 6.88	20.94 7.95	24.83 9.26	26.96 10.06	29.46 10.96	31.75 12.09	36.30 13.79	41.98 15.74	46.99 17.38	58.71 21.51	65.51 23.80
12192	6.10 2.36	6.82 2.65	7.93 3.06	9.99 3.83	11.29 4.33	11.92 4.58	14.50 5.29	16.12 5.92	17.22 6.55	19.92 7.36	23.59 8.58	25.61 9.32	27.99 10.14	30.18 11.20	34.51 12.78	39.89 14.57	44.65 16.09	55.77 19.92	62.25 22.03
12497	5.83 2.21	6.52 2.46	7.58 2.86	9.55 3.57	10.74 4.02	11.38 4.26	13.83 4.91	15.36 5.51	16.81 6.10	18.92 6.82	22.46 7.95	24.35 8.65	26.63 9.41	28.72 10.39	32.83 11.86	37.95 13.52	42.48 14.94	53.06 18.49	59.23 20.46
12802	5.57 2.05	6.23 2.30	7.23 2.65	9.12 3.32	10.24 3.75	10.87 3.96	13.17 4.56	14.62 5.12	16.06 5.66	18.03 6.34	21.38 7.39	23.21 8.05	25.36 8.75	27.36 9.66	31.27 11.01	36.16 12.57	40.46 13.89	50.53 17.19	56.43 19.01
13106	5.34 1.92	5.96 2.15	6.93 2.49	8.72 3.07	9.76 3.48	10.39 3.70	12.56 4.26	13.93 4.75	15.33 5.26	17.20 5.92	20.40 6.88	22.12 7.50	24.18 8.15	26.09 9.00	29.82 10.27	34.47 11.71	38.58 12.93	48.20 16.00	53.80 17.71
13411	5.12 1.80	5.73 2.01	6.65 2.33	8.33 2.87	9.32 3.25	9.95 3.47	11.99 3.96	13.30 4.43	14.68 4.91	16.43 5.51	19.48 6.42	21.14 6.99	23.08 7.60	24.91 8.39	28.47 9.57	32.92 10.93	36.83 12.06	46.02 14.92	51.37 16.52
13716	4.90 1.69	5.48 1.89	6.36 2.18	7.96 2.68	8.90 3.03	9.51 3.23	11.47 3.70	12.74 4.15	14.05 4.59	15.68 5.15	18.60 6.01	20.19 6.53	22.08 7.10	23.81 7.85	27.20 8.94	31.44 10.21	35.21 11.26	43.97 13.95	49.09 15.44
14021	4.69 1.59	5.26 1.78	6.12 2.05	7.61 2.51	8.50 2.84	9.12 3.03	10.96 3.47	12.17 3.88	13.48 4.29	15.01 4.83	17.78 5.61	19.32 6.11	21.11 6.65	22.78 7.34	26.05 8.37	30.09 9.55	33.68 10.55	42.07 13.06	46.97 14.44
14326	4.52 1.48	5.04 1.66	5.88 1.92	7.31 2.34	8.15 2.65	8.75 2.86	10.50 3.25	11.66 3.63	12.91 4.02	14.37 4.52	17.04 5.26	18.49 5.73	20.22 6.23	21.80 6.87	24.92 7.85	28.82 8.96	32.26 9.88	40.29 12.22	44.97 13.52
14630	4.34 1.40	4.85 1.56	5.64 1.80	7.00 2.21	7.80 2.49	8.40 2.68	10.06 3.05	11.17 3.41	12.40 3.77	13.79 4.24	16.34 4.94	17.73 5.37	19.39 5.85	20.89 6.45	23.90 7.35	27.62 8.40	30.90 9.28	38.61 11.48	43.09 12.69



LOAD TABLES

LRFD - LH-SERIES

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES																			
Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)																			
Joist Designation	28LH05	28LH06	28LH07	28LH08	28LH09	28LH10	28LH11	28LH12	28LH13	28LH14	28LH15	28LH16	28LH17	28LH18	28LH19	28LH20	28LH21	28LH22	28LH23
Depth (mm)	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	711	
Approx. Wt. (kN/m)	0.19	0.23	0.25	0.26	0.31	0.34	0.36	0.39	0.44	0.51	0.55	0.61	0.72	0.82	0.92	1.15	1.28	1.49	1.62
Span (mm)																			
8534	13.70 9.13	18.18 12.12	21.19 14.12	22.67 15.11	29.37 19.58	31.47 20.98	34.36 22.91	40.24 26.83	44.52 28.37	53.82 35.88	58.33 38.89								
8839	13.04 8.69	17.30 11.54	20.13 13.42	21.51 14.34	27.81 18.54	29.81 19.87	32.54 21.70	38.10 24.43	42.07 25.49	50.87 33.91	55.12 36.74	64.84 41.43							
9144	12.43 8.28	16.52 11.01	19.13 12.75	20.44 13.63	26.35 17.30	28.25 18.84	30.83 20.13	36.13 22.03	39.79 22.99	48.13 31.08	52.15 33.81	61.25 37.37							
9449	11.86 7.90	15.76 10.50	18.18 11.93	19.45 12.74	25.01 15.67	26.80 17.06	29.26 18.22	34.28 19.94	37.69 20.82	45.59 28.13	49.40 30.61	57.93 33.84							
9754	11.31 7.28	15.03 9.60	17.30 10.84	18.51 11.57	23.74 14.22	25.45 15.49	27.80 16.54	32.57 18.12	35.74 18.91	43.22 25.55	46.84 27.80	54.87 30.73	63.22 35.11						
10058	10.81 6.62	14.36 8.75	16.47 9.88	17.64 10.53	22.59 12.95	24.21 14.11	26.41 15.07	30.95 16.50	33.93 17.23	41.03 23.27	44.48 25.32	52.02 27.99	59.93 31.98						
10363	10.33 6.05	13.71 7.99	15.71 9.01	16.81 9.63	21.49 11.83	23.02 12.88	25.14 13.77	29.46 15.07	32.26 15.74	39.00 21.26	42.26 23.13	49.40 25.56	56.74 29.21	64.27 33.36					
10668	9.86 5.54	13.13 7.32	14.98 8.26	16.03 8.81	20.46 10.84	21.93 11.80	23.94 12.62	28.06 13.80	30.69 14.41	37.09 19.48	40.20 21.19	46.77 23.42	53.51 26.76	61.09 30.55					
10973	9.45 5.09	12.56 6.72	14.31 7.58	15.32 8.09	19.52 9.95	20.92 10.84	22.82 11.58	26.76 12.68	29.21 13.23	35.33 17.89	38.30 19.45	44.17 21.51	50.56 24.57	58.11 28.06	65.55 31.04				
11278	9.06 4.68	12.03 6.18	13.67 6.97	14.63 7.45	18.62 9.16	19.96 9.98	21.80 10.66	25.52 11.67	27.84 12.18	33.68 16.46	36.51 17.90	41.81 19.78	47.85 22.62	55.31 25.83	62.00 28.57				
11582	8.66 4.31	11.52 5.70	13.09 6.43	14.01 6.87	17.78 8.44	19.05 9.20	20.81 9.83	24.37 10.77	26.57 11.23	32.13 15.17	34.82 16.52	39.62 18.25	45.32 20.85	52.42 23.81	58.76 26.35				
11887	8.31 3.99	11.04 5.28	12.53 5.95	13.39 6.34	17.00 7.82	18.22 8.50	19.89 9.09	23.30 9.95	25.39 10.39	30.69 14.03	33.27 15.26	37.57 16.88	43.00 19.27	49.75 22.02	55.77 24.37				
12192	7.98 3.70	10.60 4.88	12.01 5.51	12.84 5.88	16.25 7.23	17.43 7.88	19.04 8.42	22.29 9.22	24.25 9.61	29.33 13.00	31.80 14.14	35.72 15.63	40.86 17.86	47.25 20.40	52.99 22.56				
12497	7.66 3.44	10.20 4.53	11.51 5.12	12.30 5.45	15.49 6.71	16.69 7.31	18.22 7.82	21.36 8.55	23.20 8.93	28.06 12.06	30.42 13.11	33.98 14.50	38.89 16.57	44.97 18.92	50.40 20.94	63.13 26.00			
12802	7.36 3.19	9.80 4.21	11.04 4.75	11.82 5.07	14.59 6.24	15.95 6.80	17.07 7.26	18.75 7.95	19.58 8.30	26.88 11.22	29.12 12.20	32.36 13.48	37.03 15.41	42.83 17.60	48.02 19.46	60.12 24.18			
13106	7.06 2.99	9.38 3.94	10.59 4.45	11.31 4.74	13.98 5.83	15.41 6.40	16.68 6.93	18.31 7.58	19.13 7.92	25.75 10.44	27.90 11.36	30.86 12.56	35.33 14.34	40.84 16.38	45.79 18.14	57.35 22.51	64.02 24.92		
13411	6.78 2.80	9.01 3.69	10.15 4.15	10.85 4.45	13.39 5.47	14.85 6.04	16.11 6.53	17.90 7.23	18.69 7.55	24.70 9.74	26.76 10.59	29.46 11.71	33.72 13.38	39.00 15.29	43.73 16.91	54.74 21.00	61.13 23.24		
13716	6.49 2.62	8.63 3.47	9.73 3.89	10.39 4.15	12.82 5.12	14.24 5.66	15.55 6.17	17.51 6.94	18.27 7.22	23.70 9.10	25.69 9.90	28.16 10.94	32.23 12.50	37.27 14.28	41.78 15.80	52.31 19.62	58.41 21.73	64.27 24.63	
14021	6.26 2.46	8.28 3.25	9.34 3.66	9.98 3.91	12.31 4.80	13.67 5.31	14.92 5.79	17.11 6.62	17.86 6.88	22.76 8.52	24.69 9.26	26.94 10.24	30.83 11.70	35.65 13.36	39.98 14.78	50.05 18.35	55.88 20.32	61.46 23.04	
14326	6.01 2.32	7.96 3.05	8.97 3.44	9.58 3.67	11.82 4.50	13.13 4.99	14.33 5.44	16.76 6.34	17.48 6.59	21.86 7.98	23.72 8.68	25.80 9.60	29.52 10.96	34.14 12.52	38.27 13.86	47.94 17.20	53.51 19.04	58.85 21.59	
14630	5.79 2.18	7.66 2.87	8.62 3.23	9.19 3.44	11.35 4.24	12.60 4.69	13.76 5.12	16.12 5.95	17.11 6.31	20.97 7.48	22.82 8.14	24.73 9.00	28.29 10.28	32.71 11.74	36.68 13.00	45.94 16.14	51.31 17.87	56.43 20.27	64.57 22.03
14935	5.57 2.07	7.36 2.71	8.28 3.05	8.81 3.23	10.91 3.99	12.12 4.42	13.23 4.83	15.51 5.58	16.76 6.05	20.11 7.03	21.97 7.66	23.72 8.46	27.14 9.67	31.39 11.04	35.20 12.21	44.08 15.17	49.21 16.79	54.12 19.04	62.08 20.70
15240	5.35 1.94	7.09 2.55	7.98 2.87	8.46 3.05	10.52 3.76	11.66 4.15	12.74 4.55	14.92 5.26	16.43 5.77	19.30 6.62	21.10 7.19	22.78 7.96	26.06 9.09	30.13 10.39	33.79 11.49	42.30 14.27	47.25 15.80	51.96 17.92	59.68 19.48
15545	5.18 1.83	6.84 2.42	7.70 2.71	8.11 2.86	10.12 3.54	11.22 3.92	12.27 4.29	14.36 4.96	15.80 5.44	18.56 6.23	20.27 6.78	21.89 7.50	25.04 8.56	28.95 9.77	32.48 10.82	40.67 13.44	45.40 14.88	49.92 16.87	57.45 18.34
15850	4.99 1.73	6.58 2.27	7.41 2.56	7.80 2.69	9.76 3.32	10.82 3.72	11.82 4.05	13.83 4.68	15.19 5.13	17.83 5.88	19.49 6.39	21.05 7.07	24.09 8.08	27.85 9.22	31.23 10.21	39.09 12.68	43.66 14.03	48.02 15.90	55.35 17.30
16154	4.81 1.64	6.36 2.15	7.15 2.42	7.53 2.55	9.41 3.15	10.43 3.51	11.39 3.83	13.32 4.42	14.62 4.84	17.16 5.54	18.75 6.04	20.24 6.66	23.17 7.63	26.80 8.71	30.04 9.63	37.62 11.96	42.03 13.25	46.20 15.01	53.34 16.33
16459	4.65 1.56	6.14 2.04	6.97 2.30	7.23 2.40	9.07 2.97	10.06 3.32	10.98 3.63	12.84 4.15	14.06 4.58	16.52 5.23	18.08 5.70	19.49 6.30	22.32 7.20	25.83 8.23	28.93 9.10	36.25 11.31	40.46 12.52	44.49 14.19	51.45 15.44
16764	4.50 1.48	5.92 1.94	6.66 2.18	6.97 2.27	8.77 2.81	9.71 3.13	10.60 3.44	12.39 3.94	13.57 4.33	15.93 4.96	17.42 5.39	18.79 5.96	21.51 6.81	24.88 7.79	27.90 8.62	34.93 10.69	39.00 11.85	42.90 13.44	49.66 14.60
17069	4.34 1.41	5.73 1.83	6.45 2.07	6.74 2.15	8.46 2.67	9.38 2.97	10.24 3.25	11.95 3.73	13.09 4.10	15.36 4.69	16.78 5.10	18.12 5.64	20.75 6.46	23.99 7.36	26.89 8.15	33.68 10.14	37.60 11.22	41.37 12.72	47.95 13.83



LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 345 MPa Maximum Yield Strength - Loads Shown in Kilonewtons Per Meter (kN/m)

Joist Designation	32LH06	32LH07	32LH08	32LH09	32LH10	32LH11	32LH12	32LH13	32LH14	32LH15	32LH16	32LH17	32LH18	32LH19	32LH20	32LH21	32LH22	32LH23	32LH24
Depth (mm)	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813	813
Approx. Wt. (kN/m)	0.20	0.23	0.25	0.31	0.31	0.35	0.39	0.44	0.48	0.51	0.61	0.72	0.82	0.90	1.14	1.27	1.47	1.61	1.81
Span (mm)																			
9754	14.33 9.55	16.08 10.72	18.14 12.09	24.05 16.03	25.91 17.27	28.37 18.91	33.31 22.21	39.15 26.10	41.94 27.96	44.87 29.91	58.90 39.27								
10058	13.76 9.17	15.42 10.28	17.35 11.57	22.95 15.30	24.75 16.50	27.10 18.06	31.80 21.20	37.31 24.88	39.98 26.66	42.77 27.29	56.05 37.25	64.59 42.61							
10363	13.23 8.82	14.84 9.89	16.63 11.09	21.94 14.63	23.64 15.76	25.88 17.26	30.38 20.25	35.60 23.42	38.13 24.12	40.80 24.92	53.41 34.03	61.55 38.93							
10668	12.71 8.47	14.24 9.50	15.93 10.62	20.98 13.68	22.60 15.07	24.75 16.50	29.07 19.30	33.98 21.45	36.39 22.09	38.93 22.82	50.91 31.17	58.68 35.65							
10973	12.22 8.15	13.70 9.13	15.27 10.05	20.06 12.56	21.64 13.86	23.68 15.17	27.81 17.73	32.48 19.70	34.77 20.30	37.21 20.97	48.59 28.61	55.99 32.74	63.26 37.40						
11278	11.74 7.64	13.17 8.52	14.66 9.25	19.22 11.57	20.72 12.76	22.67 13.96	26.63 16.31	31.05 18.14	33.24 18.68	35.59 19.29	46.40 26.34	53.47 30.13	60.41 34.42						
11582	11.31 7.06	12.69 7.86	14.06 8.53	18.43 10.66	19.84 11.77	21.73 12.88	25.52 15.06	29.72 16.72	31.82 17.23	34.03 17.80	44.35 24.29	51.10 27.80	57.74 31.75						
11887	10.90 6.52	12.21 7.26	13.49 7.88	17.65 9.86	19.04 10.88	20.84 11.90	24.47 13.92	28.45 15.46	30.47 15.92	32.61 16.44	42.42 22.46	48.90 25.69	55.25 29.36	63.26 32.54					
12192	10.47 6.04	11.77 6.72	12.97 7.31	16.94 9.13	18.25 10.08	19.97 11.03	23.48 12.88	27.27 14.31	29.20 14.75	31.23 15.23	40.62 20.81	46.81 23.80	52.88 27.18	60.47 30.15					
12497	10.11 5.60	11.33 6.24	12.47 6.78	16.25 8.47	17.52 9.35	19.19 10.23	22.54 11.96	26.15 13.29	27.99 13.68	29.96 14.14	38.92 19.30	44.84 22.08	50.67 25.23	57.87 27.97					
12802	9.73 5.21	10.91 5.80	12.01 6.30	15.63 7.88	16.85 8.69	18.43 9.51	21.64 11.12	25.08 12.36	26.88 12.72	28.76 13.14	37.31 17.95	42.81 20.53	48.59 23.46	55.42 26.00					
13106	9.41 4.85	10.55 5.41	11.55 5.86	15.03 7.34	16.19 8.09	17.73 8.85	20.81 10.36	24.09 11.51	25.80 11.85	27.62 12.24	35.65 16.72	40.81 19.11	46.62 21.84	53.01 24.22					
13411	9.06 4.52	10.17 5.04	11.13 5.47	14.44 6.84	15.58 7.55	17.04 8.27	20.02 9.66	23.16 10.74	24.79 11.06	26.53 11.42	34.03 15.60	38.98 17.83	44.78 20.38	50.61 22.59	63.48 28.12				
13716	8.75 4.23	9.82 4.71	10.72 5.12	13.92 6.40	14.98 7.06	16.41 7.72	19.26 9.03	22.25 10.02	23.83 10.33	25.52 10.66	32.52 14.56	37.25 16.66	43.03 19.04	48.37 21.11	60.65 26.28				
14021	8.44 3.95	9.47 4.40	10.34 4.78	13.39 5.98	14.44 6.61	15.80 7.22	18.56 8.44	21.42 9.38	22.94 9.67	24.56 9.98	31.12 13.63	35.63 15.60	41.21 17.81	46.27 19.76	58.02 24.59	64.81 27.23			
14326	8.15 3.70	9.16 4.13	9.98 4.48	12.91 5.61	13.92 6.18	15.23 6.77	17.87 7.90	20.63 8.80	22.08 9.06	23.64 9.35	29.78 12.76	34.12 14.60	39.46 16.69	44.32 18.50	55.57 23.04	62.05 25.52			
14630	7.89 3.48	8.85 3.88	9.63 4.20	12.39 5.26	13.41 5.80	14.68 6.36	17.24 7.42	19.87 8.26	21.27 8.50	22.76 8.78	28.56 11.98	32.70 13.71	37.84 15.67	42.46 17.36	53.25 21.62	59.49 23.94	65.45 27.17		
14935	7.63 3.26	8.55 3.64	9.29 3.95	11.90 4.94	12.93 5.45	14.15 5.96	16.63 6.97	19.14 7.74	20.50 7.98	21.94 8.24	27.40 11.26	31.39 12.88	36.29 14.72	40.76 16.31	51.09 20.31	57.06 22.50	62.79 25.53		
15240	7.39 3.07	8.28 3.42	8.98 3.72	11.29 4.65	12.49 5.13	13.67 5.61	16.06 6.56	17.87 7.29	18.44 7.51	19.04 7.76	26.31 10.59	30.12 12.12	34.85 13.84	39.11 15.35	49.05 19.11	54.78 21.17	60.28 24.02		
15545	7.13 2.90	8.01 3.25	8.68 3.53	10.90 4.40	12.03 4.84	13.17 5.29	15.58 6.24	17.52 7.00	18.08 7.22	18.66 7.45	25.27 9.98	28.95 11.41	33.49 13.04	37.57 14.46	47.15 18.00	52.64 19.93	62.05 22.62	65.33 24.64	
15850	6.88 2.75	7.72 3.07	8.37 3.34	10.50 4.15	11.61 4.59	12.69 5.00	15.06 5.92	17.17 6.72	17.73 6.94	18.31 7.18	24.31 9.41	27.84 10.77	32.19 12.30	36.16 13.64	45.32 16.97	50.62 18.79	55.70 21.33	62.97 23.24	
16154	6.65 2.61	7.45 2.91	8.07 3.15	10.12 3.94	11.20 4.33	12.25 4.74	14.53 5.60	16.87 6.47	17.39 6.68	17.96 6.90	23.39 8.88	26.79 10.17	30.99 11.61	34.77 12.87	43.62 16.02	48.72 17.74	53.60 20.13	60.73 21.94	63.93 23.75
16459	6.43 2.46	7.19 2.75	7.80 2.99	9.77 3.73	10.82 4.11	11.83 4.49	14.02 5.31	16.24 6.12	17.07 6.42	17.61 6.62	22.51 8.39	25.80 9.60	29.85 10.97	33.50 12.17	42.03 15.14	46.93 16.78	51.63 19.04	58.63 20.73	61.57 22.46
16764	6.21 2.34	6.96 2.61	7.54 2.83	9.45 3.54	10.46 3.89	11.42 4.26	13.54 5.03	15.64 5.79	16.76 6.08	17.30 6.39	21.71 7.93	24.86 9.09	28.76 10.39	32.28 11.51	40.49 14.33	45.22 15.87	49.75 18.00	56.62 19.61	59.33 21.24
17069	6.01 2.23	6.74 2.48	7.28 2.68	9.15 3.35	10.11 3.70	11.04 4.04	13.09 4.77	15.10 5.48	16.15 5.76	16.98 6.15	20.94 7.53	23.99 8.61	27.72 9.83	31.14 10.90	39.05 13.57	43.62 15.03	47.98 17.06	54.69 18.57	57.22 20.12
17374	5.82 2.11	6.52 2.36	7.04 2.55	8.84 3.19	9.73 3.50	10.68 3.83	12.65 4.53	14.57 5.16	15.60 5.45	16.69 5.93	20.19 7.13	23.13 8.15	26.76 9.32	30.04 10.33	37.69 12.87	42.08 14.25	46.32 16.17	52.88 17.61	55.22 19.07
17678	5.61 2.01	6.30 2.24	6.82 2.43	8.55 3.03	9.41 3.32	10.34 3.66	12.22 4.40	14.06 5.18	15.06 5.73	16.41 6.77	19.49 7.74	22.34 8.84	25.84 9.80	29.02 10.82	36.38 12.21	40.64 13.52	44.71 15.33	51.15 16.71	53.32 18.09
17983	5.44 1.91	6.10 2.13	6.61 2.32	8.28 2.86	9.10 3.16	10.02 3.48	11.83 4.10	13.58 4.65	14.55 4.91	15.86 5.45	18.84 6.42	21.58 7.35	24.97 8.40	28.03 9.31	35.15 11.58	39.27 12.84	43.21 14.57	49.51 15.87	51.53 17.19
18288	5.29 1.82	5.92 2.04	6.40 2.20	8.02 2.75	8.80 3.00	9.69 3.31	11.47 3.89	13.13 4.43	14.06 4.68	15.33 5.18	18.22 6.11	20.88 6.99	24.13 7.98	27.10 8.85	33.98 11.01	37.95 12.20	41.76 13.84	47.94 15.09	49.79 16.34
18593	5.12 1.73	5.73 1.94	6.21 2.10	7.79 2.62	8.50 2.86	9.38 3.15	11.12 3.72	12.71 4.20	13.61 4.43	14.84 4.93	17.61 5.80	20.18 6.65	23.35 7.60	26.22 8.42	32.88 10.47	36.73 11.61	40.41 13.17	46.45 14.36	48.17 15.54
18898	4.96 1.66	5.56 1.85	6.01 1.99	7.54 2.51	8.23 2.71	9.10 3.00	10.77 3.54	12.30 4.01	13.17 4.23	14.36 4.69	17.04 5.53	19.54 6.33	22.60 7.23	25.36 8.01	31.82 9.98	35.55 11.06	39.09 12.55	45.02 13.67	46.62 14.79
19202	4.81 1.57	5.39 1.76	5.83 1.91	7.32 2.39	7.96 2.59	8.81 2.86	10.43 3.38	11.90 3.92	12.75 4.02	13.89 4.46	16.52 5.26	18.91 6.02	21.89 6.88	24.57 7.64	30.82 9.51	34.41 10.53	37.87 11.95	43.65 13.01	45.15 14.09
19507	4.68 1.51	5.25 1.69	5.66 1.82	7.10 2.29	7.72 2.46	8.53 2.72	10.12 3.22	11.52 3.63	12.34 3.85	13.48 4.28	15.99 5.02	18.31 5.74	21.20 6.56	23.81 7.28	29.85 9.07	33.33 10.04	36.68 11.39	42.33 12.41	43.73 13.45



LOAD TABLES

LRFD - LH-SERIES

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES

Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)

Joist Designation	36LH07	36LH08	36LH09	36LH10	36LH11	36LH12	36LH13	36LH14	36LH15	36LH16	36LH17	36LH18	36LH19	36LH20	36LH21	36LH22	36LH23	36LH24	36LH25	
Depth (mm)	914	914	914	914	914	914	914	914	914	914	914	914	914	914	914	914	914	914	914	
Approx. Wt. (kN/m)	0.23	0.26	0.31	0.31	0.34	0.36	0.44	0.53	0.53	0.64	0.72	0.85	0.93	1.18	1.34	1.46	1.78	1.90	2.17	
Span (mm)																				
↓																				
10973	12.74 8.49	14.62 9.74	18.62 12.41	22.02 14.68	23.29 15.52	27.85 18.57	33.55 22.37	36.96 24.64	40.01 26.67	51.23 34.16	59.07 39.38									
11278	12.30 8.20	14.09 9.39	17.95 11.96	21.16 14.11	22.37 14.91	26.79 17.86	32.19 21.46	35.47 23.65	38.39 25.59	49.09 32.73	56.60 37.73	63.93 42.62								
11582	11.87 7.92	13.57 9.04	17.07 11.38	20.32 13.55	21.51 14.34	25.75 17.17	30.90 20.60	34.06 22.70	36.86 24.57	47.06 31.21	54.26 35.74	61.29 40.84								
11887	11.48 7.66	13.09 8.72	16.68 11.12	19.57 13.04	20.70 13.80	24.78 16.52	29.69 19.80	32.70 21.80	35.39 23.23	45.15 28.85	52.05 33.04	58.81 37.75								
12192	11.12 7.41	12.60 8.40	16.08 10.72	18.82 12.24	19.92 13.28	23.86 15.87	28.54 18.60	31.43 20.44	34.01 21.52	43.34 26.72	49.96 30.60	56.44 34.96	65.36 38.83							
12497	10.74 7.16	12.17 8.07	15.54 10.27	18.14 11.35	19.17 12.36	22.95 14.72	27.45 17.26	30.22 18.97	32.70 19.97	41.63 24.79	47.99 28.39	54.21 32.45	62.66 36.03							
12802	10.39 6.84	11.74 7.50	14.98 9.55	17.46 10.56	18.47 11.48	22.12 13.68	26.40 16.05	29.08 17.64	31.47 18.56	40.01 23.05	46.14 26.40	52.11 30.18	60.15 33.49							
13106	10.06 6.37	11.33 6.99	14.46 8.90	16.82 9.83	17.81 10.69	21.32 12.75	25.40 14.95	27.99 16.43	30.29 17.29	38.48 21.46	44.36 24.59	50.13 28.10	57.74 31.20							
13411	9.73 5.95	10.94 6.52	13.98 8.30	16.24 9.17	17.17 9.98	20.57 11.89	24.47 13.95	26.96 15.32	29.17 16.14	37.03 20.02	42.68 22.94	48.24 26.21	55.48 29.10							
13716	9.42 5.56	10.59 6.08	13.52 7.76	15.67 8.56	16.56 9.32	19.84 11.12	23.59 13.03	25.97 14.31	28.12 15.07	35.65 18.70	41.11 21.42	46.45 24.48	53.34 27.18							
14021	9.12 5.19	10.21 5.70	13.06 7.25	15.11 8.02	15.99 8.72	19.14 10.40	22.73 12.20	25.05 13.39	27.11 14.11	34.33 17.51	39.59 20.05	44.74 22.91	51.32 25.45	64.54 31.72						
14326	8.84 4.87	9.89 5.34	12.65 6.80	14.59 7.51	15.45 8.17	18.49 9.74	21.93 11.42	24.16 12.55	26.15 13.22	33.09 16.40	38.17 18.78	43.12 21.48	49.42 23.84	62.14 29.74						
14630	8.58 4.56	9.55 5.02	12.22 6.37	14.11 7.04	14.92 7.67	17.86 9.15	21.16 10.72	23.33 11.77	25.23 12.40	31.93 15.39	36.82 17.62	41.59 20.15	47.60 22.37	59.86 27.90						
14935	8.31 4.29	9.25 4.71	11.83 5.99	13.63 6.62	14.41 7.20	17.26 8.59	20.44 10.06	22.51 11.07	24.38 11.66	30.79 14.46	35.52 16.56	40.14 18.92	45.88 21.01	57.70 26.22	63.52 29.05					
15240	8.05 4.04	8.97 4.43	11.47 5.64	13.17 6.23	13.93 6.78	16.69 8.08	19.76 9.48	21.75 10.42	23.55 10.96	29.74 13.61	34.19 15.58	38.76 17.81	44.26 19.77	55.64 24.66	61.26 27.33					
15545	7.80 3.80	8.68 4.17	11.12 5.31	12.75 5.88	13.48 6.39	16.15 7.61	19.08 8.93	21.02 9.80	22.76 10.33	28.67 12.81	32.85 14.68	37.43 16.78	42.70 18.62	53.63 23.23	59.11 25.74					
15850	7.58 3.59	8.40 3.94	10.77 5.00	12.34 5.54	13.06 6.02	15.64 7.18	18.47 8.42	20.35 9.25	22.02 9.73	27.55 12.08	31.58 13.84	36.17 15.81	41.06 17.57	51.57 21.90	57.09 24.28	63.39 27.56				
16154	7.36 3.38	8.15 3.72	10.43 4.72	11.95 5.22	12.65 5.69	15.14 6.78	17.86 7.95	19.48 8.74	21.29 9.19	26.53 11.41	30.39 13.07	34.98 14.94	39.53 16.57	49.61 20.67	55.13 22.92	61.00 26.02				
16459	7.15 3.21	7.89 3.51	10.11 4.46	11.52 4.94	12.22 5.37	14.66 6.40	17.29 7.51	19.05 8.26	20.62 8.69	25.53 10.78	29.28 12.34	33.84 14.11	38.06 15.67	47.78 19.55	53.29 21.65	58.75 24.59	65.16 26.82			
16764	6.96 3.03	7.66 3.32	9.82 4.23	11.13 4.67	11.86 5.09	14.22 6.07	16.73 7.10	18.44 7.80	19.96 8.21	24.61 10.20	28.21 11.68	32.63 13.35	36.68 14.82	46.05 18.49	51.45 20.48	56.52 23.26	63.00 25.37			
17069	6.75 2.87	7.44 3.15	9.51 4.01	10.74 4.42	11.51 4.81	13.79 5.74	16.21 6.72	17.87 7.39	19.35 7.79	23.74 9.66	27.20 11.06	31.47 12.65	35.37 14.03	44.40 17.51	49.61 19.40	54.61 22.03	60.91 24.03	65.24 26.07		
17374	6.56 2.72	7.22 2.97	9.25 3.79	10.37 4.20	11.16 4.56	13.36 5.44	15.71 6.37	17.33 7.01	18.75 7.38	22.91 9.16	26.26 10.49	30.38 11.99	34.14 13.30	42.86 16.60	47.89 18.40	52.71 20.88	58.93 22.79	62.97 24.72		
17678	6.39 2.58	7.01 2.83	8.98 3.60	9.93 3.98	10.82 4.33	12.97 5.16	15.25 6.05	16.81 6.65	17.70 7.00	22.12 8.69	25.34 9.95	29.33 11.38	32.96 12.63	41.38 15.76	46.23 17.45	50.88 19.81	57.04 21.62	60.81 23.45		
17983	6.18 2.45	6.80 2.69	8.71 3.42	9.63 3.79	10.50 4.13	12.57 4.93	14.76 5.76	16.52 6.33	17.39 6.77	21.38 8.26	24.48 9.45	28.34 10.79	31.84 11.99	39.98 14.95	44.67 16.57	49.16 18.82	55.25 20.53	58.75 22.27		
18288	5.99 2.33	6.61 2.56	8.44 3.26	9.32 3.61	10.17 3.92	12.18 4.69	14.31 5.48	15.95 6.01	17.08 6.53	20.66 7.85	23.68 8.98	27.40 10.27	30.79 11.39	38.65 14.22	43.18 15.76	47.54 17.89	53.54 19.52	56.79 21.17		
18593	5.82 2.23	6.40 2.45	8.18 3.12	9.03 3.44	9.86 3.75	11.82 4.48	13.87 5.23	15.45 5.72	16.82 6.33	19.97 7.47	22.91 8.55	26.50 9.77	29.78 10.84	37.40 13.52	41.78 14.98	45.98 17.01	51.89 18.57	54.94 20.13	65.03 23.46	
18898	5.64 2.13	6.21 2.33	7.93 2.97	8.77 3.28	9.58 3.59	11.44 4.26	13.45 4.99	14.94 5.44	16.28 6.02	19.35 7.10	22.16 8.14	25.65 9.31	28.82 10.33	36.20 12.88	40.42 14.27	44.49 16.21	50.31 17.68	53.16 19.17	62.92 22.34	
19202	5.48 2.04	6.04 2.23	7.70 2.84	8.50 3.13	9.29 3.41	11.12 4.07	13.04 4.77	14.46 5.19	15.77 5.74	18.73 6.77	21.46 7.74	24.83 8.85	27.90 9.83	35.03 12.27	39.15 13.60	43.09 15.44	48.81 16.85	51.48 18.27	60.94 21.27	
19507	5.34 1.95	5.86 2.13	7.48 2.71	8.27 3.00	9.01 3.26	10.78 3.89	12.66 4.55	14.02 4.94	15.27 5.47	18.14 6.46	20.79 7.39	24.05 8.44	27.05 9.38	33.94 11.70	37.92 12.97	41.73 14.72	47.38 16.06	49.88 17.42	59.03 20.30	
19812	5.18 1.86	5.69 2.04	7.28 2.61	8.02 2.87	8.77 3.12	10.46 3.72	12.30 4.34	13.58 4.71	14.81 5.22	17.60 6.15	20.15 7.06	23.33 8.07	26.22 8.96	32.92 11.17	36.77 12.37	40.46 14.05	46.01 15.33	48.34 16.62	57.23 19.36	
20117	5.03 1.78	5.53 1.95	7.06 2.49	7.80 2.74	8.50 2.99	10.15 3.54	11.95 4.15	13.17 4.50	14.36 4.99	17.04 5.88	19.54 6.74	22.60 7.70	25.40 8.55	31.91 10.66	35.65 11.82	39.24 13.42	44.70 14.63	46.89 15.87	55.51 18.50	
20422	4.90 1.70	5.38 1.86	6.87 2.37	7.58 2.62	8.27 2.86	9.85 3.38	11.61 3.98	12.78 4.40	13.93 4.77	16.54 5.61	18.97 6.43	21.94 7.35	24.66 8.17	30.96 10.20	34.58 11.29	38.06 12.82	43.43 13.99	45.48 15.17	53.85 17.67	
20726	4.77 1.63	5.22 1.79	6.69 2.29	7.39 2.52	8.05 2.74	9.55 3.23	11.29 3.82	12.40 4.13	13.52 4.55	16.06 5.38	18.40 6.15	21.29 7.03	23.94 7.82	30.04 9.74	33.58 10.79	36.95 12.27	42.22 13.38	44.14 14.50	52.27 16.89	
21031	4.64 1.56	5.09 1.72	6.49 2.18	7.18 2.40	7.83 2.62	9.28 3.10	10.98 3.66	12.03 3.94	13.13 4.36	15.60 5.15	17.87 5.89	20.67 6.74	23.24 7.48	29.20 9.32	32.61 10.33	35.90 11.73	41.06 12.79	42.87 13.89	50.75 16.18	
21336	4.52 1.50	4.96 1.64	6.31 2.10	7.00 2.32	7.61 2.52	9.01 2.97	10.68 3.50	11.70 3.77	12.75 4.17	15.16 4.93	17.38 5.64	20.09 6.45	22.59 7.16	28.37 8.93	31.66 9.89	34.86 11.23	39.94 12.25	41.65 13.29	49.31 15.48	
21641	4.39 1.44	4.83 1.59	6.17 2.01	6.80 2.21	7.41 2.42	8.75 2.84	10.39 3.37	11.38 3.60	12.40 3.99	14.72 4.71	16.87 5.39	19.52 6.17	21.94 6.85	27.55 8.5						

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 345 MPa Maximum Yield Strength - Loads Shown in Kilonewtons Per Meter (kN/m)

Joist Designation	40LH08	40LH09	40LH10	40LH11	40LH12	40LH13	40LH14	40LH15	40LH16	40LH17	40LH18	40LH19	40LH20	40LH21	40LH22	40LH23	40LH24	40LH25
Depth (mm)	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016	1016
Approx. Wt. (kN/m)	0.23	0.31	0.31	0.32	0.36	0.44	0.51	0.53	0.61	0.74	0.82	0.93	1.18	1.36	1.46	1.77	1.85	2.16
Span (mm)																		
↓																		
12192	11.35 7.57	15.42 10.28	18.35 12.24	19.23 12.82	23.37 15.58	28.38 18.92	32.39 21.59	36.22 24.15	42.96 28.64	52.02 34.68	58.76 39.18							
12497	11.03 7.35	14.92 9.95	17.73 11.82	18.60 12.40	22.59 15.06	27.37 18.25	31.23 20.82	34.95 23.30	41.38 27.59	50.13 33.42	56.60 37.73							
12802	10.72 7.15	14.44 9.63	17.13 11.42	17.96 11.98	21.81 14.55	26.41 17.61	30.13 20.09	33.71 22.47	39.88 26.59	48.29 32.19	54.55 36.36	63.74 41.94						
13106	10.39 6.93	14.01 9.34	16.56 11.04	17.38 11.58	21.10 14.06	25.49 17.00	29.08 19.39	32.54 21.70	38.44 25.62	46.55 30.73	52.59 35.06	61.33 39.06						
13411	10.11 6.74	13.57 9.04	16.02 10.68	16.78 11.19	20.40 13.60	24.61 16.41	28.10 18.73	31.43 20.95	37.08 24.72	44.92 28.67	50.74 32.77	59.06 36.44						
13716	9.80 6.53	13.14 8.77	15.49 10.01	16.24 10.82	19.74 13.16	23.78 15.48	27.14 17.76	30.35 19.80	35.78 21.74	43.34 26.79	48.94 30.63	56.88 34.04						
14021	9.51 6.34	12.74 8.49	14.98 9.36	15.71 10.15	19.10 12.36	22.98 14.49	26.22 16.62	29.33 18.53	34.54 20.34	41.82 25.07	47.25 28.66	54.82 31.85						
14326	9.25 6.10	12.34 7.96	14.50 8.78	15.20 9.51	18.49 11.58	22.21 13.58	25.36 15.57	28.37 17.36	33.36 19.07	40.41 23.49	45.66 26.85	52.88 29.85						
14630	8.98 5.72	11.96 7.47	14.05 8.24	14.72 8.93	17.90 10.87	21.49 12.74	24.53 14.60	27.45 16.28	32.23 17.89	39.05 22.03	44.10 25.20	51.02 28.02	64.19 34.99					
14935	8.75 5.37	11.61 7.03	13.61 7.74	14.27 8.39	17.33 10.21	20.79 11.98	23.72 13.73	26.54 15.30	31.17 16.81	37.73 20.70	42.64 23.68	49.26 26.32	61.99 32.88					
15240	8.50 5.06	11.26 6.61	13.19 7.28	13.83 7.89	16.81 9.61	20.13 11.26	22.98 12.91	25.69 14.40	30.13 15.81	36.51 19.48	41.24 22.28	47.59 24.76	59.86 30.93					
15545	8.27 4.77	10.94 6.23	12.78 6.85	13.41 7.42	16.28 9.04	19.49 10.60	22.24 12.17	24.88 13.57	29.15 14.90	35.33 18.35	39.89 20.98	45.98 23.32	57.85 29.14	63.70 32.29				
15850	8.05 4.49	10.63 5.86	12.39 6.46	13.00 7.00	15.80 8.53	18.88 10.01	21.55 11.47	24.09 12.79	28.23 14.05	34.19 17.30	38.63 19.78	44.45 21.99	55.95 27.48	61.60 30.45				
16154	7.83 4.24	10.33 5.54	12.01 6.11	12.60 6.62	15.32 8.05	18.30 9.44	20.88 10.82	23.35 12.08	27.33 13.26	33.11 16.34	37.40 18.68	43.00 20.76	54.11 25.94	59.58 28.74				
16459	7.61 4.01	10.02 5.23	11.66 5.77	12.22 6.26	14.85 7.61	17.74 8.93	20.24 10.24	22.64 11.41	26.48 12.53	32.06 15.44	36.25 17.65	41.60 19.62	52.36 24.51	57.66 27.17				
16764	7.41 3.79	9.76 4.96	11.33 5.45	11.87 5.92	14.41 7.20	17.20 8.44	19.62 9.69	21.97 10.79	25.65 11.86	31.08 14.60	35.12 16.71	40.29 18.56	50.69 23.20	55.82 25.71	63.49 29.20			
17069	7.22 3.59	9.47 4.69	11.00 5.18	11.52 5.60	14.01 6.82	16.69 7.99	19.04 9.17	21.32 10.23	24.88 11.23	30.13 13.83	34.06 15.81	39.02 17.58	49.09 21.96	54.07 24.34	61.22 27.65			
17374	7.04 3.40	9.20 4.45	10.68 4.90	11.20 5.31	13.61 6.47	16.19 7.58	18.49 8.69	20.67 9.69	24.13 10.65	29.24 13.11	33.02 15.00	37.82 16.66	47.59 20.82	52.40 23.08	59.10 26.22	64.35 28.63		
17678	6.84 3.22	8.97 4.21	10.37 4.65	10.87 5.04	13.22 6.14	15.73 7.19	17.95 8.26	20.09 9.20	23.42 10.11	28.37 12.44	32.06 14.22	36.65 15.81	46.11 19.76	50.80 21.90	57.06 24.88	62.35 27.17		
17983	6.66 3.06	8.72 4.01	10.08 4.42	10.56 4.78	12.84 5.83	15.27 6.82	17.43 7.83	19.49 8.74	22.72 9.60	27.40 11.82	31.12 13.51	35.55 15.01	44.74 18.76	49.26 20.53	55.13 23.62	60.43 25.80		
18288	6.49 2.91	8.49 3.80	9.77 4.20	10.28 4.55	12.49 5.54	14.84 6.49	16.94 7.45	18.95 8.30	22.06 9.12	26.50 11.23	30.22 12.84	34.47 14.28	43.34 17.83	47.80 19.77	53.29 22.46	58.59 24.53	63.78 26.63	
18593	6.34 2.77	8.27 3.63	9.47 3.99	9.99 4.33	12.14 5.26	14.41 6.18	16.46 7.09	18.43 7.90	21.45 8.68	25.62 10.68	29.34 12.21	33.36 13.58	41.91 16.97	46.37 18.81	51.54 21.36	56.84 23.33	61.70 25.33	
18898	6.18 2.64	8.05 3.45	9.16 3.80	9.73 4.13	11.82 5.02	14.02 5.88	15.99 6.74	17.90 7.53	20.84 8.26	24.79 10.17	28.51 11.63	32.28 12.93	40.55 16.15	45.05 17.98	49.88 20.34	55.17 22.22	59.71 24.12	
19202	6.04 2.52	7.83 3.29	8.88 3.63	9.47 3.92	11.51 4.78	13.63 5.60	15.55 6.43	17.42 7.16	20.24 7.88	24.00 9.69	27.72 11.09	31.26 12.33	39.28 15.39	43.75 17.06	48.30 19.38	53.55 21.17	57.83 22.98	
19507	5.88 2.40	7.63 3.13	8.62 3.45	9.20 3.75	11.20 4.56	13.26 5.34	15.14 6.12	16.94 6.84	19.70 7.51	23.26 9.25	26.92 10.56	30.29 11.74	38.06 14.68	42.52 16.27	46.80 18.49	52.02 20.18	56.04 21.92	
19812	5.73 2.29	7.44 3.09	8.36 3.29	8.97 3.57	10.90 4.34	12.91 5.10	14.72 5.85	16.47 6.52	19.14 7.16	22.56 8.82	26.09 10.08	29.34 11.22	36.87 14.01	41.21 15.52	45.37 17.64	50.53 19.26	54.30 20.92	64.28 24.38
20117	5.56 2.18	7.26 2.86	8.02 3.15	8.72 3.41	10.63 4.15	12.53 4.87	14.36 5.58	16.06 6.23	17.68 6.84	21.86 8.42	25.30 9.63	28.47 10.71	35.76 13.38	39.97 14.82	44.00 16.84	49.13 18.40	52.66 19.97	62.35 23.29
20422	5.39 2.10	7.06 2.74	7.80 3.02	8.49 3.26	10.33 3.80	12.18 4.48	13.96 5.12	15.58 5.69	17.42 6.43	21.23 7.70	24.56 8.80	27.62 9.79	34.71 12.22	38.79 13.55	42.68 15.39	47.78 16.81	51.09 18.25	60.50 21.27
20726	5.26 2.01	6.88 2.62	7.58 2.88	8.27 3.13	10.04 3.80	11.86 4.48	13.57 5.12	15.11 5.69	17.16 6.43	20.59 7.70	23.83 8.80	26.80 9.79	33.68 12.22	37.65 13.55	41.43 15.39	46.46 16.81	49.60 18.25	58.72 21.27
21031	5.12 1.92	6.69 2.52	7.39 2.77	8.05 3.02	9.77 3.66	11.55 4.30	13.19 4.90	14.68 5.44	16.89 6.24	20.00 7.36	23.13 8.42	26.02 9.36	32.71 11.70	36.55 12.97	40.23 14.73	45.22 16.09	48.15 17.46	57.01 20.37
21336	4.99 1.85	6.52 2.42	7.19 2.67	7.83 2.88	9.51 3.51	11.25 4.13	12.84 4.71	14.27 5.21	16.65 6.07	19.43 7.04	22.47 8.07	25.27 8.97	31.78 11.20	35.50 12.41	39.09 14.11	44.01 15.41	46.80 16.72	55.39 19.49
21641	4.85 1.78	6.36 2.33	7.01 2.56	7.63 2.77	9.28 3.37	10.94 3.95	12.49 4.50	13.84 4.99	16.43 5.89	18.88 6.75	21.84 7.73	24.57 8.59	30.88 10.74	34.51 11.89	38.00 13.01	42.86 14.76	45.48 16.02	53.85 18.68
21946	4.74 1.70	6.18 2.23	6.84 2.46	7.44 2.67	9.03 3.23	10.65 3.79	12.17 4.33	13.48 4.78	15.98 5.64	18.35 6.47	21.24 7.41	23.90 8.23	30.03 10.28	33.55 11.41	36.95 12.95	41.73 14.15	44.21 15.36	52.33 17.90
22250	4.61 1.63	6.04 2.14	6.66 2.36	7.26 2.56	8.80 3.10	10.39 3.64	11.86 4.15	13.10 4.59	15.54 5.41	17.86 6.21	20.66 7.10	23.24 7.89	29.21 9.88	32.63 10.94	35.91 12.43	40.67 13.57	43.00 14.73	50.91 17.17
22555	4.50 1.57	5.88 2.05	6.49 2.27	7.06 2.46	8.58 2.99	10.12 3.51	11.55 3.98	12.75 4.40	15.11 5.19	17.38 5.96	20.11 6.82	22.60 7.58	28.42 9.47	31.75 10.50	34.95 11.93	39.63 13.03	41.85 14.15	49.53 16.49
22860	4.39 1.51	5.74 1.98	6.34 2.18	6.88 2.37	8.36 2.87	9.86 3.37	11.26 3.83	12.40 4.23	14.72 4.99	16.91 5.73	19.57 6.55	22.02 7.28	27.67 9.10	30.90 10.08	33.14 11.45	38.63 12.52	40.73 13.58	48.21 15.83
23165	4.29 1.45	5.60 1.91	6.18 2.10	6.74 2.29	8.15 2.75	9.63 3.25	10.98 3.67	12.08 4.07	14.33 4.80	16.47 5.50	19.05 6.28	21.42 7.00	26.94 8.74	30.09 9.69	33.14 11.00	37.69 12.02	39.66 13.06	46.94 15.22
23470	4.20 1.41	5.47 1.83	6.04 2.02	6.56 2.20	7.96 2.65	9.38 3.12	10.72 3.54	11.77 3.91	13.96 4.61	16.03 5.29	18.56 6.05	20.88 6.72	26.23 8.40	28.30 9.30	32.28 10.58	36.77 11.55	38.63 12.55	45.75 14.63
23774	4.08 																	

LOAD TABLES

LRFD - LH-SERIES

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES

Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)

Joist Designation	44LH09	44LH10	44LH11	44LH12	44LH13	44LH14	44LH15	44LH16	44LH17	44LH18	44LH19	44LH20	44LH21	44LH22	44LH23	44LH24	44LH25	
Depth (mm)	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	1118	
Approx. Wt. (kN/m)	0.28	0.31	0.32	0.36	0.44	0.45	0.53	0.61	0.69	0.83	0.93	1.20	1.36	1.47	1.72	1.85	2.15	
Span (mm)																		
13411	12.79 8.53 9.41	14.11 11.09 13.09	16.63 13.09 15.44	19.62 15.44 18.38	23.16 18.38 21.39	27.58 21.39 25.24	32.09 25.24 28.15	37.87 28.15 34.85	42.22 34.85 41.09	52.27 41.09	61.64 41.09							
13716	12.43 8.28 9.15	13.71 10.77 12.69	16.15 12.69 14.97	19.04 14.97 17.80	22.46 17.80 20.72	26.70 20.72 24.41	31.08 24.41 27.23	36.61 27.23 33.71	40.84 33.71 39.66	50.56 39.66	59.49 39.66							
14021	12.08 8.05 8.88	13.32 10.44 12.31	15.67 12.31 14.52	18.47 14.52 17.24	21.77 17.24 20.06	25.87 20.06 23.62	30.09 23.62 26.35	35.43 26.35 32.61	39.53 32.61 38.30	48.91 38.30	57.45 38.30							
14326	11.74 7.83 8.63	12.95 10.14 11.95	15.20 11.95 14.09	17.92 14.09 16.72	21.14 16.72 19.45	25.08 19.45 22.86	29.17 22.86 25.51	34.29 25.51 31.58	38.26 31.58 36.54	47.37 36.54	55.52 36.54							
14630	11.42 7.61 8.40	12.60 9.83 11.60	14.75 11.60 13.68	17.39 13.68 16.21	20.53 16.21 18.85	24.31 18.85 22.15	28.28 22.15 24.24	33.23 24.24 30.57	37.05 30.57 34.29	45.85 34.29	53.67 34.29							
14935	11.12 7.41 8.17	12.25 9.51 11.26	14.33 11.26 13.28	16.89 13.28 15.71	19.92 15.71 18.28	23.56 18.28 21.30	27.42 21.30 22.78	32.17 22.78 28.95	35.90 28.95 32.22	44.43 32.22 40.30	51.89 40.30	65.33 40.30						
15240	10.81 7.20 7.95	11.92 9.94 11.95	13.92 11.95 14.09	16.41 14.09 16.21	19.35 16.21 18.85	22.86 18.85 21.42	26.59 21.42 24.05	31.17 24.05 27.24	34.77 27.24 30.31	43.05 30.31 37.91	50.21 37.91	63.22 37.91						
15545	10.52 7.01 7.73	11.60 9.83 11.60	13.52 11.60 13.68	15.93 13.68 16.21	18.79 16.21 18.85	22.16 18.85 21.42	25.80 21.42 24.05	30.22 24.05 27.24	33.71 27.24 30.31	41.73 30.31 37.91	48.59 37.91	61.20 37.91						
15850	10.24 6.68 7.35	11.29 9.51 11.26	13.13 11.26 13.28	15.49 13.28 15.71	18.27 15.71 18.28	21.54 18.28 21.30	25.05 21.30 22.78	29.30 22.78 28.95	32.67 28.95 32.22	40.46 32.22 40.30	47.06 40.30	65.25 40.30	65.23 40.30					
16154	9.95 6.30 6.94	10.98 9.26 10.98	12.75 10.98 12.69	15.06 12.69 14.97	17.74 14.97 17.80	20.89 17.80 20.72	24.31 20.72 24.41	28.42 24.41 27.23	31.69 27.23 30.31	39.24 30.31 37.91	45.59 37.91	63.19 37.91	63.19 37.91					
16459	9.69 5.96 6.56	10.69 9.07 10.73	12.40 10.73 12.31	14.63 12.31 14.52	17.26 14.52 17.24	20.28 17.24 20.06	23.61 20.06 23.62	27.58 23.62 26.35	30.77 26.35 32.61	38.09 32.61 38.30	44.17 38.30	61.25 38.30	61.25 38.30					
16764	9.45 5.64 6.21	10.42 8.84 10.51	12.05 10.51 12.10	14.22 12.10 14.09	16.78 14.09 16.21	19.71 16.21 18.85	22.94 18.85 21.30	26.76 21.30 22.78	29.85 22.78 28.95	36.96 28.95 32.22	42.81 32.22 40.30	59.36 40.30	59.36 40.30					
17069	9.20 5.34 5.88	10.15 8.66 10.33	11.73 10.33 12.00	13.84 12.00 13.68	16.33 13.68 16.21	19.17 16.21 18.85	22.29 18.85 21.30	26.00 21.30 22.78	28.99 22.78 28.95	35.90 28.95 32.22	41.51 32.22 40.30	57.57 40.30	57.57 40.30					
17374	8.97 5.06 5.57	9.89 8.41 10.08	11.42 10.08 11.73	13.48 11.73 13.68	15.89 13.68 16.21	18.62 16.21 18.85	21.67 18.85 21.30	25.26 21.30 22.78	28.16 22.78 28.95	34.86 28.95 32.22	40.29 32.22 40.30	50.74 40.30	55.86 40.30	65.46 40.30	65.46 40.30			
17678	8.72 4.80 5.29	9.63 8.15 9.72	11.12 9.72 11.37	13.10 11.37 13.05	15.49 13.05 15.71	18.12 15.71 18.28	21.07 18.28 21.30	24.53 21.30 22.78	27.36 22.78 28.95	33.88 28.95 32.22	39.11 32.22 40.30	49.22 40.30	54.21 40.30	63.23 40.30	63.23 40.30			
17983	8.50 4.56 5.02	9.38 7.90 9.47	10.81 9.47 11.12	12.75 11.12 12.77	15.06 12.77 14.97	17.61 14.97 17.80	20.50 17.80 20.72	23.83 20.72 24.41	26.59 24.41 27.23	32.93 27.23 30.31	37.97 30.31 37.91	47.80 37.91	52.64 37.91	61.09 37.91	65.01 37.91			
18288	8.28 4.33 4.77	9.15 7.67 9.24	10.52 9.24 10.89	12.43 10.89 12.69	14.66 12.69 14.97	17.13 14.97 17.80	19.93 17.80 20.72	23.17 20.72 24.41	25.84 24.41 27.23	32.01 27.23 30.31	36.87 30.31 37.91	46.42 37.91	51.13 37.91	59.06 37.91	63.10 37.91			
18593	8.09 4.13 4.55	8.93 7.45 8.94	10.25 8.94 10.59	12.09 10.59 12.24	14.27 12.24 14.52	16.68 14.52 16.21	19.40 16.21 18.85	22.54 18.85 21.30	25.14 21.30 22.78	31.14 22.78 28.95	35.82 28.95 32.22	45.10 32.22	49.69 32.22	57.13 32.22	61.26 32.22			
18898	7.89 3.92 4.33	8.71 7.23 8.80	9.99 8.80 10.45	11.79 10.45 12.10	13.92 12.10 13.68	16.24 13.68 16.21	18.88 16.21 18.85	21.93 18.85 21.30	24.47 21.30 22.78	30.29 22.78 28.95	34.82 28.95 32.22	43.84 32.22	48.29 32.22	55.29 32.22	59.49 32.22			
19202	7.70 3.75 4.13	8.49 7.01 8.58	9.73 8.58 10.14	11.48 10.14 11.73	13.54 11.73 13.68	15.80 13.68 16.21	18.40 16.21 18.85	21.33 18.85 21.30	23.81 21.30 22.78	29.47 22.78 28.95	33.85 28.95 32.22	42.64 32.22	46.94 32.22	53.54 32.22	57.80 32.22	64.18 32.22		
19507	7.50 3.57 3.94	8.28 6.80 8.37	9.50 8.37 9.94	11.20 9.94 11.59	13.22 11.59 13.68	15.41 13.68 16.21	17.92 16.21 18.85	20.76 18.85 21.30	23.17 21.30 22.78	28.69 22.78 28.95	32.92 28.95 32.22	41.46 32.22	45.66 32.22	51.88 32.22	56.18 32.22	62.17 32.22		
19812	7.32 3.41 3.75	8.09 6.61 8.18	9.25 8.18 9.75	10.91 9.75 11.37	12.88 11.37 13.68	14.98 13.68 16.21	17.46 16.21 18.85	20.22 18.85 21.30	22.56 21.30 22.78	27.94 22.78 28.95	32.04 28.95 32.22	40.33 32.22	44.40 32.22	50.27 32.22	54.63 32.22	60.25 32.22		
20117	7.15 3.25 3.59	7.89 6.41 7.98	8.98 7.98 9.55	10.65 9.55 11.12	12.56 11.12 12.77	14.62 12.77 14.97	17.00 14.97 17.80	19.70 17.80 20.72	21.97 20.72 24.41	27.23 24.41 27.23	31.17 27.23 30.31	39.27 30.31	43.22 30.31	48.77 30.31	53.15 30.31	58.44 30.31		
20422	6.97 3.10 3.42	7.70 6.22 7.79	8.72 7.79 9.36	10.39 9.36 10.93	12.25 10.93 12.69	14.24 12.69 14.97	16.59 14.97 17.80	19.19 17.80 20.72	21.40 20.72 24.41	26.53 24.41 27.23	30.35 27.23 30.31	38.22 30.31	42.08 30.31	47.29 30.31	51.72 30.31	56.69 30.31		
20726	6.82 2.97 3.28	7.53 6.05 7.62	8.49 7.62 9.19	10.12 9.19 10.76	11.95 10.76 12.33	13.89 12.33 14.97	16.17 14.97 17.80	18.70 17.80 20.72	20.88 20.72 24.41	25.84 24.41 27.23	29.55 27.23 30.31	37.21 30.31	40.99 30.31	45.92 30.31	50.34 30.31	55.03 30.31	65.16 30.31	
21031	6.65 2.84 3.13	7.35 5.87 7.44	8.24 7.44 8.99	9.89 8.99 10.56	11.66 10.56 12.13	13.54 12.13 13.68	15.77 13.68 16.21	18.22 16.21 18.85	20.35 18.85 21.30	25.18 21.30 24.41	28.77 24.41 27.23	36.25 27.23	39.92 27.23	44.58 27.23	49.00 27.23	53.45 27.23	63.27 27.23	
21336	6.49 2.72 3.00	7.18 5.70 7.27	8.01 7.27 8.84	9.64 8.84 10.41	11.39 10.41 11.98	13.22 11.98 13.68	15.38 13.68 16.21	17.78 16.21 18.85	19.83 18.85 21.30	24.57 21.30 24.41	27.99 24.41 27.23	35.21 27.23	38.92 27.23	43.31 27.23	47.73 27.23	51.96 27.23	61.48 27.23	
21641	6.36 2.61 2.87	7.01 5.53 7.10	7.79 7.10 8.67	9.42 8.67 10.24	11.12 10.24 11.81	12.88 11.81 13.68	15.01 13.68 16.21	17.33 16.21 18.85	19.35 18.85 21.30	23.96 21.30 24.41	27.20 24.41 27.23	34.20 27.23	37.92 27.23	42.08 27.23	46.51 27.23	50.45 27.23	59.76 27.23	
21946	6.21 2.51 2.75	6.84 5.36 6.93	7.58 6.93 8.50	9.20 8.50 10.07	10.85 10.07 11.64	12.57 11.64 13.68	14.66 13.68 16.21	16.91 16.21 18.85	18.88 18.85 21.30	23.37 21.30 24.41	26.45 24.41 27.23	33.27 27.23	36.96 27.23	40.93 27.23	45.05 27.23	49.05 27.23	58.09 27.23	
22250	6.08 2.40 2.64	6.69 5.21 6.78	7.39 6.78 8.35	8.98 8.35 9.92	10.60 9.92 11.49	12.30 11.49 13.68	14.31 13.68 16.21	16.50 16.21 18.85	18.43 18.85 21.30	22.82 21.30 24.41	25.74 24.41 27.23	32.36 27.23	36.07 27.23	39.81 27.23	43.08 27.23	46.42 27.23	55.52 27.23	
22555	5.95 2.30 2.53	6.56 5.08 6.65	7.10 6.65 8.22	8.80 8.22 9.79	10.43 9.79 11.36	12.01 11.36 13.68	13.98 13.68 16.21	16.12 16.21 18.85	17.29 18.85 21.30	22.24 21.30 24.41	25.04 24.41 27.23	31.49 27.23	35.17 27.23	38.74 27.23	43.08 27.23	46.42 27.23	54.98 27.23	
22860	5.79 2.21 2.45	6.40 4.92 6.49	6.93 6.49 8.06	8.59 8.06 9.63	10.20 9.63 11.20	11.68 11.20 13.68	13.63 13.68 16.21	15.73 16.21 18.85	17.07 18.85 21.3									

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES
Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)

Joist Designation	48LH10	48LH11	48LH12	48LH13	48LH14	48LH15	48LH16	48LH17	48LH18	48LH19	48LH20	48LH21	48LH22	48LH23	48LH24	48LH25
Depth (mm)	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219
Approx. Wt. (kN/m)	0.31	0.32	0.36	0.42	0.47	0.53	0.61	0.69	0.83	0.90	1.15	1.27	1.47	1.59	1.81	2.10
Span (mm) ↓																
14630	11.77 7.85	12.71 8.47	16.54 11.03	19.80 13.20	24.12 16.08	27.67 18.44	32.71 21.81	36.73 24.48	46.86 31.24	55.52 37.02						
14935	11.48 7.66	12.39 8.26	16.11 10.74	19.26 12.84	23.43 15.63	26.89 17.93	31.78 21.19	35.65 23.77	45.50 30.34	53.80 35.87						
15240	11.20 7.47	12.08 8.05	15.68 10.46	18.75 12.50	22.78 15.19	26.13 17.42	30.83 20.56	34.60 23.07	44.19 29.46	52.14 34.76						
15545	10.91 7.28	11.77 7.85	15.27 10.18	18.27 12.18	22.16 14.78	25.40 16.94	29.96 19.97	33.62 22.41	42.92 28.61	50.56 33.71	63.67 42.45					
15850	10.65 7.10	11.48 7.66	14.88 9.92	17.78 11.86	21.55 14.37	24.70 16.47	29.11 19.40	32.66 21.77	41.69 27.80	49.03 32.35	61.74 40.51					
16154	10.39 6.93	11.20 7.47	14.49 9.66	17.33 11.55	20.97 13.98	24.05 16.03	28.28 18.85	31.74 21.16	40.51 27.01	47.56 30.54	59.90 38.25					
16459	10.12 6.75	10.94 7.29	14.11 9.41	16.87 11.25	20.40 13.60	23.39 15.60	27.49 18.25	30.83 20.41	39.37 25.91	46.16 28.86	58.14 36.14	64.02 40.08				
16764	9.89 6.59	10.68 7.12	13.74 9.16	16.43 10.96	19.84 13.09	22.76 14.98	26.72 17.27	29.99 19.32	38.27 24.53	44.80 27.31	56.44 34.20	62.17 37.92				
17069	9.64 6.43	10.42 6.94	13.39 8.80	16.02 10.50	19.32 12.39	22.16 14.19	26.00 16.35	29.17 18.30	37.22 23.23	43.51 25.87	54.82 32.39	60.37 35.91				
17374	9.42 6.15	10.17 6.64	13.06 8.34	15.63 9.95	18.82 11.74	21.58 13.45	25.27 15.51	28.37 17.33	36.22 22.02	42.29 24.51	53.25 30.70	58.63 34.04				
17678	9.19 5.83	9.93 6.30	12.74 7.90	15.23 9.45	18.31 11.14	21.01 12.76	24.60 14.71	27.59 16.46	35.25 20.89	41.08 23.27	51.76 29.14	57.00 32.31				
17983	8.97 5.54	9.69 5.98	12.40 7.51	14.85 8.97	17.83 10.59	20.46 12.12	23.94 13.98	26.88 15.63	34.32 19.84	39.94 22.09	50.31 27.67	55.39 30.69	65.42 34.87			
18288	8.77 5.28	9.47 5.69	12.09 7.15	14.49 8.53	17.39 10.06	19.93 11.52	23.30 13.28	26.15 14.85	33.40 18.86	38.83 21.00	48.91 26.31	53.86 29.17	63.61 33.15			
18593	8.58 5.02	9.25 5.41	11.82 6.80	14.14 8.11	16.94 9.57	19.43 10.96	22.69 12.63	25.48 14.12	32.52 17.95	37.78 19.97	47.59 25.02	52.40 27.74	61.87 31.53	65.05 34.51		
18898	8.36 4.77	9.03 5.15	11.52 6.47	13.79 7.73	16.52 9.12	18.95 10.43	22.10 12.03	24.82 13.45	31.69 17.08	36.74 19.03	46.29 23.83	50.97 26.41	60.21 30.03	63.26 32.86		
19202	8.18 4.55	8.81 4.90	11.25 6.17	13.45 7.36	16.11 8.68	18.47 9.95	21.54 11.47	24.18 12.82	30.88 16.28	35.76 18.12	45.06 22.70	49.61 25.17	58.62 28.61	61.51 31.31		
19507	7.98 4.34	8.62 4.68	10.98 5.88	13.13 7.01	15.71 8.28	18.00 9.48	20.98 10.93	23.56 12.22	30.09 15.52	34.82 17.29	43.86 21.65	48.30 24.00	56.93 27.29	59.84 29.85		
19812	7.80 4.14	8.42 4.46	10.72 5.61	12.82 6.69	15.32 7.90	17.57 9.04	20.46 10.43	22.98 11.67	29.33 14.81	33.90 16.50	42.73 20.66	47.06 22.91	55.17 26.03	58.24 28.50		
20117	7.63 3.95	8.24 4.26	10.46 5.35	12.52 6.40	14.94 7.54	17.16 8.63	19.96 9.96	22.41 11.14	28.60 14.15	33.02 15.76	41.63 19.73	45.83 21.87	53.51 24.86	56.69 27.21	64.22 29.61	
20422	7.45 3.77	8.05 4.07	10.21 5.12	12.22 6.11	14.59 7.20	16.73 8.26	19.45 9.52	21.84 10.65	27.90 13.52	32.19 15.06	40.55 18.85	44.65 20.91	51.92 23.77	55.20 26.00	62.30 28.29	
20726	7.31 3.61	7.88 3.89	9.98 4.90	11.95 5.85	14.24 6.90	16.34 7.89	19.00 9.10	21.32 10.18	27.23 12.93	31.36 14.40	39.53 18.03	43.53 19.99	50.40 22.72	53.77 24.86	60.47 27.05	
21031	7.13 3.45	7.70 3.73	9.76 4.68	11.66 5.60	13.89 6.61	15.95 7.55	18.53 8.71	20.79 9.74	26.57 12.37	30.60 13.77	38.54 17.24	42.43 19.13	48.94 21.74	52.40 23.80	58.72 25.88	
21336	6.97 3.31	7.53 3.57	9.54 4.49	11.39 5.35	13.58 6.31	15.58 7.23	18.08 8.34	20.31 9.34	25.93 11.85	29.82 13.19	37.57 16.52	41.38 18.31	47.54 20.82	51.06 22.79	57.04 24.79	
21641	6.82 3.18	7.36 3.42	9.32 4.30	11.16 5.13	13.26 6.05	15.20 6.93	17.65 7.99	19.83 8.94	25.32 11.35	29.08 12.63	36.65 15.83	40.38 17.55	46.20 19.94	49.77 21.83	55.44 23.75	65.67 27.71
21946	6.66 3.05	7.22 3.28	9.10 4.13	10.90 4.91	12.95 5.80	14.85 6.65	17.24 7.66	19.35 8.56	24.70 10.88	28.38 12.12	35.76 15.17	39.40 16.82	44.93 19.13	48.55 20.92	53.90 22.76	63.84 26.57



LOAD TABLES

LRFD - LH-SERIES

LRFD

METRIC LOAD TABLE/OPEN WEB STEEL JOISTS, LH-SERIES																
Based on a 345 MPa Maximum Yield Strength - Loads Shown In Kilonewtons Per Meter (kN/m)																
Joist Designation	48LH10	48LH11	48LH12	48LH13	48LH14	48LH15	48LH16	48LH17	48LH18	48LH19	48LH20	48LH21	48LH22	48LH23	48LH24	48LH25
Depth (mm)	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219	1219
Approx. Wt. (kN/m)	0.31	0.32	0.36	0.42	0.47	0.53	0.61	0.69	0.83	0.90	1.15	1.27	1.47	1.59	1.81	2.10
Span (mm)																
↓																
22250	6.53 2.91	7.06 3.15	8.90 3.95	10.65 4.72	12.66 5.57	14.53 6.37	16.82 7.35	18.91 8.23	24.13 10.43	27.71 11.63	34.90 14.56	38.45 16.14	43.70 18.34	47.34 20.08	52.45 21.84	62.09 26.48
22555	6.40 2.80	6.91 3.02	8.71 3.79	10.42 4.53	12.39 5.35	14.19 6.12	16.46 7.06	18.47 7.89	23.59 10.02	27.05 11.16	34.07 13.98	37.53 15.49	42.52 17.61	46.20 19.27	51.02 20.97	60.43 24.45
22860	6.26 2.68	6.75 2.90	8.50 3.64	10.20 4.34	12.09 5.13	13.87 5.88	16.06 6.77	18.03 7.57	23.04 9.61	26.41 10.71	33.27 13.42	36.65 14.88	41.38 16.91	45.09 18.50	49.66 20.13	58.81 23.49
23165	6.14 2.58	6.62 2.78	8.33 3.50	9.98 4.18	11.83 4.93	13.57 5.64	15.71 6.50	17.64 7.28	22.51 9.25	25.80 10.30	32.50 12.90	35.81 14.30	40.29 16.25	44.01 17.78	48.34 19.35	57.28 22.57
23470	6.01 2.48	6.49 2.68	8.15 3.37	9.76 4.02	11.57 4.74	13.28 5.42	15.36 6.26	17.24 7.00	22.02 8.88	25.18 9.89	31.75 12.39	34.98 13.74	39.27 15.63	42.99 17.10	47.10 18.60	55.79 21.70
23774	5.88 2.39	6.34 2.58	7.98 3.23	9.55 3.86	11.31 4.56	13.00 5.22	15.01 6.02	16.85 6.74	21.54 8.55	24.61 9.51	31.04 11.92	34.16 13.22	38.26 15.03	41.98 16.44	45.89 17.89	54.37 20.86
24079	5.77 2.30	6.21 2.48	7.80 3.12	9.36 3.72	11.07 4.39	12.71 5.03	14.68 5.79	16.47 6.47	21.05 8.23	24.07 9.16	30.29 11.47	33.40 12.72	37.30 14.46	41.02 15.81	44.74 17.22	52.99 20.08
24384	5.64 2.21	6.10 2.39	7.66 3.00	9.16 3.59	10.82 4.23	12.43 4.84	14.36 5.57	16.12 6.24	20.59 7.92	23.48 8.81	29.55 11.04	32.66 12.24	36.35 13.92	40.07 15.23	43.62 16.57	51.67 19.33
24689	5.53 2.13	5.96 2.30	7.50 2.88	8.97 3.45	10.60 4.07	12.17 4.67	14.05 5.37	15.77 6.01	20.15 7.63	22.89 8.49	28.82 10.63	31.93 11.80	35.46 13.41	39.18 14.68	42.55 15.96	50.39 18.63
24994	5.38 2.05	5.82 2.21	7.35 2.78	8.80 3.32	10.39 3.92	11.92 4.49	13.76 5.18	15.45 5.79	19.71 7.35	22.34 8.18	28.10 10.25	31.23 11.36	34.60 12.93	38.30 14.14	41.51 15.38	49.16 17.95
25298	5.26 1.98	5.69 2.14	7.19 2.69	8.59 3.22	10.15 3.79	11.66 4.34	13.45 5.00	15.10 5.58	19.30 7.09	21.80 7.89	27.45 9.88	30.55 10.96	33.77 12.46	37.44 13.63	40.51 14.84	47.98 17.30
25603	5.16 1.92	5.57 2.07	7.04 2.61	8.40 3.10	9.93 3.66	11.39 4.18	13.14 4.83	14.76 5.41	18.91 6.82	21.27 7.61	26.79 9.52	29.90 10.58	32.96 12.02	36.64 13.14	39.54 14.31	46.84 16.69
25908	5.04 1.85	5.44 1.99	6.88 2.52	8.23 3.00	9.71 3.54	11.16 4.05	12.87 4.67	14.44 5.22	18.44 6.59	20.79 7.35	26.15 9.20	29.21 10.20	32.19 11.60	35.85 12.69	38.63 13.80	45.75 16.11
26213	4.94 1.79	5.34 1.94	6.74 2.43	8.05 2.90	9.50 3.41	10.91 3.92	12.60 4.52	14.14 5.04	18.03 6.36	20.28 7.09	25.53 8.88	28.54 9.85	31.43 11.19	35.06 12.25	37.73 13.32	44.67 15.55
26518	4.83 1.73	5.22 1.88	6.58 2.34	7.88 2.81	9.29 3.31	10.68 3.79	12.31 4.36	13.83 4.88	17.61 6.14	19.83 6.84	24.95 8.58	27.88 9.51	30.70 10.81	34.32 11.83	36.86 12.87	43.66 15.01
26822	4.74 1.69	5.12 1.82	6.45 2.27	7.72 2.72	9.10 3.21	10.46 3.67	12.05 4.21	13.54 4.72	17.20 5.93	19.39 6.62	24.40 8.28	27.27 9.19	30.03 10.44	33.59 11.42	36.03 12.43	42.65 14.50
27127	4.64 1.63	5.00 1.75	6.31 2.20	7.54 2.62	8.90 3.09	10.24 3.56	11.82 4.08	13.26 4.58	16.82 5.74	18.95 6.39	23.86 8.01	26.66 8.88	29.34 10.09	32.89 11.04	35.21 12.02	41.72 14.02
27432	4.55 1.57	4.91 1.70	6.18 2.14	7.39 2.55	8.70 3.00	10.02 3.44	11.55 3.95	12.97 4.43	16.46 5.56	18.53 6.18	23.30 7.74	26.06 8.59	28.69 9.76	32.22 10.68	34.42 11.63	40.77 13.55
27737	4.46 1.53	4.81 1.64	6.05 2.07	7.26 2.48	8.53 2.90	9.80 3.32	11.33 3.83	12.71 4.29	16.08 5.37	18.12 5.98	22.81 7.48	25.48 8.30	28.06 9.44	31.56 10.33	33.68 11.23	39.88 13.11
28042	4.37 1.48	4.72 1.60	5.95 2.01	7.10 2.39	8.37 2.81	9.60 3.22	11.09 3.72	12.44 4.15	15.73 5.19	17.73 5.79	22.29 7.25	24.92 8.04	27.45 9.13	30.92 9.99	32.93 10.87	39.02 12.69
28346	4.29 1.44	4.64 1.54	5.82 1.94	6.96 2.32	8.20 2.72	9.41 3.12	10.87 3.60	12.21 4.02	15.41 5.03	17.35 5.60	21.84 7.01	24.40 7.77	26.88 8.84	30.31 9.67	32.23 10.53	38.19 12.28
28651	4.20 1.40	4.55 1.50	5.70 1.88	6.82 2.24	8.02 2.64	9.23 3.03	10.65 3.48	11.96 3.91	15.07 4.87	16.98 5.42	21.36 6.80	23.87 7.53	26.28 8.56	29.69 9.36	31.56 10.20	37.38 11.89
28956	4.11 1.35	4.46 1.45	5.60 1.83	6.69 2.18	7.88 2.56	9.03 2.93	10.43 3.38	11.73 3.79	14.75 4.71	16.60 5.25	20.92 6.58	23.37 7.29	25.74 8.28	29.11 9.07	30.88 9.88	36.60 11.52
29261	4.04 1.31	4.37 1.41	5.48 1.78	6.56 2.11	7.72 2.49	8.85 2.84	10.24 3.28	11.48 3.67	14.44 4.56	16.28 5.09	20.48 6.37	22.89 7.07	25.21 8.04	28.54 8.80	30.25 9.57	35.82 11.16



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CODE OF STANDARD PRACTICE FOR STEEL JOISTS AND JOIST GIRDERS

Adopted by the Steel Joist Institute April 7, 1931
Revised to Nov. 10, 2014 - Effective Jan.1, 2015

SECTION 1. GENERAL

1.1 SCOPE

The practices and customs set forth herein are in accordance with good engineering practice, tend to ensure safety in steel joist and Joist Girder construction, and are standard within the industry. There shall be no conflict between this code and any legal building regulation. This code shall only supplement and amplify such laws. Unless specific provisions to the contrary are made in a contract for the purchase of steel joists or Joist Girders, this code is understood to govern the interpretation of such a contract.

1.2 APPLICATION

This Code of Standard Practice is to govern as a standard unless otherwise covered in the architects' and engineers' plans and specifications.

1.3 DEFINITIONS

Add-Load. A single vertical concentrated load that occurs at any one panel point along the joist chord. This load is in addition to any other gravity loads specified.

Bend-Check Load. A vertical concentrated load used to design the joist chord for the additional bending stresses resulting from this load being applied at any location between the joist panel points. This load shall already be accounted for in the specified joist designation load, uniform load, or Add-Load and is used only for the additional bending check in the chord and does not contribute to the overall axial forces within the joist. An ideal use of this is for incidental loads which have already been accounted for in the design loading but may induce additional bending stress due to this load occurring at any location along the chord.

Buyer. The entity that has agreed to purchase Material from the manufacturer and has also agreed to the terms of sale.

Erector. The entity that is responsible for the safe and proper erection of the materials in accordance with all applicable codes and regulations.

Material. Steel joists, Joist Girders and accessories as provided by the seller.

Owner. The entity that is identified as such in the contract documents.

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Placement Plans. Drawings that are prepared depicting the interpretation of the contract document's requirements for the Material to be supplied by the Seller. These floor or roof plans are approved by the Specifying Professional, Buyer, or Owner for conformance with the design requirements. The Seller uses the information contained on these drawings for final material design. A unique piece mark number is typically shown for the individual placement of the steel joists, Joist Girders and accessories along with sections that describe the end bearing conditions and minimum attachment required so that material is placed in the proper location in the field.

Seller. A company certified by the Steel Joist Institute engaged in the manufacture and distribution of steel joists, Joist Girders and accessories.

Specifying Professional. The licensed professional who is responsible for sealing the building contract documents, that indicates that he or she has performed or supervised the analysis, design and document preparation for the structure and has knowledge of the load-carrying structural system.

Structural Drawings. The graphic or pictorial portions of the contract documents showing the design, location and dimensions of the work. These documents generally include plans, elevations, sections, details, connections, all loads, schedules, diagrams and notes.

1.4 DESIGN

In the absence of ordinances or specifications to the contrary, all designs prepared by the Specifying Professional shall be in accordance with the Steel Joist Institute Standard Specifications of latest adoption.

1.5 RESPONSIBILITY FOR DESIGN AND ERECTION

When material requirements are specified, the seller shall assume no responsibility other than to furnish the items listed in Section 5.2(a). When material requirements are not specified, the seller shall furnish the items listed in Section 5.2(a) in accordance with Steel Joist Institute Standard Specifications of latest adoption, and this code. Pertinent design information shall be provided to the seller as stipulated in Section 6.1. The seller shall identify material by showing size and type. In no case shall the seller assume any responsibility for the erection of the item furnished.

1.6 PERFORMANCE TESTS FOR OPEN WEB STEEL JOIST CONSTRUCTION

When a performance test on a joist is required, the following criteria shall be used:

- a) The performance test load shall be the maximum factored uniformly distributed downward design load for the selected joist.
 - (1) The TOTAL safe factored uniformly distributed load-carrying capacity tabulated in the Standard LRFD Load Table for the specific joist designation and span.
 - (2) For a joist with factored loading conditions other than those found in the Standard LRFD Load Table, this is the LRFD Load Combination resulting in the highest uniformly distributed downward factored design load.
 - (3) For a joist with loading conditions other than those found in the Standard ASD Load Table, this is the ASD Load Combination resulting in the highest uniformly distributed downward design load multiplied times 1.50.
- b) Joist self-weight and the weight of all test materials shall be included in the calculation of applied performance test loading as appropriate for the joist during testing.

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- c) Loading shall be uniformly distributed across the full length of the joist top chord, and the load application shall maintain uniform distribution throughout the test. At any stage during the application of the test loading, the test load shall not be distributed in such a manner as to result in any joist component being subjected to a higher proportion of force than intended by the joist design.
- d) If tested as a panel assembly, the joists shall be tested in pairs with deck, deck attachments, and bridging installed per the approved joist and deck Placement Plans. All bottom chord horizontal bridging rows shall be terminated by bracing back to the top chord of the adjacent joist or by a lateral restraint system which does not inhibit the vertical deflection of the test joist.
- e) If tested singly in a load test machine apparatus, the joist chords shall be braced to prevent lateral movement, without inhibiting vertical displacement. The joist top chord shall have lateral braces located at equal spacing of no more than 36 inches (914 mm) on center. The joist bottom chord shall have lateral braces located, at a minimum, per the bottom chord bridging locations shown on the approved joist placement plan.
- f) The performance test loading shall be applied at a rate of no greater than 25 plf per minute and shall be sustained for no less than 15 minutes. After the maximum test load has been removed for a minimum of 10 minutes, the remaining vertical displacement at midspan shall not exceed 20% of the vertical midspan deflection sustained under the full performance test load.
- g) All costs associated with such testing shall be borne by the purchaser.
- h) Joists that have been designed and manufactured and have satisfied the above performance test criteria shall be considered to satisfy the intent of the Steel Joist Institute Standard Specifications, and shall be considered acceptable for use in construction. No further proof of strength of individual joist components or connections is required.

SECTION 2.

JOISTS, JOIST GIRDERS, AND ACCESSORIES

2.1 STEEL JOISTS AND JOIST GIRDERS

Steel joists and Joist Girders shall carry the designations and meet the requirements of the Steel Joist Institute Standard Specifications of latest adoption.

K-Series, LH-Series, DLH-Series joists, and Joist Girders are furnished either underslung or square ended, with top chords either parallel, pitched one way or pitched two ways. It is not recommended that any Joist Girder, or any DLH-Series joist that exceeds 72 inches (1829 mm) in depth and has a span greater than 80 feet (24384 mm), be used in a bottom bearing configuration.

The steel joist or Joist Girder designation depth or nominal depth shall be the depth at midspan, except for double pitched joists which shall be the depth at the ridge. K-Series, LH-Series, DLH-Series joists, and Joist Girders shall be permitted to have either parallel chords or a top chord pitch of up to 1/2 inch per foot (1:24).

2.2 BEARING SEATS

Underslung types are furnished with minimum end bearing depths as shown in Table 2.2-1. A standard maximum joist bearing seat width (perpendicular to the joist length) is provided. This width shall be permitted to vary based on the joist design and joist manufacturer.

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TABLE 2.2-1

STANDARD END BEARING SEAT DEPTH AND STANDARD MAXIMUM SEAT WIDTH		
JOIST SECTION NUMBER ¹	MINIMUM BEARING DEPTH	MAXIMUM SEAT WIDTH ²
K1-12	2 ½" (64 mm)	6" (152 mm)
LH02-06	5" (127 mm)	6" (152 mm)
LH07-17, DLH10-17	5" (127 mm)	8" (203 mm)
JG	7 ½" (191 mm)	8" (203 mm)
LH/DLH18-25, JG ³	7 ½" (191 mm)	13" (330 mm)
JG ⁴	10" (254 mm)	13" (330 mm)
⁽¹⁾ Last two digits of joist designation shown in Load Table. ⁽²⁾ THE SEAT WIDTH MAY VARY BASED ON DESIGN. ⁽³⁾ Joist Girders with a self weight greater than 50 plf (0.73 kN/m). ⁽⁴⁾ Joist Girders with a self weight equal to or greater than 150 plf (2.19 kN/m).		

Joist Girder bearing seat widths vary depending on the Joist Girder size and shall be permitted to be up to 13" (330 mm) wide. The supporting structural member shall be made wide enough to accommodate the seat widths.

Where steel joists or Joist Girders are sloped, sloped end bearings may be provided where the slope exceeds 1/4 inch per foot (1:48). When sloped end bearings are required, the seat depths shall be adjusted to maintain the standard height at the shallow end of the sloped bearing. For Open Web Steel Joists, K-Series, bearing ends shall be permitted to not be beveled for slopes of 1/4 inch or less per foot (1:48). For sloped joist bearing seats refer to the sloped seat depth requirements of Table 2.2-2 and Table 2.2-3.



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TABLE 2.2-2
SLOPED SEAT REQUIREMENTS FOR SLOPES 3/8":12 AND GREATER
K-SERIES OPEN WEB STEEL JOISTS

LOW END W/OUT TOP CHORD EXTENSIONS	HIGH END W/OUT TOP CHORD EXTENSIONS	SLOPE "X":12	MINIMUM HIGH END SEAT DEPTH "d"
		3/8	3 1/2
		1/2	3 1/2
		1	3 1/2
		1 1/2	4
		2	4
		2 1/2	4
		3	4 1/2
		3 1/2	4 1/2
		4	4 1/2
		4 1/2	5
		5	5
		5 1/2	5 1/2
SEE NOTE (2) FOR SLOPE RATES GREATER THAN 6:12		6	5 1/2

Notes:

- (1) Depths shown are the minimum required for manufacturing of sloped seats. Depths may vary depending on actual bearing conditions.
- (2) $d = 1/2 + 2.5/\cos\theta + 4\tan\theta$ (Rounded up to the nearest 1/2".)
- (3) Clearance must be checked at outer edge of support. Increase bearing depths as required to allow passage of 2 1/2" deep extension.
- (4) If extension depth greater than 2 1/2" is required, increase bearing depths accordingly.
- (5) If slope is 1/4 : 12 or less, sloped seats are not required.
- (6) Required bearing seat depth is determined at END OF SEAT.
- (7) Also refer to SJI Specification 5.4 for special considerations of joist end reaction location.

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**TABLE 2.2-3
SLOPED SEAT REQUIREMENTS FOR SLOPES 3/8":12 AND GREATER
LH- AND DLH-SERIES OPEN WEB STEEL JOISTS**

LOW END W/OUT TOP CHORD EXTENSIONS	HIGH END W/OUT TOP CHORD EXTENSIONS	SLOPE "X" : 12	MINIMUM HIGH END SEAT DEPTH "d"
		3/8	6
		1/2	6
		1	6 1/2
		1 1/2	6 1/2
		2	7
		2 1/2	7
LOW END W/ TOP CHORD EXTENSIONS	HIGH END W/ TOP CHORD EXTENSIONS	3 1/2	7 1/2
		4	8
		4 1/2	8 1/2
		5	8 1/2
		5 1/2	9
		6	9 1/2
		SEE NOTE (2) FOR SLOPE RATES GREATER THAN 6:12	

Notes:

- (1) Depths shown are the minimum required for manufacturing of sloped seats. Depth may vary depending on actual bearing condition.
- (2) $d = 1/2 + 5 / \cos\theta + 6 \tan\theta$
- (3) Clearance must be checked at outer edge of support. Increase bearing seat depth as required to allow passage of 5" deep extension.
- (4) If extension depth greater than 5" is required, increase bearing depths accordingly.
- (5) Add 2 1/2" to seat depth at 18 thru 25 chord section numbers. Consult with joist manufacturer for information when TCXs are present.
- (6) If slope is 1/4 : 12 or less, sloped seats may not be required.
- (7) Required bearing seat depth shall be determined at END OF SEAT.
- (8) Also refer to SJI Specification 5.4 for special considerations of joist end reaction location.

2.3 JOIST LOCATION AND SPACING

The uniform loads as shown in the Standard Specifications Load Tables & Weight Tables of latest adoption shall be used to determine maximum joist spacing.

Where sidewalls, wall beams or tie beams are capable of supporting the floor slab or roof deck, the first adjacent joists should be placed one full space from these members. Joists are provided with camber and may have a significant difference in elevation with respect to the adjacent structure because of this camber. This difference in elevation shall be given consideration when locating the first joist adjacent to a side wall, wall beam, or tie beam.

K-Series Joists should be placed no closer than 6 inches (152 mm) to adjacent walls or structural members. LH-Series and DLH-Series Joists should be placed no closer than 12 inches (305 mm) to adjacent walls or structural members. Where partition walls are supported by parallel floor joists, there shall be at least one joist provided under each such partition, and more than one such joist shall be provided if necessary to safely support the weight of such partition and the adjacent floor. When partitions occur perpendicular to the joists, they shall be treated as concentrated loads on the supporting joists.

2.4 SPECIFYING DESIGN LOADS

Neither the Steel Joist Institute nor the joist manufacturer establishes the loading requirements for which structures are designed.

The *specifying professional* shall provide the nominal loads and load combinations as stipulated by the applicable code under which the structure is designed and shall provide the design basis (ASD or LRFD).

The *specifying professional* shall calculate and provide the magnitude and location of ALL JOIST and JOIST GIRDER LOADS. This includes all special loads (drift loads, mechanical units, net uplift, axial loads, moments, structural bracing loads, or other applied loads) which are to be incorporated into the joist or Joist Girder design. For Joist Girders, reactions from supported members shall be clearly denoted as point loads on the Joist Girder. When necessary to clearly convey the information, a load diagram or load schedule shall be provided.

The *specifying professional* shall give due consideration to the following loads and load effects:

- Ponded rain water.
- Accumulation of snow in the vicinity of obstructions such as penthouses, signs, parapets, adjacent buildings, etc.
- Wind and seismic forces. Indicate wind NET uplift in pounds per square foot (Pascals) and any other wind or seismic forces required to be incorporated into the joist or Joist Girder design. If applicable, make clear if loads specified are reduced (i.e. for ASD $0.6W=$, $0.7E=$) and provide any pertinent S_{Ds} values. Connection details shall be designed by the *specifying professional*.
- Movable partitions. Convey any special deflection requirements as well as any stacked loading conditions.
- Type and magnitude of end moments and/or axial forces at the joist and Joist Girder end supports shall be shown on the Structural Drawings. For moment resisting joists or Joist Girders framing at or near the top of a column, due consideration shall be given to extend the column length to allow a plate type connection between the top of the joist or Joist Girder top chord and the column.
Avoid transferring joist or Joist Girder end moments and axial forces through the bearing seat connection.
A note shall be provided on the structural drawings stating that all moment resisting joists shall have all dead loads applied to the joist before the bottom chord struts are welded to the supporting connection whenever the design moments provided do not include dead load.
The top and bottom chord moment connection details shall be designed by the *specifying professional*. The joist designer shall furnish the *specifying professional* with the joist detail information if requested. Additional design tools and details are available at the Steel Joist Institute's website, www.steeljoist.org.
- Joist chords shall not carry out-of-plane or torsional loads, such as from horizontal components of concentrated loads applied to laterally sloped joists, braces, screen walls, posts, etc. The structural contract drawings shall show the required structural bracing to resolve these forces.



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Where concentrated loads occur, the magnitude and location of these concentrated loads shall be shown on the structural drawings when, in the opinion of the *specifying professional*, they shall require consideration by the joist manufacturer. For nominal concentrated loads, which have been accounted for in the specified uniform design loads, a “strut” to transfer the load to a panel point on the opposite chord shall not be required provided that the sum of the concentrated loads within a chord panel does not exceed 100 pounds (445 N) and the attachments are concentric to the chord. When exact dimensional locations for concentrated loads which do not meet the above criteria are provided by the *specifying professional*, the joist shall be designed for the loads and load locations provided without the need for additional field applied web members at the specified locations.

(a) Specifying Joist Design Loads

The Steel Joist Institute Load Tables are based on uniform loading conditions and are valid for use in selecting joist sizes for gravity loads that can be expressed in terms of “pounds per linear foot” (kiloNewtons per meter) of joist.

For other loads, the Specifying Professional shall use one of the five options described below that allows:

- The estimator to price the joists.
- The joist manufacturer to design the joists in accordance with the Standard Specifications of latest adoption.
- The owner to obtain the most economical joists.

Option 1: Select a joist designation from the Standard Load Table (or specify a joist type using a uniform load in the designation) which has been determined to be adequate for all design loads. The shear and moment envelope resulting from the selected uniform load shall meet the actual shear and moment requirements. Thus, this option alone may not be adequate if large concentrated loads need to be designed for.

Option 2: Select a joist designation from the Standard Load Table (or specify a joist type using a uniform load in the designation) and also provide the load and location of any additional loads on the structural plan with a note “Joist manufacturer shall design joists for additional loads at locations shown.” This option works well for a few added loads per joist with known magnitude and locations.

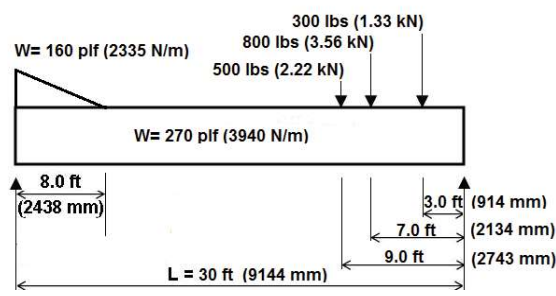
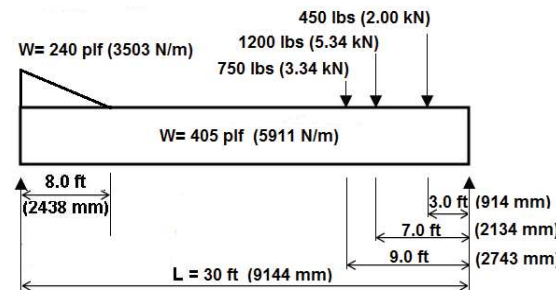
Option 3: For additional point loads with exact locations not known along the joist or for incidental loads, any one, or both, of the following can be specified on the structural plan in addition to option 1 or 2 above:

- a) “**Design for a () lb. concentrated load located at any one panel point along the joist**”. This is referred to as an *Add-Load*.
- b) “**Design for additional bending stresses resulting from a () lb. concentrated load located at any location along () chord**”. This is referred to as a *Bend-Check* and can be specified on the top chord, bottom chord, or both top and bottom chords. This can be used when the concentrated load is already accounted for in the joist designation, uniform load, or specified *Add-Load* yet this specified amount of load shall be permitted to also be located at any location between panel points. The additional bending stresses as a result of this load are then designed for. A *Bend-Check* load shall not exceed (*Add-Load* + 400 lbs.) A *Bend-Check* load can be specified by itself without an *Add-Load*.
- c) Both (a) and (b) above can be specified with equal concentrated loads for each; or simply denote “**Design joist for a () lb. concentrated load at any location along the () chord.**”

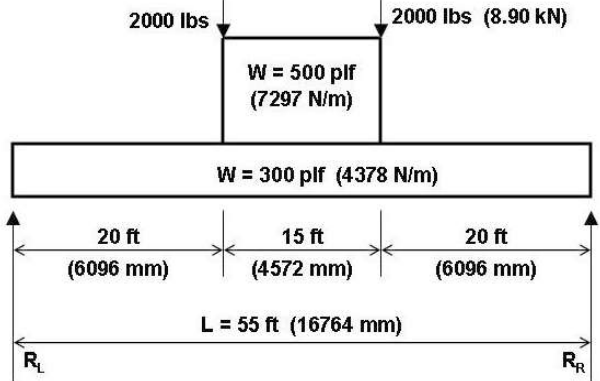
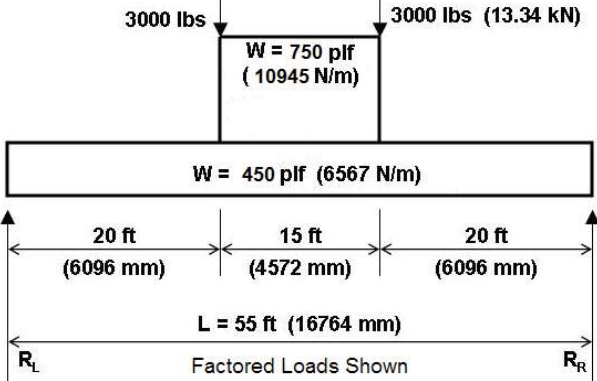
Example uses:

- *Specifying professional* selects a standard joist capable of carrying a 500 lb. RTU. However, the location and exact frame size is not yet known but the frame load shall result in two- 250 lb. point loads at least 5'-0" apart. **Specify a 250 lb. Bend-Check.**
- Standard joist specified but not selected for 500 lb. RTU load, location not known. **Specify a 500 lb. Add-Load and 250 lb. Bend-Check.**
- Standard SJI joist selected to carry collateral load of 3 psf. *Specifying professional* wants bending from 150 lb. incidental loads to also be designed for. **Specify a 150 lb. Bend-Check.**

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OPTION 4 - ASD EXAMPLE 2:	OPTION 4 - LRFD EXAMPLE 2:
U.S. CUSTOMARY UNITS AND (METRIC UNITS)	U.S. CUSTOMARY UNITS AND (METRIC UNITS)
 <p>W= 160 plf (2335 N/m) 300 lbs (1.33 kN) 800 lbs (3.56 kN) 500 lbs (2.22 kN)</p> <p>W= 270 plf (3940 N/m)</p> <p>8.0 ft (2438 mm) 3.0 ft (914 mm) 7.0 ft (2134 mm) 9.0 ft (2743 mm)</p> <p>L = 30 ft (9144 mm)</p>	 <p>W= 240 plf (3503 N/m) 450 lbs (2.00 kN) 1200 lbs (5.34 kN) 750 lbs (3.34 kN)</p> <p>W= 405 plf (5911 N/m)</p> <p>8.0 ft (2438 mm) 3.0 ft (914 mm) 7.0 ft (2134 mm) 9.0 ft (2743 mm)</p> <p>L = 30 ft (9144 mm)</p>
<p>M = 443 k-in. (50.1 kN-m) R_L = 5000 lbs (22.24 kN), R_R = 5340 lbs (23.75 kN) Select a 22KCS2, M = 488 k-in. (55.1 kN-m) R = 5900 lbs (26.2 kN) Bridging section no. 6 for L = 30 ft. (9144 mm)</p> <p>Use 22K6 to determine bridging and stability requirements. Since the maximum uniform load of 430 plf [6275 N/m] (270 plf (3940 N/m) + 160 plf (2335 N/m)) does not exceed the maximum KCS Joist uniform load of 550 plf (8020 N/m) and a standard KCS Joist can be selected from the load table, a load diagram is not required.</p>	<p>M = 664 k-in. (75.03 kN-m) R_L = 7500 lbs (33.36 kN), R_R = 8010 lbs (35.63 kN) Select a 22KCS2, M = 732 k-in. (82.64 kN-m) R = 8850 lbs (39.3 kN) Bridging section no. 6 for L = 30 ft. (9144mm)</p> <p>Use 22K6 to determine bridging and stability requirements. Since the maximum factored uniform load of 645 plf (9413 N/m) (405 plf (5911 N/m) + 240 plf (3503 N/m)) does not exceed the maximum KCS Joist uniform load of 825 plf (12030 N/m) and a standard KCS Joist can be selected from the load table, a load diagram is not required.</p>

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OPTION 4 - ASD EXAMPLE 3:	OPTION 4 - LRFD EXAMPLE 3:
U.S. CUSTOMARY UNITS AND (METRIC UNITS)	U.S. CUSTOMARY UNITS AND (METRIC UNITS)
	
<p>M = 2910 k-in. (328.8 kN-m) RL = RR = 14000 lbs (62.28 kN) EXCEEDS CAPACITY OF 30KCS5 (MAXIMUM KCS JOIST) AND EXCEEDS MAXIMUM UNIFORM LOAD OF 550 plf (8027 N/m). OPTION A: Use double joists each having a minimum moment capacity, M = 1455 k-in. (164.4 kN-m) and shear capacity, R = 7000 lbs (31.14 kN) and a uniform load of 400 plf (5838 N/m). Select two 28KCS5, M = 1704 k-in. (192.5 kN-m), R = 9200 lbs (40.9 kN). Bridging section no. 12 for L = 55 ft. (16764 mm). Use 28K12 to determine bridging and stability requirements. OPTION B: Select a LH-Series Joist. See OPTION 5.</p>	<p>M = 4365 k-in. (493.2 kN-m) RL = RR = 21000 lbs (93.41 kN) EXCEEDS CAPACITY OF 30KCS5 (MAXIMUM KCS JOIST) AND EXCEEDS MAXIMUM FACTORED UNIFORM LOAD OF 825 plf (12040 N/m). OPTION A: Use double joists each having a minimum moment capacity, M = 2183 k-in. (246.65 kN-m) and shear capacity, R = 10500 lbs (46.71 kN) and a uniform load of 600 plf (8756 N/m). Select two 28KCS5, M = 2556 k-in. (288.7 kN-m), R = 13800 lbs (61.3 kN). Bridging section no. 12 for L = 55 ft. (16764 mm) Use 28K12 to determine bridging and stability requirements. OPTION B: Select a LH-Series Joist. See OPTION 5.</p>

Option 5: Specify a SPECIAL joist designation when the joist includes more complex loading or for conditions which need consideration of multiple potentially controlling load combinations.

- Provide a load diagram and/or enough information on the drawings to clearly define ALL loads.
- If the loading criteria are too complex to adequately communicate on the drawings or with a simple load diagram, then the *specifying professional* shall provide a load schedule along with the appropriate load combinations. Regardless of where the loads are shown, unfactored design loads broken down by load categories shall be provided in order to design the joists correctly with applicable load combinations.

Place the designation (e.g. 28K SP or 28LH SP) with the following note: "Joist manufacturer to design joist to support loads as shown."



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OPTION 5 - ASD EXAMPLE: U.S. CUSTOMARY UNITS AND (METRIC UNITS)	OPTION 5 - LRFD EXAMPLE: U.S. CUSTOMARY UNITS AND (METRIC UNITS)
Load diagram per ASCE 7 2.4.1(3), D + S	Unfactored Load diagram per ASCE 7 2.3.2(3), 1.2D+1.6S
<p style="text-align: center; font-size: small;">Joist manufacturer to design joist to support loads as shown above.</p>	<p style="text-align: center; font-size: small;">Joist manufacturer to design joist to support unfactored loads as shown above.</p>
PLEASE NOTE THE LOAD COMBINATIONS SHOWN ARE FOR REFERENCE EXAMPLES ONLY.	

CAUTION FOR OPTIONS 1 thru 5 ABOVE:

If a K-Series joist is being specified, the Specifying Professional shall compare the equivalent uniform loads derived from the maximum moment and shear to the uniform loads tabulated in the K-Series Load Table. An equivalent unfactored uniform load in excess of 550 plf (8020 N/m) or a maximum unfactored end reaction exceeding 9200 lbs. (40.9 kN) indicates that the *specifying professional* shall use additional joists to reduce the loading or use an LH-Series joist and make provisions for 5 inch (127 mm) deep bearing seats.

If the joist has not been designed for localized accumulation of loads that results in a point or concentrated load, this load attachment shall be made at top or bottom chord panel points. Therefore, specify on the structural drawings, "Where concentrated loads do not occur at panel points, an extra web shall be field applied from the point of attachment to a panel point on the opposite chord", and indicate the extra web size and weld requirements. When exact dimensional locations for concentrated loads are provided by the *specifying professional*, the joist shall be designed for the loads and load locations provided without the need for additional field applied web members at the specified locations.

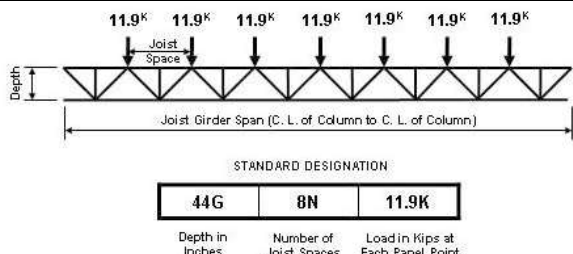
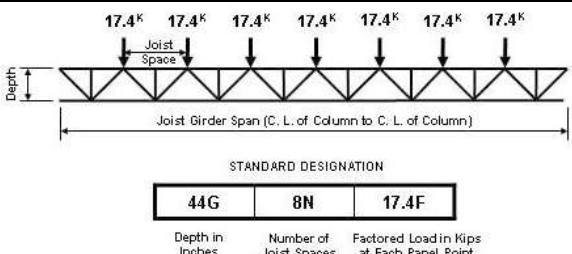
(b) Specifying Joist Girder Design Loads

The Steel Joist Institute's Design Guide ASD or LRFD Weight Tables for Joist Girders are based on uniformly spaced panel point loading conditions and are valid for use in selecting Joist Girder sizes for gravity conditions that can be expressed in kips (kiloNewtons) per panel point on the Joist Girder. Note that anything other than point loads shall be shown unfactored or in a Load Schedule. For a given Joist Girder span, the *specifying professional* first determines the number of joist spaces. Then the panel point loads are calculated and a depth is selected. The information provided in the tables gives the Joist Girder weight in pounds per linear foot (kiloNewtons per meter) for various depths and loads.

1. The purpose of the Joist Girder Design Guide Weight Table is to assist the *specifying professional* in the selection of a roof or floor support system.
2. It is not necessary to use only the depths, spans, or loads shown in the tables.
3. Holes in chord elements present special problems that shall be considered by both the *specifying professional* and the Joist Girder Manufacturer. The sizes and locations of such holes shall be clearly indicated on the structural drawings.
4. Live load deflection rarely governs because of the relatively small span to depth ratios of Joist Girders. However, it is recommended that a breakdown of the point loads, by load category (i.e. TL/LL), be provided so specified deflection requirements and load combinations can be properly accounted for in design.



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Example using <u>Allowable Strength Design (ASD)</u> and U. S. Customary units:	Example using <u>Load and Resistance Factor Design (LRFD)</u> and U. S. Customary units:
	
<p>Given 42'-0" x 50'-0" bay. Joists spaced on 5'-3" centers</p> <p>Live Load = 30 psf Dead Load = 15 psf (includes the approximate Joist Girder weight) Total Load = 45 psf</p> <p>Note: Web configuration may vary from that shown. Contact joist manufacturer if exact layout must be known.</p> <ol style="list-style-type: none"> 1. Determine number of actual joist spaces (N). In this example, N = 8. 2. Compute total load: Total load = 5.25 x 45 psf = 236.25 plf 3. Joist Girder Section: (Interior) <ol style="list-style-type: none"> a) Compute the concentrated load at top chord panel points $P = 236.25 \times 50 = 11,813 \text{ lbs} = 11.9 \text{ kips}$ (use 12K for depth selection). b) Select Joist Girder depth: Refer to the ASD Joist Girder Design Guide Weight Table for the 42'-0" span, 8 panel, 12.0K Joist Girder. The rule of about one inch of depth for each foot of span is a good compromise of limited depth and economy. Therefore, select a depth of 44 inches. c) The Joist Girder shall then be designated 44G8N11.9K. d) The ASD Joist Girder Design Guide Weight Table shows the weight for a 44G8N12K as 49 pounds per linear foot. The designer should verify that the weight is not greater than the weight assumed in the Dead Load above. 	<p>Given 42'-0" x 50'-0" bay. Joists spaced on 5'-3" centers</p> <p>Live Load = 30 psf x 1.6 Dead Load = 15 psf x 1.2 (includes the approximate Joist Girder weight) Total Load = 66 psf (factored)</p> <p>Note: Web configuration may vary from that shown. Contact joist manufacturer if exact layout must be known.</p> <ol style="list-style-type: none"> 1. Determine number of actual joist spaces (N). In this example, N = 8. 2. Compute total factored load: Total load = 5.25 x 66 psf = 346.50 plf 3. Joist Girder Section: (Interior) <ol style="list-style-type: none"> a) Compute the factored concentrated load at top chord panel points $P = 346.5 \times 50 = 17,325 \text{ lbs} = 17.4 \text{ kips}$ (use 18K for depth selection). b) Select Joist Girder depth: Refer to the LRFD Joist Girder Design Guide Weight Table for the 42'-0" span, 8 panel, 18.0K Joist Girder. The rule of about one inch of depth for each foot of span is a good compromise of limited depth and economy. Therefore, select a depth of 44 inches. c) The Joist Girder shall then be designated 44G8N17.4F. Note that the letter "F" is included at the end of the designation to clearly indicate that this is a factored load. d) The LRFD Joist Girder Design Guide Weight Table shows the weight for a 44G8N18.0F as 49 pounds per linear foot. The designer should verify that the weight is not greater than the weight assumed in the Dead Load above.

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<p>e) Check live load deflection:</p> <p>Live load = 30 psf x 50 ft. = 1500 plf</p> <p>Approximate Joist Girder moment of inertia = 0.027 NPLd</p> <p>= 0.027 x 8 x 11.9 x 42 x 44 = 4750 in.⁴</p> <p>Allowable deflection for plastered ceilings</p> <p>= L/360 = $\frac{42(12)}{360} = 1.40$ in.</p> <p>$\Delta = 1.15 \left[\frac{5wL^4}{384EI} \right] = \frac{1.15(5)(1.500/12)[(42)(12)]^4}{384(29000)(4750)}$</p> <p>= 0.88 in. <1.40 in., Okay</p>	<p>e) Check live load deflection:</p> <p>Live load = 30 psf x 50 ft. = 1500 plf</p> <p>Approximate Joist Girder moment of inertia = 0.018 NPLd</p> <p>= 0.018 x 8 x 17.4 x 42 x 44 = 4630 in.⁴</p> <p>Allowable deflection for plastered ceilings</p> <p>= L/360 = $\frac{42(12)}{360} = 1.40$ in.</p> <p>$\Delta = 1.15 \left[\frac{5wL^4}{384EI} \right] = \frac{1.15(5)(1.500/12)[(42)(12)]^4}{384(29000)(4630)}$</p> <p>= 0.90 in. <1.40 in., Okay</p>
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(c) Load Schedule Example

LOAD SCHEDULE (all loads are to be shown as unfactored)

MARK	DESIGNATION ⁽¹⁾ (TL/LL) Joists: (plf) Girders: (kips)	LOADING ⁽²⁾		W WIND		ADD-LOAD ⁽⁶⁾ TL/LL (kips/kips)	BEND-CHECK ⁽⁷⁾		REMARKS
		DL ⁽³⁾ (plf)	LL ⁽⁴⁾ or L _r /S/R (plf)	DOWN WARD (plf)	NET ⁽⁵⁾ UPLIFT (plf)		D TC (kips)	D BC (kips)	
J1	18KSP	120	185		180	1.0/0.6		0.3	Axial Loads Wind Moments Drift Loads, see diagram
J2	24K7SP	85	155						
J3	28LHSP	110	355	95	175	0.5			
G1	36G5N6.5K/3.5K				360				End Moments

- (1) Joist designation loads include all uniform gravity loads. **Provide both Total and Live loads.**
- (2) Loading values are not required if designation loading values are correct for deflection and load combinations.
- (3) When standard SJI designations are used, the design Dead Load is required for load combinations with Wind or Seismic.
- (4) The Floor or Roof Live load, Snow, or Rain load.
- (5) When Net Uplift is specified for simple loading, it shall already take into account possible reduced Dead Loading present in order to create the largest Net uplift load combination. For more complex loading or when the Dead Load varies greatly for use in load combinations below, **Gross** uplift should be specified with the minimum and maximum Dead Loading values clearly defined. If the uplift cannot be assigned in pounds per lineal foot, a diagram can be shown for joist loading using pounds per square foot.
- (6) A concentrated load applied at any panel point on both the top chord and bottom chord.
- (7) Chord members shall be designed for additional bending stresses created by this concentrated Total load.



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When in-plane moments (wind load, seismic load) are specified, continuity moments (live load) **shall** also be specified. A Load Schedule that shows a complete breakdown of all loads by Load Category may be required.

AXIAL and END MOMENT LOAD SCHEDULE

MARK	DESIGNATION (TL/LL) Joists: (plf) Girders: (kips)	MIN. I (in. ⁴)	AXIAL			END MOMENTS								TRANSFER DETAILS @ GRIDS	
			W WIND (kips)	E SEISMIC (kips)	E _m (kips)	LIVE LOAD CONTINUITY MOMENTS (k-ft.)		LATERAL MOMENTS (k-ft.)							
								W WIND		E		E _m			
						LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT		
J1 J2 G1	18KSP 24K7SP 36G5N6.5K/3.5K	985	W=18.0	E=21.8											9/S8 @ 4 11/S8 @ B,C

When special loads as shown in the tables above are specified, the load combinations to be used for joist and Joist Girder design **shall** be provided. Two examples showing how to list load combinations are shown below:

LRFD example- Basic Load Combinations	ASD example - Basic Load Combinations
1. 1.4D	1. D
2. 1.2D + 1.6L + 0.5(L _r or S or R)	2. D + L
3. 1.2D + 1.6(L _r or S or R) + (1.0L or 0.5W)	3. D + (L _r or S or R)
4. 1.2D + 1.0W + 1.0L + 0.5(L _r or S or R)	4. D + 0.75L + 0.75(L _r or S or R)
5. 1.2D + 1.0E + 1.0L + 0.2S	5. D + (0.6W or 0.7E)
6. 0.9D + 1.0W	6a. D + 0.75L + 0.75(0.6W) + 0.75(L _r or S or R)
7. 0.9D + 1.0E	6b. D + 0.75L + 0.75(0.7E) + 0.75S
	7. 0.6D + 0.6W
	8. 0.6D + 0.7E
Special Seismic Load Combinations	Special Seismic Load Combinations
8. (1.2 + 0.2S _{DS})D + E _h + L + 0.2S	9. (1.0 + 0.14S _{DS})D + 0.7E _h
9. (0.9 - 0.2S _{DS})D + E _h	10. (1.0 + 0.105S _{DS})D + 0.525E _h + 0.75L + 0.75(L _r or S or R)
	11. (0.6 - 0.14S _{DS})D + 0.7E _h

2.5 JOIST AND JOIST GIRDER EXTENSIONS

Steel joist and Joist Girder extensions shall be specified and designed in accordance with the requirements of the Steel Joist Institute Standard Specifications of latest adoption.



2.6 CEILING EXTENSIONS

Ceiling extensions shall be furnished to support ceilings that are to be attached directly to the bottom of the joists. They are not furnished for the support of suspended ceilings. The ceiling extension shall be either an extended bottom chord element or a loose unit, whichever is standard with the manufacturer, and shall be of sufficient strength to properly support any specified ceiling loads.

2.7 BRIDGING AND BRIDGING ANCHORS

- (a) Bridging standard with the manufacturer and complying with the Steel Joist Institute Standard Specifications of latest adoption shall be used for bridging all joists furnished by the joist manufacturer. Positive anchorage shall be provided at the ends of each bridging row at both top and bottom chords.
- (b) For K-Series and LH-Series joists, horizontal bridging is recommended for spans up to and including 60 feet (18288 mm) except where the Steel Joist Institute Standard Specifications Load Tables & Weight Tables require bolted diagonal bridging for erection stability.

LH-Series and DLH-Series joists exceeding 60 feet (18288 mm) in length shall have bolted diagonal bridging for all rows.

Refer to Section 5.5 in the Steel Joist Institute Standard Specification for erection stability requirements.

Refer to Appendix B for OSHA steel joist erection stability requirements.

Horizontal bridging shall consist of continuous horizontal steel members designed per Section 5.5 in the Steel Joist Institute Standard Specifications. The material sizes listed in Table 2.7-1 meet the requirements of the specifications. Alternately, or for "load/length" designation joists, Table 2.7-2 provides the maximum horizontal bridging force, P_{br} , for various combinations of joist spacing and bridging angle size.

- (c) Diagonal cross bridging consisting of angles or other shapes connected to the top and bottom chords of K-Series, LH-Series, and DLH-Series joists shall be used when required by the Steel Joist Institute Standard Specifications of latest adoption.

Diagonal bridging, when used, shall be designed per Section 5.5 in the Steel Joist Institute Standard Specifications.

When the bridging members are connected at their point of intersection, the material sizes listed in Table 2.7-3 and Table 2.7-4 meet the requirements of the specifications.

For LH-Series and DLH-Series joists, where the joist spacing is less than 70 percent of the joist depth, bolted horizontal bridging shall be provided in addition to the diagonal bridging, as shown in Table 2.7-4.

- (d) When bolted diagonal erection bridging is required, the following shall apply:
1. The bridging shall be indicated on the joist placement plans.
 2. The joist placement plans shall be the exclusive indicator for the proper placement of this bridging.
 3. Shop installed bridging clips, or functional equivalents, shall be provided where the bridging bolts to the steel joist.
 4. When two pieces of bridging are attached to a steel joist by a common bolt, the nut that secures the first piece of bridging shall not be removed from the bolt for the attachment of the second piece.
 5. Bridging attachments shall not protrude above the top chord of the steel joists.
 6. See Table 2.7-5 for bolt sizes that meet the connection requirements of the Steel Joist Institute Standard Specifications Section 5.5.

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TABLE 2.7-1

MAXIMUM JOIST SPACING FOR HORIZONTAL BRIDGING							
SPANS OVER 60 ft. (18.3 m) REQUIRE BOLTED DIAGONAL BRIDGING							
JOIST SECTION NUMBER ¹	Nominal Unfactored Force P _{br} lbs (N)	BRIDGING MATERIAL SIZE ²					
		Equal Leg Angles					
		1 x 7/64 (25 x 3 mm) r = 0.20" (5.08 mm)	1-1/4 x 7/64 (32 x 3 mm) r = 0.25" (6.35 mm)	1-1/2 x 7/64 (38 x 3 mm) r = 0.30" (7.62 mm)	1-3/4 x 7/64 (45 x 3 mm) r = 0.35" (8.89 mm)	2 x 1/8 (52 x 3 mm) r = 0.40" (10.16 mm)	2-1/2 x 5/32 (64 x 4 mm) r = 0.50" (12.70 mm)
ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)		
K1 – 8	340 (1512)	5'-0" (1524)	6'-3" (1905)	7'-6" (2286)	8'-9" (2667)	10'-0" (3048)	12'-6" (3810)
K9-10, LH02-03	450 (2002)	4'-4" (1321)	6'-1" (1854)	7'-6" (2286)	8'-9" (2667)	10'-0" (3048)	12'-6" (3810)
K11-12, LH04-05	560 (2491)	3'-11" (1194)	5'-6" (1676)	7'-4" (2235)	8'-9" (2667)	10'-0" (3048)	12'-6" (3810)
LH06-08	750 (3336)		4'-9" (1448)	6'-3" (1905)	7'-11" (2413)	10'-0" (3048)	12'-6" (3810)
LH09	850 (3781)		4'-5" (1346)	5'-10" (1778)	7'-5" (2261)	9'-9" (2972)	12'-6" (3810)
LH/DLH10	900 (4003)		4'-4" (1321)	5'-8" (1727)	7'-3" (2210)	9'-5" (2870)	12'-6" (3810)
LH/DLH11	950 (4226)		4'-2" (1270)	5'-7" (1702)	7'-0" (2134)	9'-2" (2794)	12'-6" (3810)
LH/DLH12	1100 (4893)		3'-11" (1194)	5'-2" (1575)	6'-8" (2032)	8'-6" (2591)	12'-6" (3810)
LH/DLH13	1200 (5338)		3'-9" (1143)	4'-11" (1499)	6'-3" (1905)	8'-2" (2489)	12'-6" (3810)
LH/DLH14	1300 (5783)			4'-9" (1448)	6'-0" (1829)	7'-10" (2388)	12'-4" (3759)
LH/DLH15	1450 (6450)			4'-6" (1372)	5'-8" (1727)	7'-5" (2261)	11'-8" (3556)
LH/DLH16-17	1850 (8229)			4'-0" (1219)	5'-0" (1524)	6'-7" (2007)	10'-4" (3150)
LH/DLH18-20	2350 (10453)			3'-7" (1067)	4'-4" (1321)	5'-10" (1778)	9'-1" (2769)
LH/DLH21-22	3150 (14012)				3'-10" (1168)	5'-0" (1524)	7'-11" (2413)
LH/DLH23-24	4130 (18371)				3'-4" (1016)	4'-5" (1346)	6'-11" (2108)
LH/DLH25	4770 (21218)					4'-1" (1245)	6'-5" (1956)

(1) Refer to last two digit(s) of Joist Designation

(2) Connection to joist shall resist force listed in the Steel Joist Institute Standard Specifications Table 5.5-2



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TABLE 2.7-2

JOIST SPACING (ft.-in.)	MAXIMUM BRIDGING FORCE (P_{br}) FOR HORIZONTAL BRIDGING (lbs)						
	BRIDGING ANGLE SIZE (EQUAL LEG ANGLE)						
	1 x 7/64 r = 0.20"	1¼ x 7/64 r = 0.25"	1½ x 7/64 r = 0.30"	1¾ x 7/64 r = 0.35"	2 x 1/8 r = 0.40"	2½ x 5/32 r = 0.50"	3 x 3/16 r = 0.60"
2'-0"	2150	3960	5600				
2'-6"	1370	2730	4410	5910			
3'-0"	950	1890	3290	4850			
3'-6"	700	1390	2420	3840	6180		
4'-0"	530	1060	1850	2960	5030		
4'-6"	420	840	1460	2340	4000		
5'-0"	340	680	1180	1890	3240		
5'-6"	-	560	980	1560	2670		
6'-0"	-	470	820	1310	2250	5490	
6'-6"	-	-	700	1120	1910	4680	
7'-0"	-	-	600	960	1650	4030	
7'-6"	-	-	520	840	1440	3510	
8'-0"	-	-	-	740	1260	3090	
8'-6"	-	-	-	650	1120	2740	5680
9'-0"	-	-	-	-	1000	2440	5060
9'-6"	-	-	-	-	890	2190	4540
10'-0"	-	-	-	-	810	1970	4100
10'-6"	-	-	-	-	-	1790	3720
11'-0"	-	-	-	-	-	1630	3390
11'-6"	-	-	-	-	-	1490	3100
12'-0"	-	-	-	-	-	1370	2850



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TABLE 2.7-3

K, LH, and DLH SERIES JOISTS MAXIMUM JOIST SPACING FOR DIAGONAL BRIDGING ¹								
JOIST DEPTH	BRIDGING ANGLE SIZE – (EQUAL LEG ANGLE) ²							
	1 x 7/64 (25 x 3 mm) r = 0.20" (5.08 mm)	1-1/4 x 7/64 (32 x 3 mm) r = 0.25" (6.35 mm)	1-1/2 x 7/64 (38 x 3 mm) r = 0.30" (7.62 mm)	1-3/4 x 7/64 (45 x 3 mm) r = 0.35" (8.89 mm)	2 x 1/8 (50 x 3 mm) r = 0.40" (10.16 mm)	2 1/2 x 5/32 (64 x 4 mm) r = 0.50" (12.70 mm)	3 x 3/16 (76 x 5 mm) r = 0.60" (15.24 mm)	3 1/2 x 1/4 (89 x 6 mm) r = 0.70" (17.78 mm)
in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)	ft.-in. (mm)
12" (305)	6'-7" (2007)	8'-3" (2514)	9'-11" (3022)	11'-7" (3530)	13'-3" (4038)	16'-7" (5055)	19'-11" (6070)	23'-3" (7086)
14" (356)	6'-6" (1981)	8'-3" (2514)	9'-11" (3022)	11'-7" (3530)	13'-3" (4038)	16'-7" (5055)	19'-11" (6070)	23'-3" (7086)
16" (406)	6'-6" (1981)	8'-2" (2489)	9'-10" (2997)	11'-7" (3530)	13'-3" (4038)	16'-7" (5055)	19'-11" (6070)	23'-3" (7086)
18" (457)	6'-6" (1981)	8'-2" (2489)	9'-10" (2997)	11'-6" (3505)	13'-3" (4038)	16'-7" (5055)	19'-11" (6070)	23'-3" (7086)
20" (508)	6'-5" (1955)	8'-2" (2489)	9'-10" (2997)	11'-6" (3505)	13'-2" (4013)	16'-7" (5055)	19'-11" (6070)	23'-3" (7086)
22" (559)	6'-4" (1930)	8'-1" (2463)	9'-10" (2997)	11'-6" (3505)	13'-2" (4013)	16'-6" (5029)	19'-11" (6070)	23'-3" (7086)
24" (610)	6'-4" (1930)	8'-1" (2463)	9'-9" (2971)	11'-5" (3479)	13'-2" (4013)	16'-6" (5029)	19'-10" (6045)	23'-3" (7086)
26" (660)	6'-3" (1905)	8'-0" (2438)	9'-9" (2971)	11'-5" (3479)	13'-1" (3987)	16'-6" (5029)	19'-10" (6045)	23'-2" (7061)
28" (711)	6'-3" (1905)	8'-0" (2438)	9'-8" (2946)	11'-5" (3479)	13'-1" (3987)	16'-6" (5029)	19'-10" (6045)	23'-2" (7061)
30" (762)	6'-2" (1879)	7'-11" (2413)	9'-8" (2946)	11'-4" (3454)	13'-1" (3987)	16'-5" (5004)	19'-10" (6045)	23'-2" (7061)
32" (813)	6'-1" (1854)	7'-10" (2387)	9'-7" (2921)	11'-4" (3454)	13'-0" (3962)	16'-5" (5004)	19'-9" (6020)	23'-2" (7061)
36" (914)	5'-11" (1803)	7'-9" (2362)	9'-6" (2895)	11'-3" (3429)	12'-11" (3973)	16'-4" (4979)	19'-9" (6020)	23'-1" (7035)
40" (1016)	5'-9" (1753)	7'-7" (2311)	9'-5" (2870)	11'-2" (3403)	12'-10" (3911)	16'-4" (4979)	19'-8" (5994)	23'-1" (7035)
44" (1118)	5'-6" (1676)	7'-5" (2260)	9'-3" (2819)	11'-0" (3352)	12'-9" (3886)	16'-3" (4953)	19'-7" (5969)	23'-0" (7010)
48" (1219)	5'-4" (1626)	7'-3" (2209)	9'-2" (2794)	10'-11" (3327)	12'-8" (3860)	16'-2" (4928)	19'-7" (5969)	22'-11" (6985)
52" (1321)	5'-0" (1524)	7'-1" (2159)	9'-0" (2743)	10'-10" (3302)	12'-7" (3835)	16'-1" (4902)	19'-6" (5943)	22'-11" (6985)
56" (1422)	4'-9" (1448)	6'-10" (2083)	8'-10" (2692)	10'-8" (3251)	12'-5" (3784)	16'-0" (4877)	19'-5" (5918)	22'-10" (6960)
60" (1524)	4'-4" (1321)	6'-8" (2032)	8'-7" (2616)	10'-6" (3200)	12'-4" (3759)	15'-10" (4826)	19'-4" (5893)	22'-9" (6935)
64" (1626)	**	6'-4" (1931)	8'-5" (2565)	10'-4" (3149)	12'-2" (3708)	15'-9" (4801)	19'-3" (5867)	22'-8" (6909)
68" (1727)	**	6'-1" (1854)	8'-2" (2489)	10'-2" (3098)	12'-0" (3657)	15'-8" (4775)	19'-2" (5842)	22'-7" (6884)
72" (1829)	**	5'-9" (1753)	8'-0" (2438)	10'-0" (3048)	11'-10" (3606)	15'-6" (4724)	19'-1" (5816)	22'-6" (6858)
80" (2032)	**	5'-0" (1524)	7'-5" (2260)	9'-6" (2895)	11'-6" (3505)	15'-3" (4648)	18'-10" (5740)	22'-4" (6808)
88" (2235)		**	6'-9" (2058)	9'-0" (2743)	11'-1" (3378)	14'-11" (4546)	18'-7" (5664)	22'-1" (6731)
96" (2438)		**	6'-0" (1829)	8'-5" (2565)	10'-8" (3251)	14'-7" (4445)	18'-4" (5588)	21'-11" (6680)
104" (2642)			**	7'-9" (2362)	10'-1" (3073)	14'-2" (4318)	18'-0" (5486)	21'-8" (6604)
112" (2845)			**	7'-0" (2134)	9'-6" (2895)	13'-9" (4191)	17'-8" (5385)	21'-4" (6503)
120" (3048)				**	8'-9" (2667)	13'-4" (4064)	17'-3" (5258)	21'-1" (6426)

**** INTERPOLATION BELOW THE MINIMUM VALUES SHOWN IS NOT ALLOWED.**

1) SEE TABLE 2.7-4 FOR MINIMUM JOIST SPACE FOR DIAGONAL ONLY BRIDGING.
 2) In the shaded range of the Table, for LH23, 24, and 25, compressive strength requirements may control, reducing the maximum joist spacing shown. Either select a larger bridging angle size (outside of the shaded area) or check compression strength (Ref. Section 2.7(c)) for LH23, 24, and 25.



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TABLE 2.7-4

LH AND DLH SERIES JOISTS HORIZONTAL PLUS DIAGONAL BRIDGING REQUIREMENTS		
JOIST DEPTH	MINIMUM JOIST SPACE FOR DIAGONAL ONLY BRIDGING (0.70 x DEPTH)*	HORIZONTAL AND DIAGONAL MINIMUM ANGLE SIZE REQUIRED FOR JOIST SPACING < (0.70 X DEPTH) AND JOIST SPANS > 60'-0" (18.3 m)
in. (mm)	ft.-in. (mm)	in. (mm)
52" (1321)	3'- 0" (914)	1" x 1" x 7/64" (25 x 3)
56" (1422)	3'- 3" (990)	1" x 1" x 7/64" (25 x 3)
60" (1524)	3'- 6" (1066)	1" x 1" x 7/64" (25 x 3)
64" (1626)	3'- 8" (1117)	1 1/4" x 1 1/4" x 7/64" (32 x 3)
68" (1727)	3'-11" (1193)	1 1/4" x 1 1/4" x 7/64" (32 x 3)
72" (1829)	4'- 2" (1270)	1 1/4" x 1 1/4" x 7/64" (32 x 3)
80" (2032)	4'- 8" (1422)	1 1/4" x 1 1/4" x 7/64" (32 x 3)
88" (2235)	5'- 1" (1549)	1 1/2" x 1 1/2" x 7/64" (38 x 3)
96" (2438)	5'- 7" (1702)	1 1/2" x 1 1/2" x 7/64" (38 x 3)
104" (2642)	6'- 0" (1829)	1 3/4" x 1 3/4" x 7/64" (44 x 3)
112" (2845)	6'- 6" (1981)	1 3/4" x 1 3/4" x 7/64" (44 x 3)
120" (3048)	7'- 0" (2134)	2" x 2" x 1/8" (51 x 3)

*NOTE: WHEN THE JOIST SPACING IS LESS THAN 0.70 x JOIST DEPTH,
BOLTED HORIZONTAL BRIDGING SHALL BE USED IN ADDITION TO DIAGONAL BRIDGING.

TABLE 2.7-5

BOLT SIZES WHICH MEET BOLTED BRIDGING CONNECTION REQUIREMENTS		
JOIST SERIES	SECTION NUMBER*	BOLT DIAMETER
K	ALL	3/8" (10 mm) A307
LH/DLH	2 – 12	3/8" (10 mm) A307
LH/DLH	13 – 17	1/2" (13 mm) A307
LH/DLH	18 – 20	5/8" (16 mm) A307
LH/DLH	21 – 22	5/8" (16 mm) A325
LH/DLH	23 – 25	3/4" (19 mm) A325

*REFER TO LAST DIGIT(S) OF JOIST DESIGNATION
NOTE: WASHERS SHALL BE USED WITH SLOTTED OR OVERSIZED HOLES. BOLTS SHALL BE TIGHTENED TO A MINIMUM SNUG TIGHT CONDITION.



2.8 HEADERS

Where the end reaction of a steel joist is supported by a header, as outlined and defined in Section 5.2(a), and is not more than 10,000 pounds (44482 N), the header shall be furnished by the Seller. Such headers shall be any type standard with the joist manufacturer. Conditions involving headers shall be investigated during erection and, if necessary, provisions made to provide a safe condition. Headers are not provided for steel joists with end reactions greater than 10,000 pounds (44482 N).

2.9 BOTTOM CHORD LATERAL BRACING FOR JOIST GIRDERS

Bottom chord lateral bracing shall be furnished as required to prevent lateral movement of the bottom chord of the Joist Girder and to prevent the ratio of chord length to chord radius of gyration from exceeding that specified in the Steel Joist Institute Standard Specifications of latest adoption. The lateral bracing shall be that which is standard with the joist manufacturer, and shall be sufficient to properly brace the bottom chord of the Joist Girder.

2.10 CONNECTIONS

The adequacy of the end anchorage connection (bolted or welded) between the joist or Joist Girder bearing seat and the supporting structure is the responsibility of the *specifying professional*. The contract documents shall clearly illustrate the end anchorage connection. Forces to be considered include end moments, axial loads, and diaphragm boundaries. Particular attention is required where there is net uplift.

Welded End Anchorage for Uplift

The strength of the joist bearing seat for an uplift loading combination is a function of both the joist seat thickness and length of the end anchorage welds. The minimum end anchorage welds as shown in the Steel Joist Institute Standard Specifications Table 5.7-1 may not develop the full capacity of the joist seat assembly for the specified uplift resistance. When the support dimensions allow, it is recommended the *specifying professional* use a small fillet weld thickness in conjunction with a longer weld length for the connection design to facilitate the design of the joist bearing seat. The joist manufacturer will provide a seat of sufficient thickness and strength to resist the uplift end reaction resulting from the specified uplift. For additional information, including tables for welded end anchorage uplift capacities, refer to Steel Joist Institute Technical Digest 6, "Structural Design of Steel Joist Roofs to Resist Uplift Loads"

Bolted End Anchorage for Uplift

Typically, joists and Joist Girders with bolted end anchorage also require a final connection by welding in order to provide lateral stability to the supporting member. However, only the bolts are relied on to provide uplift anchorage. The bolt type and diameter designed by the *specifying professional* shall provide sufficient tensile strength to resist the uplift end reaction resulting from the specified uplift. Bolts of higher strength than the minimum required by the Steel Joist Institute Standard Specifications may be required.

When the bearing seats are detailed for a bolted connection, bolts shall be installed. If the bolts are not installed, an equivalent welded connection may be permitted by the *specifying professional*, provided the weld is deposited in the slot on the side farthest from the edge of the seat. Additional weld required to meet that specified for the welded connection shall be placed at a location on the seat away from the outer edge of the slot as shown in Figure 2.10-1.

For additional information, including tables for bolted end anchorage uplift capacities, refer to Steel Joist Institute Technical Digest 6, "Structural Design of Steel Joist Roofs to Resist Uplift Loads"

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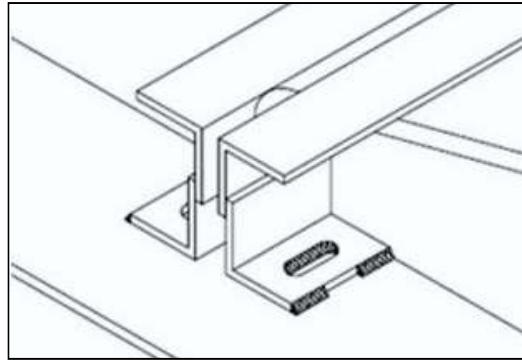


Figure 2.10-1

SECTION 3. MATERIALS

3.1 STEEL

The steel used in the manufacture of joists and Joist Girders shall comply with the Steel Joist Institute Standard Specifications of latest adoption.

3.2 PAINT

- (a) Standard Shop Paint - The shop coat of paint, when specified, shall comply with the Steel Joist Institute Standard Specifications of latest adoption.
- (b) Disclaimer - The typical shop applied paint that is used to coat steel joists and Joist Girders is a dip applied, air dried paint. The paint is intended to be an impermanent and provisional coating which shall protect the steel for only a short period of exposure in ordinary atmospheric conditions.

Since most joists and Joist Girders are painted using a standard dip coating, the coating shall be permitted to not be uniform and shall be permitted to include drips, runs, and sags. Compatibility of any coating including fire protective coatings applied over the standard shop paint shall be the responsibility of the specifier and/or painting contractor.

The shop applied paint may require field touch-up/repair as a result of, but not limited to, the following:

1. Abrasions from: Bundling, banding, loading and unloading, chains, dunnage during shipping, cables and chains during erection, bridging, installation, and other handling at the jobsite.
NOTE: Rusting should be expected at any abrasion.
2. Dirt.
3. Diesel smoke.
4. Road salt.
5. Weather conditions during storage.

The joist manufacturer shall not be responsible for the condition of the paint if it is not properly protected after delivery.

SECTION 4. **INSPECTION**

Inspections shall be made in accordance with Section 5.14 of the Steel Joist Institute Standard Specifications of latest adoption.

SECTION 5. **ESTIMATING**

5.1 PLANS FOR BIDDING

Plans to serve as the basis for bids shall show the character of the work with sufficient clarity to permit making an accurate estimate and shall show the following:

- Designation and location of Materials [see Section 5.2(a)], including any special design or configuration requirements
- Locations and elevations of all steel and concrete supporting members and bearing walls
- Location and length of joist extended ends
- Location and size of all openings in floors and roofs
- Location of all partitions
- Loads and their locations as defined in Section 6.1
- Construction and thickness of floor slabs, roof deck, ceilings and partitions
- Joists or Joist Girders requiring extended bottom chords
- Paint, if other than manufacturer's standard

5.2 SCOPE OF ESTIMATE

(a) Unless otherwise specified, the following items shall be included in the estimate, and requirements shall be determined as outlined in Section 6.1:

- Steel Joists
- Joist Girders
- Joist Substitutes
- Joist Extended Ends
- Ceiling Extensions
- Extended bottom chord used as strut
- Bridging
- Joist Girder bottom chord bracing
- Headers which are defined as members supported by and carrying Open Web Steel Joists with end reactions of no more than 10,000 lbs. (44482 N)
- One shop coat of paint, when specified, shall be in accordance with Section 3.2

(b) The following items shall not be included in the estimate but shall be permitted to be quoted and identified by the joist manufacturer as separate items:

- Headers carrying Open Web Steel Joists with end reactions greater than 10,000 lbs. (44482 N)
- Headers for Deep Longspan Steel Joists, **DLH-Series**

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- Reinforcement in slabs over joists
- Centering material, decking, and attachments
- Miscellaneous framing between joists for openings at ducts, dumbwaiters, ventilators, skylights, etc.
- Loose individual or continuous bearing plates and bolts or anchors for such plates
- Erection bolts for joist and Joist Girder end anchorage
- Horizontal bracing in the plane of the top and bottom chords from joist to joist or joist to structural framing and walls
- Bridging anchors and anchorage
- Wood nailers
- Moment plates
- Special joist configuration or bridging layouts for ductwork or sprinkler systems
- Shear studs

SECTION 6.

PLANS AND SPECIFICATIONS**6.1 PLANS FURNISHED BY BUYER**

The Buyer shall furnish the Seller plans and specifications as prepared by the *specifying professional* showing all Material requirements and steel joist and/or steel Joist Girder designations, the layout of walls, columns, beams, girders and other supports, as well as floor and roof openings and partitions correctly dimensioned. The elevation of finished floors, roofs, and bearings shall be shown.

(a) Loads

The *specifying professional* shall clearly provide all design loads as described in Section 2.4 This includes the live loads to be used, the wind uplift if any, the weights of partitions and the location and amount of any special loads, such as monorails, fans, blowers, tanks, etc.

(b) Connections

Minimum end anchorage for simple span gravity loading shall be in accordance with Steel Joist Institute Standard Specifications of latest adoption, Section 5.7. The end anchorage of a steel joist or Joist Girder is the connection of the joist or Joist Girder bearing seat to the support of the joist or Joist Girder.

The adequacy of the end anchorage connection (bolted or welded) between the joist or Joist Girder bearing seat and the supporting structure is the responsibility of the *specifying professional*. The contract documents shall clearly illustrate the end anchorage connection.

The joist manufacturer is responsible for the design of the bearing seats of joists or Joist Girders for the loads designated by the *specifying professional* in the contract documents.

The *specifying professional* is responsible for bridging termination connections. The contract documents shall clearly illustrate these termination connections.

(c) Special Considerations

The *specifying professional* shall indicate on the construction documents special considerations including:

- 1) Profiles for non-standard joist and Joist Girder configurations (Standard joist and Joist Girder configurations are as indicated in the Steel Joist Institute Standard Specifications of latest adoption).
- 2) Oversized or other non-standard web openings
- 3) Extended Ends

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- 4) Deflection criteria for live and total loads for non-SJI standard joists
- 5) Non-SJI standard bridging

6.2 PLANS FURNISHED BY SELLER

The Seller shall furnish the buyer with steel joist placement plans to show the material as specified on the construction documents and are to be utilized for field installation in accordance with specific project requirements as stated in Section 6.1. Steel placement plans shall include, at a minimum, the following:

- a) Listing of all applicable loads as stated in Section 6.1 and used in the design of the steel joists and Joist Girders as specified in the construction documents.
- b) Profiles for non-standard joist and Joist Girder configurations (standard joist and Joist Girder configurations are as indicated in the Steel Joist Institute Standard Specifications of latest adoption).
- c) Connection requirements for:
 - 1) Joist supports
 - 2) Joist Girder supports
 - 3) Field splices
 - 4) Bridging attachments
- d) Deflection criteria for live load and total loads for non-SJI standard joists.
- e) Size, location, and connections for all bridging
- f) Joist headers

All Material shall be identified with its mark which also appears on the Bill of Materials. The shop paint shall be as noted on the joist placement plans. **Steel joist placement plans do not require the seal and signature of the joist manufacturer's registered design professional.**

6.3 DISCREPANCIES

The *specifying professional's* bid plans and specifications shall be assumed to be correct in the absence of written notice from the Buyer to the contrary. When plans are furnished by the Buyer that do not agree with the Architect's bid plans, such detailed plans shall be considered as a written notice of change of plans. However, it shall be the Buyer's responsibility to advise the Seller of those changes which affect the joists or Joist Girders.

6.4 APPROVAL

When joist placement plans are furnished by the Seller, they are submitted to the Buyer and owner for examination and approval. The Seller allows a maximum of fourteen (14) calendar days in their schedule for the return of placement plans noted with the owner's and customer's approval, or approval subject to corrections as noted. The Seller makes the corrections, furnishes corrected prints for field use to the owner/customer and is released by the owner/customer to start joist manufacture.

Approval by the owner/customer of the placement plans, sections, notes and joist schedule prepared by the Seller indicates that the Seller has correctly interpreted the contract requirements, and is released by the owner/customer to start joist manufacture. This approval constitutes the owner's/customer's acceptance of all responsibility for the design adequacy of any detail configuration of joist support conditions shown by the Seller as part of the preparation of these placement plans.

Approval does not relieve the Seller of the responsibility for accuracy of detail dimensions on the plans, nor the general fit-up of joists to be placed in the field.



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6.5 CHANGES

When any changes in plans are made by the Buyer (or the buyer's representative) either prior to or after approval of detailed plans, or when any Material is required and was not shown on the plans used as the basis of the bid, the cost of such changes and/or extra Material shall be paid by the Buyer at a price to be agreed upon between Buyer and Seller.

6.6 CALCULATIONS

The Seller shall design the steel joists and/or steel Joist Girders in accordance with the current Steel Joist Institute Standard Specifications of latest adoption to support the load requirements of Section 6.1. The *specifying professional* may require submission of the steel joist and Joist Girder calculations as prepared by a registered design professional responsible for the product design. If requested by the *specifying professional*, the steel joist manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's registered design professional. In addition to standard calculations under this seal and signature, submittal of the following shall be included:

- a) Non-SJI standard bridging details (e.g. for cantilevered conditions, net uplift, etc.)
- b) Connection details for:
 - 1) Non-SJI standard connections (e.g. flush framed or framed connections)
 - 2) Field splices
 - 3) Joist headers

SECTION 7.**HANDLING AND ERECTION**

The Buyer and Erector shall comply with the requirements of the Steel Joist Institute Standard Specifications of latest adoption in the handling and erection of Material. For additional coverage of this topic, refer to the Steel Joist Institute's Technical Digest 9, "Handling and Erection of Steel Joists and Joist Girders".

The Buyer and/or Erector shall check all materials on arrival at job site and promptly report to Seller any discrepancies and/or damages.

When joists cannot be delivered as a single piece, they shall be permitted to be delivered in several pieces therefore requiring the pieces to be spliced together in the field. The manufacturer's instructions SHALL be followed to ensure matching pieces are joined, proper bolts are used, and any required bolt tensioning is incorporated.

All joists shall be handled by methods which avoid damage to any part of the joist. For long LH-Series joists, DLH-Series joists, or Joist Girders this may require the use of spreader bars, multiple hoisting cables, or multiple cranes as necessary to safely handle the joist. Hoisting cables shall be attached at panel points and shall be at panel point locations selected to minimize erection stresses.

The current OSHA, 29 CFR Part 1926, Safety Standards for Steel Erection; Subpart R- Steel Erection, refers to certain joists at or near columns to be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging. **This STANDARD shall not be interpreted that any joist at or near a column line is safe to support an employee without bridging installed.** Many limitations exist that prevent these joists from being designed to safely allow an employee on an un-bridged joist. Because of these limitations these joists shall be erected by incorporating erection methods ensuring joist stability and either:

- 1) Installing bridging or otherwise stabilizing the joist prior to releasing the hoisting cable, or
- 2) Releasing the hoisting cable without having a worker on the joist.

A steel joist or Joist Girder shall not be placed on any support structure unless such structure is stabilized. When steel joists or Joist Girders are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation.

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A bridging terminus point shall be established before joist bridging is installed.

Steel joist and Joist Girders shall not be used as anchorage points for a fall arrest system unless written directions to do so is obtained from a “qualified person”. (For definition of “qualified person” see Code of Federal Regulations (CFR), Occupational Safety and Health Administration (OSHA), 29 CFR Part 1926, Safety Standards for Steel Erection; Subpart R- Steel Erection, §1926.751 Definitions, January 18, 2001, Washington, D.C.)

No modification that affects the strength of a steel joist or Joist Girder shall be made without the written approval of the project engineer of record.

The Seller shall not be responsible for the condition of paint finish on Material if it is not properly protected after delivery.

The Seller shall not be responsible for improper fit of Material due to inaccurate construction work.

SECTION 8. **BUSINESS RELATIONS**

8.1 PRESENTATION OF PROPOSALS

All proposals for furnishing Material shall be made on a sales contract form. After acceptance by the Buyer, these proposals shall be approved or executed by a qualified official of the Seller. Upon such approval the proposal becomes a contract.

8.2 ACCEPTANCE OF PROPOSALS

All proposals are intended for prompt acceptance and are subject to change without notice.

8.3 BILLING

Contracts on a lump sum basis are to be billed proportionately as shipments are made.

8.4 PAYMENT

Payments shall be made in full on each invoice without retention.

8.5 ARBITRATION

All business controversies which cannot be settled by direct negotiations between Buyer and Seller shall be submitted to arbitration. Both parties shall sign a submission to arbitration and if possible agree upon an arbitrator. If they are unable to agree, each shall appoint an arbitrator and these two shall appoint a third arbitrator. The expenses of the arbitration shall be divided equally between the parties, unless otherwise provided for in the agreements to submit to arbitration. The arbitrators shall pass final judgment upon all questions, both of law and fact, and their findings shall be conclusive.

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STANDARD SPECIFICATION

FOR K-SERIES, LH-SERIES, AND DLH-SERIES OPEN WEB STEEL JOISTS AND FOR JOIST GIRDERS.

K-Series Adopted by the Steel Joist Institute November 4, 1985
 LH/DLH-Series Adopted by the Steel Joist Institute May 10, 2006
 Joist Girders Adopted by the Steel Joist Institute November 4, 1985
 Revised to April 27, 2020, Effective July 1, 2020

SECTION 1.

SCOPE AND DEFINITIONS

1.1 SCOPE

The *Standard Specification for K-Series, LH-Series, DLH-Series Open Web Steel Joists and for Joist Girders*, hereafter referred to as the Specification, covers the design, manufacture, application, and erection stability and handling of Joist Girders and Open Web Steel Joists K-Series, LH-Series, and DLH-Series in buildings or other structures, where other structures are defined as those structures designed, manufactured, and erected in a manner similar to buildings. Joist Girders and K-Series, LH-Series, and DLH-Series joists shall be designed using Allowable Stress Design (ASD) or Load and Resistance Factor Design (LRFD) in accordance with this Specification. Included as part of this Specification are KCS joists, K-Series; Joist Substitutes, K-Series; and Top Chord Extensions and Extended Ends, K-Series.

1.2 OTHER REGULATIONS

Joist Girders and K-Series, LH-Series, and DLH-Series joists shall be erected in accordance with the Occupational Safety and Health Administration (OSHA), 29 CFR Part 1926, Safety Standards for Steel Erection, Subpart R – Steel Erection. The erection of Joist Girders and K-Series, LH-Series, and DLH-Series joists 144 ft. (43.9 m) or less in length shall be in accordance with the requirements of Section 1926.757, Open Web Steel Joists. Joist Girders and DLH-Series joists greater than 144 ft. (43.9 m) in length shall be in accordance with the requirements of Section 1926.756 Beams and Columns.

1.3 APPLICATION

This Specification includes Section 1 through Section 6. The user notes shall not be part of the Specification.

User Note: User notes are intended to provide practical guidance in the use and application of this Specification.

1.4 DEFINITIONS

The following terms shall, for the purposes of this Specification, have the meanings shown in this Section. Where terms are not defined in this Section, those terms shall have their ordinary accepted meanings in the context in which it applies.

Joist Girders, K-Series, LH-Series, and DLH-Series shall be open web, in-plane load-carrying steel members utilizing hot-rolled or cold-formed steel, including cold-formed steel whose yield strength has been attained by cold working.

Joist Girders shall be open web steel trusses used as primary framing members designed as simple spans supporting in-plane concentrated loads for a floor or roof system. These concentrated loads shall be considered to act at the top chord panel points of the Joist Girders unless otherwise specified.



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The Joist Girder standard designation in ASD shall be established by its nominal depth in inches (mm), the letter “G”, followed by the number of joist spaces, the letter “N”, the load in kips (kN) at each panel point, and the letter “K”. The Joist Girder standard designation in LRFD shall be established by its nominal depth in inches (mm), the letter “G”, followed by the number of joist spaces, the letter “N”, the factored load in kips (kN) at each panel point, and the letter “F”. Joist Girders shall be designed in accordance with this Specification to support the loads defined by the specifying professional.

Joist Girders shall be designed and manufactured as either simple framing members with underslung ends and bottom chord extensions or as part of an ordinary steel moment frame (OMF). Where used as part of an OMF the specifying professional shall be responsible for carrying out all the required frame analyses (i.e. first-order and second-order), provide all the required load information and stiffness data to the joist manufacturer, and indicate the type of **Joist Girder** to column connections that are being designed on the structural drawings.

User Note: Joist Girders have been standardized in depths from 20 inches (508 mm) through 120 inches (3048 mm), for spans from 20 feet (6096 mm) through 120 feet (36576 mm).

Where this Specification refers to “steel joists”, this shall mean the K-Series, LH-Series, and DLH-Series joists.

User Note: Joists are suitable for the direct support of floors and roof slabs or decks. The K-Series joists are standardized in depths from 10 inches (254 mm) through 30 inches (762 mm), for spans up through 60 feet (18288 mm). The LH-Series joists are standardized in depths from 18 inches (457 mm) through 48 inches (1219 mm), for spans up through 96 feet (29261 mm). The DLH-Series joists are standardized in depths from 52 inches (1321 mm) through 120 inches (3048 mm), for spans up through 240 feet (73152 mm).

The K-Series, LH-Series and DLH-Series standard joist designations shall be established by their nominal depth, followed by the letters K, LH or DLH as appropriate, and then by the Section Number designation assigned. The Section Number designations shall range from 01 to 25. The K-Series, LH-Series and DLH-Series standard joist designations listed in the following Standard Load Tables shall support the uniformly distributed loads as provided in the applicable tables:

Standard LRFD Load Table Open Web Steel Joists, K-Series – U.S. Customary Units
 Standard ASD Load Table Open Web Steel Joists, K-Series – U.S. Customary Units
 Standard LRFD Load Table Longspan Steel Joists, LH-Series – U.S. Customary Units
 Standard ASD Load Table Longspan Steel Joists, LH-Series – U.S. Customary Units
 Standard LRFD Load Table Deep Longspan Steel Joists, DLH-Series – U.S. Customary Units
 Standard ASD Load Table Deep Longspan Steel Joists, DLH-Series – U.S. Customary Units
 Standard LRFD Load Table Open Web Steel Joists, K-Series – S.I. Units
 Standard ASD Load Table Open Web Steel Joists, K-Series – S.I. Units
 Standard LRFD Load Table Longspan Steel Joists, LH-Series – S.I. Units
 Standard ASD Load Table Longspan Steel Joists, LH-Series – S.I. Units
 Standard LRFD Load Table Deep Longspan Steel Joists, DLH-Series – S.I. Units
 Standard ASD Load Table Deep Longspan Steel Joists, DLH-Series – S.I. Units

Wherever a standard SJI Section Number is specified in the joist designation (e.g. 18K4, 32LH10) and other design load cases are also specified for the joist, the steel joist shall be designed for the corresponding total load as shown in the Standard Load Tables as a minimum.

User Note: Six standard types of K-Series, LH-Series and DLH-Series joists are designed and manufactured. These types are underslung (top chord bearing) or square-ended (bottom chord bearing), with parallel chords or with single or double pitched top chords. The Standard Load Tables apply for a pitched top chord up to 1/2 inch per foot (1:24).

The steel joist or Joist Girder designation depth shall be the depth at mid-span.

An alternate method of specifying a standard K-Series, LH-Series, or DLH-Series joist shall be permitted by providing the designation in a “load/load” sequence. The format used shall be ddKt/ll, ddLHt/ll, or ddDLHt/ll where:

dd is the nominal depth of the joist in inches (mm)

tl is the total uniformly distributed load applied to the joist top chord, plf (kN/m)

ll is the uniform live load for which the deflection shall be checked and limited as required by this Specification, plf (kN/m)

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User Note: The load/load K-Series, LH-Series, or DLH-Series joists can be specified in depths from 10 inches (254 mm) through 120 inches (3048 mm) and spans up through 240 feet (73152 mm). The maximum uniformly distributed load-carrying capacity of 2400 plf (35.03 kN/m) in ASD and 3600 plf (52.54 kN/m) in LRFD has been established for this alternate K-Series, LH-Series, or DLH-Series format. The maximum capacity for any given load/load joist designation is a function of span, depth and chord member size. When requirements exceed the standard K-Series load table limitations for loading, span, and depth, an LH-Series designation is recommended to facilitate the proper determination of minimum seat depth, end anchorage, bridging size, deck attachment, etc. Thus, any joist exceeding a 30 inch depth, a span of 60 feet, an in-kip moment of Depth x 61 kips in ASD or Depth x 91.5 kips in LRFD, or an end reaction of 9.2 kips in ASD or 13.8 kips in LRFD should be designated as an LH-Series which allows for a cross-reference with a standard LH designation as listed in this Specification for seat, end anchorage, bridging, attachment tables, etc.

A KCS Joist is a particular type of K-Series joist, and shall be designed in accordance with this Specification based on an envelope of moment and shear capacity, rather than uniform load capacity, to support uniform plus concentrated loads or other non-uniform loads. The KCS Joists shall be selected from standardized depths from 10 inches (254 mm) through 30 inches (762 mm), for spans up through 60 feet (18288 mm). The maximum total safe uniformly distributed load-carrying capacity of a KCS Joist, K-Series, shall be 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD. A KCS Joist shall be parallel chord only and shall be permitted to be underslung or bottom chord bearing.

The KCS Joists, K-Series, standard designations shall be established by their nominal depth, followed by the letters "KCS", and then by the Section Number designation assigned. The Section Number designations shall range from 1 to 5. A KCS Joist shall not be designated using the alternate "load/load" method. The KCS Joists, K-Series, standard designations listed in the following Standard Load Tables shall provide the moment capacity and shear capacity as listed in the applicable tables:

- Standard LRFD Load Table for KCS Open Web Steel Joists – U.S. Customary Units
- Standard ASD Load Table for KCS Open Web Steel Joists – U.S. Customary Units
- Standard LRFD Load Table for KCS Open Web Steel Joists – S.I. Units
- Standard ASD Load Table for KCS Open Web Steel Joists – S.I. Units

Where an open web configuration becomes impractical, a Joist Substitute, K-Series, shall be designed in accordance with this Specification to support uniform loads when the span is less than 10 feet (3048 mm). The maximum total safe uniformly distributed load-carrying capacity of a Joist Substitute shall be 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD.

The Joist Substitutes, K-Series, standard designations shall be established by their nominal depth, e.g. 2.5, followed by the letter "K" and then by the chord size designation assigned. The chord size designations shall range from 1 to 3. The Joist Substitutes, K-Series, standard designations listed in the following Load Tables shall support the uniformly distributed loads as provided in the applicable tables:

User Note: The Joist Substitutes, K-Series, are standardized as 2.5 inch (64 mm) deep sections for spans up through 10'-0" (3048 mm).

- LRFD Simple Span Load Table for 2.5 Inch K-Series Joist Substitutes – U.S. Customary Units
- ASD Simple Span Load Table for 2.5 Inch K-Series Joist Substitutes – U.S. Customary Units
- LRFD Simple Span Load Table for 64 mm K-Series Joist Substitutes – S.I. Units
- ASD Simple Span Load Table for 64 mm K-Series Joist Substitutes – S.I. Units

- LRFD Outriggers Load Table for 2.5 Inch K-Series Joist Substitutes – U.S. Customary Units
- ASD Outriggers Load Table for 2.5 Inch K-Series Joist Substitutes – U.S. Customary Units
- LRFD Outriggers Load Table for 64 mm K-Series Joist Substitutes – S.I. Units
- ASD Outriggers Load Table for 64 mm K-Series Joist Substitutes – S.I. Units

A Top Chord Extension or Extended End, K-series, shall be a joist accessory that shall be designed in accordance with this Specification to support uniform loads when one or both ends of an underslung joist needs to be cantilevered beyond its bearing seat.

User Note: The Top Chord Extensions and Extended Ends are standardized as an "S" Type (top chord angles extended only) and an "R" Type (top chord and bearing seat angles extended), respectively.

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Standard designations for the "S" Type shall range from S1 to S12 for spans from 0'-6" to 4'-6" (152 to 1372 mm). Standard designations for the "R" Type shall range from R1 to R12 for spans from 0'-6" to 6'-0" (152 to 1829 mm). The maximum total safe uniformly distributed load-carrying capacity of either an "R" or "S" Type extension shall be 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD. The "S" Type Top Chord Extensions and "R" Type Extended Ends listed in the following Standard Load Tables shall support the uniformly distributed loads as provided in the applicable tables:

LRFD Top Chord Extension Load Table (S Type) – U.S. Customary Units
 ASD Top Chord Extension Load Table (S Type) – U.S. Customary Units
 LRFD Top Chord Extension Load Table (R Type) – U.S. Customary Units
 ASD Top Chord Extension Load Table (R Type) – U.S. Customary Units
 LRFD Top Chord Extension Load Table (S Type) – S.I. Units
 ASD Top Chord Extension Load Table (S Type) – S.I. Units
 LRFD Top Chord Extension Load Table (R Type) – S.I. Units
 ASD Top Chord Extension Load Table (R Type) – S.I. Units

1.5 STRUCTURAL DESIGN DRAWINGS AND SPECIFICATIONS

The structural design drawings and specifications shall meet the requirements in the *Code of Standard Practice for Steel Joists and Joist Girders*, except for deviations specifically identified in the design drawings and/or specifications.

SECTION 2. REFERENCED SPECIFICATIONS, CODES AND STANDARDS

2.1 REFERENCES

The standards listed below shall be considered as part of the requirements of this Specification. Where conflicts occur between this Specification and a referenced standard, the provisions of this Specification shall take precedence unless otherwise stated. This section lists the standards that are referenced in this Specification. The standards are listed in alphabetical order by name of standards developer organization, with the specific standard designations, title and dates of each of the referenced standards below.

American Institute of Steel Construction, Inc. (AISC), Chicago, IL

ANSI/AISC 360-10 *Specification for Structural Steel Buildings*

American Iron and Steel Institute (AISI), Washington, DC

ANSI/AISI S100-2012 *North American Specification for the Design of Cold-Formed Steel Structural Members*

American Society of Civil Engineers (ASCE), Reston, VA

SEI/ASCE 7-10 *Minimum Design Loads for Buildings and Other Structures*

American Society of Testing and Materials, ASTM International (ASTM), West Conshohocken, PA

ASTM A6/A6M-13A, *Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling*

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- ASTM A36/A36M-12, *Standard Specification for Carbon Structural Steel*
- ASTM A242/242M-13, *Standard Specification for High-Strength Low-Alloy Structural Steel*
- ASTM A307-12a, *Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength*
- ASTM A325/325M-13, *Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi [830 MPa] Minimum Tensile Strength*
- ASTM A370-12a, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*
- ASTM A500/A500M-13, *Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes*
- ASTM A501-07 *Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing* ASTM A529/A529M-05(2009), *Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality* ASTM A572/A572M-13a, *Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel*
- ASTM A588/A588M-10, *Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance*
- ASTM A606/A606M-09a, *Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance*
- ASTM A992/A992M-11, *Standard Specification for Structural Steel Shapes*
- ASTM A1008/A1008M-13, *Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable*
- ASTM A1011/A1011M-13, *Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength*
- ASTM A1065/A1065M-09(2014) *Standard Specification for Cold-Formed Electric-Fusion (ARC) Welded High-Strength Low-Alloy Structural Tubing in Shapes with 50 ksi (345 MPA) Minimum Yield Point*
- ASTM A1085-13 *Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)*

American Welding Society (AWS), Miami, FL

- AWS A5.1/A5.1M-2012, *Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding*
- AWS A5.5/A5.5M:2006, *Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding*
- AWS A5.17/A5.17M-97:R2007, *Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding*
- AWS A5.18/A5.18M:2005, *Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding*
- AWS A5.20/A5.20M:2005, *Specification for Carbon Steel Electrodes for Flux Cored Arc Welding*
- AWS A5.23/A5.23M:2011, *Specification for Low-Alloy Steel Electrodes and Fluxes for Submerged Arc Welding*
- AWS A5.28/A5.28M:2005, *Specification for Low-Alloy Steel Electrodes and Rods for Gas Shielded Arc Welding*
- AWS A5.29/A5.29M:2010, *Specification for Low-Alloy Steel Electrodes for Flux Cored Arc Welding*
- AWS D1.1/D1.1M:2015, *Structural Welding Code - Steel*
- AWS D1.3/D1.3M:2008, *Structural Welding Code Sheet Steel*

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User Note: The following informative references provide practical guidance in the use and application of this Specification:

Code of Federal Regulations (CFR), Occupational Safety and Health Administration (OSHA), 29 CFR Part 1926, Safety Standards for Steel Erection; Subpart R - Steel Erection; January 18, 2001, Washington, D.C.

Steel Joist Institute (SJI), Florence, SC

SJI-COSP-2015, *Code of Standard Practice for Steel Joists and Joist Girders*

Technical Digest No. 3 (2007), *Structural Design of Steel Joist Roofs to Resist Ponding Loads*

Technical Digest No. 5 (2015), *Vibration of Steel Joist-Concrete Slab Floors*

Technical Digest No. 6 (2012), *Structural Design of Steel Joist Roofs to Resist Uplift Loads*

Technical Digest No. 8 (2008), *Welding of Open Web Steel Joists and Joist Girders*

Technical Digest No. 9 (2008), *Handling and Erection of Steel Joists and Joist Girders*

Technical Digest No. 10 (2003), *Design of Fire Resistive Assemblies with Steel Joists*

Technical Digest No. 11 (2007), *Design of Lateral Load Resisting Frames Using Steel Joists and Joist Girders*

Technical Digest No. 12 (2007), *Evaluation and Modification of Open-Web Steel Joists and Joist Girders*

The Society for Protective Coatings (SSPC), *Steel Structures Painting Manual, Volume 2, Systems and Specifications*, Paint Specification No. 15, Steel Joist Shop Primer, May 1, 1999, Pittsburgh, PA.

Van Malssen, S.H. (1984), *The Effects of Arc Strikes on Steel Used in Nuclear Construction*, Welding Journal, American Welding Society, Miami, FL, July 1984.

SECTION 3. MATERIALS

3.1 STEEL

The steel used in the manufacture of Joist Girders and K-Series, LH-Series, and DLH-Series joists shall conform to one of the following ASTM specifications:

ASTM A36/A36M, Carbon Structural Steel

ASTM A242/A242M, High-Strength Low-Alloy Structural Steel

ASTM A500/A500M, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A529/A529M, High-Strength Carbon-Manganese Steel of Structural Quality

ASTM A572/A572M, High-Strength Low-Alloy Columbium-Vanadium Structural Steel

ASTM A588/A588M, High-Strength Low-Alloy Structural Steel up to 50 ksi [345 MPa] Minimum Yield Point with Atmospheric Corrosion Resistance

ASTM A606/A606M, Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance

ASTM A992/A992M, Structural Steel Shapes

ASTM A1008/A1008M, Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable

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ASTM A1011/A1011M, Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength

ASTM A1018/A1018M, Steel, Sheet and Strip, Heavy Thickness Coils, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, Columbium or Vanadium, and High-Strength Low-Alloy with Improved Formability and Ultra-High Strength

EXCEPTION: Steel used in the manufacture of Joist Girders and K-Series, LH-Series, and DLH-Series joists shall be permitted to be of suitable quality ordered or produced to other than the listed ASTM specifications, provided that such material in the state used for final assembly and manufacture is weldable and is proven by tests performed by the producer or manufacturer to have properties, in accordance with Section 3.2.

3.2 MECHANICAL PROPERTIES

3.2.1 Minimum Yield Strength: Steel used for Joist Girders and K-Series, LH-Series, and DLH-Series joists shall have a minimum yield strength determined in accordance with one of the procedures specified in this section, which is equal to the yield strength assumed in the design.

User note: The term "Yield Strength" as used herein designates the yield level of a material as determined by the applicable method outlined in paragraph 13.1 "Yield Point", and in paragraph 13.2 "Yield Strength", of ASTM A370, *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*, or as specified in Section 3.2.3.

Evidence that the steel furnished meets or exceeds the design yield strength shall, if requested, be provided in the form of an affidavit or by witnessed or certified test reports.

For material used without consideration of increase in yield strength resulting from cold forming, the specimens shall be taken from as-rolled material. In the case of such material, the mechanical properties of which conform to the requirements of one of the listed ASTM specifications in Section 3.1, the test specimens and procedures shall conform to those of the applicable ASTM specification and to ASTM A370.

3.2.2 Other Materials: For materials where the mechanical properties do not conform to the requirements of one of the ASTM specifications listed in Section 3.1, these materials shall conform to the following requirements:

- a) The specimens shall comply with ASTM A370,
- b) The specimens shall exhibit a yield strength equal to or exceeding the design yield strength,
- c) The specimens shall have an elongation of not less than 20 percent in 2 inches (51 mm) for sheet strip, or 18 percent in 8 inches (203 mm) for plates, shapes and bars with adjustments for thickness for plates, shapes and bars as prescribed in either ASTM A36/A36M, A242/A242M, A500/A500M, A529/A529M, A572/A572M, A588/A588M, or A992/A992M, whichever ASTM specification is applicable, on the basis of design yield strength.
- d) The number of tests for a), b), and c) above shall be as prescribed in ASTM A6/A6M for plates, shapes, and bars; and ASTM A606/A606M, A1008/A1008M and A1011/A1011M for sheet and strip.

3.2.3 As-Formed Strength: If as-formed strength is utilized, the test reports shall show the results of tests performed on full section specimens in accordance with the provisions of the AISI S100. The reports shall also indicate compliance with the following additional requirements:

- a) The yield strength calculated from the test data shall equal or exceed the design yield strength.
- b) Where tension tests are made for acceptance and control purposes, the tensile strength shall be at least 8 percent greater than the yield strength of the section.
- c) Where compression tests are used for acceptance and control purposes, the specimen shall withstand a gross shortening of 2 percent of its original length without cracking. The length of the specimen shall be not greater than 20 times the least radius of gyration.
- d) If any test specimen fails to pass the requirements of the subparagraphs (a), (b), or (c) above, as applicable, two retests shall be made of specimens from the same lot. Failure of one of the retest specimens to meet such requirements shall be the cause for rejection of the lot represented by the specimens.

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3.3 WELDING ELECTRODES

3.3.1 Welding Electrodes: The welding electrodes used for arc welding shall be in accordance with the following:

- a) For connected members both having a specified minimum yield strength greater than 36 ksi (250 MPa), one of the following electrodes shall be used:

AWS A5.1:	E70XX
AWS A5.5:	E70XX-X
AWS A5.17:	F7XX-EXXX, F7XX-ECXXX flux electrode combination
AWS A5.18:	ER70S-X, E70C-XC, E70C-XM
AWS A5.20:	E7XT-X, E7XT-XM
AWS A5.23:	F7XX-EXXX-XX, F7XX-ECXXX-XX
AWS A5.28:	ER70S-XXX, E70C-XXX
AWS A5.29:	E7XTX-X, E7XTX-XM

- b) For connected members both having a specified minimum yield strength of 36 ksi (250 MPa) or one having a specified minimum yield strength of 36 ksi (250 MPa), and the other having a specified minimum yield strength greater than 36 ksi (250 MPa), one of the following electrodes shall be used:

AWS A5.1:	E60XX
AWS A5.17:	F6XX-EXXX, F6XX-ECXXX flux electrode combination
AWS A5.20:	E6XT-X, E6XT-XM
AWS A5.29:	E6XTX-X, E6XTX-XM

or any of those listed in Section 3.3.1(a).

3.3.2 Other Welding Methods: Other welding methods, providing equivalent strength as demonstrated by tests, shall be permitted to be used.

3.4 PAINT

The standard shop paint shall be considered an impermanent and provisional coating.

User Note: The standard shop paint is intended to protect the steel for only a short period of exposure in ordinary atmospheric conditions.

When specified, the standard shop paint shall conform to one of the following:

- The Society for Protective Coatings, SSPC Paint Specification No. 15.
- Or, shall be a shop paint which meets the minimum performance requirements of SSPC Paint Specification No. 15.

SECTION 4.**DESIGN AND MANUFACTURE****4.1 METHOD**

Joist Girders support steel joists or other secondary members and shall be designed in accordance with this Specification as simply-supported primary load-carrying members for in-plane loading. Steel joists shall be designed in accordance with this Specification as simply-supported trusses supporting a floor or roof deck so constructed as to brace the top chord of the steel joists against lateral buckling. Where any applicable design feature is not specifically covered herein, the design shall be in accordance with the following Specifications:

- Where the steel used consists of hot-rolled shapes, bars or plates, AISC 360.
- For members which are cold-formed from sheet or strip steel, AISI S100.

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4.1.1 Design Basis:

Steel joist and Joist Girder designs shall be in accordance with the provisions in this Specification using Load and Resistance Factor Design (LRFD) or Allowable Strength Design (ASD) as specified by the specifying professional for the project.

4.1.2 Loads, Forces and Load Combinations:

The loads and forces used for the steel joist and Joist Girder design shall be calculated by the specifying professional in accordance with the applicable building code and specified and provided on the structural drawings.

For nominal concentrated loads, which have been accounted for in the specified uniform loads, the addition of chord bending moments or an added shop or field web member due to these nominal concentrated loads shall not be required provided that the sum of the concentrated loads within a chord panel does not exceed 100 pounds and the attachments are concentric to the chord. When exact dimensional locations for concentrated loads which do not meet the above criteria are provided by the specifying professional, the joist shall be designed for the loads and load locations provided without the need for additional field applied web members at the specified locations.

The load combinations shall be specified by the specifying professional on the structural drawings in accordance with the applicable building code. In the absence of an applicable building code, the load combinations shall be those stipulated in SEI/ASCE 7 Section 2.3 and Section 2.4 as appropriate. For LRFD designs, the load combinations in SEI/ASCE 7, Section 2.3 shall apply. For ASD designs, the load combinations in SEI/ASCE 7, Section 2.4 shall apply.

4.2 DESIGN AND ALLOWABLE STRESSES

4.2.1 Design Using Load and Resistance Factor Design (LRFD)

Joists and Joist Girders shall have their components so proportioned that the required stresses, f_u , shall not exceed ϕF_n where

f_u	= required stress	ksi (MPa)
F_n	= nominal stress	ksi (MPa)
ϕ	= resistance factor	
ϕF_n	= design stress	ksi (MPa)

4.2.2 Design Using Allowable Strength Design (ASD)

Joists and Joist Girders shall have their components so proportioned that the required stresses, f , shall not exceed F_n / Ω where

f	= required stress	ksi (MPa)
F_n	= nominal stress	ksi (MPa)
Ω	= safety factor	
F_n / Ω	= allowable stress	ksi (MPa)

4.2.3 Stresses:

The calculation of design stress or allowable stress for chords shall be based on a yield strength, F_y , of the material used in manufacturing equal to 50 ksi (345 MPa). The calculation of design stress or allowable stress for all other joist elements shall be based on a yield strength, F_y , of the material used in manufacturing, but shall not be less than 36 ksi (250 MPa) nor greater than 50 ksi (345 MPa). Yield strengths greater than 50 ksi shall not be used for the design of any members.

4.2.3.1 Tension: $\phi_t = 0.90$ (LRFD), $\Omega_t = 1.67$ (ASD)

$$\text{Design Stress} = 0.9F_y \text{ (LRFD)} \tag{4.2-1}$$

$$\text{Allowable Stress} = 0.6F_y \text{ (ASD)} \tag{4.2-2}$$

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4.2.3.2 Compression: $\phi_c = 0.90$ (LRFD), $\Omega_c = 1.67$ (ASD)

$$\text{Design Stress} = 0.9F_{cr} \text{ (LRFD)} \quad (4.2-3)$$

$$\text{Allowable Stress} = 0.6F_{cr} \text{ (ASD)} \quad (4.2-4)$$

Where:

For members with $k\ell/r \leq 4.71\sqrt{E/QF_y}$

$$F_{cr} = Q \left[0.658^{\left(\frac{QF_y}{F_e} \right)} \right] F_y \quad (4.2-5)$$

For members with $k\ell/r > 4.71\sqrt{E/QF_y}$

$$F_{cr} = 0.877F_e \quad (4.2-6)$$

Where F_e = Elastic buckling stress determined in accordance with Equation 4.2-7

$$F_e = \frac{\pi^2 E}{\left(\frac{k\ell}{r} \right)^2} \quad (4.2-7)$$

In the above equations, ℓ is the length, k is the effective length factor, and r is the corresponding radius of gyration of the member as defined in Section 4.3. E is equal to 29,000 ksi (200,000 MPa).

For hot-rolled sections and cold-formed angles, Q shall be taken as the full reduction factor for slender compression members as determined in accordance with AISI 360-10.

Exception: Where a compression web member is a crimped-end angle member intersecting at the first bottom chord panel point, whether hot-rolled or cold-formed, then Q shall be determined as follows:

$$Q = [5.25/(w/t)] + t \leq 1.0 \quad (4.2-8a)$$

Where: w = angle leg length, inches
 t = angle leg thickness, inches

or,

$$Q = [5.25/(w/t)] + (t/25.4) \leq 1.0 \quad (4.2-8b)$$

Where: w = angle leg length, millimeters
 t = angle leg thickness, millimeters

For all other cold-formed sections the method of calculating the nominal compression strength shall be in accordance with AISI S100.

4.2.3.3 Bending: $\phi_b = 0.90$ (LRFD), $\Omega_b = 1.67$ (ASD)

Bending calculations shall be based on the elastic section modulus.

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For chords and web members other than solid rounds: $F_n = F_y$

$$\text{Design Stress} = \phi_b F_n = 0.9F_y \text{ (LRFD)} \quad (4.2-9)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.6F_y \text{ (ASD)} \quad (4.2-10)$$

For web members of solid round cross section: $F_n = 1.6 F_y$

$$\text{Design Stress} = \phi_b F_n = 1.45F_y \text{ (LRFD)} \quad (4.2-11)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.95F_y \text{ (ASD)} \quad (4.2-12)$$

For bearing plates used in joist seats: $F_n = 1.5 F_y$

$$\text{Design Stress} = \phi_b F_n = 1.35F_y \text{ (LRFD)} \quad (4.2-13)$$

$$\text{Allowable Stress} = F_n/\Omega_b = 0.90F_y \text{ (ASD)} \quad (4.2-14)$$

4.2.3.4 Weld Strength:

Shear at throat of fillet welds, flare bevel groove welds, partial joint penetration groove welds, and plug/slot welds shall be determined as follows:

$$\text{Nominal Shear Stress} = F_{nw} = 0.6F_{exx} \quad (4.2-15)$$

LRFD: $\phi_w = 0.75$

$$\text{Design Shear Strength} = \phi R_n = \phi_w F_{nw} A = 0.45F_{exx} A_w \quad (4.2-16)$$

ASD: $\Omega_w = 2.0$

$$\text{Allowable Shear Strength} = R_n/\Omega_w = F_{nw}A/\Omega_w = 0.3F_{exx} A_w \quad (4.2-17)$$

Where:

F_{exx} is determined as follows:

E70 series electrodes or F7XX-EXXX flux-electrode combinations $F_{exx} = 70 \text{ ksi (483 MPa)}$

E60 series electrodes or F6XX-EXXX flux-electrode combinations $F_{exx} = 60 \text{ ksi (414 MPa)}$

A_w = effective throat area, where:

For fillet welds, A_w = effective throat area

Other design methods demonstrated to provide sufficient strength by testing shall be permitted to be used.

For flare bevel groove welds, the effective weld area is based on a weld throat width, T, where:

$$T \text{ (inches)} = 0.12D + 0.11 \quad (4.2-18a)$$

Where D = web diameter, inches

or,

$$T \text{ (mm)} = 0.12D + 2.8 \quad (4.2-18b)$$

Where D = web diameter, mm

For plug/slot welds, A_w = cross-sectional area of the hole or slot in the plane of the faying surface provided that the hole or slot meets the requirements of AISC 360.

User Note: For more on plugs/slot welds see Steel Joist Institute Technical Digest No. 8, "Welding of Open-Web Steel Joists and Joist Girders".

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Strength of resistance welds and complete-joint-penetration groove or butt welds in tension or compression (only where the stress is normal to the weld axis) shall be equal to the base metal strength:

$$\phi_t = \phi_c = 0.90 \text{ (LRFD)} \quad \Omega_t = \Omega_c = 1.67 \text{ (ASD)}$$

$$\text{Design Stress} = 0.9 F_y \text{ (LRFD)} \quad (4.2-19)$$

$$\text{Allowable Stress} = 0.6 F_y \text{ (ASD)} \quad (4.2-20)$$

4.3 MAXIMUM SLENDERNESS RATIOS

The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$ of members as a whole or any component part shall not exceed the values given in Table 4.3-1, Part A.

4.3.1 Effective Slenderness Ratios: The effective slenderness ratio, $k\ell/r$ to be used in calculating the nominal stresses, F_{cr} and F'_e , is the largest value as determined from Table 4.3-1, Part B and Part C, and modified where required with equation 4.3-1. The effective length k shall be taken as 1.0 for all components in Joist Girders.

4.3.2 Compressive Members: In compression members where fillers or ties are used, they shall be spaced so that the ℓ_s/r_z ratio of each component does not exceed the governing ℓ/r ratio of the member as a whole. The terms used in Table 4.3-1 shall be defined as follows:

- ℓ = length center-to-center of panel points, except $\ell = 36$ inches (914 millimeters) for calculating ℓ/r_y of the top chord member for joists, and for Joist Girders this distance shall be the unbraced length between joists which are positively attached to the top chord, in. (mm).
- ℓ_s = maximum length center-to-center between panel point and filler (tie), or between adjacent fillers (ties), in. (mm).
- r_x = member radius of gyration about the horizontal axis of the joist or Joist Girder cross section, in. (mm).
- r_y = member radius of gyration about the vertical axis of the joist or Joist Girder cross section, in. (mm).
- r_z = least radius of gyration of a member component, in. (mm).

Compression web members shall be those web members subject to compressive axial loads under gravity loading.

4.3.3 Tension Members: Tension web members shall be those web members subject to tension axial loads under gravity loading, and which shall be permitted to be subject to compressive axial loads under alternate loading conditions

User Note: An example of a non-gravity alternate loading condition is net uplift.

4.3.4 Top Chords: For top chords, the end panel(s) shall be the panels between the bearing seat and the first primary interior panel point comprised of at least two intersecting web members.

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4.3.5 Built-Up Web Members: For built-up web members composed of two interconnected shapes, where $\ell_s/r_z > 40$,

a modified slenderness ratio $\left(\frac{k\ell}{r_y}\right)_m$ shall replace $\frac{k\ell}{r_y}$ in equations 4.2-5, 4.2-6, and 4.2-7, where:

$$\left(\frac{k\ell}{r_y}\right)_m = \sqrt{\left(\frac{k\ell}{r_y}\right)^2 + \left(\frac{k_i\ell_s}{r_z}\right)^2} \quad (4.3-1)$$

and,

$$\begin{aligned} k_i &= 0.50 \text{ for angles back-to-back} \\ &= 0.75 \text{ for channels back-to-back} \end{aligned}$$

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TABLE 4.3-1

MAXIMUM AND EFFECTIVE SLENDERNESS RATIOS¹

Description		$k\ell/r_x$	$k\ell/r_y$	$k\ell/r_z$	$k\ell_s/r_z$
I. TOP CHORD INTERIOR PANELS					
A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 90.				
B.	The effective slenderness ratio for joists, $k\ell/r$, to determine F_{cr} where k is:				
1.	Two shapes with fillers or ties	0.75	0.94	---	1.0
2.	Two shapes without fillers or ties	---	---	0.75	---
3.	Single component members	0.75	0.94	---	---
C.	For bending, the effective slenderness ratio, $k\ell/r$, to determine F'_e where k is:				
		0.75	---	---	---
II. TOP CHORD END PANELS					
A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 120.				
B.	The effective slenderness ratio for joists, $k\ell/r$, to determine F_{cr} where k is:				
1.	Two shapes with fillers or ties	1.0	0.94	---	1.0
2.	Two shapes without fillers or ties	---	---	1.0	---
3.	Single component members	1.0	0.94	---	---
C.	For bending, the effective slenderness ratio, $k\ell/r$, to determine F'_e where k is:				
		1.0	---	---	---
III. ALL BOTTOM CHORD PANELS					
A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 240.				
B.	For members subject to compression, the effective slenderness ratio for joists, $k\ell/r$, to determine F_{cr} where k is:				
1.	Two shapes with fillers or ties	0.9	0.94	---	1.0
2.	Two shapes without fillers or ties	---	---	0.9	---
3.	Single component members	0.9	0.94	---	---
C.	For bending, the effective slenderness ratio, $k\ell/r$, to determine F'_e where k is:				
		0.9	---	---	---
IV. WEB MEMBERS					
A.	The slenderness ratios, $1.0\ell/r$ and $1.0\ell_s/r$, of members as a whole or any component part shall not exceed 240 for a tension member or 200 for a compression member.				
B.	For members subject to compression, the effective slenderness ratio for joists, $k\ell/r$, to determine F_{cr} where k is:				
1.	Two shapes with fillers or ties	0.75	1.0	---	1.0
2.	Two shapes without fillers or ties	---	---	1.0	---
3.	Single component members	0.75	0.9*	---	---
	*For end tension web members subject to compression, k shall equal 0.8				
(1) The effective length k shall equal 1.0 for all components of Joist Girders.					

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4.4 MEMBERS

4.4.1 Chords

The joist and Joist Girder bottom chord shall be designed as an axially loaded tension member.

For Joist Girders, the radius of gyration of the bottom chord about its vertical axis shall not be less than $\ell/240$ where ℓ is the distance between lines of bracing. The radius of gyration of a Joist Girder top chord about the vertical axis shall not be less than $\text{Span}/575$.

For steel joists, the radius of gyration of the top chord about its vertical axis shall not be less than the results of equation 4.4-1 or 4.4-2:

$$r_y \geq \ell_{br} / \left(124 + 0.67 d_j + 28 \frac{d_j}{L} \right), \text{ in.} \quad (4.4-1a)$$

$$r_y \geq \ell_{br} / \left(124 + 0.026 d_j + 0.34 \frac{d_j}{L} \right), \text{ mm} \quad (4.4-1b)$$

or,

$$r_y \geq \ell_{br} / 170 \quad (4.4-2)$$

Where:

d_j is the steel joist depth, in. (mm)

L is the joist span length, ft. (m)

r_y is the radius of gyration of the top chord about the vertical axis of the joist cross section, in. (mm)

ℓ_{br} is the spacing in inches (millimeters) between lines of bracing as specified in Section 5.5.3.1.

A steel joist top chord shall be considered as laterally braced by the floor slab or roof deck provided the requirements of Section 5.9 are met.

A Joist Girder top chord shall be considered as laterally braced by the steel joists provided positive attachment is made. The outstanding part of the top chord member shall be designed such that the allowable reaction from a single joist shall not exceed equation 4.4-3 or 4.4-4:

$$\phi P_p \text{ and } \phi P_p (1.6 - f_{au}/\phi Q F_y) \quad (\text{LRFD, } \phi = 0.9) \quad (4.4-3)$$

$$P_p/\Omega \text{ and } P_p/\Omega (1.6 - \Omega f_{au}/Q F_y) \quad (\text{ASD, } \Omega = 1.67) \quad (4.4-4)$$

Where:

F_y = Specified minimum yield strength, ksi (MPa)

P_p = Plastic failure mode = $[(t^2 F_y) / [2(b-k)]] [g + 5.66(b-k)]$, kips (N)

Q = Form factor defined in Section 4.2.3.2

b = width of the outstanding part of the top chord member, in. (mm)

f_{au} = P_u/A = Required compressive stress, ksi (MPa)

f_a = P/A = Required compressive stress, ksi (MPa)

g = width of bearing seat, in. (mm)

k = value from angle properties or similar dimension for other members, in (mm)

t = thickness of the outstanding part of the top chord member, in. (mm)

The top chord of a steel joist or Joist Girder shall be designed as a continuous member subject to combined axial and bending stresses, except a Joist Girder loaded only at panel points shall be designed as an axial loaded compression member. For combined stresses the top chord shall be so proportioned that:



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For LRFD:

at the panel point:

$$f_{au} + f_{bu} \leq 0.9F_y \quad (4.4-5)$$

at the mid panel:

$$\text{for, } \frac{f_{au}}{\phi_c F_{cr}} \geq 0.2,$$

$$\frac{f_{au}}{\phi_c F_{cr}} + \frac{8}{9} \left[\frac{C_m f_{bu}}{\left[1 - \left(\frac{f_{au}}{\phi_c F'_e} \right) \right] Q \phi_b F_y} \right] \leq 1.0 \quad (4.4-6)$$

$$\text{for, } \frac{f_{au}}{\phi_c F_{cr}} < 0.2,$$

$$\frac{f_{au}}{2\phi_c F_{cr}} + \left[\frac{C_m f_{bu}}{\left[1 - \left(\frac{f_{au}}{\phi_c F'_e} \right) \right] Q \phi_b F_y} \right] \leq 1.0 \quad (4.4-7)$$

f_{au} = P_u/A = Required compressive stress using LRFD load combinations, ksi (MPa)

P_u = Required axial strength using LRFD load combinations, kips (N)

A = Area of the top chord, in.² (mm²)

f_{bu} = M_u/S = Required bending stress at the location under consideration using LRFD load combinations, ksi (MPa)

M_u = Required flexural strength using LRFD load combinations, kip-in. (N-mm)

S = Elastic Section Modulus, in.³ (mm³)

F_{cr} = Nominal axial compressive stress in ksi (MPa) based on $k\ell/r$ as defined in Section 4.3

C_m = $1 - 0.3 f_{au}/\phi_c F'_e$ for end panels

C_m = $1 - 0.4 f_{au}/\phi_c F'_e$ for interior panels

Q = Form factor defined in Section 4.2.3.2

ϕ_c = Resistance factor for compression = 0.9

ϕ_b = Resistance factor for flexure = 0.9

F_y = Specified minimum yield strength, ksi (MPa)

$$F'_e = \frac{\pi^2 E}{(k\ell/r_x)^2}, \text{ ksi (MPa),}$$

where ℓ is the length, k is the effective length factor, and r_x is the corresponding radius of gyration of the member as defined in Section 4.3

E = Modulus of elasticity, 29,000 ksi (200,000 MPa)

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For **ASD**:

at the panel point:

$$f_a + f_b \leq 0.6F_y \quad (4.4-8)$$

at the mid panel:

for, $\frac{f_a}{F_a} \geq 0.2$,

$$\frac{f_a}{F_a} + \frac{8}{9} \left[\frac{C_m f_b}{\left[1 - \left(\frac{1.67f_a}{F'_e} \right) \right] QF_b} \right] \leq 1.0 \quad (4.4-9)$$

for $\frac{f_a}{F_a} < 0.2$,

$$\left(\frac{f_a}{2F_a} \right) + \left[\frac{C_m f_b}{\left[1 - \left(\frac{1.67f_a}{F'_e} \right) \right] QF_b} \right] \leq 1.0 \quad (4.4-10)$$

- f_a = P/A required compressive stress using ASD load combinations, ksi (MPa)
- A = Area of the top chord, in.² (mm²)
- P = Required axial strength using ASD load combinations, kips (N)
- f_b = M/S = required bending stress at the location under consideration using ASD load combinations, ksi (MPa)
- S = Elastic Section Modulus, in.³ (mm³)
- M = Required flexural strength using ASD load combinations, k-in. (N-mm)
- F_a = Allowable axial compressive stress based on $k\ell/r$ as defined in Section 4.3; $0.6F_{cr}$, ksi (MPa)
- F_b = Allowable bending stress; $0.6F_y$, ksi (MPa)
- C_m = $1 - 0.50 f_a/F'_e$ for end panels
- C_m = $1 - 0.67 f_a/F'_e$ for interior panels
- Q = Form factor defined in Section 4.2.3.2
- $F'_e = \frac{\pi^2 E}{(k\ell/r_x)^2}$, ksi (MPa),
where ℓ is the length, k is the effective length factor, and r_x is the corresponding radius of gyration of the member as defined in Section 4.3
- E = Modulus of elasticity, 29,000 ksi (200,000 MPa)

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The top chord and bottom chord shall be designed such that at each joint complies with equation 4.4-11 or 4.4-12:

$$f_{vmod} \leq \phi_v F_n \quad (\text{LRFD, } \phi_v = 1.00) \quad (4.4-11)$$

$$f_{vmod} \leq F_n / \Omega_v \quad (\text{ASD, } \Omega_v = 1.50) \quad (4.4-12)$$

F_n = nominal shear stress = $0.6F_y$, ksi (MPa)

f_t = axial stress = P/A , ksi (MPa)

f_v = shear stress = V/bt , ksi (MPa)

f_{vmod} = modified shear stress = $(1/2)\sqrt{f_t^2 + 4f_v^2}$

b = length of vertical part(s) of cross section, in. (mm)

t = thickness of vertical part(s) of cross section, in. (mm)

It shall not be necessary to design the top chord and bottom chord for the modified shear stress, f_{vmod} , where a round bar web member is continuous through a joint. The minimum required shear of section 4.4.2 (25 percent of the maximum end reaction) shall not be required when evaluating Equation 4.4-11 or 4.4-12.

KCS Joist, K-Series, chords shall be designed for a flat positive bending moment envelope where the moment capacity is constant at all interior panels. The top chord end panel(s) shall be designed for an axial load based on the force in the first tension web resulting from the specified shear. A uniform load of 550 plf (8.02 kN/m) in ASD or 825 plf (12.03 kN/m) in LRFD shall be used to check bending in the end panel(s). The top chord interior panels shall be designed for an axial stress resulting from the constant moment capacity plus the bending stress. The bending stress shall be determined from the smaller uniform load derived from the constant moment and constant shear, not to exceed 550 plf (ASD) or 825 plf (LRFD). The constant moment and shear shall be those values as listed in the Standard Load Table for KCS Steel Joists.

4.4.2 Web

The vertical shears to be used in the design of the web members shall be determined by including all loads, but such vertical shears shall be not less than 25 percent of the maximum end reaction from the design load combinations.

4.4.2.1 Redundant Web Members: Redundant web members used in modified Warren type web systems shall be designed to resist the gravity loads supported by the member plus an additional axial load of $1/2$ of 1.0 percent of the top chord axial force. For a **Joist Girder**, this total axial load shall not be less than 2 percent of the top chord axial force.

4.4.2.2 Joist Girders: For Joist Girders, the tension web members shall be designed to resist at least 25 percent of their axial force in compression.

4.4.2.3 KCS Joist Web Forces: KCS Joist web forces shall be determined based on a flat shear envelope, and the following:

- All webs shall be designed for a vertical shear equal to the specified shear capacity.
- All webs shall be designed for 100 percent stress reversal except for the first tension web which remains in tension under all simple span gravity loads.

4.4.2.4 Single Component Web Member: In those cases where a single component web member is attached to the outside of the stem of a tee or double angle chord or any other orientation of a single web member which creates an out-of-plane moment, the web member design shall account for the stresses due to eccentricity.

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4.4.2.4.1 Uncrimped Single Angle Web Members

For 1 inch uncrimped single angle web members where one leg is placed flat against one chord member in the gap, the resulting eccentricities and the effects in loading shall be considered in the design. A minimum of 50 percent of the required weld shall be deposited to each chord angle.

For angles subjected to tensile loading, the following requirements shall be met:

For **LRFD**: combined axial and bending stresses shall be proportioned in accordance with Eq. 4.4-5.

For **ASD**: combined axial and bending stresses shall be proportioned in accordance with Eq. 4.4-8.

For angles subjected to compression loading, the following requirements shall be met:

For **LRFD**:

at the panel point, combined axial and bending stresses shall be proportioned in accordance with Eq. 4.4-5.

at the mid length, the strength shall meet Eqs. 4.4-6 or 4.4-7, and 4.4-13:

$$\frac{f_{au}}{\phi_c F_{crz}} \leq 1.0 \quad (4.4-13)$$

where

f_{au} = P_u/A = Required tensile or compressive stress, ksi (MPa)

P_u = Required axial strength using LRFD load combinations, kips (N)

A = Area of the uncrimped angle web, in.², (mm²)

f_{bu} = M_u/S = required bending stress, ksi (MPa)

M_u = Required flexural strength = $0.5 P_u \left(\frac{\text{chord gap}}{2} - \bar{y} \right)$, kip-in. (N-mm)

S = Minimum Elastic Section Modulus, in.³ (mm³)

F_{cr} = F_{crx} , ksi (MPa)

F_{crx} = Nominal axial compressive stress in ksi (MPa) based on $k\ell/r_x$, where ℓ is the length, k is the effective length factor, and r_x is the corresponding radius of gyration of the member as defined in Section 4.3

F_{crz} = Nominal axial compressive stress in ksi (MPa) based on $k\ell/r_z$ where $k = 1.0$

C_m = 1.0

F_y = Specified minimum yield strength, ksi (MPa)

F'_c = $\frac{\pi^2 E}{(k\ell/r_x)^2}$, ksi (MPa)

Q = Form factor defined in Section 4.2.3.2

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For **ASD**:

at the panel point, combined axial and bending stresses shall be proportioned in accordance with Eq. 4.4-8.

at the mid length the strength shall meet Eqs. 4.4-9 or 4.4-10, and 4.4-14:

$$\frac{f_a}{F_{az}} \leq 1.0 \quad (4.4-14)$$

where

f_a = P/A = Required tensile or compressive stress, ksi (MPa)

P = Required axial strength using ASD load combinations, kips (N)

A = Area of the uncrimped angle web, in.², (mm²)

f_b = M/S = required bending stress, ksi (MPa)

S = Minimum Elastic Section Modulus, in.³ (mm³)

M = Required flexural strength = $0.5 P \left(\frac{\text{chord gap}}{2} - \bar{y} \right)$, kip-in. (N-mm)

F_a = F_{ax} , ksi (MPa)

F_{ax} = Nominal axial compressive stress in ksi (MPa) based on $k\ell/r_x$, where ℓ is the length, k is the effective length factor, and r_x is the corresponding radius of gyration of the member as defined in Section 4.3

F_{az} = Nominal axial compressive stress in ksi (MPa) based on $K\ell/r_z$, where $k = 1.0$

F_b = Allowable bending stress; $0.6F_y$, ksi (MPa)

Alternate methods of design shall be permitted provided they provide strength equal to or greater than those given. Alternate design procedures shall be submitted to the Steel Joist Institute's consulting engineer for approval.

4.4.3 Fillers and Ties

Fillers or ties added on chord or web compression members shall be designed and connected for a force equal to 2 percent of the required member axial force.

4.4.4 Joist and Joist Girder Extensions

Joist and Joist Girder extensions shall be designated as one of three extension types, as follows: top chord extensions (TCX), extended ends, or full depth cantilevers.

Design criteria for joist extensions shall be specified using one of the following methods:

- A joist top chord extension (TCX), extended end, or full depth cantilevered end shall be designed for the load from the Standard Load Tables based on the design length and designation of the specified joist. In the absence of other design information, the joist manufacturer shall design the joist extension for this loading as a default.
- A loading diagram shall be provided for the joist extension, extended end, or full depth cantilevered end. The diagram shall include the magnitude and location of the loads to be supported, as well as the applicable load combinations.

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- c) 2½" deep steel joist extensions shall be permitted to be specified using extension designations found in the Top Chord Extension Load Table (S Type) for TCXs or the Top Chord Extension Load Table (R Type) for extended ends.

Any deflection requirements or limits due to the accompanying loads and load combinations on the steel joist or Joist Girder extension shall be provided by the specifying professional, regardless of the method used to specify the extension. Unless otherwise specified, the joist manufacturer shall check the extension for the specified deflection limit under uniform live load acting simultaneously on both the joist base span and the extension.

The joist manufacturer shall consider the effects of steel joist or Joist Girder extension loading on the base span of the steel joist or Joist Girder. This shall include carrying the design bending moment due to the loading on the extension into the top chord end panel(s), and the effect on the overall steel joist or Joist Girder chord and web axial forces. In the case of a K-Series Standard Type 'R' Extended End or 'S' TCX, the design bending moment shall be determined by the tabulated extension section modulus (S) multiplied by the appropriate allowable (ASD) or design (LRFD) flexural stress.

Bracing of extensions shall be clearly indicated on the structural drawings.

4.5 CONNECTIONS

4.5.1 Methods

Member connections and splices shall be made by attaching the members to one another by arc or resistance welding or other accredited methods in accordance with the following:

- a) Steel joist and Joist Girder arc welded joints shall be in accordance with the American Welding Society, "Structural Welding Code-Steel", D1.1, and/or the "Structural Welding Code Sheet Steel", D1.3 with the following seven modified acceptance criteria as permitted by AWS D1.1 Clause 6.8:

- 1) Undercut shall not exceed 1/16 inch (2 mm) for welds oriented parallel to the principal stress.

User Note: The typical diagonal web member connection to one leg of a chord angle is considered to be parallel to the principal stress.

- 2) Discontinuities outside of the weld design length shall be permitted provided no cracks exist and undercut does not exceed the limits of item 1).

User Note: The weld design length is the minimum weld length needed for the connection force and weld thickness. Portions of the actual weld length with imperfections or discontinuities such as porosity or lack of a full profile are not included when comparing the actual weld length to the weld design length.

- 3) One unrepaired arc strike shall be permitted per joint provided it does not result in other unacceptable defects.

User Note: Minor arc strikes do not reduce the strength of AWS Group II materials (refer to Van Malssen, 1984).

- 4) The effective throat for flare bevel groove welds shall be calculated in accordance with equation 4.2-18.

User Note: The effective weld throat used by the SJI with round bars is based on SJI research and is more conservative than AWS D1.1 for GMAW for round bars in excess of 9/16" (14 mm). See Steel Joist Institute Technical Digest 8, "Welding of Open Web Steel Joists and Joist Girders".

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- 5) Tack welds that are discontinuous from other welds shall meet the criteria for undercut, but shall be exempt from all other acceptance criteria.

User Note: Joist manufacturers use tack welds in the assembly process, and so long as they do not diminish the strength of the base metal and are not incorporated into the final weld for strength, they are not required to meet other inspection criteria.

- 6) The weld profile shall be considered acceptable provided neither the weld leg nor the weld throat is undersized less than AWS D1.1 limits within the weld design length.
- 7) For material with thickness less than 1/8", AWS D1.1 or D1.3 shall be considered appropriate.

User Note: AWS D1.1 does not address thicknesses less than 1/8" for hot rolled material and AWS D1.3 does not address hot rolled material, thus SJI has extended the ranges to include these material thicknesses.

- b) Steel joist and Joist Girder resistance welded joints shall follow a preproduction validation procedure and a production checking procedure and shall meet the strength requirements of this Specification.

User Note: Spot, flash or upset resistance welds should have a written welding procedure qualification record and a systematic quality plan. For further information, see Steel Joist Institute Technical Digest 8, "Welding of Open Web Steel Joists and Joist Girders".

- c) Welded Connections for Crimped-End Angle Web Members

- 1) The connection of each end of a crimped angle web member to each side of the chord shall consist of a weld group made of more than a single line of weld. The design weld length shall include an end return of no less than two times the nominal weld size.

- d) Welding Program

- 1) The manufacturer's welders shall be qualified in accordance with either AWS D1.1 or AWS D1.3 for the applicable weld type, position, and material.
- 2) Manufacturers shall have a program for establishing weld procedures and operator qualification, and for weld sampling and testing. Each manufacturing facility shall have trained inspectors, and an engineer responsible for all welding procedures.

- e) Weld Inspection by Outside Agencies (See Section 5.14)

- 1) The agency shall arrange for visual inspection to determine that welds meet the acceptance standards of Section 4.5.1.

User Note: Ultrasonic, X-ray, and magnetic particle testing are inappropriate for joists due to the configurations of the components and welds.

4.5.2 Strength

4.5.2.1 Joint Connections: Joint connections shall develop the maximum force due to any of the design loads, but not less than 50 percent of the strength of the member in tension or compression, whichever force is the controlling factor in the selection of the member.

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4.5.2.2 Shop Splices: Shop splices shall be permitted to occur at any point in chord or web members. Splices shall be designed for the member force, but not less than 50 percent of the member strength. All component parts comprising the cross section of the chord or web member (including reinforcing plates, rods, etc.) at the point of the splice shall develop a nominal tensile strength of at least 1.2 times the product of the yield strength and the full design area of the chord or web. The "full design area" shall be defined as the minimum required area such that the required stress will be less than the design (LRFD) or allowable (ASD) stress.

User Note: For more information on welding, see Steel Joist Institute Technical Digest 8, "Welding of Open Web Steel Joists and Joist Girders".

4.5.3 Field Splices

Field Splices shall be designed by the manufacturer and shall be either bolted or welded. Splices shall be designed for the member force, but not less than 50 percent of the member strength.

4.5.4 Eccentricity

Members connected at a joint shall have their center of gravity lines meet at a point, where practical. Ends of joists or Joist Girders shall be proportioned to resist bending produced by eccentricity at the support.

For a single component web member, the eccentricity shall be permitted to be neglected where it does not exceed the lesser of three-quarters of the over-all dimension of the chord or 2" (51 mm). This eccentricity, measured in the plane of the joist, shall be the perpendicular distance from the centroidal axis of that web member to the point on the centroidal axis of the chord which is vertically above or below the intersection of the centroidal axis of the web member(s) forming the joint in accordance with Figure 4.5-1.

For a web member composed of at least two shapes, the eccentricity on either side of the neutral axis of chord members, measured in the plane of the joist at the joint work point, shall be permitted to be neglected where the web intersect point does not exceed one and one-half times the distance between the neutral axis and the back of the chord in accordance with Figure 4.5-2.

If these limits are exceeded, provision shall be made for the stresses due to eccentricity.

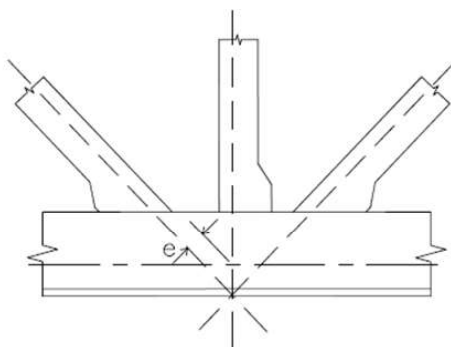


FIGURE 4.5-1

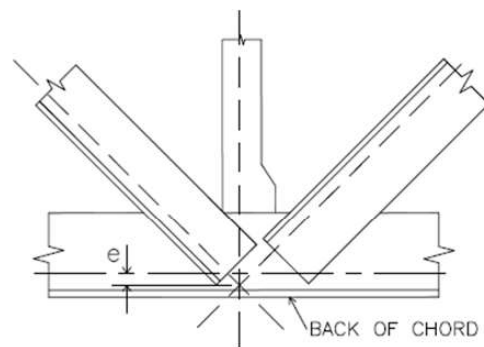


FIGURE 4.5-2

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4.6 CAMBER

Steel joists and Joist Girders 100'-0" or less shall have a manufactured camber in accordance with Table 4.6-1:

TABLE 4.6-1

TOP CHORD LENGTH		APPROXIMATE CAMBER	
20'-0"	(6096 mm)	1/4"	(6 mm)
30'-0"	(9144 mm)	3/8"	(10 mm)
40'-0"	(12192 mm)	5/8"	(16 mm)
50'-0"	(15240 mm)	1"	(25 mm)
60'-0"	(18288 mm)	1 1/2"	(38 mm)
70'-0"	(21336 mm)	2"	(51 mm)
80'-0"	(24384 mm)	2 3/4"	(70 mm)
90'-0"	(27432 mm)	3 1/2"	(89 mm)
100'-0"	(30480 mm)	4 1/4"	(108 mm)

For lengths exceeding 100'-0", manufactured camber equal to Span/300 shall be used.

User Note: The specifying professional shall give consideration to coordinating this approximate camber with adjacent framing.

4.7 VERIFICATION OF DESIGN AND MANUFACTURE

User Note: This Section is included as part of this Specification since the verification of design and manufacture is a requirement of any Steel Joist Institute member company in order to be in compliance with this Specification. This Section applies only to a Steel Joist Institute member manufacturer.

4.7.1 Design Calculations

Companies manufacturing any K-Series, LH-Series, DLH-Series Joists or Joist Girders shall submit design data to the Steel Joist Institute, or an independent agency approved by the Steel Joist Institute, for verification of compliance with this Specification. Design data shall be submitted in detail and in the format specified by the Steel Joist Institute.

4.7.2 Tests of Chord and Web Members

Each manufacturer shall, at the time of design review by the Steel Joist Institute, verify by tests that the design, in accordance with Section 4.1 through Section 4.5, provides the theoretical strength of critical members. Such tests shall be evaluated considering the actual yield strength of the members of the test joists.

Material tests for determining mechanical properties of component members shall be conducted.

4.7.3 Tests of Joints and Connections

Each manufacturer shall, at the time of design review by the Steel Joist Institute, verify by shear tests on representative joints of typical joists that connections will meet the provision of Section 4.5.2. Chord and web members shall be permitted to be reinforced for such tests.

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4.7.4 In-Plant Inspections

Each manufacturer shall verify their ability to manufacture K-Series, LH-Series, DLH-Series Joists and Joist Girders through periodic In-Plant Inspections. Inspections shall be performed by an independent agency approved by the Steel Joist Institute. The frequency, manner of inspection, and manner of reporting shall be determined by the Steel Joist Institute. The plant inspections shall not represent a guarantee of the quality of any specific joists; this responsibility shall lie fully and solely with the individual manufacturer.

**SECTION 5.
APPLICATION****5.1 USAGE**

5.1.1 Scope: This Specification shall apply to any type of structure where floors or roofs are to be supported directly by steel joists installed as hereinafter specified or where steel joists are to be supported directly by Joist Girders installed as hereinafter specified. Where joists or Joist Girders are used other than on simple spans under uniformly distributed loading for joists, or under equal concentrated gravity loading for Joist Girders, as prescribed in Section 4.1, they shall be designed to limit the required stresses to those listed in Section 4.2. The magnitude and location of all loads and forces to be considered in the joist or Joist Girder design shall be provided on the structural drawings.

5.1.2 Continuous Frame Action: Where a rigid connection of the bottom chord is to be made to a column or other structural support, the steel joist or Joist Girder is then no longer simply-supported, and the system shall be investigated for continuous frame action by the specifying professional. The specifying professional shall design the supporting structure, including the design of columns, connections, and moment plates. This design shall account for the stresses caused by lateral forces and the stresses due to connecting the bottom chord to the column or other structural support.

The designed detail of a rigid type connection and moment plates shall be shown on the structural drawings by the specifying professional. The moment plates shall be furnished by other than the joist manufacturer.

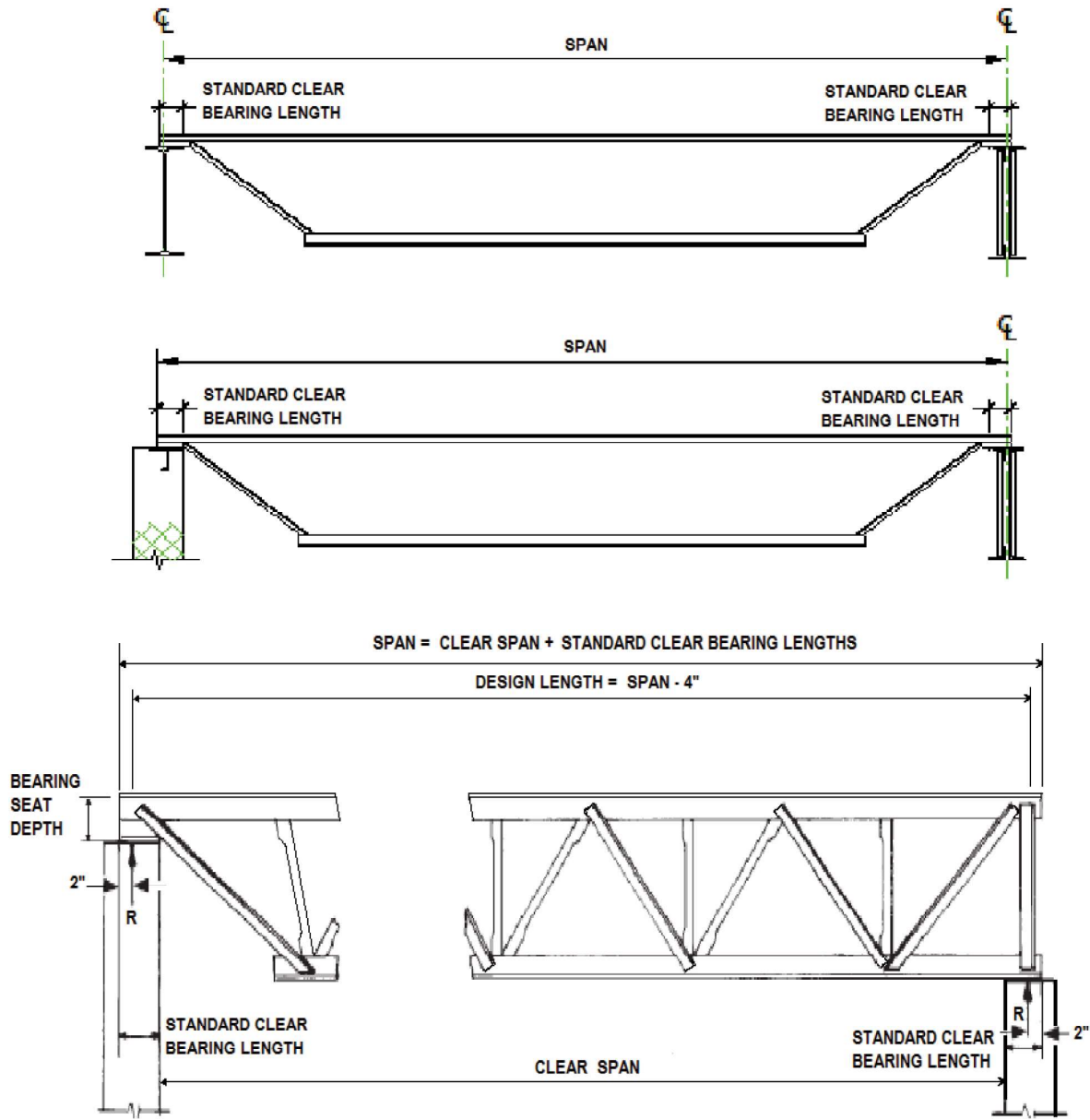
User Note: For further reference concerning continuous frame action and their connections, refer to Steel Joist Institute Technical Digest No. 11, "Design of Lateral Load Resisting Frames Using Steel Joists and Joist Girders".

5.2 SPAN

Except for joist substitutes, the span of a joist or Joist Girder shall not exceed 24 times the depth. Design length shall equal the span minus 4 inches (102 mm) as shown in Figure 5.2-1 "Definition of Span".

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Figure 5.2-1
DEFINITION OF SPAN
(U. S. Customary Units)



- NOTES:
- 1) DESIGN LENGTH = SPAN - 4"
 - 2) MINIMUM BEARING LENGTHS SHALL MEET THE REQUIREMENTS OF SECTION 5.4. BEARING LENGTHS SHOWN MAY VARY BETWEEN STANDARD CLEAR BEARING AND MINIMUM BEARING LENGTH.
 - 3) PARALLEL CHORD JOISTS INSTALLED TO A SLOPE GREATER THAN 1/2 INCH PER FOOT SHALL USE A SPAN DEFINED BY THE LENGTH ALONG THE SLOPE.

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5.3 DEPTH

Steel joists or Joist Girders shall have either parallel chords or a top chord pitch of up to 1/2 inch per foot (1:24). The steel joist or Joist Girder designation depth or nominal depth shall be the depth at mid-span, except for double pitched joists which shall be the depth at the ridge.

5.4 END SUPPORTS

Consideration of the reactions, vertical and lateral, shall be taken by the specifying professional in the design of the steel support, or the steel bearing plate on masonry or concrete. The standard location of the end reaction shall be 2" (51 mm) from the end of the span (exclusive of extensions) at each end of the steel joist or Joist Girder as shown in Figure 5.2-1 "Definition of Span". The standard end reaction location shall require the minimum bearing lengths shown in Table 5.4-1.

TABLE 5.4-1

JOIST SECTION NUMBER ¹	STANDARD CLEAR BEARING LENGTH	MINIMUM BEARING LENGTH ON STEEL
K1-12	4" (102 mm)	2 ½" (64 mm)
LH02-06	6" (152 mm)	2 ½" (64 mm)
LH07-17, DLH10-17, JG	6" (152 mm)	4" (102 mm)
LH/DLH18-25, JG ²	6" (152 mm)	6" (152 mm)
⁽¹⁾ Last digit(s) of joist designation shown in Load Table. ⁽²⁾ Joist Girders with a self weight greater than 50 plf (0.73 kN/m).		

If the specifying professional requires the end reaction to be located at a distance from the face of support more than the standard clear bearing length values shown in Table 5.4-1 minus 2" (51 mm), the structural drawings shall indicate the required special location of the end reaction. The seat depth shall also be increased to the special minimum bearing seat depth per Table 5.4-3.

5.4.1 Masonry and Concrete

5.4.1.1 Scope: A K-Series, LH-Series, DLH-Series Joist or Joist Girder end supported by masonry or concrete shall bear on steel bearing plates and shall be designed as steel bearing.

5.4.1.2 Bearing Length: The ends of K-Series Joists shall extend a distance of not less than 4 inches (102 mm) over the face of masonry or concrete support unless it is deemed necessary to bear less than 4 inches (102 mm) over the support. The ends of LH-Series, DLH-Series Joists and Joist Girders shall extend a distance of not less than 6 inches (152 mm) over the face of masonry or concrete support unless it is deemed necessary to bear less than 6 inches (152 mm) over the support.

5.4.1.3 Anchorage: K-Series, LH-Series, DLH-Series Joists and **Joist Girders** shall be anchored to the steel bearing plate per Section 5.7.

The steel bearing plate shall be located not more than 1/2 inch (13 mm) from the face of the wall. If the steel bearing plate is located more than 1/2 inch (13 mm) from the face of the wall, or the minimum bearing over the masonry or concrete support cannot be provided as shown in Table 5.4-1, special consideration shall be given to the design of the steel bearing plate and the masonry or concrete by the specifying professional.

The steel bearing plate width shall not be less than that shown in Table 5.4-2 perpendicular to the length of the joist. The plate is to be designed by the specifying professional and shall be furnished by other than the joist manufacturer.

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TABLE 5.4-2

JOIST SECTION NUMBER ¹	MINIMUM BEARING PLATE WIDTH
K1-12, LH02-06	7" (178 mm)
LH07-17, DLH10-17, JG	9" (229 mm)
LH/DLH18-25, JG ²	14" (356 mm)
⁽¹⁾ Last digit(s) of joist designation shown in Load Table.	
⁽²⁾ Joist Girders with a self weight greater than 50 plf (0.73 kN/m).	

5.4.2 Steel

The ends of K-Series, LH-Series, DLH-Series Joists and Joist Girders shall be anchored to the support per Section 5.7.

5.4.3 Bearing Depth

The standard non-sloping bearing seat depths shall be as shown in Table 5.4-3. If the steel joist slopes 3/8 inch per foot or greater, the high end bearing seat shall require additional depth due to the slope.

User Note: The Steel Joist Institute Code of Standard Practice provides guidance for determining additional seat depth requirements for sloped joists.

TABLE 5.4-3

JOIST SECTION NUMBER ¹	STANDARD BEARING SEAT DEPTH	STANDARD CLEAR BEARING LENGTH	SPECIAL MINIMUM BEARING SEAT DEPTH ²
K1-12	2 ½" (64 mm)	4" (102 mm)	0.6 x (RP + 2 ½" (64 mm))
LH02-17, DLH10-17	5" (127 mm)	6" (152 mm)	0.6 x (RP + 4" (102 mm))
LH/DLH18-25	7 ½" (191 mm)	6" (152 mm)	0.6 x (RP + 4" (102 mm)) + 2 ½" (64 mm)
JG	7 ½" (191 mm)	6" (152 mm)	RP + 4" (102 mm)
⁽¹⁾ Last digit(s) of joist designation shown in Load Table.			
⁽²⁾ RP is equal to the distance the reaction is to occur from the face of the wall or leading edge of support member. The equation is not applicable for the high end of a sloped joist or Joist Girder.			

When the specifying professional requires the steel joist or Joist Girder reaction to occur at or near the centerline of the wall or other support, a special bearing seat depth shall be required and a note shall be placed on the structural drawings identifying where the reaction is to occur. The specified bearing seat depth shall be increased according to Table 5.4-3 to allow for this special requirement.

5.5 BRIDGING or BRACING

Joist Girders shall be proportioned such that they can be erected without bridging. Therefore, the following requirements shall be met:

- The ends of the bottom chord shall be restrained from lateral movement to brace the girder from overturning. For Joist Girders at columns in steel frames, restraint shall be provided by a stabilizer plate on the column.
- No other loads shall be placed on the Joist Girder until the steel joists bearing on the Joist Girder are in place and positively attached to the Joist Girder.

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User Note: See Section 5.12 for bridging or bracing required for uplift forces.

Steel joist top and bottom chord bridging shall be required and shall consist of one or both of either horizontal or diagonal bridging.

5.5.1 Horizontal Bridging

Horizontal bridging lines shall consist of continuous horizontal steel members. The ℓ/r ratio of the bridging member shall not exceed 300, where ℓ is the distance in inches (millimeters) between attachments and r is the least radius of gyration of the bridging member.

5.5.2 Diagonal Bridging

Diagonal bridging lines shall consist of cross-bracing with a ℓ/r ratio of not more than 200, where ℓ is the distance in inches (millimeters) between connections and r is the least radius of gyration of the bracing member. Where cross-bracing members are connected at their point of intersection, the ℓ distance shall be taken as the distance in inches (millimeters) between connections at the point of intersection of the bridging members and the connections to the chords of the joists.

5.5.2.1 Diagonal Erection Bridging

User Note: Joists exhibit varying degrees of stability dependent upon the span, depth, member sizes, self weight and other parameters. Bolted diagonal Erection Bridging which must be installed prior to releasing hoisting cables may be required.

Where required as identified below, bolted diagonal Erection Bridging shall be required and shall be in accordance with the following:

- (a) For joist spans up through and including 60 feet (18288 mm) in length;

Welded horizontal bridging shall be permitted except where the row of bridging nearest the center is required to be bolted diagonal Erection Bridging as indicated by the **Red shaded area** in the Load Tables. Hoisting cables shall not be released until this row of bolted diagonal Erection Bridging is completely installed and anchored.

Bolted diagonal Erection Bridging shall be provided as required in the SJI Load Tables wherever a standard SJI Section Number designation is specified. For spans 60 feet (18288mm) or less, in the absence of a standard SJI Section Number designation, minimum bolted diagonal Erection Bridging requirements shall be determined by:

- 1) Matching the joist design to an equivalent standard SJI Section Number designation to determine the span at which Erection Bridging is needed as designated in the tables; or
- 2) Using Equation 5.5-1 to determine the joist stability and the need for Erection Bridging.

$$W = \frac{-b + \sqrt{b^2 - 4 \cdot a \cdot c}}{2 \cdot a} ; \quad \text{If, } \frac{w_u}{w_{actual}} > 1.00 \text{ Erection Bridging is not required.} \quad (5.5-1)$$

$$a = \left(\frac{\pi^2 + 3}{24} \right)^2$$

$$b = P \cdot \frac{\pi^2 + 3}{12} \cdot \frac{\pi^2 + 4}{16} - \frac{\pi^4 \cdot E \cdot I_y}{2 \cdot (k \cdot L)^3} \cdot \left[\beta_x \cdot \left(\frac{\pi^2 - 3}{24} \right) - \frac{y_o}{2} \right]$$

$$c = (P)^2 \left(\frac{\pi^2 + 4}{16} \right)^2 - \frac{\pi^4 \cdot E \cdot I_y}{2 \cdot (k \cdot L)^3} \cdot \left[P \cdot \left(\beta_x \cdot \frac{\pi^2 - 4}{16} - a_e \right) + \frac{\pi^4 \cdot E \cdot C_w}{2 \cdot (k \cdot L)^3} + \frac{\pi^2 \cdot G \cdot J}{2 \cdot k \cdot L} \right]$$



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Where:

P = Factored weight of erector = 1.2 x (assumed weight of 250 lbs.) = 300 lbs. (1334 N)

E = Modulus of elasticity = 29,000,000 psi (200,000 MPa)

I_y = Joist moment of inertia about y-axis, in.⁴ (mm⁴) $I_y = I_{yt} + I_{yb}$

I_{yt} = Top chord moment of inertia about y-axis, in.⁴ (mm⁴)

I_{yb} = Bottom chord moment of inertia about y-axis, in.⁴ (mm⁴)

L = Joist Span, in. (mm)

k = Effective length factor = 0.85

β_x = Cross-Sectional parameter
$$\beta_x = \frac{1}{I_x} \left[A_b \cdot (d_e - y)^3 - A_t \cdot y^3 \right] - 2 \cdot y_o$$

A_b = Area of bottom chord, in.² (mm²)

A_t = Area of top chord, in.² (mm²)

d_e = Joist effective depth, in. (mm) $d_e = d - y_t - y_b$

y_t = Neutral axis of top chord, in. (mm)

y_b = Neutral axis of bottom chord, in. (mm)

y = Distance from centroid of top chord to centroid of cross section, in. (mm) $y = \frac{A_b \cdot d_e}{A_t + A_b}$

I_x = Joist moment of inertia about x-axis, in.⁴ (mm⁴) $I_x = A_t y^2 + A_b (d_e - y)^2$

y_o = Distance from centroid of cross section to shear center, in. (mm) $y_o = -y + \frac{I_{yb} \cdot d_e}{I_y}$

a_e = Vertical location of load P from shear center (locate at joist center of gravity), in. (mm), where $a_e = y_o$

C_w = Warping constant
$$C_w = \frac{d_e^2 \cdot I_{yb} \cdot I_{yt}}{I_y}$$

G = Shear modulus, psi (MPa) $G = 0.385E$

J = St. Venant torsion constant, in.⁴ (mm⁴) $J = \frac{1}{3} (A_t \cdot t_t^2 + A_b \cdot t_b^2)$

t_t = Thickness of top chord, in. (mm)

t_b = Thickness of bottom chord, in. (mm)

w_u = Ultimate lateral buckling load $w_u = \frac{W \cdot 12}{L}$, plf $w_u = \frac{W}{L}$, (kN/m)

w_{actual} = Joist self-weight, plf (kN/m)

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- b) For joist spans greater than 60 feet (18288 mm) in length; Bolted diagonal Erection Bridging shall be used as indicated by the **Blue and Gray shaded areas** of the Load Tables. Hoisting cables shall not be released until all rows of bolted diagonal Erection Bridging are completely installed and anchored. Where the joist spacing is less than 0.70 x joist depth, bolted horizontal bridging shall be used in addition to bolted diagonal Erection Bridging.
- c) The bolted diagonal Erection Bridging determined by Section 5.5.2.1a and Section 5.5.2.1b shall be considered a minimum. This bolted diagonal Erection Bridging shall be indicated on the placement plans.

User Note: Joists with special profiles having a higher center of gravity as compared to a parallel chord joist, joists which are canted, or joists having any condition which may create instability, may require additional bridging and/or special erection methods.

5.5.3 Quantity and Spacing of Bridging

5.5.3.1 Scope: Bridging shall be properly spaced and anchored to support the decking and the employees prior to the attachment of the deck to the top chord. The maximum spacing between lines of bridging, ℓ_{brmax} shall be the lesser of,

$$\ell_{brmax} = \left(124 + 0.67 d_j + 28 \frac{d_j}{L} \right) r_y, \text{ in.} \quad (5.5-2a)$$

$$\ell_{brmax} = \left(124 + 0.026 d_j + 0.34 \frac{d_j}{L} \right) r_y, \text{ mm} \quad (5.5-2b)$$

or,
$$\ell_{brmax} = 170 r_y \quad (5.5-3)$$

Where:

d_j is the steel joist depth, in. (mm)

L is the joist span length, ft. (m)

r_y is the radius of gyration of the top chord about the vertical axis of the joist cross section, in. (mm)

5.5.3.2 Number of Rows: The number of rows of top chord bridging shall not be less than as shown in Table 5.5-1 and the spacing shall meet the requirements of Equations 5.5-2 and 5.5-3. The number of rows of bottom chord bridging, including bridging required per Section 5.12, shall not be less than the number of top chord rows. Rows of bottom chord bridging shall be permitted to be spaced independently of rows of top chord bridging. The spacing of rows of bottom chord bridging shall meet the slenderness requirement of Section 4.3 and any specified strength requirements.

5.5.3.3 DLH Joist Section 21 and Greater: For DLH-Series joist Section Number 21 and greater, bridging shall be installed near a bottom chord panel point or an extra web member shall be furnished to brace the bottom chord for the vertical component of the bridging force equal to the horizontal bracing force.

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TABLE 5.5-1

U.S. CUSTOMARY UNITS										
NUMBER OF ROWS OF TOP CHORD BRIDGING ²										
Section Number ¹	Joist Depth	1 Row	2 Rows	3 Rows	4 Rows	5 Rows	6 Rows	7 Rows	8 Rows	9 Rows
K1	All	17	>17 to 26	>26 to 28						
K2	All	21	>21 to 30	>30 to 32						
K3	All	18	>18 to 26	>26 to 40						
K4	All	20	>20 to 30	>30 to 41	>41 to 48					
K5	12K to 24K	20	>20 to 30	>30 to 42	>42 to 48					
	26K	28	>28 to 41	> 41 to 52						
K6	14K to 24K	20	>20 to 31	>31 to 42	>42 to 48					
	26K & 28K	28	>28 to 41	>41 to 54	>54 to 56					
K7	16K to 24K	23	>23 to 34	>34 to 48						
	26K to 30K	29	>29 to 44	>44 to 60						
K8	24K	25	>25 to 39	>39 to 48						
	26K to 30K	29	>29 to 44	>44 to 60						
K9	16K to 24K	22	>22 to 34	>34 to 48						
	26K to 30K	29	>29 to 44	>44 to 60						
K10	18K to 24K	22	>22 to 38	>38 to 48						
	26K to 30K	29	>29 to 48	>48 to 60						
K11	22K	24	>24 to 39	>39 to 44						
	30K	34	>34 to 49	>49 to 60						
K12	24K	25	>25 to 43	>43 to 48						
	26K to 30K	29	>29 to 47	>47 to 60						
LH02-03	All	20	>20 to 30	>30 to 40	>40					
LH04-05	All	22	>22 to 33	>33 to 44	>44 to 55	>55				
LH06-08	All	26	>26 to 45	>45 to 60	>60 to 75	>75				
LH09	All	26	>26 to 48	>48 to 64	>64 to 80	>80				
LH/DLH10	All	28	>28 to 54	>54 to 72	>72 to 90	>90				
LH/DLH11	All	30	>30 to 54	>54 to 72	>72 to 90	>90 to 108	>108			
LH/DLH12	All	34	>34 to 55	>55 to 74	>74 to 92	>92 to 111	>111			
LH/DLH13	All	36	>36 to 63	>63 to 84	>84 to 105	>105 to 126	>126			
LH/DLH14	All	38	>38 to 64	>64 to 86	>86 to 107	>107 to 129	>129			
LH/DLH15	All	42	>42 to 73	>73 to 98	>98 to 122	>122 to 147	>147			
LH/DLH 16-17	All	44	>44 to 75	>75 to 100	>100 to 125	>125 to 150	>150 to 175	>175		
LH/DLH 18-20	All	52	>52 to 78	>78 to 104	>104 to 130	>130 to 156	>156 to 182	>182 to 208	>208 to 234	>234
LH/DLH 21-25	All	60	>60 to 90	>90 to 120	>120 to 150	>150 to 180	>180 to 210	>210		

(1) Last digit(s) of joist designation shown in Load Table.
 (2) Distances are Joist Span lengths in feet – See “Definition of Span” Figure 5.2-1. Refer to the Joist Load Table and Specification Section 6 for required bolted diagonal bridging and additional stability requirements. See Section 5.12 for additional bridging required for uplift design.



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5.5.4 Sizing of Bridging

Horizontal and diagonal bridging shall be capable of resisting the nominal unfactored horizontal compressive force, P_{br} given in Equation 5.5-4.

$$P_{br} = 0.0025 n A_t F_{\text{construction}}, \text{ kips (N)} \quad (5.5-4)$$

Where:

$n = 8$ for horizontal bridging

$n = 2$ for diagonal bridging

A_t = cross sectional area of joist top chord, in.² (mm²)

$F_{\text{construction}}$ = assumed ultimate stress in top chord to resist construction loads, determined in accordance with the following:

$$F_{\text{construction}} = \left(\frac{\pi^2 E}{\left(\frac{0.9 \ell_{brmax}}{r_y} \right)^2} \right) \geq 12.2 \text{ ksi} \quad (5.5-5a)$$

$$F_{\text{construction}} = \left(\frac{\pi^2 E}{\left(\frac{0.9 \ell_{brmax}}{r_y} \right)^2} \right) \geq 84.1 \text{ MPa} \quad (5.5-5b)$$

Where:

E = Modulus of Elasticity of steel = 29,000 ksi (200,000 MPa)

and $\frac{\ell_{brmax}}{r_y}$ is determined from Equations 5.5-2 or 5.5-3

The bridging nominal horizontal unfactored compressive forces, P_{br} , shall be in accordance with Table 5.5-2.

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TABLE 5.5-2

BRIDGING NOMINAL HORIZONTAL UNFACTORED COMPRESSIVE FORCE					
JOIST SECTION NUMBER ¹	HORIZONTAL BRIDGING P_{br} (n=8)		REQUIRED BRIDGING CONNECTION WELD ²	DIAGONAL BRIDGING P_{br} (n=2)	
	Lbs.	(N)	In.	Lbs.	(N)
K1-8	340	(1512)	1/8" x 1" (3mm x 25mm)	85	(378)
K9-10, LH02-03	450	(2002)		113	(503)
K11-12, LH04-05	560	(2491)		140	(623)
LH06-08	750	(3336)		188	(836)
LH09	850	(3781)		213	(945)
LH/DLH10	900	(4003)		225	(1001)
LH/DLH11	950	(4226)		238	(1056)
LH/DLH12	1100	(4893)		275	(1223)
LH/DLH13	1200	(5338)		300	(1334)
LH/DLH14	1300	(5783)		325	(1446)
LH/DLH15	1450	(6450)		363	(1612)
LH/DLH16-17	1850	(8229)	1/8" x 1 1/2" (3mm x 38mm)	463	(2057)
LH/DLH18-20	2350	(10453)		585	(2602)
LH/DLH21-22	3150	(14012)	1/8" x 2" (3mm x 51mm)	790	(3514)
LH/DLH23-24	4130	(18371)	1/8" x 3" (3mm x 76mm)	1035	(4604)
LH/DLH25	4770	(21218)		1195	(5316)

(¹) Last digit(s) of joist designation shown in Load Table.
(²) Or other connection type designed for the required force.

5.5.5 Connections

Connections to the joist chords shall be made by welding or mechanical means and shall be capable of resisting the unfactored or nominal horizontal force, P_{br} , of Equation 5.5-4 but not less than 700 pounds (3114 N).

5.5.6 Bottom Chord Bearing Joists

Where bottom chord bearing joists are utilized, a row of diagonal bridging shall be provided near the support(s). This bridging shall be installed and anchored before the hoisting cable(s) is released.

5.6 INSTALLATION OF BRIDGING

Bridging shall support the top and bottom chords against lateral movement during the construction period and shall hold the steel joists in the approximate position as shown on the joist placement plans.

The ends of all bridging lines terminating at walls or beams shall be anchored thereto.

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5.7 BEARING SEAT ATTACHMENTS

5.7.1 Masonry and Concrete

Ends of K-Series, LH-Series, and DLH-Series Joists and Joist Girders resting on steel bearing plates on masonry or structural concrete shall be attached thereto, as shown in Table 5.7-1, with a minimum of two fillet welds, or with two bolts, or the equivalent.

5.7.2 Steel

Ends of K-Series, LH-Series, and DLH-Series Joists and Joist Girders resting on steel supports shall be attached thereto, as shown in Table 5.7-1, with a minimum of two fillet welds, or with two bolts, or the equivalent. Where K-Series, LH-Series and DLH-Series Joists and Joist Girders are used to provide lateral stability to the supporting member, the final connection shall be made by welding or as designated by the specifying professional.

TABLE 5.7-1

JOIST SECTION NUMBER ¹	MINIMUM FILLET WELD	MINIMUM BEARING SEAT BOLTS FOR ERECTION
K1-12	2– 1/8" x 2 1/2" (3 x 64 mm)	2– 1/2" (13 mm) A307
LH02-06	2– 3/16" x 2 1/2" (5 x 64 mm)	
LH07-17, DLH10-17, JG	2– 1/4" x 2 1/2" (6 x 64 mm)	2– 3/4" (19 mm) A307
LH/ DLH18-25, JG ²	2– 1/4" x 4" (6 x 102 mm)	2– 3/4" (19 mm) A325
⁽¹⁾ Last digit(s) of joist designation shown in load table.		
⁽²⁾ Joist Girders with a self weight greater than 50 plf (0.73 kN/m).		

5.7.3 Uplift

Where uplift forces are a design consideration, roof joists shall be anchored to resist such forces and shall meet the requirements of Section 5.12.

5.8 JOIST SPACING

Joists shall be spaced so that the loading on each joist does not exceed the design load (LRFD or ASD) for the particular joist designation and span as shown in the applicable load tables.

5.9 FLOOR AND ROOF DECKS

5.9.1 Material

Floor and roof decks shall be permitted to consist of cast-in-place or pre-cast concrete or gypsum, cold-formed steel, wood, or other suitable material capable of supporting the required load at the specified joist spacing.

5.9.2 Thickness

Cast-in-place slabs shall be not less than 2 inches (51 mm) thick.



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5.9.3 Centering

Centering for cast-in-place slabs shall be permitted to be ribbed metal lath, corrugated steel sheets, paper-backed welded wire fabric, removable centering or any other suitable material capable of supporting the slab at the designated joist spacing.

Centering shall not cause lateral displacement or damage to the top chord of joists during installation or removal of the centering or placing of the concrete.

5.9.4 Bearing

Slabs or decks shall bear uniformly along the top chords of the joists.

5.9.5 Attachments

The spacing of attachments along the joist top chord shall not exceed 36 inches (914 mm). Such attachments of the slab or deck to the top chords of joists shall be capable of resisting the forces given in Table 5.9-1.

TABLE 5.9-1

JOIST SECTION NUMBER ¹	NOMINAL FORCE REQUIRED ²
K1-12	100 lbs/ft. (1.46 kN/m)
LH02-04	120 lbs/ft. (1.75 kN/m)
LH05-09	150 lbs/ft. (2.19 kN/m)
LH/DLH10-17	200 lbs/ft. (2.92 kN/m)
LH/DLH18-19	250 lbs/ft. (3.65 kN/m)
LH/DLH20-21	300 lbs/ft. (4.38 kN/m)
LH/DLH22-24	420 lbs/ft. (6.13 kN/m)
LH/DLH25	520 lbs/ft. (7.59 kN/m)
⁽¹⁾ Last digit(s) of joist designation shown in Load Table.	
⁽²⁾ Nominal bracing force is unfactored.	

5.9.6 Wood Nailers

Where wood nailers are used, such nailers in conjunction with deck or slab shall be firmly attached to the top chords of the joists in conformance with Section 5.9.5.

5.9.7 Joist With Standing Seam Roofing or Laterally Unbraced Top Chords

Where the roof systems do not provide lateral stability for the steel joists in accordance with Section 5.9.5 sufficient stability shall be provided to brace the steel joists laterally under the full design load. For this condition, the compression chord design shall include the effects of both the in-plane and out-of-plane buckling of the steel joist (e.g., buckling about the vertical axis of the steel joist cross section). In any case where the attachment requirement of Section 5.9.5 is not achieved, out-of-plane strength shall be achieved by adjusting the bridging spacing and/or increasing the compression chord area and the y-axis radius of gyration. The effective slenderness ratio about the vertical axis equals $0.94 L/r_y$; where L is the bridging spacing in inches (millimeters) and r_y is the radius of gyration of the top chord in inches (millimeters). The maximum bridging spacing shall not exceed that specified in Section 5.5.3.

User Note: Some examples of roof systems which may not provide adequate top chord lateral stability may be standing seam roofs, skylights, or other openings which do not provide top chord attachments per Section 5.9.5.

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Horizontal bridging members attached to the compression chords and their anchorages shall be designed for a compressive axial force, P_{br} , given in Equation 5.9-1.

$$P_{br} = 0.001nP + 0.004P\sqrt{n} \geq 0.0025nP, \text{ kips (N)} \quad (5.9-1)$$

Where n is the number of joists between end anchors and P is the chord design force in kips (N)

The attachment force between the horizontal bridging member and the compression chord shall be $0.01P$. Horizontal bridging attached to the tension chords shall be proportioned so that the slenderness ratio between attachments does not exceed 300. Diagonal bridging shall be proportioned so that the slenderness ratio between attachments does not exceed 200.

5.10 DEFLECTION

The deflection due to the design live load shall not exceed the following:

Floors: 1/360 of span.

Roofs: 1/360 of span where a plaster ceiling is attached or suspended, or
1/240 of span for all other cases.

The specifying professional shall give consideration to the effects of deflection and vibration in the selection of joists.

User Note: For further information on vibration, refer to Steel Joist Institute Technical Digest 5, "Vibration of Steel Joist-Concrete Slab Floors".

5.11 PONDING

The ponding investigation shall be performed by the specifying professional.

User Note: For further reference, refer to Steel Joist Institute Technical Digest 3, "Structural Design of Steel Joist Roofs to Resist Ponding Loads" and AISC 360.

5.12 UPLIFT

Where uplift forces due to wind are a design requirement, these forces shall be indicated on the structural drawings in terms of NET uplift in pounds per square foot (Pascals). The structural drawings shall indicate if the net uplift is based upon an LRFD or ASD load combination. When these forces are specified, they shall be considered in the design of joists, Joist Girders, and required bridging or bracing. Wherever uplift due to wind forces is a design consideration, the following shall be required:

- For joists, a single line of **bottom chord** bridging shall be provided near the first bottom chord panel points.
- For **Joist Girders**, if the ends of the bottom chord are not strutted and extended to column stabilizer plates, bracing shall be provided near the first bottom chord panel points.

User Note: For further reference, refer to Steel Joist Institute Technical Digest 6, "Structural Design of Steel Joist Roofs to Resist Uplift Loads".

5.13 DIAPHRAGMS AND COLLECTORS

Where diaphragm collector forces due to wind or seismic forces are a design requirement, these forces shall be indicated on the structural drawings. The structural drawings shall indicate the nominal (unfactored) forces. The structural drawings shall also indicate the Seismic Design Category, and the Seismic Force Resisting System type, and applicable seismic design coefficients. When this data is specified, joist collectors or chords in horizontal diaphragm systems, shall be designed in conformance with the provisions of Section 4 through Section 6. End connections and splices in joists incorporated into Seismic Force Resisting System (SFRS) as horizontal diaphragms as collectors or chords shall adhere to the requirements stipulated by the applicable building code.

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5.14 INSPECTION

Joists shall be inspected by the manufacturer before shipment to verify compliance of materials and workmanship with the requirements of this Specification.

User Note: If the purchaser requires an inspection of the steel joists or Joist Girders by someone other than the manufacturer's own inspectors, they shall be permitted to reserve the right to do so in their "Invitation to Bid" or the accompanying "Job Specifications". Arrangements shall be made with the manufacturer for such inspection of the joists or Joist Girders at the manufacturing shop by the purchaser's inspectors at purchaser's expense.

5.15 PARALLEL CHORD SLOPED JOISTS AND JOIST GIRDERS

The span of a parallel chord sloped joist or Joist Girder shall be defined by the length along the slope. Minimum depth, load-carrying capacity, and bridging requirements shall be determined by the sloped definition of span. The Load Table capacity shall be the component normal to the joist.

SECTION 6

ERECTION STABILITY AND HANDLING

As a minimum, erection stability and handling of joists and Joist Girders shall meet the requirements of this Section 6.

User Note: Additional requirements for erection of steel joists and Joist Girders can be found in Steel Joist Institute Technical Digest No. 9, "Handling and Erection of Steel Joists and Joist Girders".

6.1 STABILITY REQUIREMENTS

User Note: It is not recommended that an erector climb on unbridged joists, extreme caution shall be exercised since unbridged joists exhibit some degree of instability under the erector's weight.

- a) In steel framing, where joists/Joist Girders are utilized at column lines, the joist/Joist Girder shall be field-bolted at the column. Before hoisting cables are released and before an employee is allowed on the joists/Joist Girder the following conditions shall be met:
 - 1) The seat at each end of the joist/Joist Girder is attached in accordance with Section 5.7. Where a bolted seat connection is used for erection purposes, as a minimum, the bolts shall be snug tightened. The snug tight condition shall be defined as the tightness that exists where all plies of a joint are in firm contact. This shall be attained by a few impacts of an impact wrench or the full effort of an employee using an ordinary spud wrench.
 - 2) Where stabilizer plates are required the joist/Joist Girder bottom chord shall engage the stabilizer plate.

During the construction period, the contractor shall provide means for the adequate distribution of loads so that the carrying capacity of any joist or Joist Girder is not exceeded.

- b) Before an employee is allowed on the steel joist: BOTH ends of joists at columns (or joists designated as column joists) shall be attached to its supports. For all other joists a minimum of one end shall be attached before the employee is allowed on the joist. The attachment shall be in accordance with Section 5.7.

Where a bolted seat connection is used for erection purposes, as a minimum, the bolts shall be snug tightened. The snug tight condition shall be defined as the tightness that exists where all plies of a joint are in firm contact. This shall be attained by a few impacts of an impact wrench or the full effort of an employee using an ordinary spud wrench.

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- c) On steel joists that do not require erection bridging as shown by either the unshaded area of the Load Tables or as determined by Section 5.5.2.1, only one employee shall be allowed on the steel joist until all bridging is installed and anchored.
- d) Where the span of the steel joist is within the Red shaded area of the Load Table, or in the absence of a standard SJI Section Number designation and Erection Bridging is required in accordance with Section 5.5.2.1, the following shall apply:
 - 1) The row of bridging nearest the midspan of the steel joist shall be bolted diagonal Erection Bridging; and
 - 2) Hoisting cables shall not be released until this bolted diagonal Erection Bridging is installed and anchored, unless an alternate method of stabilizing the joist has been provided; and
 - 3) No more than one employee shall be allowed on these spans until all other bridging is installed and anchored.
- e) Where the span of the steel joist is within the Blue shaded area of the Load Table, the following shall apply:
 - 1) All rows of bridging shall be bolted diagonal bridging; and
 - 2) Hoisting cables shall not be released until the two rows of bolted diagonal Erection Bridging nearest the third points of the steel joist are installed and anchored; and
 - 3) No more than two employees shall be allowed on these spans until all bridging is installed and anchored.
- f) Where the span of the steel joist is in the Gray shaded area of the Load Table, the following shall apply:
 - 1) All rows of bridging shall be bolted diagonal bridging; and
 - 2) Hoisting cables shall not be released until all bridging is installed and anchored; and
 - 3) No more than two employees shall be allowed on these spans until all other bridging is installed and anchored.
- g) Where permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points shall be required to provide lateral stability.
- h) In the case of bottom chord bearing joists, the ends of the joist shall be restrained laterally per Section 5.5.6 before releasing the hoisting cables.
- i) After the joist is straightened and plumbed, and all bridging is completely installed and anchored, the ends of the joists shall be fully connected to the supports in accordance with Section 5.7.

6.2 LANDING AND PLACING LOADS

- a) Except as stated in Section 6.2(d), no "construction loads" shall be allowed on the steel joists until all bridging is installed and anchored, and all joist bearing ends are attached.

User Note: For definition of "construction load" see Code of Federal Regulations (CFR), Occupational Safety and Health Administration (OSHA), 29 CFR Part 1926, Safety Standards for Steel Erection; Subpart R - Steel Erection, §1926.751 Definitions; January 18, 2001, Washington, D.C.

- b) During the construction period, loads placed on the steel joists shall be distributed so as not to exceed the capacity of the steel joists.
- c) The weight of a bundle of joist bridging shall not exceed a total of 1000 pounds (454 kilograms). The bundle of joist bridging shall be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle shall be positioned within 1 foot (0.30 m) of the secured end.
- d) No bundle of deck shall be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless the following conditions are met:
 - 1) The contractor has first determined from a "qualified person" and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
 - 2) The bundle of decking is placed on a minimum of three steel joists;

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- 3) The joists supporting the bundle of decking are attached at both ends;
- 4) At least one row of bridging is installed and anchored;
- 5) The total weight of the decking does not exceed 4000 pounds (1816 kilograms); and
- 6) The edge of the bundle of decking is placed within 1 foot (0.30 meters) of the bearing surface of the joist end.

User Note: For definition of “qualified person” see Code of Federal Regulations (CFR), Occupational Safety and Health Administration (OSHA), 29 CFR Part 1926, Safety Standards for Steel Erection; Subpart R - Steel Erection, §1926.751 Definitions; January 18, 2001, Washington, D.C.

- e) The edge of the construction load shall be placed within 1 foot (0.30 meters) of the bearing surface of the joist end.

6.3 FIELD WELDING

All field welding shall be performed in accordance with the structural drawings. Field welding shall not damage the joists or Joist Girders.

On cold-formed steel members whose yield strength has been attained by cold working, and whose as-formed strength is used in the design, the total length of weld at any one point shall not exceed 50 percent of the overall developed width of the cold-formed section.

6.4 HANDLING

Particular attention shall be considered for the handling and erection of K-Series, LH-Series, DLH-Series steel joists and Joist Girders. Damage to the joists and accessories shall be avoided. Hoisting cables shall be attached at panel point locations and those locations shall be selected to minimize erection stresses.

Each joist shall be adequately braced laterally before any loads are applied. If lateral support is provided by bridging, the bridging lines as defined in Section 6.1(c), 6.1(d), 6.1(e), and 6.1(f) shall be anchored to prevent lateral movement.

6.5 FALL ARREST SYSTEMS

Steel joists and Joist Girders shall not be used as anchorage points for a fall arrest system unless written direction to do so is obtained from a “qualified person”.

User Note: For definition of “qualified person” see Code of Federal Regulations (CFR), Occupational Safety and Health Administration (OSHA), 29 CFR Part 1926, Safety Standards for Steel Erection; Subpart R - Steel Erection, §1926.751 Definitions; January 18, 2001, Washington, D.C.