

# HSS

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## LRFD Beam Load Tables



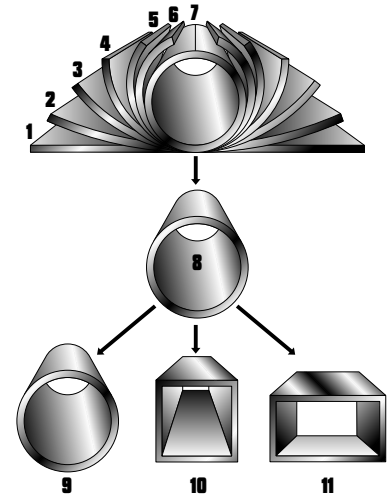
**Steel Tube  
Institute**  
OF NORTH AMERICA

## HSS Manufacturing Methods

The transformation of steel strip into hollow structural sections (HSS) is the result of operations including forming, welding and sizing. Currently three methods are being used in North America for the manufacture of HSS. These methods, including two ERW methods and an SAW method, are described below. Both ERW methods meet ASTM A 500 and CSA G-40.21 requirements for the manufacture of HSS, and the ERW sizes included in this publication may be produced to either standard. The SAW method is not included as a manufacturing process in the ASTM or CSA specification. SAW sizes listed in this publication can be specified to meet desired physical and dimensional criteria of ASTM A500 and CSA G-40.21

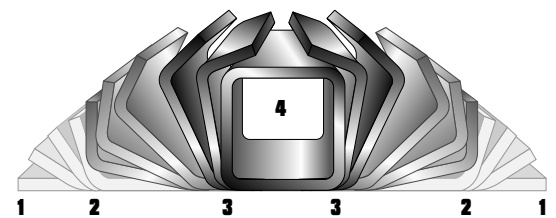
### *Electric Resistance Welding (ERW) Process*

In the tube mill, flat steel strip (1) is formed continuously around its longitudinal axis to produce a round tube. This is done by moving the strip through a progressive set of rolls (2-6). The strip edges (7) are heated by either high frequency induction or contact welding and then forged together by weld rolls to create a continuous longitudinal weld without the addition of filler metal. The weld seam (8) is then cooled and processed through a set of sizing/shaping rolls which cold-form it into a round (9), square (10) or rectangular (11) section.



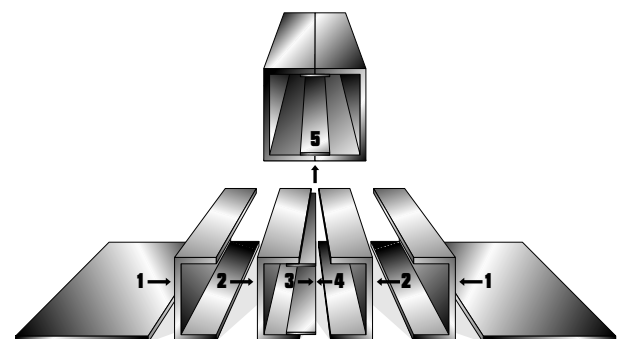
### *Form-Square Weld-Square (ERW) Process*

In the weld mill, driven forming dies progressively shape the flat strip (1) by forming the top two corners (2) of the square or rectangular tube in the initial forming station. Subsequent stations form the bottom two corners (3) of the shape. No cold working of the sides of the shape is performed, and the shape's seam is welded by high-frequency contacts when the tube is near its final shape and size. The welded tube (4) is cooled and then driven through a series of sizing stations which qualifies the tube's final dimensions.



### *Submerged Arc Weld (SAW) Process*

Two identical pieces of flat strip (1) are placed in a press brake and formed into two identical halves (2) of a finished tube size. A backup bar is tack welded to each leg of one of the half-sections (3). The two half-sections are fitted together toe-to-toe (4) and welded by the submerged arc process to complete the square or rectangular section (5).



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## Foreword

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Load and Resistance Factor Design (LRFD) beam load tables are presented for rectangular and square Hollow Structural Sections (HSS) manufactured by the electric resistance welding (ERW) method and the submerged arc welding (SAW) method.

Maximum factored uniform loads for simple laterally supported beams have been calculated in accordance with the AISC "Specification for the Design of Steel Hollow Structural Sections – April 15, 1997". This Specification is a supplement to the AISC "Load and Resistance Factor Design Specification for Structural Steel Buildings – December 1, 1993". The factored uniform loads are based upon section property data for HSS that were recalculated in 1996 to account for more precise manufacturing methods. Revised section property data for HSS is published in "Hollow Structural Sections – Dimensions and Section Properties" available from the Steel Tube Institute of North America.

Tables are presented for two specified minimum yield point steels;  $F_y = 46$  ksi and  $F_y = 50$  ksi. The tabulated factored uniform loads for HSS sizes produced by the ERW and SAW methods are presented in separate tables.

The factored uniform loads, in kips, are based upon the flexural design strength specified in the "HSS Specification". Factored uniform loads are also included for HSS defined as slender-element cross-sections. These sections are identified in the tables with an asterisk ( \* ) immediately following the design wall thickness parameter in the heading and a double asterisk ( \*\* ) immediately following the effective section modulus,  $S_{eff}$  in the Properties section. The foot weight of the HSS beam is included in the tabulated loads and must be deducted to determine the net load that the beam will support. It is assumed that the loading is applied in the plane of the minor axis and that the HSS beam deflects vertically in the plane of bending only.

Refer to Part 4 – Beam and Girder Design, of the AISC 2nd Edition "Manual of Steel Construction – Load & Resistance factor Design" for a discussion of the design strength of beams. Symbols used in these tables follow those used in the AISC "Manual".

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## How To Use The Beam Load Tables

### Example 1

A simply supported 20 in. x 12 in. x 3/8 in. ERW HSS beam of  $F_y = 46$  ksi (ASTM A500 Gr. B) spans 22 feet. The beam is laterally braced for its entire length. Determine the uniform load capacity for loading in the plane of the minor axis.

Enter the  $F_y = 46$  load table for the HSS20x12x3/8 (page 6). Read across the row at the span equal to 22 feet and note that the maximum factored uniform load is equal to 167 kips. Note that this includes the weight of the HSS beam.

### Example 2

Select the lightest 8-inch deep, simply supported ERW HSS beam of  $F_y = 50$  ksi (ASTM A500 Gr. C) to span 8 feet and support a maximum factored uniform load of 52 kips (includes the estimated weight of the HSS beam). The beam is laterally supported for its entire length.

Enter the  $F_y = 50$  ksi load tables for the 8-in. deep rectangular and 8 in. deep square HSS. Note that the maximum factored uniform load capacity for a:

HSS8x8x1/4 (25.82 lbs./ft.) = 70 kips > 52 kips o.k.  
HSS8x8x3/16 (19.63 lbs./ft.) = 46 kips < 52 kips not good

HSS8x6x1/4 (22.42 lbs./ft.) = 63 kips > 52 kips o.k.  
HSS8x6x3/16 (17.08 lbs./ft.) = 43 kips < 52 kips not good

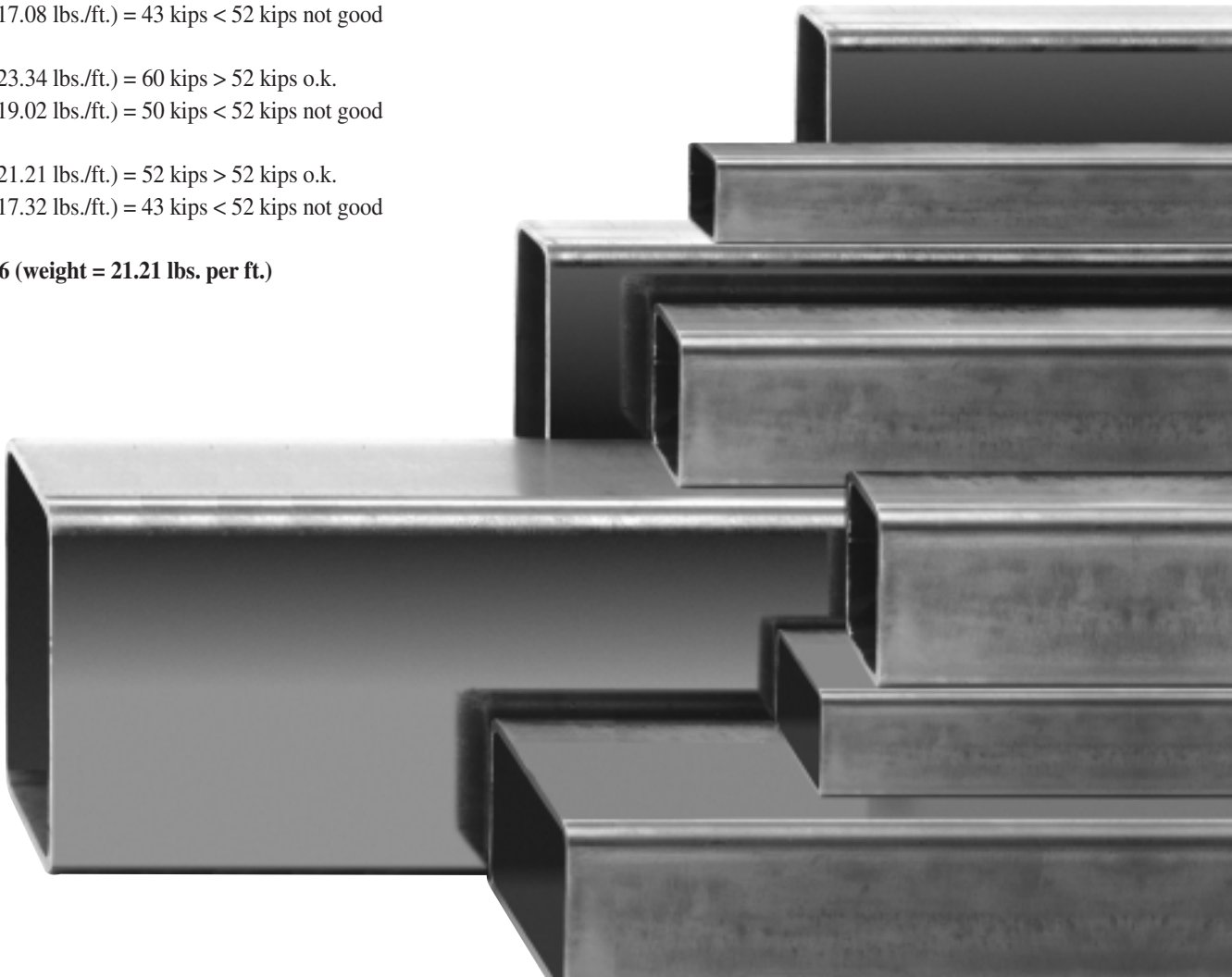
HSS8x4x5/16 (23.34 lbs./ft.) = 60 kips > 52 kips o.k.  
HSS8x4x1/4 (19.02 lbs./ft.) = 50 kips < 52 kips not good

HSS8x3x5/16 (21.21 lbs./ft.) = 52 kips > 52 kips o.k.  
HSS8x3x1/4 (17.32 lbs./ft.) = 43 kips < 52 kips not good

**Select: HSS8x3x5/16 (weight = 21.21 lbs. per ft.)**

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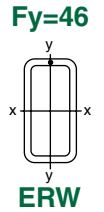
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# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

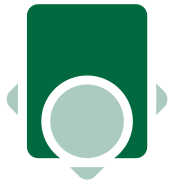


Nominal Size		20 x 12			20 x 8			20 x 4			
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/2	3/8	5/16
Weight Per Foot		103.30	78.52	65.87	110.36	89.68	68.31	57.36	76.07	58.10	48.86
Design Wall Thickness		0.465	0.349	0.291*	0.581	0.465	0.349	0.291	0.465	0.349	0.291
<b>F<sub>y</sub> = 46 ksi</b>											
Effective length KL in feet	3								924	694	541
	4				1150	924	694		794	616	522
	5	924	694	541	1020	839	646	541	635	493	417
	6	865	611	452	851	699	538	454	529	411	348
	7	741	524	387	729	599	461	389	453	352	298
	8	649	458	339	638	524	404	340	397	308	261
	9	577	407	301	567	466	359	302	353	274	232
	10	519	367	271	511	420	323	272	317	246	209
	11	472	333	246	464	381	294	247	289	224	190
	12	432	306	226	426	350	269	227	265	205	174
	13	399	282	209	393	323	248	209	244	190	161
	14	371	262	194	365	300	231	194	227	176	149
	15	346	244	181	340	280	215	181	212	164	139
	16	324	229	169	319	262	202	170	198	154	130
	17	305	216	159	300	247	190	160	187	145	123
	18	288	204	151	284	233	179	151	176	137	116
	19	273	193	143	269	221	170	143	167	130	110
	20	260	183	136	255	210	161	136	159	123	104
	21	247	175	129	243	200	154	130	151	117	99
	22	236	167	123	232	191	147	124	144	112	95
	23	226	159	118	222	182	140	118	138	107	91
	24	216	153	113	213	175	135	113	132	103	87
	25	208	147	108	204	168	129	109	127	99	83
	26	200	141	104	196	161	124	105	122	95	80
	27	192	136	100	189	155	120	101	118	91	77
	28	185	131	97	182	150	115	97	113	88	75
	29	179	126	93	176	145	111	94	109	85	72
	30	173	122	90	170	140	108	91	106	82	70
	31	167	118	87	165	135	104	88	102	80	67
	32	162	115	85	160	131	101	85	99	77	65
33	157	111	82	155	127	98	82	96	75	63	
34	153	108	80	150	123	95	80	93	72	61	
36	144	102	75	142	117	90	76	88	68	58	
38	137	97	71	134	110	85	72	84	65	55	
40	130	92	68	128	105	81	68	79	62	52	
42	124	87	65	122	100	77	65	76	59	50	
44	118	83	62	116	95	73	62	72	56	47	
46	113	80	59	111	91	70	59	69	54	45	
48	108	76	56	106	87	67	57	66	51	43	
50	104	73	54	102	84	65	54	63	49	42	
<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	1550	1200	1010	1440	1190	926	786	838	657	560	
S <sub>x</sub> , in. <sup>3</sup>	155	120	98.2**	144	119	92.6	78.6	83.8	65.7	56.0	
Z <sub>x</sub> , in. <sup>3</sup>	188	144	122	185	152	117	98.6	115	89.3	75.6	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	462	347	271	577	462	347	271	462	347	271	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	5190	3670	2710	5110	4200	3230	2720	3170	2460	2090	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

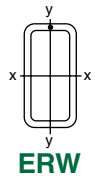
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46

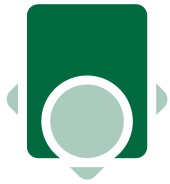


Nominal Size		18 x 6					16 x 12			16 x 8				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	1/2	3/8	5/16	5/8	1/2	3/8	5/16	
Weight Per Foot		93.34	76.07	58.10	48.86	39.43	89.68	68.31	57.36	93.34	76.07	58.10	48.86	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.465	0.349	0.291*	0.581	0.465	0.349	0.291	
<b>F<sub>y</sub> = 46 ksi</b>														
Effective length KL in feet	3	1040	832	624	520					924	739			
	4	932	773	596	504	345				890	731	555	463	
	5	745	618	477	404	328	739	555	463	712	585	453	383	
	6	621	515	397	336	273	621	444	331	593	488	378	319	
	7	532	442	341	288	234	532	380	284	509	418	324	274	
	8	466	386	298	252	205	466	333	248	445	366	283	239	
	9	414	343	265	224	182	414	296	221	396	325	252	213	
	10	373	309	238	202	164	373	266	199	356	293	227	192	
	11	339	281	217	183	149	339	242	181	324	266	206	174	
	12	311	258	199	168	137	311	222	166	297	244	189	160	
	13	287	238	183	155	126	287	205	153	274	225	174	147	
	14	266	221	170	144	117	266	190	142	254	209	162	137	
	15	248	206	159	135	109	248	177	132	237	195	151	128	
	16	233	193	149	126	102	233	166	124	223	183	142	120	
	17	219	182	140	119	96	219	157	117	209	172	133	113	
	18	207	172	132	112	91	207	148	110	198	163	126	106	
	19	196	163	126	106	86	196	140	105	187	154	119	101	
	20	186	155	119	101	82	186	133	99	178	146	113	96	
	21	177	147	114	96	78	177	127	95	170	139	108	91	
	22	169	141	108	92	75	169	121	90	162	133	103	87	
	23	162	134	104	88	71	162	116	86	155	127	99	83	
	24	155	129	99	84	68	155	111	83	148	122	94	80	
	25	149	124	95	81	66	149	106	79	142	117	91	77	
	26	143	119	92	78	63	143	102	76	137	113	87	74	
	27	138	114	88	75	61	138	99	74	132	108	84	71	
	28	133	110	85	72	59	133	95	71	127	104	81	68	
	29	128	107	82	70	57	128	92	69	123	101	78	66	
	30	124	103	79	67	55	124	89	66	119	98	76	64	
	31	120	100	77	65	53	120	86	64	115	94	73	62	
	32	116	97	75	63	51	116	83	62	111	91	71	60	
	33	113	94	72	61	50	113	81	60	108	89	69	58	
	34	110	91	70	59	48	110	78	58	105	86	67	56	
	35	106	88	68	58	47	106	76	57	102	84	65	55	
	36	104	86	66	56	46	104	74	55	99	81	63	53	
	37	101	84	64	55	44	101	72	54	96	79	61	52	
	38	98	81	63	53	43	98	70	52	94	77	60	50	
	39	96	79	61	52	42	96	68	51	91	75	58	49	
	41	91	75	58	49	40								
	43	87	72	55	47	38								
	45	83	69	53	45	36								
	<b>PROPERTIES</b>													
	I <sub>x</sub> , in. <sup>4</sup>	923	770	602	513	419	904	702	595	815	679	531	451	
	S <sub>x</sub> , in. <sup>3</sup>	103	85.6	66.9	57.0	46.5	113	87.7	72.0**	102	84.9	66.3	56.4	
	Z <sub>x</sub> , in. <sup>3</sup>	135	112	86.4	73.1	59.4	135	104	87.7	129	106	82.1	69.4	
	Φ <sub>v</sub> V <sub>n</sub> , (kips)	520	416	312	260	173	370	277	231	462	370	277	231	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	3730	3090	2380	2020	1640	3730	2660	1990	3560	2930	2270	1920		

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

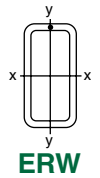
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



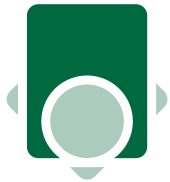
Nominal Size		16 x 4			14 x 10				
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		62.46	47.90	40.35	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.465	0.349	0.291	0.581	0.465	0.349	0.291	0.233*
<b>F<sub>y</sub> = 46 ksi</b>									
Effective length KL in feet	0								
	2	<u>739</u>	<u>555</u>						
	3	711	554						<u>324</u>
	4	533	415	<u>463</u>					<u>292</u>
	5	427	332	282	<u>808</u>	<u>647</u>	<u>485</u>	<u>405</u>	<u>234</u>
	6	356	277	235	552	454	351	275	195
	7	305	237	201	473	390	301	236	167
	8	267	208	176	414	341	263	206	146
	9	237	185	157	368	303	234	184	130
	10	213	166	141	331	273	211	165	117
	11	194	151	128	301	248	191	150	106
	12	178	138	118	276	227	175	138	97
	13	164	128	108	255	210	162	127	90
	14	152	119	101	237	195	150	118	83
	15	142	111	94	221	182	140	110	78
	16	133	104	88	207	170	132	103	73
	17	125	98	83	195	160	124	97	69
	18	119	92	78	184	151	117	92	65
	19	112	87	74	174	144	111	87	61
	20	107	83	71	166	136	105	83	58
	21	102	79	67	158	130	100	79	56
	22	97	76	64	151	124	96	75	53
	23	93	72	61	144	119	92	72	51
	24	89	69	59	138	114	88	69	49
	25	85	66	56	132	109	84	66	47
	26	82	64	54	127	105	81	64	45
	27	79	62	52	123	101	78	61	43
	28	76	59	50	118	97	75	59	42
	29	74	57	49	114	94	73	57	40
	30	71	55	47	110	91	70	55	39
	31	69	54	45	107	88	68	53	38
	32	67	52	44	104	85	66	52	36
	33	65	50	43	100	83	64	50	35
	34	63	49	41	97	80	62	49	34
	35	61	47	40	95	78	60	47	33
	36	59	46	39					
	37	58	45	38					
	38	56	44	37					
	39	55	43	36					
	40	53	42	35					
<b>PROPERTIES</b>									
I <sub>x</sub> , in. <sup>4</sup>	455	360	308	687	573	447	380	310	
S <sub>x</sub> , in. <sup>3</sup>	56.9	45.0	38.5	98.2	81.8	63.9	54.3	42.3**	
Z <sub>x</sub> , in. <sup>3</sup>	77.3	60.2	51.1	120	98.8	76.3	64.6	52.4	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	370	277	231	404	323	243	202	162	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2130	1660	1410	3310	2730	2110	1650	1170	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

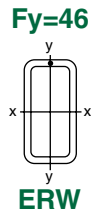
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).





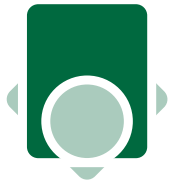
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		14 x 6						14 x 4					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	24.73	67.82	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0							<u>808</u>	<u>647</u>	<u>485</u>	<u>405</u>	<u>324</u>	<u>192</u>
	2							673	561	440	374	305	192
	3	<u>808</u>	<u>647</u>	<u>485</u>	<u>405</u>	<u>324</u>	<u>192</u>	673	561	440	374	305	192
	4	612	508	395	335	273	189	504	421	330	280	229	175
	5	490	406	316	268	219	151	404	337	264	224	183	140
	6	408	339	264	224	182	126	336	281	220	187	153	116
	7	350	290	226	192	156	108	288	241	188	160	131	100
	8	306	254	198	168	137	94	252	210	165	140	115	87
	9	272	226	176	149	121	84	224	187	147	125	102	78
	10	245	203	158	134	109	75	202	168	132	112	92	70
	11	223	185	144	122	99	69	183	153	120	102	83	63
	12	204	169	132	112	91	63	168	140	110	93	76	58
	13	188	156	122	103	84	58	155	130	101	86	70	54
	14	175	145	113	96	78	54	144	120	94	80	65	50
	15	163	135	105	89	73	50	135	112	88	75	61	47
	16	153	127	99	84	68	47	126	105	82	70	57	44
	17	144	119	93	79	64	44	119	99	78	66	54	41
	18	136	113	88	75	61	42	112	94	73	62	51	39
	19	129	107	83	71	58	40	106	89	69	59	48	37
	20	122	102	79	67	55	38	101	84	66	56	46	35
	21	117	97	75	64	52	36	96	80	63	53	44	33
	22	111	92	72	61	50	34	92	77	60	51	42	32
	23	106	88	69	58	48	33	88	73	57	49	40	30
	24	102	85	66	56	46	31	84	70	55	47	38	29
	25	98	81	63	54	44	30	81	67	53	45	37	28
	26	94	78	61	52	42	29	78	65	51	43	35	27
	27	91	75	59	50	40	28	75	62	49	42	34	26
	28	87	73	56	48	39	27	72	60	47	40	33	25
	29	84	70	55	46	38	26	70	58	45	39	32	24
	30	82	68	53	45	36	25	67	56	44	37	31	23
	31	79	66	51	43	35	24	65	54	43	36	30	23
	32	77	63	49	42	34	24	63	53	41	35	29	22
	33	74	62	48	41	33	23	61	51	40	34	28	21
	34	72	60	47	39	32	22	59	50	39	33	27	21
	35	70	58	45	38	31	22	58	48	38	32	26	20
36													
37													
38													
39													
40													
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	478	402	317	271	222	170	373	317	252	216	178	137	
S <sub>x</sub> , in. <sup>3</sup>	68.2	57.4	45.3	38.7	31.7	24.3	53.3	45.3	36.0	30.9	25.4	19.5	
Z <sub>x</sub> , in. <sup>3</sup>	88.7	73.6	57.3	48.6	39.6	30.1	73.1	61.0	47.8	40.6	33.2	25.3	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	404	323	243	202	162	95.8	404	323	243	202	162	95.8	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2450	2030	1580	1340	1090	754	2020	1680	1320	1120	916	698	

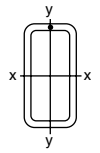
Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



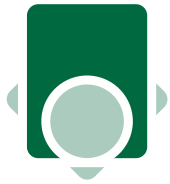
ERW

Nominal Size		12 x 10				12 x 8						
Wall Thickness		1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4	3/16	
Weight Per Foot		69.27	53.00	44.60	36.03	76.33	62.46	47.90	40.35	32.63	24.73	
Design Wall Thickness		0.465	0.349	0.291	0.233*	0.581	0.465	0.349	0.291	0.233	0.174*	
<b>F<sub>y</sub> = 46 ksi</b>												
Effective length KL in feet	0											
	2											
	3	554		347	278	693	554	416	347	278	193	
	4	544	416	332	236	566	470	366	310	234	151	
	5	435	337	266	189	453	376	293	248	187	120	
	6	362	281	221	158	378	313	244	207	156	100	
	7	311	241	190	135	324	269	209	177	133	86	
	8	272	211	166	118	283	235	183	155	117	75	
	9	242	187	148	105	252	209	163	138	104	67	
	10	217	169	133	95	227	188	146	124	93	60	
	11	198	153	121	86	206	171	133	113	85	55	
	12	181	141	111	79	189	157	122	103	78	50	
	13	167	130	102	73	174	145	113	95	72	46	
	14	155	120	95	68	162	134	104	89	67	43	
	15	145	112	89	63	151	125	98	83	62	40	
	16	136	105	83	59	142	117	91	77	58	38	
	17	128	99	78	56	133	111	86	73	55	35	
	18	121	94	74	53	126	104	81	69	52	33	
	19	114	89	70	50	119	99	77	65	49	32	
	20	109	84	66	47	113	94	73	62	47	30	
	21	104	80	63	45	108	90	70	59	44	29	
	22	99	77	60	43	103	85	66	56	42	27	
	23	95	73	58	41	99	82	64	54	41	26	
	24	91	70	55	39	94	78	61	52	39	25	
	25	87	67	53	38	91	75	59	50	37	24	
	26	84	65	51	36	87	72	56	48	36	23	
	27	81	62	49	35	84	70	54	46	35	22	
	28	78	60	47	34	81	67	52	44	33	22	
	29	75	58	46	33	78	65	50	43	32	21	
	30	72	56	44	32	76	63	49	41	31	20	
	31											
	32											
	33											
	34											
	35											
	36											
	37											
	38											
	39											
	40											
<b>PROPERTIES</b>												
I <sub>x</sub> , in. <sup>4</sup>	395	310	264	216	396	333	262	224	184	140		
S <sub>x</sub> , in. <sup>3</sup>	65.9	51.6	44.0	34.2**	66.1	55.5	43.7	37.4	30.6	21.8**		
Z <sub>x</sub> , in. <sup>3</sup>	78.8	61.1	51.7	42.1	82.1	68.1	53.0	44.9	36.6	27.8		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	277	208	173	139	346	277	208	173	139	96.7		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2170	1690	1330	945	2270	1880	1460	1240	934	602		

Load above heavy horizontal line is limited by design shear strength.

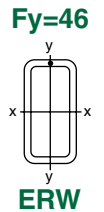
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



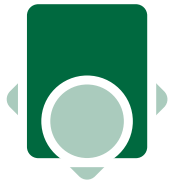
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



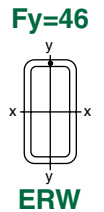
Nominal Size		12 x 6						12 x 4					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		67.82	55.66	42.79	36.10	29.23	22.18	59.32	48.85	37.69	31.84	25.82	19.63
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	<u>693</u>	<u>554</u>	<u>416</u>				<u>693</u>	<u>554</u>	<u>416</u>	<u>347</u>	<u>278</u>	<u>194</u>
	3	633	528	412	<u>347</u>	<u>278</u>	<u>193</u>	511	430	338	288	236	180
	4	475	396	309	263	215	149	383	322	253	216	177	135
	5	380	317	247	210	172	119	306	258	203	173	141	108
	6	316	264	206	175	143	100	255	215	169	144	118	90
	7	271	226	177	150	123	85	219	184	145	123	101	77
	8	237	198	155	131	107	75	191	161	127	108	88	68
	9	211	176	137	117	95	66	170	143	113	96	79	60
	10	190	158	124	105	86	60	153	129	101	86	71	54
	11	173	144	112	96	78	54	139	117	92	79	64	49
	12	158	132	103	88	72	50	128	107	84	72	59	45
	13	146	122	95	81	66	46	118	99	78	66	54	42
	14	136	113	88	75	61	43	109	92	72	62	50	39
	15	127	106	82	70	57	40	102	86	68	58	47	36
	16	119	99	77	66	54	37	96	81	63	54	44	34
	17	112	93	73	62	50	35	90	76	60	51	42	32
	18	105	88	69	58	48	33	85	72	56	48	39	30
	19	100	83	65	55	45	31	81	68	53	45	37	28
	20	95	79	62	53	43	30	77	64	51	43	35	27
	21	90	75	59	50	41	28	73	61	48	41	34	26
	22	86	72	56	48	39	27	70	59	46	39	32	25
	23	83	69	54	46	37	26	67	56	44	38	31	24
	24	79	66	52	44	36	25	64	54	42	36	29	23
	25	76	63	49	42	34	24	61	52	41	35	28	22
	26	73	61	48	40	33	23	59	50	39	33	27	21
	27	70	59	46	39	32	22	57	48	38	32	26	20
	28	68	57	44	38	31	21	55	46	36	31	25	19
	29	65	55	43	36	30	21	53	44	35	30	24	19
	30	63	53	41	35	29	20	51	43	34	29	24	18
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	321	271	215	184	151	116	245	209	168	144	119	91.8	
S <sub>x</sub> , in. <sup>3</sup>	53.4	45.2	35.8	30.7	25.2	19.4	40.8	34.9	28.0	24.0	19.9	15.3	
Z <sub>x</sub> , in. <sup>3</sup>	68.8	57.4	44.8	38.1	31.1	23.7	55.5	46.7	36.7	31.3	25.6	19.6	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	346	277	208	173	139	96.7	346	277	208	173	139	96.7	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1900	1580	1240	1050	858	597	1530	1290	1010	864	707	541	

Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

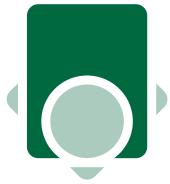


Nominal Size		12 x 3 1/2		12 x 3			12 x 2		10 x 8				
Wall Thickness		3/8	5/16	5/16	1/4	3/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		36.41	30.78	29.72	24.12	18.35	22.42	17.08	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.349	0.291	0.291	0.233	0.174	0.233	0.174	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	416	347	347	278	194	277	194					
	3	319	272	257	211	161	185	143	462	347	289	232	156
	4	239	204	193	158	121	139	107	358	279	237	180	117
	5	192	163	154	126	97	111	86	286	224	190	144	93
	6	160	136	128	105	81	93	71	239	186	158	120	78
	7	137	117	110	90	69	79	61	205	160	136	103	67
	8	120	102	96	79	60	69	54	179	140	119	90	58
	9	106	91	86	70	54	62	48	159	124	105	80	52
	10	96	82	77	63	48	56	43	143	112	95	72	47
	11	87	74	70	57	44	50	39	130	102	86	66	42
	12	80	68	64	53	40	46	36	119	93	79	60	39
	13	74	63	59	49	37	43	33	110	86	73	55	36
	14	68	58	55	45	35	40	31	102	80	68	52	33
	15	64	54	51	42	32	37	29	95	75	63	48	31
	16	60	51	48	40	30	35	27	90	70	59	45	29
	17	56	48	45	37	28	33	25	84	66	56	42	27
	18	53	45	43	35	27	31	24	80	62	53	40	26
	19	50	43	41	33	25	29	23	75	59	50	38	25
	20	48	41	39	32	24	28	21	72	56	47	36	23
	21	46	39	37	30	23	26	20	68	53	45	34	22
	22	44	37	35	29	22	25	19	65	51	43	33	21
	23	42	36	33	27	21	24	19	62	49	41	31	20
	24	40	34	32	26	20	23	18	60	47	40	30	19
	25	38	33	31	25	19	22	17	57	45	38	29	19
	26	37	31	30	24	19	21	16					
	27	35	30	29	23	18	21	16					
	28	34	29	28	23	17	20	15					
	29	33	28	27	22	17	19	15					
	30	32	27	26	21	16	19	14					
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	156	134	124	103	79.6	86.9	67.4	214	169	145	119	91.4	
S <sub>x</sub> , in. <sup>3</sup>	26.0	22.4	20.7	17.2	13.3	14.5	11.2	42.7	33.9	29.0	23.8	16.9**	
Z <sub>x</sub> , in. <sup>3</sup>	34.7	29.6	27.9	22.9	17.5	20.1	15.5	51.9	40.5	34.4	28.1	21.4	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	208	173	173	139	96.7	139	96.7	231	173	145	116	86.4	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	958	817	770	632	483	555	428	1430	1120	949	721	467	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

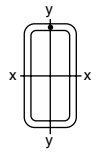
\*\* Effective section modulus,  $S_{eff}$  calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

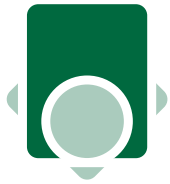
F<sub>y</sub>=46



ERW

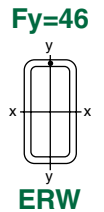
Nominal Size		10 x 6					10 x 5					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	3/8	5/16	1/4	3/16	
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	19.63	35.13	29.72	24.12	18.35	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.349	0.291	0.233	0.174	
<b>F<sub>y</sub> = 46 ksi</b>												
Effective length KL in feet	0											
	2	<u>577</u>	<u>462</u>	<u>347</u>	<u>289</u>	<u>232</u>	<u>173</u>	<u>347</u>	<u>289</u>	<u>232</u>	<u>173</u>	
	3	<u>472</u>	<u>396</u>	<u>311</u>	<u>265</u>	<u>217</u>	<u>152</u>	<u>280</u>	<u>239</u>	<u>196</u>	<u>150</u>	
	4	<u>354</u>	<u>297</u>	<u>233</u>	<u>199</u>	<u>163</u>	<u>114</u>	<u>210</u>	<u>179</u>	<u>147</u>	<u>112</u>	
	5	<u>283</u>	<u>237</u>	<u>187</u>	<u>159</u>	<u>130</u>	<u>91</u>	<u>168</u>	<u>144</u>	<u>118</u>	<u>90</u>	
	6	236	198	155	132	109	76	140	120	98	75	
	7	202	170	133	114	93	65	120	103	84	64	
	8	177	148	117	99	81	57	105	90	73	56	
	9	157	132	104	88	72	51	93	80	65	50	
	10	142	119	93	79	65	46	84	72	59	45	
	11	129	108	85	72	59	41	76	65	53	41	
	12	118	99	78	66	54	38	70	60	49	37	
	13	109	91	72	61	50	35	65	55	45	35	
	14	101	85	67	57	47	33	60	51	42	32	
	15	94	79	62	53	43	30	56	48	39	30	
	16	88	74	58	50	41	28	52	45	37	28	
	17	83	70	55	47	38	27	49	42	35	26	
	18	79	66	52	44	36	25	47	40	33	25	
	19	75	62	49	42	34	24	44	38	31	24	
	20	71	59	47	40	33	23	42	36	29	22	
	21	67	57	44	38	31	22	40	34	28	21	
	22	64	54	42	36	30	21	38	33	27	20	
	23	62	52	41	35	28	20	36	31	26	20	
	24	59	49	39	33	27	19	35	30	24	19	
	25	57	47	37	32	26	18	34	29	24	18	
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	40											
<b>PROPERTIES</b>												
I <sub>x</sub> , in. <sup>4</sup>	201	171	137	118	96.9	74.6	120	104	85.8	66.2		
S <sub>x</sub> , in. <sup>3</sup>	40.2	34.3	27.3	23.5	19.4	14.9	24.1	20.8	17.2	13.2		
Z <sub>x</sub> , in. <sup>3</sup>	51.3	43.0	33.8	28.8	23.6	18.0	30.4	26.0	21.3	16.3		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	289	231	173	145	116	86.4	173	145	116	86.4		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1420	1190	933	795	651	456	839	718	588	450		

Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



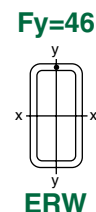
Nominal Size		10 x 4					10 x 3 1/2	10 x 3						
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	3/16	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	16.44	30.03	25.46	20.72	15.80	10.71	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.174	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>														
Effective length KL in feet	0													
	2	556	462	347	289	232	173	173	327	280	231	173		
	3	371	314	248	213	175	134	126	218	187	154	118	79	
	4	278	235	186	159	131	101	95	164	140	115	88	61	
	5	222	188	149	128	105	81	76	131	112	92	71	49	
	6	185	157	124	106	87	67	63	109	93	77	59	40	
	7	159	134	106	91	75	58	54	93	80	66	50	35	
	8	139	118	93	80	66	50	47	82	70	58	44	30	
	9	124	105	83	71	58	45	42	73	62	51	39	27	
	10	111	94	75	64	52	40	38	65	56	46	35	24	
	11	101	86	68	58	48	37	34	59	51	42	32	22	
	12	93	78	62	53	44	34	32	55	47	38	29	20	
	13	86	72	57	49	40	31	29	50	43	35	27	19	
	14	79	67	53	46	37	29	27	47	40	33	25	17	
	15	74	63	50	43	35	27	25	44	37	31	24	16	
	16	70	59	47	40	33	25	24	41	35	29	22	15	
	17	65	55	44	38	31	24	22	38	33	27	21	14	
	18	62	52	41	35	29	22	21	36	31	26	20	13	
	19	59	50	39	34	28	21	20	34	29	24	19	13	
	20	56	47	37	32	26	20	19	33	28	23	18	12	
	21	53	45	35	30	25	19	18	31	27	22	17	12	
	22	51	43	34	29	24	18	17	30	25	21	16	11	
	23	48	41	32	28	23	18	16	28	24	20	15	11	
	24	46	39	31	27	22	17	16	27	23	19	15	10	
	25	44	38	30	26	21	16	15	26	22	18	14	10	
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	36													
	37													
	38													
	39													
	40													
<b>PROPERTIES</b>														
I <sub>x</sub> , in. <sup>4</sup>	149	129	104	90.1	74.7	57.8	53.6	88.0	76.3	63.6	49.4	34.2		
S <sub>x</sub> , in. <sup>3</sup>	29.9	25.8	20.8	18.0	14.9	11.6	10.7	17.6	15.3	12.7	9.87	6.83		
Z <sub>x</sub> , in. <sup>3</sup>	40.3	34.1	27.0	23.1	19.0	14.6	13.7	23.7	20.3	16.7	12.8	8.80		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	289	231	173	145	116	86.4	86.4	173	145	116	86.4	39.5		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1110	941	745	638	524	403	378	654	560	461	353	243		

Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

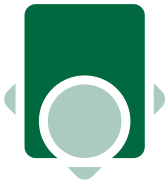


Nominal Size		10 x 2				9 x 7					
Wall Thickness		3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		27.48	23.34	19.02	14.53	59.32	48.85	37.69	31.84	25.82	19.63
Design Wall Thickness		0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 46 ksi</b>											
Effective length KL in feet	0										
	2	281	242	199	153	<u>520</u>	<u>416</u>	<u>312</u>	<u>260</u>	<u>208</u>	<u>156</u>
	3	187	161	132	102	444	373	293	249	204	129
	4	140	121	99	77	333	279	219	187	153	97
	5	112	97	79	61	267	224	176	150	123	77
	6	93	81	66	51	222	186	146	125	102	65
	7	80	69	57	44	190	160	125	107	88	55
	8	70	60	50	38	167	140	110	93	77	48
	9	62	54	44	34	148	124	98	83	68	43
	10	56	48	40	31	133	112	88	75	61	39
	11	51	44	36	28	121	102	80	68	56	35
	12	47	40	33	26	111	93	73	62	51	32
	13	43	37	31	24	103	86	68	58	47	30
	14	40	35	28	22	95	80	63	53	44	28
	15	37	32	26	20	89	75	59	50	41	26
	16	35	30	25	19	83	70	55	47	38	24
	17	33	28	23	18	78	66	52	44	36	23
	18	31	27	22	17	74	62	49	42	34	22
	19	29	25	21	16	70	59	46	39	32	20
	20	28	24	20	15	67	56	44	37	31	19
	21	27	23	19	15	63	53	42	36	29	18
	22	25	22	18	14	61	51	40	34	28	18
	23	24	21	17	13						
	24	23	20	17	13						
	25	22	19	16	12						
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	71.7	62.6	52.5	41.0	174	149	119	102	84.1	64.7	
S <sub>x</sub> , in. <sup>3</sup>	14.3	12.5	10.5	8.19	38.7	33.0	26.4	22.6	18.7	14.0**	
Z <sub>x</sub> , in. <sup>3</sup>	20.3	17.5	14.4	11.1	48.3	40.5	31.8	27.1	22.2	16.9	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	173	145	116	86.4	260	208	156	130	104	77.8	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	560	483	397	306	1330	1120	878	748	613	387	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

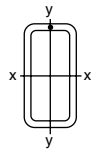
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46

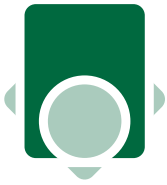


ERW

Nominal Size		9 x 5					9 x 3						
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16	
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	35.24	27.48	23.34	19.02	14.53	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.465	0.349	0.291	0.233	0.174	
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	<u>520</u>	<u>416</u>	<u>312</u>	<u>260</u>	<u>208</u>	<u>156</u>	340	272	233	193	149	
	3	<u>354</u>	<u>299</u>	<u>236</u>	<u>202</u>	<u>167</u>	<u>127</u>	226	181	155	129	99	
	4	266	224	177	152	125	95	170	136	117	97	75	
	5	213	179	142	121	100	76	136	109	93	77	60	
	6	177	150	118	101	83	63	113	91	78	64	50	
	7	152	128	101	87	71	54	97	78	67	55	43	
	8	133	112	89	76	62	48	85	68	58	48	37	
	9	118	100	79	67	56	42	75	60	52	43	33	
	10	106	90	71	61	50	38	68	54	47	39	30	
	11	97	82	64	55	45	35	62	49	42	35	27	
	12	89	75	59	51	42	32	57	45	39	32	25	
	13	82	69	55	47	38	29	52	42	36	30	23	
	14	76	64	51	43	36	27	48	39	33	28	21	
	15	71	60	47	40	33	25	45	36	31	26	20	
	16	66	56	44	38	31	24	42	34	29	24	19	
	17	63	53	42	36	29	22	40	32	27	23	18	
	18	59	50	39	34	28	21	38	30	26	21	17	
	19	56	47	37	32	26	20	36	29	25	20	16	
	20	53	45	35	30	25	19	34	27	23	19	15	
	21	51	43	34	29	24	18	32	26	22	18	14	
	22	48	41	32	28	23	17	31	25	21	18	14	
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	133	115	92.5	79.8	66.1	51.1	80.8	66.3	57.7	48.2	37.6		
S <sub>x</sub> , in. <sup>3</sup>	29.6	25.5	20.5	17.7	14.7	11.4	17.9	14.7	12.8	10.7	8.35		
Z <sub>x</sub> , in. <sup>3</sup>	38.5	32.5	25.7	22.0	18.1	13.8	24.6	19.7	16.9	14.0	10.8		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	260	208	156	130	104	77.8	208	156	130	104	77.8		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1060	897	709	607	500	381	679	544	466	386	298		

Load above heavy horizontal line is limited by design shear strength.

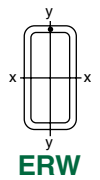




# LRFD Beams Rectangular HSS

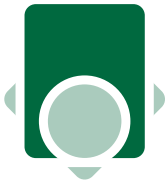
Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



Nominal Size		8 x 6						8 x 4							
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	42.30	35.24	27.48	23.34	19.02	14.53	9.86	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>															
Effective length KL in feet	0														
	2	<u>462</u>	<u>370</u>	<u>278</u>	<u>232</u>	<u>186</u>	<u>138</u>	378	324	259	222	184	<u>138</u>	<u>86</u>	
	3	<u>332</u>	<u>281</u>	<u>222</u>	<u>190</u>	<u>155</u>	<u>110</u>	252	216	173	148	122	<u>94</u>	<u>59</u>	
	4	249	210	166	142	117	83	189	162	130	111	92	70	44	
	5	199	168	133	114	93	66	151	130	104	89	73	56	35	
	6	166	140	111	95	78	55	126	108	86	74	61	47	29	
	7	142	120	95	81	67	47	108	93	74	63	52	40	25	
	8	125	105	83	71	58	41	95	81	65	56	46	35	22	
	9	111	94	74	63	52	37	84	72	58	49	41	31	20	
	10	100	84	67	57	47	33	76	65	52	44	37	28	18	
	11	91	77	60	52	42	30	69	59	47	40	33	26	16	
	12	83	70	55	47	39	28	63	54	43	37	31	23	15	
	13	77	65	51	44	36	25	58	50	40	34	28	22	14	
	14	71	60	48	41	33	24	54	46	37	32	26	20	13	
	15	66	56	44	38	31	22	50	43	35	30	24	19	12	
	16	62	53	42	36	29	21	47	41	32	28	23	18	11	
	17	59	50	39	33	27	19	44	38	31	26	22	17	10	
	18	55	47	37	32	26	18	42	36	29	25	20	16	10	
	19	52	44	35	30	25	17	40	34	27	23	19	15	9	
	20	50	42	33	28	23	17	38	32	26	22	18	14	9	
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<b>PROPERTIES</b>															
I <sub>x</sub> , in. <sup>4</sup>	114	98.2	79.1	68.3	56.6	43.7	81.9	71.7	58.7	51.0	42.5	33.1	22.9		
S <sub>x</sub> , in. <sup>3</sup>	28.5	24.5	19.8	17.1	14.1	10.9	20.5	17.9	14.7	12.8	10.6	8.27	5.73		
Z <sub>x</sub> , in. <sup>3</sup>	36.1	30.5	24.1	20.6	16.9	13.0	27.4	23.5	18.8	16.1	13.3	10.2	7.02		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	231	185	139	116	92.6	69.2	231	185	139	116	92.6	69.2	43.0		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	996	842	665	569	466	331	756	649	519	444	367	282	177		

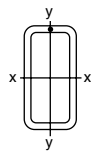
Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

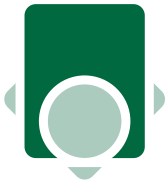
Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



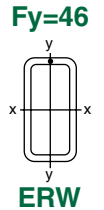
ERW

Nominal Size		8 x 3						8 x 2					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		31.84	24.93	21.21	17.32	13.25	9.01	22.37	19.08	15.62	11.97	8.16	
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	276	222	192	159	122	84	185	160	134	104	72	
	3	184	148	128	106	82	56	123	107	89	69	48	
	4	138	111	96	79	61	42	92	80	67	52	36	
	5	110	89	77	63	49	34	74	64	53	41	29	
	6	92	74	64	53	41	28	62	53	45	35	24	
	7	79	63	55	45	35	24	53	46	38	30	20	
	8	69	56	48	40	31	21	46	40	33	26	18	
	9	61	49	43	35	27	19	41	36	30	23	16	
	10	55	44	38	32	24	17	37	32	27	21	14	
	11	50	40	35	29	22	15	34	29	24	19	13	
	12	46	37	32	26	20	14	31	27	22	17	12	
	13	42	34	30	24	19	13	28	25	21	16	11	
	14	39	32	27	23	17	12	26	23	19	15	10	
	15	37	30	26	21	16	11	25	21	18	14	10	
	16	35	28	24	20	15	11	23	20	17	13	9	
	17	32	26	23	19	14	10	22	19	16	12	8	
	18	31	25	21	18	14	9	21	18	15	12	8	
	19	29	23	20	17	13	9	19	17	14	11	8	
	20	28	22	19	16	12	8	18	16	13	10	7	
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	58.5	48.5	42.4	35.5	27.8	19.3	38.2	33.7	28.5	22.4	15.7		
S <sub>x</sub> , in. <sup>3</sup>	14.6	12.1	10.6	8.88	6.94	4.83	9.56	8.43	7.12	5.61	3.93		
Z <sub>x</sub> , in. <sup>3</sup>	20.0	16.1	13.9	11.5	8.87	6.11	13.4	11.6	9.68	7.51	5.19		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	185	139	116	92.6	69.2	43.0	139	116	92.6	69.2	43.0		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	552	444	384	317	245	169	370	320	267	207	143		



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

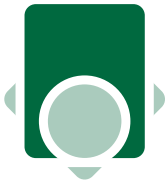


Nominal Size		7 x 5						7 x 4							
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		42.30	35.24	27.48	23.34	19.02	14.53	9.86	31.84	24.93	21.21	17.32	13.25	9.01	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>															
Effective length KL in feet	0														
	2	353	302	242	202	162	121	73	259	208	181	149	115	72	
	3	236	201	161	138	114	88	48	173	139	121	99	77	48	
	4	177	151	121	104	86	66	36	130	104	90	75	57	36	
	5	141	121	97	83	68	53	29	104	83	72	60	46	29	
	6	118	101	81	69	57	44	24	86	69	60	50	38	24	
	7	101	86	69	59	49	38	21	74	60	52	43	33	21	
	8	88	76	60	52	43	33	18	65	52	45	37	29	18	
	9	79	67	54	46	38	29	16	58	46	40	33	26	16	
	10	71	60	48	41	34	26	15	52	42	36	30	23	14	
	11	64	55	44	38	31	24	13	47	38	33	27	21	13	
	12	59	50	40	35	29	22	12	43	35	30	25	19	12	
	13	54	46	37	32	26	20	11	40	32	28	23	18	11	
	14	50	43	35	30	24	19	10	37	30	26	21	16	10	
	15	47	40	32	28	23	18	10	35	28	24	20	15	10	
	16	44	38	30	26	21	16	9	32	26	23	19	14	9	
	17	42	36	28	24	20	15	9	31	25	21	18	14	9	
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<b>PROPERTIES</b>															
$I_x$ , in. <sup>4</sup>	69.3	60.6	49.5	43.0	35.8	27.9	19.3	50.6	41.8	36.4	30.5	23.8	16.6		
$S_x$ , in. <sup>3</sup>	19.8	17.3	14.1	12.3	10.2	7.96	5.26**	14.5	11.9	10.4	8.72	6.80	4.73		
$Z_x$ , in. <sup>3</sup>	25.6	21.9	17.5	15.0	12.4	9.52	6.53	18.8	15.1	13.1	10.8	8.33	5.73		
$\Phi_v V_n$ , (kips)	202	162	121	101	81.0	60.5	40.3	162	121	101	81.0	60.5	40.3		
$\Phi_b W_c$ , (kip-ft)	707	604	483	414	342	263	145	519	417	362	298	230	145		

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

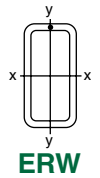
\*\* Effective section modulus,  $S_{eff}$  calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

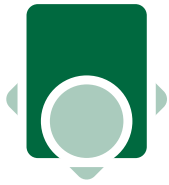
Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



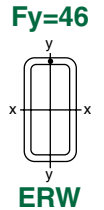
Nominal Size		7 x 3					6 x 5				
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	24.93	21.21	17.32	13.25
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 46 ksi</b>											
Effective length KL in feet	0										
	2	218	177	153	127	99	68	190	164	136	<u>104</u>
	3	145	118	102	85	66	45	127	109	91	70
	4	109	88	77	64	49	34	95	82	68	53
	5	87	71	61	51	39	27	76	66	54	42
	6	73	59	51	42	33	23	63	55	45	35
	7	62	50	44	36	28	19	54	47	39	30
	8	55	44	38	32	25	17	48	41	34	26
	9	48	39	34	28	22	15	42	36	30	23
	10	44	35	31	25	20	14	38	33	27	21
	11	40	32	28	23	18	12	35	30	25	19
	12	36	29	26	21	16	11	32	27	23	18
	13	34	27	24	20	15	10	29	25	21	16
	14	31	25	22	18	14	10	27	23	19	15
	15	29	24	20	17	13	9	25	22	18	14
	16	27	22	19	16	12	9				
	17	26	21	18	15	12	8				
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	40.7	34.0	29.9	25.2	19.8	13.8	33.9	29.6	24.7	19.3	
S <sub>x</sub> , in. <sup>3</sup>	11.6	9.73	8.54	7.19	5.65	3.95	11.3	9.85	8.25	6.44	
Z <sub>x</sub> , in. <sup>3</sup>	15.8	12.8	11.1	9.22	7.14	4.93	13.8	11.9	9.87	7.62	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	162	121	101	81.0	60.5	40.3	104	86.7	69.5	51.9	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	436	353	306	254	197	136	381	328	272	210	

Load above heavy horizontal line is limited by design shear strength.

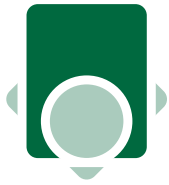


# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



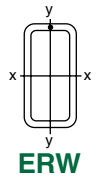
Nominal Size		6 x 4						6 x 3						
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	25.03	19.82	16.96	13.91	10.70	7.31	
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.465	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>														
Effective length KL, in feet	0													
	2	201	164	142	118	91	58	167	137	119	99	77	53	
	3	134	109	95	78	61	39	111	91	79	66	51	36	
	4	101	82	71	59	46	29	83	68	59	50	39	27	
	5	81	66	57	47	36	23	67	55	48	40	31	21	
	6	67	55	47	39	30	19	56	46	40	33	26	18	
	7	58	47	41	34	26	17	48	39	34	28	22	15	
	8	50	41	36	29	23	14	42	34	30	25	19	13	
	9	45	36	32	26	20	13	37	30	26	22	17	12	
	10	40	33	28	24	18	12	33	27	24	20	15	11	
	11	37	30	26	21	17	11	30	25	22	18	14	10	
	12	34	27	24	20	15	10	28	23	20	17	13	9	
	13	31	25	22	18	14	9	26	21	18	15	12	8	
	14	29	23	20	17	13	8	24	20	17	14	11	8	
	15	27	22	19	16	12	8	22	18	16	13	10	7	
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<b>PROPERTIES</b>														
$I_x$ , in. <sup>4</sup>	33.9	28.3	24.8	20.9	16.4	11.4	26.8	22.7	20.1	17.0	13.4	9.43		
$S_x$ , in. <sup>3</sup>	11.3	9.43	8.27	6.96	5.46	3.81	8.94	7.57	6.69	5.66	4.47	3.14		
$Z_x$ , in. <sup>3</sup>	14.6	11.9	10.3	8.53	6.60	4.56	12.1	9.90	8.61	7.19	5.59	3.87		
$\Phi_v V_n$ , (kips)	139	104	86.7	69.5	51.9	34.6	139	104	86.7	69.5	51.9	34.6		
$\Phi_b W_c$ , (kip-ft)	403	328	284	235	182	116	334	273	238	198	154	107		



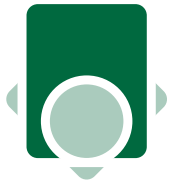
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



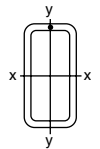
Nominal Size		6 x 2					5 x 4				
Wall Thickness		3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		17.27	14.83	12.21	9.42	6.46	25.03	19.82	16.96	13.91	10.70
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.465	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 46 ksi</b>											
Effective length KL in feet	0										
	2	109	96	81	63	44	150	124	108	90	70
	3	73	64	54	42	29	100	82	72	60	46
	4	55	48	40	32	22	75	62	54	45	35
	5	44	38	32	25	18	60	49	43	36	28
	6	36	32	27	21	15	50	41	36	30	23
	7	31	27	23	18	13	43	35	31	26	20
	8	27	24	20	16	11	38	31	27	22	17
	9	24	21	18	14	10	33	27	24	20	15
	10	22	19	16	13	9	30	25	22	18	14
	11	20	17	15	11	8	27	22	20	16	13
	12	18	16	13	11	7	25	21	18	15	12
	13	17	15	12	10	7					
	14	16	14	12	9	6					
	15	15	13	11	8	6					
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	17.1	15.3	13.1	10.5	7.42	21.2	17.9	15.8	13.4	10.6	
S <sub>x</sub> , in. <sup>3</sup>	5.71	5.11	4.37	3.49	2.47	8.48	7.16	6.32	5.35	4.22	
Z <sub>x</sub> , in. <sup>3</sup>	7.93	6.95	5.84	4.58	3.19	10.9	8.96	7.79	6.49	5.05	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	104	86.7	69.5	51.9	34.6	116	86.7	72.3	57.9	43.2	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	219	192	161	126	88.0	301	247	215	179	139	



# LRFD Beams Rectangular HSS

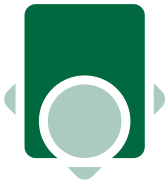
Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



ERW

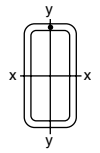
Nominal Size		5 x 3					5 x 2 1/2				
Wall Thickness	1/2	3/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8		
Weight Per Foot	21.63	17.27	14.83	12.21	9.42	6.46	11.36	8.78	6.03		
Design Wall Thickness	0.465	0.349	0.291	0.233	0.174	0.116	0.233	0.174	0.116		
<b>F<sub>y</sub> = 46 ksi</b>											
Effective length KL in feet	0										
	2	122	101	89	74	58	40	67	52	37	
	3	81	68	59	49	39	27	44	35	24	
	4	61	51	44	37	29	20	33	26	18	
	5	49	41	35	30	23	16	27	21	15	
	6	41	34	30	25	19	13	22	17	12	
	7	35	29	25	21	17	12	19	15	10	
	8	30	25	22	19	15	10	17	13	9	
	9	27	23	20	16	13	9	15	12	8	
	10	24	20	18	15	12	8	13	10	7	
	11	22	18	16	13	11	7	12	10	7	
	12	20	17	15	12	10	7	11	9	6	
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	16.4	14.1	12.6	10.7	8.53	6.03	9.40	7.51	5.34		
S <sub>x</sub> , in. <sup>3</sup>	6.56	5.65	5.03	4.29	3.41	2.41	3.76	3.01	2.14		
Z <sub>x</sub> , in. <sup>3</sup>	8.83	7.34	6.42	5.38	4.21	2.93	4.83	3.79	2.65		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	116	86.7	72.3	57.9	43.2	28.8	57.9	43.2	28.8		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	244	203	177	148	116	80.9	133	105	73.1		



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

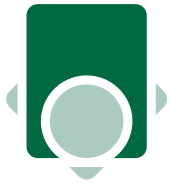
F<sub>y</sub>=46



ERW

Nominal Size		5 x 2					4 x 3					4 x 2 1/2			
Wall Thickness		3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	5/16	1/4	3/16	
Weight Per Foot		14.72	12.70	10.51	8.15	5.61	14.72	12.70	10.51	8.15	5.61	11.64	9.66	7.51	
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116	0.291	0.233	0.174	
<b>F<sub>y</sub> = 46 ksi</b>															
Effective length KL in feet	0														
	2	79	70	59	47	33	71	62	53	41	29	55	47	37	
	3	53	46	39	31	22	47	41	35	28	19	37	31	25	
	4	39	35	29	23	16	35	31	26	21	15	27	23	18	
	5	32	28	24	19	13	28	25	21	17	12	22	19	15	
	6	26	23	20	16	11	24	21	18	14	10	18	16	12	
	7	23	20	17	13	9	20	18	15	12	8	16	13	11	
	8	20	17	15	12	8	18	16	13	10	7	14	12	9	
	9	18	15	13	10	7	16	14	12	9	6	12	10	8	
	10	16	14	12	9	7	14	12	11	8	6	11	9	7	
	11	14	13	11	8	6									
	12	13	12	10	8	5									
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<b>PROPERTIES</b>															
I <sub>x</sub> , in. <sup>4</sup>		10.3	9.34	8.08	6.50	4.65	7.92	7.13	6.15	4.93	3.52	6.13	5.32	4.30	
S <sub>x</sub> , in. <sup>3</sup>		4.14	3.74	3.23	2.60	1.86	3.96	3.57	3.07	2.47	1.76	3.06	2.66	2.15	
Z <sub>x</sub> , in. <sup>3</sup>		5.71	5.05	4.27	3.37	2.37	5.12	4.51	3.81	3.00	2.11	3.97	3.38	2.67	
Φ <sub>v</sub> V <sub>n</sub> , (kips)		86.7	72.3	57.9	43.2	28.8	69.4	57.8	46.3	34.6	23.1	57.8	46.3	34.6	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)		158	139	118	93.0	65.4	141	124	105	82.8	58.2	110	93.3	73.7	

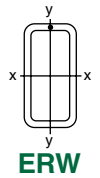




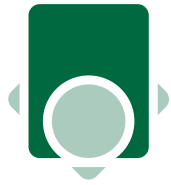
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



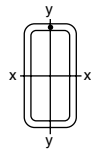
Nominal Size		4 x 2					3 1/2 x 2 1/2				
Wall Thickness		3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		12.17	10.58	8.81	6.87	4.75	12.17	10.58	8.81	6.87	4.75
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116
<b>F<sub>y</sub> = 46 ksi</b>											
Effective length KL in feet	0										
	2	53	47	41	32	23	50	44	38	30	21
	3	35	32	27	22	15	33	29	25	20	14
	4	26	24	20	16	11	25	22	19	15	11
	5	21	19	16	13	9	20	18	15	12	9
	6	18	16	14	11	8	17	15	13	10	7
	7	15	14	12	9	7	14	13	11	9	6
	8	13	12	10	8	6	12	11	9	8	5
	9	12	11	9	7	5					
	10	11	9	8	6	5					
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	39										
	40										
<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	5.59	5.12	4.49	3.66	2.65	4.74	4.34	3.79	3.09	2.23	
S <sub>x</sub> , in. <sup>3</sup>	2.80	2.56	2.25	1.83	1.32	2.71	2.48	2.17	1.76	1.28	
Z <sub>x</sub> , in. <sup>3</sup>	3.84	3.43	2.94	2.34	1.66	3.59	3.20	2.74	2.18	1.54	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	69.4	57.8	46.3	34.6	23.1	60.7	50.6	40.5	30.3	20.2	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	106	94.7	81.1	64.6	45.8	99.1	88.3	75.6	60.2	42.5	



# LRFD Beams Rectangular HSS

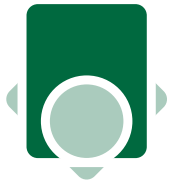
Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



ERW

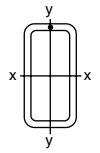
Nominal Size		3 x 2 1/2				3 x 2				3 x 1 1/2			
Wall Thickness	5/16	1/4	3/16	1/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8		
Weight Per Foot	9.51	7.96	6.23	4.33	8.45	7.11	5.59	3.90	6.26	4.96	3.48		
Design Wall Thickness	0.291	0.233	0.174	0.116	0.291	0.233	0.174	0.116	0.233	0.174	0.116		
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length K <sub>L</sub> in feet	0												
	2	35	30	24	17	29	25	20	15	21	17	12	
	3	23	20	16	11	19	17	14	10	14	11	8	
	4	17	15	12	8	15	13	10	7	10	9	6	
	5	14	12	10	7	12	10	8	6	8	7	5	
	6	12	10	8	6	10	8	7	5	7	6	4	
	7	10	9	7	5	8	7	6	4	6	5	4	
	8												
	9												
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	40												
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	2.91	2.57	2.11	1.54	2.38	2.12	1.76	1.30	1.68	1.42	1.06		
S <sub>x</sub> , in. <sup>3</sup>	1.94	1.71	1.41	1.03	1.58	1.42	1.18	0.866	1.12	0.945	0.706		
Z <sub>x</sub> , in. <sup>3</sup>	2.51	2.16	1.73	1.23	2.11	1.83	1.48	1.06	1.51	1.24	0.895		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	43.4	34.7	25.9	17.3	43.4	34.7	25.9	17.3	34.7	25.9	17.3		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	69.3	59.6	47.7	33.9	58.2	50.5	40.8	29.3	41.7	34.2	24.7		



# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46



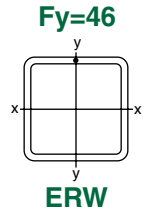
ERW

Nominal Size		3 x 1		2 1/2 x 1 1/2			2 x 1 1/2		2 x 1	
Wall Thickness		3/16	1/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8
Weight Per Foot		4.32	3.05	5.41	4.32	3.05	3.68	2.63	3.04	2.20
Design Wall Thickness		0.174	0.116	0.233	0.174	0.116	0.174	0.116	0.174	0.116
<b>F<sub>y</sub> = 46 ksi</b>										
Effective length K <sub>L</sub> in feet	0									
	2	14	10	15	13	9	9	7	7	5
	3	9	7	10	8	6	6	4	4	3
	4	7	5	8	6	5	4	3	3	3
	5	5	4	6	5	4	4	3	3	2
	6	5	3	5	4	3				
	7	4	3							
	8									
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	40									
<b>PROPERTIES</b>										
I <sub>x</sub> , in. <sup>4</sup>	1.07	0.817	1.03	0.881	0.668	0.494	0.383	0.349	0.280	
S <sub>x</sub> , in. <sup>3</sup>	0.713	0.545	0.820	0.705	0.535	0.494	0.383	0.349	0.280	
Z <sub>x</sub> , in. <sup>3</sup>	0.989	0.728	1.11	0.915	0.671	0.639	0.475	0.480	0.366	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	25.9	17.3	28.9	21.6	14.4	17.3	11.5	17.3	11.5	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	27.3	20.1	30.6	25.3	18.5	17.6	13.1	13.2	10.1	



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		16 x 16				14 x 14				12 x 12				
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		127.37	103.30	78.52	65.87	110.36	89.68	68.31	57.36	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.581	0.465	0.349*	0.291*	0.581	0.465	0.349*	0.291*	0.581	0.465	0.349	0.291*	0.233*
<b>F<sub>y</sub> = 46 ksi</b>														
Effective length KL in feet	0													
	2													
	3													
	4				463			485	405	693	554	416	347	278
	5	924	739	555	433	808	647	444	348	602	495	357	337	250
	6	920	705	462	361	695	570	370	290	501	412	298	225	167
	7	789	604	396	309	595	489	317	249	430	353	255	193	143
	8	690	529	347	271	521	428	277	218	376	309	223	169	125
	9	613	470	308	241	463	380	247	194	334	275	198	150	111
	10	552	423	277	217	417	342	222	174	301	247	179	135	100
	11	502	385	252	197	379	311	202	158	273	225	162	123	91
	12	460	352	231	180	347	285	185	145	251	206	149	112	83
	13	425	325	213	167	321	263	171	134	231	190	137	104	77
	14	394	302	198	155	298	244	159	124	215	177	128	96	71
	15	368	282	185	144	278	228	148	116	201	165	119	90	67
	16	345	264	173	135	260	214	139	109	188	155	112	84	62
	17	325	249	163	127	245	201	131	102	177	145	105	79	59
	18	307	235	154	120	232	190	123	97	167	137	99	75	56
	19	291	223	146	114	219	180	117	92	158	130	94	71	53
	20	276	211	139	108	208	171	111	87	150	124	89	67	50
	21	263	201	132	103	198	163	106	83	143	118	85	64	48
	22	251	192	126	98	189	156	101	79	137	112	81	61	45
	23	240	184	121	94	181	149	96	76	131	108	78	59	43
	24	230	176	116	90	174	143	92	73	125	103	74	56	42
	25	221	169	111	87	167	137	89	70	120	99	71	54	40
	26	212	163	107	83	160	132	85	67	116	95	69	52	38
	27	204	157	103	80	154	127	82	65	111	92	66	50	37
	28	197	151	99	77	149	122	79	62	107	88	64	48	36
	29	190	146	96	75	144	118	77	60	104	85	62	46	34
	30	184	141	92	72	139	114	74	58	100	82	60	45	33
	31	178	136	89	70	134	110	72	56					
	32	173	132	87	68	130	107	69	54					
	33	167	128	84	66	126	104	67	53					
	34	162	124	82	64	123	101	65	51					
	35	158	121	79	62	119	98	63	50					
	36	153	117	77	60									
	37	149	114	75	59									
	38	145	111	73	57									
	39	142	108	71	56									
	40	138	106	69	54									
<b>PROPERTIES</b>														
I <sub>x</sub> , in. <sup>4</sup>	1370	1130	873	739	896	743	577	490	548	457	357	304	248	
S <sub>x</sub> , in. <sup>3</sup>	171	141	100**	78.5**	128	106	80.4**	63.1**	91.3	76.2	59.5	48.8**	36.2**	
Z <sub>x</sub> , in. <sup>3</sup>	200	164	126	106	151	124	95.4	80.5	109	89.6	69.2	58.6	47.6	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	462	370	277	231	404	323	243	202	346	277	208	173	139	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	5520	4230	2770	2170	4170	3420	2220	1740	3010	2470	1790	1350	999	

Load above heavy horizontal line is limited by design shear strength.

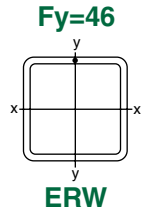
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		10 x 10						9 x 9				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	24.73	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233*	0.174*	0.465	0.349	0.291	0.233*	0.174*
<b>F<sub>y</sub> = 46 ksi</b>												
Effective length KL in feet	0						<u>173</u>				<u>208</u>	<u>156</u>
	2						<u>166</u>				<u>207</u>	<u>140</u>
	3	<u>577</u>	<u>462</u>	<u>347</u>	<u>289</u>	<u>232</u>	<u>166</u>	<u>416</u>	<u>312</u>	<u>260</u>	<u>207</u>	<u>140</u>
	4	505	419	326	259	185	124	334	261	221	155	105
	5	404	335	261	207	148	99	267	209	177	124	84
	6	337	279	217	173	123	83	223	174	148	103	70
	7	289	239	186	148	106	71	191	149	127	89	60
	8	253	209	163	129	92	62	167	130	111	77	52
	9	224	186	145	115	82	55	148	116	98	69	47
	10	202	168	130	104	74	50	134	104	89	62	42
	11	184	152	118	94	67	45	121	95	81	56	38
	12	168	140	109	86	62	41	111	87	74	52	35
	13	155	129	100	80	57	38	103	80	68	48	32
	14	144	120	93	74	53	36	95	75	63	44	30
	15	135	112	87	69	49	33	89	70	59	41	28
	16	126	105	81	65	46	31	83	65	55	39	26
	17	119	99	77	61	44	29	79	61	52	36	25
	18	112	93	72	58	41	28	74	58	49	34	23
	19	106	88	69	54	39	26	70	55	47	33	22
	20	101	84	65	52	37	25	67	52	44	31	21
	21	96	80	62	49	35	24	64	50	42	30	20
	22	92	76	59	47	34	23	61	47	40	28	19
	23	88	73	57	45	32	22					
	24	84	70	54	43	31	21					
	25	81	67	52	41	30	20					
	26											
	27											
	28											
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	40											
<b>PROPERTIES</b>												
I <sub>x</sub> , in. <sup>4</sup>	304	256	202	172	141	108	182	145	124	102	78.2	
S <sub>x</sub> , in. <sup>3</sup>	60.8	51.2	40.4	34.5	26.8**	18.0**	40.6	32.2	27.6	22.5**	15.2**	
Z <sub>x</sub> , in. <sup>3</sup>	73.2	60.7	47.2	40.1	32.7	24.8	48.4	37.8	32.1	26.2	20.0	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	289	231	173	145	116	86.4	208	156	130	104	77.8	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2020	1680	1300	1040	740	497	1340	1040	886	620	419	

Load above heavy horizontal line is limited by design shear strength.

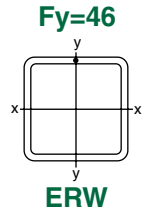
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		8 x 8						7 x 7					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	19.63	50.81	42.05	32.58	27.59	22.42	17.08
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174*	0.581	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	<u>462</u>	<u>370</u>	<u>277</u>	<u>231</u>	<u>185</u>	<u>138</u>	<u>404</u>	<u>323</u>	<u>243</u>	<u>202</u>	<u>162</u>	<u>121</u>
	3	411	345	270	231	177	115	305	257	203	174	143	92
	4	308	259	203	173	133	86	228	193	152	130	107	69
	5	247	207	162	139	106	69	183	154	122	104	86	55
	6	206	173	135	115	88	58	152	128	102	87	71	46
	7	176	148	116	99	76	49	131	110	87	75	61	39
	8	154	129	101	87	66	43	114	96	76	65	53	35
	9	137	115	90	77	59	38	102	86	68	58	48	31
	10	123	104	81	69	53	35	91	77	61	52	43	28
	11	112	94	74	63	48	31	83	70	55	47	39	25
	12	103	86	68	58	44	29	76	64	51	43	36	23
	13	95	80	62	53	41	27	70	59	47	40	33	21
	14	88	74	58	49	38	25	65	55	44	37	31	20
	15	82	69	54	46	35	23	61	51	41	35	29	18
	16	77	65	51	43	33	22	57	48	38	33	27	17
	17	73	61	48	41	31	20	54	45	36	31	25	16
	18	69	58	45	38	29	19						
	19	65	54	43	36	28	18						
	20	62	52	41	35	27	17						
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	146	125	99.6	85.6	70.7	54.4	93.3	80.5	64.9	56.1	46.5	36.0	
S <sub>x</sub> , in. <sup>3</sup>	36.5	31.2	24.9	21.4	17.7	12.5**	26.7	23.0	18.6	16.0	13.3	10.0**	
Z <sub>x</sub> , in. <sup>3</sup>	44.7	37.5	29.4	25.1	20.5	15.7	33.1	27.9	22.1	18.9	15.5	11.9	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	231	185	139	116	92.6	69.2	202	162	121	101	81.0	60.5	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1230	1040	811	693	530	345	914	770	610	522	428	276	

Load above heavy horizontal line is limited by design shear strength.

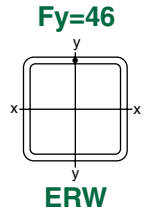
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		6 x 6						5 1/2 x 5 1/2					
Wall Thickness	5/8	1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot	42.30	35.24	27.48	23.34	19.02	14.53	9.86	24.93	21.21	17.32	13.25	9.01	
Design Wall Thickness	0.581	0.465	0.349	0.291	0.233	0.174	0.116*	0.349	0.291	0.233	0.174	0.116*	
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	320	273	<u>208</u>	<u>173</u>	<u>139</u>	<u>104</u>	62	181	156	<u>127</u>	<u>95</u>	54
	3	213	182	<u>145</u>	<u>125</u>	<u>103</u>	<u>74</u>	41	121	104	<u>86</u>	<u>65</u>	36
	4	160	137	109	94	77	56	31	90	78	64	49	27
	5	128	109	87	75	62	44	25	72	62	51	39	22
	6	107	91	73	63	52	37	21	60	52	43	33	18
	7	91	78	62	54	44	32	18	52	45	37	28	15
	8	80	68	55	47	39	28	16	45	39	32	25	14
	9	71	61	48	42	34	25	14	40	35	29	22	12
	10	64	55	44	38	31	22	12	36	31	26	20	11
	11	58	50	40	34	28	20	11	33	28	23	18	10
	12	53	46	36	31	26	19	10	30	26	21	16	9
	13	49	42	34	29	24	17	10	28	24	20	15	8
	14	46	39	31	27	22	16	9					
	15	43	36	29	25	21	15	8					
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	55.1	48.2	39.4	34.3	28.6	22.3	15.5	29.7	25.9	21.7	17.0	11.8	
S <sub>x</sub> , in. <sup>3</sup>	18.4	16.1	13.1	11.4	9.54	7.42	4.50**	10.8	9.43	7.90	6.17	3.90**	
Z <sub>x</sub> , in. <sup>3</sup>	23.2	19.8	15.8	13.6	11.2	8.63	5.92	13.1	11.3	9.32	7.19	4.95	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	173	139	104	86.7	69.5	51.9	34.6	95.4	79.5	63.7	47.5	31.7	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	640	546	436	375	309	222	124	362	312	257	196	108	

Load above heavy horizontal line is limited by design shear strength.

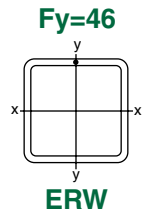
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		5 x 5						4 1/2 x 4 1/2					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	25.03	19.82	16.96	13.91	10.70	7.31
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116*
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	181	146	126	105	81	46	141	115	100	84	65	39
	3	121	98	84	70	54	31	94	77	67	56	43	26
	4	90	73	63	53	41	23	70	58	50	42	33	19
	5	72	59	51	42	33	18	56	46	40	33	26	15
	6	60	49	42	35	27	15	47	38	33	28	22	13
	7	52	42	36	30	23	13	40	33	29	24	19	11
	8	45	37	32	26	20	11	35	29	25	21	16	10
	9	40	33	28	23	18	10	31	26	22	19	14	9
	10	36	29	25	21	16	9	28	23	20	17	13	8
	11	33	27	23	19	15	8	26	21	18	15	12	7
	12	30	24	21	18	14	8						
	13												
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	26.0	21.7	19.0	16.0	12.6	8.80	18.0	15.3	13.5	11.4	9.02	6.35	
S <sub>x</sub> , in. <sup>3</sup>	10.4	8.67	7.61	6.41	5.03	3.33**	8.02	6.78	5.99	5.08	4.01	2.79**	
Z <sub>x</sub> , in. <sup>3</sup>	13.1	10.6	9.16	7.61	5.89	4.07	10.2	8.36	7.27	6.06	4.71	3.27	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	116	86.7	72.3	57.9	43.2	28.8	104	78.0	65.1	52.1	38.9	25.9	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	362	293	253	210	163	91.9	282	231	201	167	130	77.0	

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

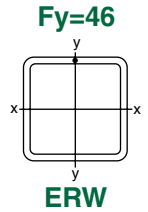
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).





# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

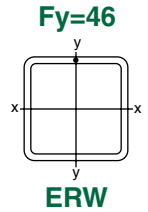


Nominal Size		4 x 4						3 1/2 x 3 1/2					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		21.63	17.27	14.83	12.21	9.42	6.46	14.72	12.70	10.51	8.15	5.61	
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	106	88	77	65	51	33	65	57	48	38	27	
	3	71	59	51	43	34	22	43	38	32	25	18	
	4	53	44	39	32	25	16	32	29	24	19	13	
	5	43	35	31	26	20	13	26	23	19	15	11	
	6	35	29	26	22	17	11	22	19	16	13	9	
	7	30	25	22	18	14	9	18	16	14	11	8	
	8	27	22	19	16	13	8	16	14	12	10	7	
	9	24	20	17	14	11	7						
	10	21	18	15	13	10	7						
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<b>PROPERTIES</b>													
$I_x$ , in. <sup>4</sup>	11.9	10.3	9.14	7.80	6.21	4.40	6.48	5.84	5.04	4.05	2.90		
$S_x$ , in. <sup>3</sup>	5.95	5.13	4.57	3.90	3.10	2.20	3.70	3.34	2.88	2.31	1.66		
$Z_x$ , in. <sup>3</sup>	7.70	6.39	5.59	4.69	3.67	2.56	4.69	4.14	3.50	2.76	1.93		
$\Phi_v V_n$ , (kips)	92.4	69.4	57.8	46.3	34.6	23.1	60.7	50.6	40.5	30.3	20.2		
$\Phi_b W_c$ , (kip-ft)	213	176	154	129	101	65.9	129	114	96.6	76.2	53.3		



# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

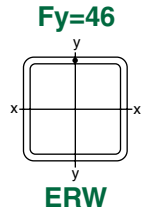


Nominal Size		3 x 3					2 1/2 x 2 1/2				2 1/4 x 2 1/4		
Wall Thickness	3/8	5/16	1/4	3/16	1/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8	
Weight Per Foot	12.17	10.58	8.81	6.87	4.75	8.45	7.11	5.59	3.90	6.26	4.96	3.48	
Design Wall Thickness	0.349	0.291	0.233	0.174	0.116	0.291	0.233	0.174	0.116	0.233	0.174	0.116	
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	0												
	2	45	40	34	27	19	26	23	18	13	18	14	10
	3	30	27	23	18	13	17	15	12	9	12	10	7
	4	22	20	17	14	10	13	11	9	7	9	7	5
	5	18	16	14	11	8	10	9	7	5	7	6	4
	6	15	13	11	9	6	9	8	6	4			
	7	13	11	10	8	6							
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	3.77	3.45	3.02	2.46	1.78	1.82	1.63	1.35	0.998	1.13	0.952	0.712	
S <sub>x</sub> , in. <sup>3</sup>	2.51	2.30	2.01	1.64	1.19	1.45	1.30	1.08	0.798	1.00	0.847	0.633	
Z <sub>x</sub> , in. <sup>3</sup>	3.25	2.90	2.48	1.97	1.40	1.88	1.63	1.32	0.947	1.28	1.04	0.755	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	52.0	43.4	34.7	25.9	17.3	36.1	28.9	21.6	14.4	26.0	19.4	13.0	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	89.7	80.0	68.4	54.4	38.6	51.9	45.0	36.4	26.1	35.3	28.7	20.8	



# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

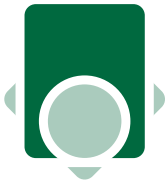


Nominal Size	2 x 2			1 3/4 x 1 3/4	1 5/8 x 1 5/8		1 1/2 x 1 1/2		1 1/4 x 1 1/4	
Wall Thickness	1/4	3/16	1/8	3/16	3/16	1/8	3/16	1/8	3/16	1/8
Weight Per Foot	5.41	4.32	3.05	3.68	3.36	2.42	3.04	2.20	2.40	1.78
Design Wall Thickness	0.233	0.174	0.116	0.174	0.174	0.116	0.174	0.116	0.174	0.116

		$F_y = 46$ ksi									
Effective length KL in feet	0										
	2	13	11	8	8	7	5	6	4	4	3
	3	9	7	5	5	5	3	4	3	2	2
	4	7	6	4	4	3	3				
	5	5	4	3							
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**PROPERTIES**

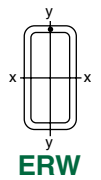
$I_x$ , in. <sup>4</sup>	0.745	0.640	0.486	0.405	0.312	0.246	0.235	0.188	0.121	0.101
$S_x$ , in. <sup>3</sup>	0.745	0.640	0.486	0.462	0.384	0.302	0.314	0.251	0.194	0.162
$Z_x$ , in. <sup>3</sup>	0.964	0.797	0.584	0.585	0.491	0.370	0.406	0.309	0.259	0.204
$\Phi_v V_n$ , (kips)	23.2	17.3	11.5	15.1	14.0	9.36	13.0	8.64	10.8	7.20
$\Phi_b W_c$ , (kip-ft)	26.6	22.0	16.1	16.1	13.6	10.2	11.2	8.53	7.15	5.63



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50

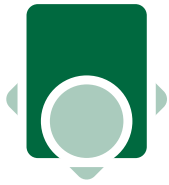


Nominal Size		20 x 12			20 x 8			20 x 4			
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/2	3/8	5/16
Weight Per Foot		103.30	78.52	65.87	110.36	89.68	68.31	57.36	76.07	58.10	48.86
Design Wall Thickness		0.465	0.349	0.291*	0.581	0.465	0.349	0.291	0.465	0.349	0.291
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL, in feet	3				<u>1250</u>	<u>1000</u>	<u>754</u>		<u>1000</u>	<u>754</u>	<u>564</u>
	4				1110	912	702		863	670	564
	5	<u>1000</u>	<u>754</u>	<u>564</u>				<u>564</u>	690	536	454
	6	940	642	485	925	760	585	493	575	447	378
	7	806	550	416	793	651	501	423	493	383	324
	8	705	481	364	694	570	439	370	431	335	284
	9	627	428	323	617	507	390	329	383	298	252
	10	564	385	291	555	456	351	296	345	268	227
	11	513	350	264	505	415	319	269	314	244	206
	12	470	321	242	463	380	293	247	288	223	189
	13	434	296	224	427	351	270	228	265	206	174
	14	403	275	208	396	326	251	211	246	191	162
	15	376	257	194	370	304	234	197	230	179	151
	16	353	241	182	347	285	219	185	216	167	142
	17	332	226	171	326	268	206	174	203	158	133
	18	313	214	162	308	253	195	164	192	149	126
	19	297	203	153	292	240	185	156	182	141	119
	20	282	192	145	278	228	176	148	173	134	113
	21	269	183	139	264	217	167	141	164	128	108
	22	256	175	132	252	207	160	134	157	122	103
	23	245	167	126	241	198	153	129	150	116	99
	24	235	160	121	231	190	146	123	144	112	95
	25	226	154	116	222	182	140	118	138	107	91
	26	217	148	112	213	175	135	114	133	103	87
	27	209	143	108	206	169	130	110	128	99	84
	28	201	137	104	198	163	125	106	123	96	81
	29	194	133	100	191	157	121	102	119	92	78
	30	188	128	97	185	152	117	99	115	89	76
	31	182	124	94	179	147	113	95	111	86	73
	32	176	120	91	173	143	110	92	108	84	71
33	171	117	88	168	138	106	90	105	81	69	
34	166	113	86	163	134	103	87	101	79	67	
36	157	107	81	154	127	98	82	96	74	63	
38	148	101	77	146	120	92	78	91	71	60	
40	141	96	73	139	114	88	74	86	67	57	
42	134	92	69	132	109	84	70	82	64	54	
44	128	87	66	126	104	80	67	78	61	52	
46	123	84	63	121	99	76	64	75	58	49	
48	118	80	61	116	95	73	62	72	56	47	
50	113	77	58	111	91	70	59	69	54	45	
<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	1550	1200	1010	1440	1190	926	786	838	657	560	
S <sub>x</sub> , in. <sup>3</sup>	155	120	97.0**	144	119	92.6	78.6	83.8	65.7	56.0	
Z <sub>x</sub> , in. <sup>3</sup>	188	144	122	185	152	117	98.6	115	89.3	75.6	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	502	377	282	627	502	377	282	502	377	282	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	5640	3850	2910	5550	4560	3510	2960	3450	2680	2270	

Load above heavy horizontal line is limited by design shear strength.

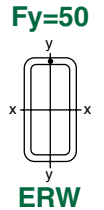
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

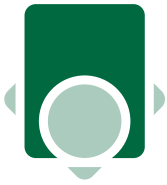


Nominal Size		18 x 6					16 x 12			16 x 8				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	1/2	3/8	5/16	5/8	1/2	3/8	5/16	
Weight Per Foot		93.34	76.07	58.10	48.86	39.43	89.68	68.31	57.36	93.34	76.07	58.10	48.86	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.465	0.349	0.291*	0.581	0.465	0.349	0.291	
<b>F<sub>y</sub> = 50 ksi</b>														
Effective length KL in feet	3	1130	904	678	566					1000	804			
	4	1010	840	648	548	359				968	795	603	503	
	5	810	672	518	439	356	804	603	503	774	636	493	416	
	6	675	560	432	366	297	675	467	355	645	530	411	347	
	7	579	480	370	313	255	579	400	304	553	454	352	297	
	8	506	420	324	274	223	506	350	266	484	398	308	260	
	9	450	373	288	244	198	450	311	237	430	353	274	231	
	10	405	336	259	219	178	405	280	213	387	318	246	208	
	11	368	305	236	199	162	368	255	194	352	289	224	189	
	12	338	280	216	183	149	338	233	178	323	265	205	174	
	13	312	258	199	169	137	312	215	164	298	245	189	160	
	14	289	240	185	157	127	289	200	152	276	227	176	149	
	15	270	224	173	146	119	270	187	142	258	212	164	139	
	16	253	210	162	137	111	253	175	133	242	199	154	130	
	17	238	198	152	129	105	238	165	125	228	187	145	122	
	18	225	187	144	122	99	225	156	118	215	177	137	116	
	19	213	177	136	115	94	213	147	112	204	167	130	110	
	20	203	168	130	110	89	203	140	107	194	159	123	104	
	21	193	160	123	104	85	193	133	101	184	151	117	99	
	22	184	153	118	100	81	184	127	97	176	145	112	95	
	23	176	146	113	95	77	176	122	93	168	138	107	91	
	24	169	140	108	91	74	169	117	89	161	133	103	87	
	25	162	134	104	88	71	162	112	85	155	127	99	83	
	26	156	129	100	84	69	156	108	82	149	122	95	80	
	27	150	124	96	81	66	150	104	79	143	118	91	77	
	28	145	120	93	78	64	145	100	76	138	114	88	74	
	29	140	116	89	76	61	140	97	73	133	110	85	72	
	30	135	112	86	73	59	135	93	71	129	106	82	69	
	31	131	108	84	71	57	131	90	69	125	103	79	67	
	32	127	105	81	69	56	127	88	67	121	99	77	65	
	33	123	102	79	66	54	123	85	65	117	96	75	63	
	34	119	99	76	65	52	119	82	63	114	94	72	61	
	35	116	96	74	63	51	116	80	61	111	91	70	59	
	36	113	93	72	61	50	113	78	59	108	88	68	58	
	37	109	91	70	59	48	109	76	58	105	86	67	56	
	38	107	88	68	58	47	107	74	56	102	84	65	55	
	39	104	86	66	56	46	104	72	55	99	82	63	53	
	41	99	82	63	53	43								
	43	94	78	60	51	41								
	45	90	75	58	49	40								
	<b>PROPERTIES</b>													
	I <sub>x</sub> , in. <sup>4</sup>	923	770	602	513	419	904	702	595	815	679	531	451	
	S <sub>x</sub> , in. <sup>3</sup>	103	85.6	66.9	57.0	46.5	113	87.7	70.9**	102	84.9	66.3	56.4	
	Z <sub>x</sub> , in. <sup>3</sup>	135	112	86.4	73.1	59.4	135	104	87.7	129	106	82.1	69.4	
	Φ <sub>v</sub> V <sub>n</sub> , (kips)	565	452	339	283	179	402	302	251	502	402	302	251	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	4050	3360	2590	2190	1780	4050	2800	2130	3870	3180	2460	2080		

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

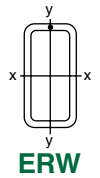
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50

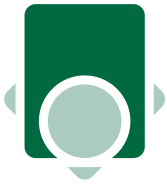


Nominal Size		16 x 4			14 x 10				
Wall Thickness		1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		62.46	47.90	40.35	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.465	0.349	0.291	0.581	0.465	0.349	0.291	0.233*
<b>F<sub>y</sub> = 50 ksi</b>									
Effective length KL in feet	0								
	2	<u>804</u>	<u>603</u>						
	3	773	602	<u>503</u>				<u>440</u>	<u>352</u>
	4	580	452	<u>383</u>	<u>878</u>	<u>703</u>	<u>528</u>	<u>434</u>	<u>313</u>
	5	464	361	307	<u>720</u>	<u>593</u>	<u>458</u>	347	250
	6	387	301	256	600	494	382	289	208
	7	331	258	219	514	423	327	248	179
	8	290	226	192	450	371	286	217	156
	9	258	201	170	400	329	254	193	139
	10	232	181	153	360	296	229	174	125
	11	211	164	139	327	269	208	158	114
	12	193	151	128	300	247	191	145	104
	13	178	139	118	277	228	176	134	96
	14	166	129	110	257	212	164	124	89
	15	155	120	102	240	198	153	116	83
	16	145	113	96	225	185	143	109	78
	17	136	106	90	212	174	135	102	74
	18	129	100	85	200	165	127	96	69
	19	122	95	81	189	156	120	91	66
	20	116	90	77	180	148	114	87	63
	21	110	86	73	171	141	109	83	60
	22	105	82	70	164	135	104	79	57
	23	101	79	67	157	129	100	76	54
	24	97	75	64	150	124	95	72	52
	25	93	72	61	144	119	92	69	50
	26	89	69	59	138	114	88	67	48
	27	86	67	57	133	110	85	64	46
	28	83	65	55	129	106	82	62	45
	29	80	62	53	124	102	79	60	43
	30	77	60	51	120	99	76	58	42
	31	75	58	49	116	96	74	56	40
	32	72	56	48	113	93	72	54	39
	33	70	55	46	109	90	69	53	38
	34	68	53	45	106	87	67	51	37
	35	66	52	44	103	85	65	50	36
	36	64	50	43					
	37	63	49	41					
	38	61	48	40					
	39	59	46	39					
	40	58	45	38					
<b>PROPERTIES</b>									
I <sub>x</sub> , in. <sup>4</sup>	455	360	308	687	573	447	380	310	
S <sub>x</sub> , in. <sup>3</sup>	56.9	45.0	38.5	98.2	81.8	63.9	54.3	41.7**	
Z <sub>x</sub> , in. <sup>3</sup>	77.3	60.2	51.1	120	98.8	76.3	64.6	52.4	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	402	302	251	439	352	264	220	176	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2320	1810	1530	3600	2960	2290	1740	1250	

Load above heavy horizontal line is limited by design shear strength.

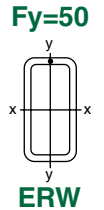
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



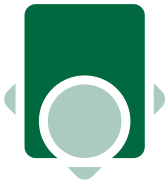
# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



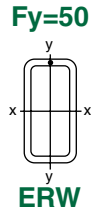
Nominal Size		14 x 6						14 x 4					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	24.73	67.82	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0							<u>878</u>	<u>703</u>	<u>528</u>	<u>440</u>	<u>352</u>	<u>192</u>
	2							731	610	478	406	332	192
	3	<u>878</u>	<u>703</u>	<u>528</u>	<u>440</u>	<u>352</u>		548	458	359	305	249	190
	4	665	552	430	365	297	<u>192</u>	439	366	287	244	199	152
	5	532	442	344	292	238							
	6	444	368	287	243	198	131	366	305	239	203	166	127
	7	380	315	246	208	170	112	313	261	205	174	142	108
	8	333	276	215	182	149	98	274	229	179	152	125	95
	9	296	245	191	162	132	87	244	203	159	135	111	84
	10	266	221	172	146	119	79	219	183	143	122	100	76
	11	242	201	156	133	108	72	199	166	130	111	91	69
	12	222	184	143	122	99	66	183	153	120	102	83	63
	13	205	170	132	112	91	61	169	141	110	94	77	58
	14	190	158	123	104	85	56	157	131	102	87	71	54
	15	177	147	115	97	79	52	146	122	96	81	66	51
	16	166	138	107	91	74	49	137	114	90	76	62	47
	17	157	130	101	86	70	46	129	108	84	72	59	45
	18	148	123	96	81	66	44	122	102	80	68	55	42
	19	140	116	90	77	63	41	115	96	75	64	52	40
	20	133	110	86	73	59	39	110	92	72	61	50	38
	21	127	105	82	69	57	37	104	87	68	58	47	36
	22	121	100	78	66	54	36	100	83	65	55	45	35
	23	116	96	75	63	52	34	95	80	62	53	43	33
	24	111	92	72	61	50	33	91	76	60	51	42	32
	25	106	88	69	58	48	31	88	73	57	49	40	30
	26	102	85	66	56	46	30	84	70	55	47	38	29
	27	99	82	64	54	44	29	81	68	53	45	37	28
	28	95	79	61	52	42	28	78	65	51	44	36	27
	29	92	76	59	50	41	27	76	63	49	42	34	26
	30	89	74	57	49	40	26	73	61	48	41	33	25
	31	86	71	55	47	38	25	71	59	46	39	32	24
	32	83	69	54	46	37	25	69	57	45	38	31	24
	33	81	67	52	44	36	24	66	55	43	37	30	23
	34	78	65	51	43	35	23	65	54	42	36	29	22
	35	76	63	49	42	34	22	63	52	41	35	28	22
36													
37													
38													
39													
40													
<b>PROPERTIES</b>													
$I_x$ , in. <sup>4</sup>	478	402	317	271	222	170	373	317	252	216	178	137	
$S_x$ , in. <sup>3</sup>	68.2	57.4	45.3	38.7	31.7	24.3	53.3	45.3	36.0	30.9	25.4	19.5	
$Z_x$ , in. <sup>3</sup>	88.7	73.6	57.3	48.6	39.6	30.1	73.1	61.0	47.8	40.6	33.2	25.3	
$\Phi_v V_n$ , (kips)	439	352	264	220	176	95.8	439	352	264	220	176	95.8	
$\Phi_b W_c$ , (kip-ft)	2660	2210	1720	1460	1190	787	2190	1830	1430	1220	996	759	

Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		12 x 10				12 x 8					
Wall Thickness		1/2	3/8	5/16	1/4	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		69.27	53.00	44.60	36.03	76.33	62.46	47.90	40.35	32.63	24.73
Design Wall Thickness		0.465	0.349	0.291	0.233*	0.581	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2										
	3	603		377	302	753	603	452	377	302	202
	4	591	452	350	253	616	511	398	337	245	161
	5	473	367	280	202	493	409	318	269	196	129
	6	394	306	233	169	411	341	265	225	164	108
	7	338	262	200	144	352	292	227	192	140	92
	8	296	229	175	126	308	255	199	168	123	81
	9	263	204	156	112	274	227	177	150	109	72
	10	236	183	140	101	246	204	159	135	98	65
	11	215	167	127	92	224	186	145	122	89	59
	12	197	153	117	84	205	170	133	112	82	54
	13	182	141	108	78	189	157	122	104	76	50
	14	169	131	100	72	176	146	114	96	70	46
	15	158	122	93	67	164	136	106	90	65	43
	16	148	115	88	63	154	128	99	84	61	40
	17	139	108	82	59	145	120	94	79	58	38
	18	131	102	78	56	137	114	88	75	55	36
	19	124	96	74	53	130	108	84	71	52	34
	20	118	92	70	51	123	102	80	67	49	32
	21	113	87	67	48	117	97	76	64	47	31
	22	107	83	64	46	112	93	72	61	45	29
	23	103	80	61	44	107	89	69	59	43	28
	24	99	76	58	42	103	85	66	56	41	27
	25	95	73	56	40	99	82	64	54	39	26
	26	91	71	54	39	95	79	61	52	38	25
	27	88	68	52	37	91	76	59	50	36	24
	28	84	65	50	36	88	73	57	48	35	23
	29	82	63	48	35	85	70	55	46	34	22
	30	79	61	47	34	82	68	53	45	33	22
	31										
	32										
	33										
	34										
	35										
	36										
	37										
	38										
	39										
	40										
<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	395	310	264	216	396	333	262	224	184	140	
S <sub>x</sub> , in. <sup>3</sup>	65.9	51.6	44.0	33.7**	66.1	55.5	43.7	37.4	30.6	21.5**	
Z <sub>x</sub> , in. <sup>3</sup>	78.8	61.1	51.7	42.1	82.1	68.1	53.0	44.9	36.6	27.8	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	301	226	189	151	376	301	226	189	151	101	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2360	1830	1400	1010	2460	2040	1590	1350	982	645	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

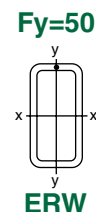
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).





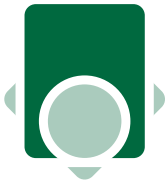
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



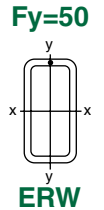
Nominal Size		12 x 6						12 x 4					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		67.82	55.66	42.79	36.10	29.23	22.18	59.32	48.85	37.69	31.84	25.82	19.63
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	<u>753</u>	<u>603</u>	<u>452</u>				<u>753</u>	<u>603</u>	<u>452</u>	<u>377</u>	<u>302</u>	<u>202</u>
	3	688	574	448	<u>377</u>	<u>302</u>	<u>202</u>	555	467	367	313	256	196
	4	516	431	336	286	233	156	416	350	275	235	192	147
	5	413	344	269	229	187	125	333	280	220	188	154	118
	6	344	287	224	191	156	104	278	234	184	157	128	98
	7	295	246	192	163	133	89	238	200	157	134	110	84
	8	258	215	168	143	117	78	208	175	138	117	96	74
	9	229	191	149	127	104	69	185	156	122	104	85	65
	10	206	172	134	114	93	62	167	140	110	94	77	59
	11	188	157	122	104	85	57	151	127	100	85	70	53
	12	172	144	112	95	78	52	139	117	92	78	64	49
	13	159	132	103	88	72	48	128	108	85	72	59	45
	14	147	123	96	82	67	45	119	100	79	67	55	42
	15	138	115	90	76	62	42	111	93	73	63	51	39
	16	129	108	84	71	58	39	104	88	69	59	48	37
	17	121	101	79	67	55	37	98	82	65	55	45	35
	18	115	96	75	64	52	35	93	78	61	52	43	33
	19	109	91	71	60	49	33	88	74	58	49	40	31
	20	103	86	67	57	47	31	83	70	55	47	38	29
	21	98	82	64	54	44	30	79	67	52	45	37	28
	22	94	78	61	52	42	28	76	64	50	43	35	27
	23	90	75	58	50	41	27	72	61	48	41	33	26
	24	86	72	56	48	39	26	69	58	46	39	32	25
	25	83	69	54	46	37	25	67	56	44	38	31	24
	26	79	66	52	44	36	24	64	54	42	36	30	23
	27	76	64	50	42	35	23	62	52	41	35	28	22
	28	74	62	48	41	33	22	59	50	39	34	27	21
	29	71	59	46	39	32	22	57	48	38	32	26	20
	30	69	57	45	38	31	21	56	47	37	31	26	20
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												
<b>PROPERTIES</b>													
$I_x$ , in. <sup>4</sup>	321	271	215	184	151	116	245	209	168	144	119	91.8	
$S_x$ , in. <sup>3</sup>	53.4	45.2	35.8	30.7	25.2	19.4	40.8	34.9	28.0	24.0	19.9	15.3	
$Z_x$ , in. <sup>3</sup>	68.8	57.4	44.8	38.1	31.1	23.7	55.5	46.7	36.7	31.3	25.6	19.6	
$\Phi_v V_n$ , (kips)	376	301	226	189	151	101	376	301	226	189	151	101	
$\Phi_b W_c$ , (kip-ft)	2060	1720	1340	1140	933	625	1670	1400	1100	939	768	588	

Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

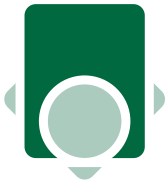


Nominal Size		12 x 3 1/2		12 x 3			12 x 2		10 x 8				
Wall Thickness		3/8	5/16	5/16	1/4	3/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		36.41	30.78	29.72	24.12	18.35	22.42	17.08	55.66	42.79	36.10	29.23	22.18
Design Wall Thickness		0.349	0.291	0.291	0.233	0.174	0.233	0.174	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	<u>452</u>	<u>377</u>	<u>377</u>	<u>302</u>	<u>202</u>		<u>202</u>					
	3	<u>347</u>	<u>296</u>	<u>279</u>	<u>229</u>	<u>175</u>	201	<u>155</u>	<u>502</u>	<u>377</u>	<u>314</u>	<u>252</u>	167
	4	260	222	209	172	131	151	116	389	304	258	190	125
	5	208	178	167	137	105	121	93	311	243	206	152	100
	6	174	148	140	115	88	101	78	260	203	172	127	83
	7	149	127	120	98	75	86	66	222	174	147	109	71
	8	130	111	105	86	66	75	58	195	152	129	95	63
	9	116	99	93	76	58	67	52	173	135	115	84	56
	10	104	89	84	69	53	60	47	156	122	103	76	50
	11	95	81	76	62	48	55	42	142	110	94	69	45
	12	87	74	70	57	44	50	39	130	101	86	63	42
	13	80	68	64	53	40	46	36	120	93	79	58	38
	14	74	63	60	49	38	43	33	111	87	74	54	36
	15	69	59	56	46	35	40	31	104	81	69	51	33
	16	65	56	52	43	33	38	29	97	76	65	47	31
	17	61	52	49	40	31	35	27	92	71	61	45	29
	18	58	49	47	38	29	34	26	87	68	57	42	28
	19	55	47	44	36	28	32	24	82	64	54	40	26
	20	52	44	42	34	26	30	23	78	61	52	38	25
	21	50	42	40	33	25	29	22	74	58	49	36	24
	22	47	40	38	31	24	27	21	71	55	47	35	23
	23	45	39	36	30	23	26	20	68	53	45	33	22
	24	43	37	35	29	22	25	19	65	51	43	32	21
	25	42	36	33	27	21	24	19	62	49	41	30	20
	26	40	34	32	26	20	23	18					
	27	39	33	31	25	19	22	17					
	28	37	32	30	25	19	22	17					
	29	36	31	29	24	18	21	16					
	30	35	30	28	23	18	20	16					
	31												
	32												
	33												
	34												
	35												
	36												
	37												
	38												
	39												
	40												
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	156	134	124	103	79.6	86.9	67.4	214	169	145	119	91.4	
S <sub>x</sub> , in. <sup>3</sup>	26.0	22.4	20.7	17.2	13.3	14.5	11.2	42.7	33.9	29.0	23.8	16.7**	
Z <sub>x</sub> , in. <sup>3</sup>	34.7	29.6	27.9	22.9	17.5	20.1	15.5	51.9	40.5	34.4	28.1	21.4	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	226	189	189	151	101	151	101	251	188	157	126	94.0	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1040	888	837	687	525	603	465	1560	1220	1030	760	500	

Load above heavy horizontal line is limited by design shear strength.

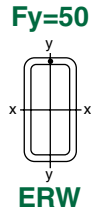
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).

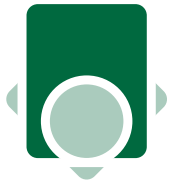


# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

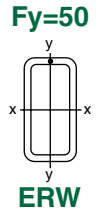


Nominal Size		10 x 6					10 x 5				
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	3/8	5/16	1/4	3/16
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	19.63	35.13	29.72	24.12	18.35
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2	<u>627</u>	<u>502</u>	<u>377</u>	<u>314</u>	<u>252</u>	<u>188</u>	<u>377</u>	<u>314</u>	<u>252</u>	<u>188</u>
	3	513	430	338	288	236	159	304	260	213	163
	4	385	323	254	216	177	119	228	195	160	122
	5	308	258	203	173	142	96	182	156	128	98
	6	257	215	169	144	118	80	152	130	107	82
	7	220	184	145	123	101	68	130	111	91	70
	8	192	161	127	108	89	60	114	98	80	61
	9	171	143	113	96	79	53	101	87	71	54
	10	154	129	101	86	71	48	91	78	64	49
	11	140	117	92	79	64	43	83	71	58	44
	12	128	108	85	72	59	40	76	65	53	41
	13	118	99	78	66	54	37	70	60	49	38
	14	110	92	72	62	51	34	65	56	46	35
	15	103	86	68	58	47	32	61	52	43	33
	16	96	81	63	54	44	30	57	49	40	31
	17	91	76	60	51	42	28	54	46	38	29
	18	86	72	56	48	39	27	51	43	36	27
	19	81	68	53	45	37	25	48	41	34	26
	20	77	65	51	43	35	24	46	39	32	24
	21	73	61	48	41	34	23	43	37	30	23
	22	70	59	46	39	32	22	41	35	29	22
	23	67	56	44	38	31	21	40	34	28	21
	24	64	54	42	36	30	20	38	33	27	20
	25	62	52	41	35	28	19	36	31	26	20
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	36										
	37										
	38										
	39										
	40										
<b>PROPERTIES</b>											
$I_x$ , in. <sup>4</sup>	201	171	137	118	96.9	74.6	120	104	85.8	66.2	
$S_x$ , in. <sup>3</sup>	40.2	34.3	27.3	23.5	19.4	14.9	24.1	20.8	17.2	13.2	
$Z_x$ , in. <sup>3</sup>	51.3	43.0	33.8	28.8	23.6	18.0	30.4	26.0	21.3	16.3	
$\Phi_v V_n$ , (kips)	314	251	188	157	126	94.0	188	157	126	94.0	
$\Phi_b W_c$ , (kip-ft)	1540	1290	1010	864	708	478	912	780	639	489	



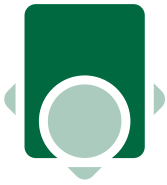
# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



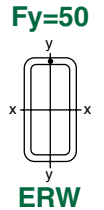
Nominal Size		10 x 4					10 x 3 1/2	10 x 3						
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	3/16	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	16.44	30.03	25.46	20.72	15.80	10.71	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.174	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>														
Effective length KL in feet	0													
	2	605	<u>502</u>	<u>377</u>	<u>314</u>	<u>252</u>	<u>188</u>	<u>188</u>	356	305	251	<u>188</u>		
	3	403	<u>341</u>	<u>270</u>	<u>231</u>	<u>190</u>	<u>146</u>	<u>137</u>	237	203	167	<u>128</u>	<u>79</u>	
	4	302	256	203	173	143	110	103	178	152	125	96	<u>66</u>	
	5	242	205	162	139	114	88	82	142	122	100	77	53	
	6	202	171	135	116	95	73	69	119	102	84	64	44	
	7	173	146	116	99	81	63	59	102	87	72	55	38	
	8	151	128	101	87	71	55	51	89	76	63	48	33	
	9	134	114	90	77	63	49	46	79	68	56	43	29	
	10	121	102	81	69	57	44	41	71	61	50	38	26	
	11	110	93	74	63	52	40	37	65	55	46	35	24	
	12	101	85	68	58	48	37	34	59	51	42	32	22	
	13	93	79	62	53	44	34	32	55	47	39	30	20	
	14	86	73	58	50	41	31	29	51	44	36	27	19	
	15	81	68	54	46	38	29	27	47	41	33	26	18	
	16	76	64	51	43	36	27	26	44	38	31	24	17	
	17	71	60	48	41	34	26	24	42	36	29	23	16	
	18	67	57	45	39	32	24	23	40	34	28	21	15	
	19	64	54	43	36	30	23	22	37	32	26	20	14	
	20	60	51	41	35	29	22	21	36	30	25	19	13	
	21	58	49	39	33	27	21	20	34	29	24	18	13	
	22	55	47	37	32	26	20	19	32	28	23	17	12	
	23	53	44	35	30	25	19	18	31	26	22	17	11	
	24	50	43	34	29	24	18	17	30	25	21	16	11	
	25	48	41	32	28	23	18	16	28	24	20	15	11	
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	38													
	39													
	40													
<b>PROPERTIES</b>														
I <sub>x</sub> , in. <sup>4</sup>	149	129	104	90.1	74.7	57.8	53.6	88.0	76.3	63.6	49.4	34.2		
S <sub>x</sub> , in. <sup>3</sup>	29.9	25.8	20.8	18.0	14.9	11.6	10.7	17.6	15.3	12.7	9.87	6.83		
Z <sub>x</sub> , in. <sup>3</sup>	40.3	34.1	27.0	23.1	19.0	14.6	13.7	23.7	20.3	16.7	12.8	8.80		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	314	251	188	157	126	94.0	94.0	188	157	126	94.0	39.5		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1210	1020	810	693	570	438	411	711	609	501	384	264		

Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

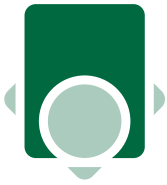


Nominal Size		10 x 2				9 x 7					
Wall Thickness		3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		27.48	23.34	19.02	14.53	59.32	48.85	37.69	31.84	25.82	19.63
Design Wall Thickness		0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2	305	263	216	167	<u>565</u>	<u>452</u>	<u>339</u>	<u>283</u>	<u>226</u>	<u>169</u>
	3	203	175	144	111	483	405	318	271	222	138
	4	152	131	108	83	362	304	239	203	166	104
	5	122	105	86	67	290	243	191	163	133	83
	6	102	88	72	56	242	203	159	136	111	69
	7	87	75	62	48	207	174	136	116	95	59
	8	76	66	54	42	181	152	119	102	83	52
	9	68	58	48	37	161	135	106	90	74	46
	10	61	53	43	33	145	122	95	81	66	41
	11	55	48	39	30	132	110	87	74	60	38
	12	51	44	36	28	121	101	80	68	55	35
	13	47	40	33	26	111	93	73	63	51	32
	14	44	38	31	24	104	87	68	58	47	30
	15	41	35	29	22	97	81	64	54	44	28
	16	38	33	27	21	91	76	60	51	42	26
	17	36	31	25	20	85	71	56	48	39	24
	18	34	29	24	19	81	68	53	45	37	23
	19	32	28	23	18	76	64	50	43	35	22
	20	30	26	22	17	72	61	48	41	33	21
	21	29	25	21	16	69	58	45	39	32	20
	22	28	24	20	15	66	55	43	37	30	19
	23	26	23	19	14						
	24	25	22	18	14						
	25	24	21	17	13						
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	40										
<b>PROPERTIES</b>											
$I_x$ , in. <sup>4</sup>	71.7	62.6	52.5	41.0	174	149	119	102	84.1	64.7	
$S_x$ , in. <sup>3</sup>	14.3	12.5	10.5	8.19	38.7	33.0	26.4	22.6	18.7	13.8**	
$Z_x$ , in. <sup>3</sup>	20.3	17.5	14.4	11.1	48.3	40.5	31.8	27.1	22.2	16.9	
$\Phi_v V_n$ , (kips)	188	157	126	94.0	282	226	170	141	113	84.6	
$\Phi_b W_c$ , (kip-ft)	609	525	432	333	1450	1220	954	813	665	415	

Load above heavy horizontal line is limited by design shear strength.

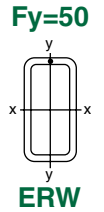
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus,  $S_{eff}$ , calculated in accordance with AISC "HSS Specification" Section 5.1(b).



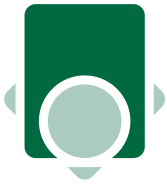
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



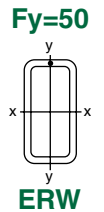
Nominal Size		9 x 5					9 x 3						
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16	
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	35.24	27.48	23.34	19.02	14.53	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.465	0.349	0.291	0.233	0.174	
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	<u>565</u>	<u>452</u>	<u>339</u>	<u>283</u>	<u>226</u>	<u>169</u>	369	296	254	210	162	
	3	<u>385</u>	<u>325</u>	<u>257</u>	<u>220</u>	<u>181</u>	<u>138</u>	246	197	169	140	108	
	4	289	244	193	165	136	104	185	148	127	105	81	
	5	231	195	154	132	109	83	148	118	101	84	65	
	6	193	163	129	110	91	69	123	99	85	70	54	
	7	165	139	110	94	78	59	105	84	72	60	46	
	8	144	122	96	83	68	52	92	74	63	53	41	
	9	128	108	86	73	60	46	82	66	56	47	36	
	10	116	98	77	66	54	41	74	59	51	42	32	
	11	105	89	70	60	49	38	67	54	46	38	29	
	12	96	81	64	55	45	35	62	49	42	35	27	
	13	89	75	59	51	42	32	57	45	39	32	25	
	14	83	70	55	47	39	30	53	42	36	30	23	
	15	77	65	51	44	36	28	49	39	34	28	22	
	16	72	61	48	41	34	26	46	37	32	26	20	
	17	68	57	45	39	32	24	43	35	30	25	19	
	18	64	54	43	37	30	23	41	33	28	23	18	
	19	61	51	41	35	29	22	39	31	27	22	17	
	20	58	49	39	33	27	21	37	30	25	21	16	
	21	55	46	37	31	26	20	35	28	24	20	15	
	22	53	44	35	30	25	19	34	27	23	19	15	
	23												
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	39												
	40												
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	133	115	92.5	79.8	66.1	51.1	80.8	66.3	57.7	48.2	37.6		
S <sub>x</sub> , in. <sup>3</sup>	29.6	25.5	20.5	17.7	14.7	11.4	17.9	14.7	12.8	10.7	8.35		
Z <sub>x</sub> , in. <sup>3</sup>	38.5	32.5	25.7	22.0	18.1	13.8	24.6	19.7	16.9	14.0	10.8		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	282	226	170	141	113	84.6	226	170	141	113	84.6		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1160	975	771	660	543	414	738	591	507	420	324		

Load above heavy horizontal line is limited by design shear strength.



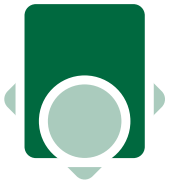
# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		8 x 6						8 x 4							
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		50.81	42.05	32.58	27.59	22.42	17.08	42.30	35.24	27.48	23.34	19.02	14.53	9.86	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174	0.581	0.465	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>															
Effective length KL in feet	0														
	2	<u>502</u>	<u>402</u>	<u>302</u>	<u>251</u>	<u>201</u>	<u>150</u>	411	353	282	242	200	<u>150</u>	<u>90</u>	
	3	361	305	241	206	169	116	274	235	188	161	133	102	62	
	4	271	229	181	155	127	87	206	176	141	121	100	77	46	
	5	217	183	145	124	101	70	164	141	113	97	80	61	37	
	6	181	153	121	103	85	58	137	118	94	81	67	51	31	
	7	155	131	103	88	72	50	117	101	81	69	57	44	26	
	8	135	114	90	77	63	43	103	88	71	60	50	38	23	
	9	120	102	80	69	56	39	91	78	63	54	44	34	21	
	10	108	92	72	62	51	35	82	71	56	48	40	31	19	
	11	98	83	66	56	46	32	75	64	51	44	36	28	17	
	12	90	76	60	52	42	29	69	59	47	40	33	26	15	
	13	83	70	56	48	39	27	63	54	43	37	31	24	14	
	14	77	65	52	44	36	25	59	50	40	35	29	22	13	
	15	72	61	48	41	34	23	55	47	38	32	27	20	12	
	16	68	57	45	39	32	22	51	44	35	30	25	19	12	
	17	64	54	43	36	30	20	48	41	33	28	23	18	11	
	18	60	51	40	34	28	19	46	39	31	27	22	17	10	
	19	57	48	38	33	27	18	43	37	30	25	21	16	10	
	20	54	46	36	31	25	17	41	35	28	24	20	15	9	
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	36														
	37														
	38														
	39														
	40														
<b>PROPERTIES</b>															
I <sub>x</sub> , in. <sup>4</sup>	114	98.2	79.1	68.3	56.6	43.7	81.9	71.7	58.7	51.0	42.5	33.1	22.9		
S <sub>x</sub> , in. <sup>3</sup>	28.5	24.5	19.8	17.1	14.1	10.9	20.5	17.9	14.7	12.8	10.6	8.27	5.73		
Z <sub>x</sub> , in. <sup>3</sup>	36.1	30.5	24.1	20.6	16.9	13.0	27.4	23.5	18.8	16.1	13.3	10.2	7.02		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	251	201	151	126	101	75.2	251	201	151	126	101	75.2	44.8		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1080	915	723	618	507	348	822	705	564	483	399	306	185		

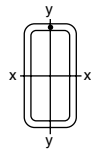
Load above heavy horizontal line is limited by design shear strength.



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50

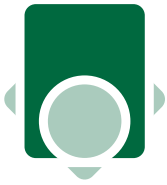


ERW

Nominal Size		8 x 3					8 x 2						
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot		31.84	24.93	21.21	17.32	13.25	9.01	22.37	19.08	15.62	11.97	8.16	
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length K <sub>L</sub> in feet	0						<u>90</u>						
	2	300	242	209	173	133	61	201	174	145	113	78	
	3	200	161	139	115	89	61	134	116	97	75	52	
	4	150	121	104	86	67	46	101	87	73	56	39	
	5	120	97	83	69	53	37	80	70	58	45	31	
	6	100	81	70	58	44	31	67	58	48	38	26	
	7	86	69	60	49	38	26	57	50	41	32	22	
	8	75	60	52	43	33	23	50	44	36	28	19	
	9	67	54	46	38	30	20	45	39	32	25	17	
	10	60	48	42	35	27	18	40	35	29	23	16	
	11	55	44	38	31	24	17	37	32	26	20	14	
	12	50	40	35	29	22	15	34	29	24	19	13	
	13	46	37	32	27	20	14	31	27	22	17	12	
	14	43	35	30	25	19	13	29	25	21	16	11	
	15	40	32	28	23	18	12	27	23	19	15	10	
	16	38	30	26	22	17	11	25	22	18	14	10	
	17	35	28	25	20	16	11	24	20	17	13	9	
	18	33	27	23	19	15	10	22	19	16	13	9	
	19	32	25	22	18	14	10	21	18	15	12	8	
	20	30	24	21	17	13	9	20	17	15	11	8	
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	38												
	39												
	40												
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	58.5	48.5	42.4	35.5	27.8	19.3	38.2	33.7	28.5	22.4	15.7		
S <sub>x</sub> , in. <sup>3</sup>	14.6	12.1	10.6	8.88	6.94	4.83	9.56	8.43	7.12	5.61	3.93		
Z <sub>x</sub> , in. <sup>3</sup>	20.0	16.1	13.9	11.5	8.87	6.11	13.4	11.6	9.68	7.51	5.19		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	201	151	126	101	75.2	44.8	151	126	101	75.2	44.8		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	600	483	417	345	266	183	402	348	290	225	156		

Load above heavy horizontal line is limited by design shear strength.

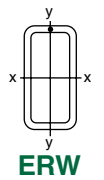




# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50

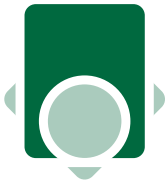


Nominal Size		7 x 5						7 x 4						
Wall Thickness	5/8	1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot	42.30	35.24	27.48	23.34	19.02	14.53	9.86	31.84	24.93	21.21	17.32	13.25	9.01	
Design Wall Thickness	0.581	0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>														
Effective length KL in feet	0													
	2	384	329	263	<u>220</u>	<u>176</u>	<u>132</u>	78	282	227	197	162	125	76
	3	256	219	175	<u>150</u>	<u>124</u>	<u>95</u>	52	188	151	131	108	83	51
	4	192	164	131	113	93	71	39	141	113	98	81	62	38
	5	154	131	105	90	74	57	31	113	91	79	65	50	30
	6	128	110	88	75	62	48	26	94	76	66	54	42	25
	7	110	94	75	64	53	41	22	81	65	56	46	36	22
	8	96	82	66	56	47	36	19	71	57	49	41	31	19
	9	85	73	58	50	41	32	17	63	50	44	36	28	17
	10	77	66	53	45	37	29	16	56	45	39	32	25	15
	11	70	60	48	41	34	26	14	51	41	36	29	23	14
	12	64	55	44	38	31	24	13	47	38	33	27	21	13
	13	59	51	40	35	29	22	12	43	35	30	25	19	12
	14	55	47	38	32	27	20	11	40	32	28	23	18	11
	15	51	44	35	30	25	19	10	38	30	26	22	17	10
	16	48	41	33	28	23	18	10	35	28	25	20	16	9
	17	45	39	31	26	22	17	9	33	27	23	19	15	9
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	40													
<b>PROPERTIES</b>														
I <sub>x</sub> , in. <sup>4</sup>	69.3	60.6	49.5	43.0	35.8	27.9	19.3	50.6	41.8	36.4	30.5	23.8	16.6	
S <sub>x</sub> , in. <sup>3</sup>	19.8	17.3	14.1	12.3	10.2	7.96	5.18**	14.5	11.9	10.4	8.72	6.80	4.73	
Z <sub>x</sub> , in. <sup>3</sup>	25.6	21.9	17.5	15.0	12.4	9.52	6.53	18.8	15.1	13.1	10.8	8.33	5.73	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	220	176	132	110	88.1	65.8	43.8	176	132	110	88.1	65.8	43.8	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	768	657	525	450	372	286	155	564	453	393	324	250	152	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

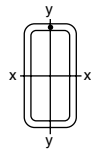
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

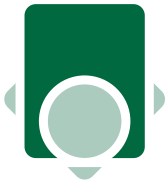
F<sub>y</sub>=50



ERW

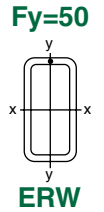
Nominal Size		7 x 3					6 x 5				
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	24.93	21.21	17.32	13.25
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2	237	192	167	138	107	74	207	179	148	<u>113</u>
	3	158	128	111	92	71	49	138	119	99	76
	4	119	96	83	69	54	37	104	89	74	57
	5	95	77	67	55	43	30	83	71	59	46
	6	79	64	56	46	36	25	69	60	49	38
	7	68	55	48	40	31	21	59	51	42	33
	8	59	48	42	35	27	18	52	45	37	29
	9	53	43	37	31	24	16	46	40	33	25
	10	47	38	33	28	21	15	41	36	30	23
	11	43	35	30	25	19	13	38	32	27	21
	12	40	32	28	23	18	12	35	30	25	19
	13	36	30	26	21	16	11	32	27	23	18
	14	34	27	24	20	15	11	30	26	21	16
	15	32	26	22	18	14	10	28	24	20	15
	16	30	24	21	17	13	9				
	17	28	23	20	16	13	9				
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	40.7	34	29.9	25.2	19.8	13.8	33.9	29.6	24.7	19.3	
S <sub>x</sub> , in. <sup>3</sup>	11.6	9.73	8.54	7.19	5.65	3.95	11.3	9.85	8.25	6.44	
Z <sub>x</sub> , in. <sup>3</sup>	15.8	12.8	11.1	9.22	7.14	4.93	13.8	11.9	9.87	7.62	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	176	132	110	88.1	65.8	43.8	113	94.3	75.5	56.4	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	474	384	333	277	214	148	414	357	296	229	

Load above heavy horizontal line is limited by design shear strength.

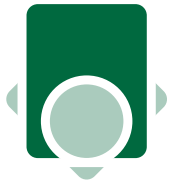


# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

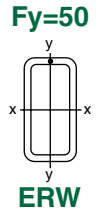


Nominal Size		6 x 4						6 x 3					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	25.03	19.82	16.96	13.91	10.70	7.31
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.465	0.349	0.291	0.233	0.174	0.116
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	219	179	155	128	99	61	182	149	129	108	84	58
	3	146	119	103	85	66	41	121	99	86	72	56	39
	4	110	89	77	64	50	30	91	74	65	54	42	29
	5	88	71	62	51	40	24	73	59	52	43	34	23
	6	73	60	52	43	33	20	61	50	43	36	28	19
	7	63	51	44	37	28	17	52	42	37	31	24	17
	8	55	45	39	32	25	15	45	37	32	27	21	15
	9	49	40	34	28	22	14	40	33	29	24	19	13
	10	44	36	31	26	20	12	36	30	26	22	17	12
	11	40	32	28	23	18	11	33	27	23	20	15	11
	12	37	30	26	21	17	10	30	25	22	18	14	10
	13	34	27	24	20	15	9	28	23	20	17	13	9
	14	31	26	22	18	14	9	26	21	18	15	12	8
	15	29	24	21	17	13	8	24	20	17	14	11	8
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	40												
<b>PROPERTIES</b>													
$I_x$ , in. <sup>4</sup>	33.9	28.3	24.8	20.9	16.4	11.4	26.8	22.7	20.1	17.0	13.4	9.43	
$S_x$ , in. <sup>3</sup>	11.3	9.43	8.27	6.96	5.46	3.81	8.94	7.57	6.69	5.66	4.47	3.14	
$Z_x$ , in. <sup>3</sup>	14.6	11.9	10.3	8.53	6.60	4.56	12.1	9.90	8.61	7.19	5.59	3.87	
$\Phi_v V_n$ , (kips)	151	113	94.3	75.5	56.4	37.6	151	113	94.3	75.5	56.4	37.6	
$\Phi_b W_c$ , (kip-ft)	438	357	309	256	198	122	363	297	258	216	168	116	

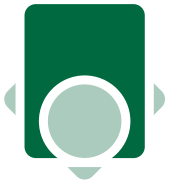


# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



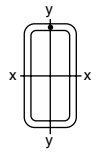
Nominal Size		6 x 2					5 x 4				
Wall Thickness		3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		17.27	14.83	12.21	9.42	6.46	25.03	19.82	16.96	13.91	10.70
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.465	0.349	0.291	0.233	0.174
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2	119	104	88	69	48	164	134	117	97	76
	3	79	70	58	46	32	109	90	78	65	51
	4	59	52	44	34	24	82	67	58	49	38
	5	48	42	35	27	19	65	54	47	39	30
	6	40	35	29	23	16	55	45	39	32	25
	7	34	30	25	20	14	47	38	33	28	22
	8	30	26	22	17	12	41	34	29	24	19
	9	26	23	19	15	11	36	30	26	22	17
	10	24	21	18	14	10	33	27	23	19	15
	11	22	19	16	12	9	30	24	21	18	14
	12	20	17	15	11	8	27	22	19	16	13
	13	18	16	13	11	7					
	14	17	15	13	10	7					
	15	16	14	12	9	6					
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<b>PROPERTIES</b>											
$I_x$ , in. <sup>4</sup>	17.1	15.3	13.1	10.5	7.42	21.2	17.9	15.8	13.4	10.6	
$S_x$ , in. <sup>3</sup>	5.71	5.11	4.37	3.49	2.47	8.48	7.16	6.32	5.35	4.22	
$Z_x$ , in. <sup>3</sup>	7.93	6.95	5.84	4.58	3.19	10.9	8.96	7.79	6.49	5.05	
$\Phi_v V_n$ , (kips)	113	94.3	75.5	56.4	37.6	126	94.2	78.6	62.9	47.0	
$\Phi_b W_c$ , (kip-ft)	238	209	175	137	95.7	327	269	234	195	151	



# LRFD Beams Rectangular HSS

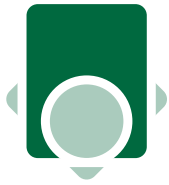
Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50



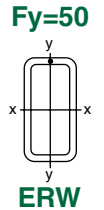
ERW

Nominal Size		5 x 3					5 x 2 1/2				
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8	
Weight Per Foot		21.63	17.27	14.83	12.21	9.42	6.46	11.36	8.78	6.03	
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2	133	110	96	81	63	44	72	57	40	
	3	88	73	64	54	42	29	48	38	27	
	4	66	55	48	40	32	22	36	28	20	
	5	53	44	39	32	25	18	29	23	16	
	6	44	37	32	27	21	15	24	19	13	
	7	38	31	28	23	18	13	21	16	11	
	8	33	28	24	20	16	11	18	14	10	
	9	29	24	21	18	14	10	16	13	9	
	10	27	22	19	16	13	9	14	11	8	
	11	24	20	18	15	11	8	13	10	7	
	12	22	18	16	13	11	7	12	9	7	
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	16.4	14.1	12.6	10.7	8.53	6.03	9.40	7.51	5.34		
S <sub>x</sub> , in. <sup>3</sup>	6.56	5.65	5.03	4.29	3.41	2.41	3.76	3.01	2.14		
Z <sub>x</sub> , in. <sup>3</sup>	8.83	7.34	6.42	5.38	4.21	2.93	4.83	3.79	2.65		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	126	94.2	78.6	62.9	47.0	31.3	62.9	47.0	31.3		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	265	220	193	161	126	87.9	145	114	79.5		



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

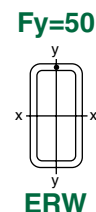


Nominal Size		5 x 2					4 x 3					4 x 2 1/2		
Wall Thickness		3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	5/16	1/4	3/16
Weight Per Foot		14.72	12.70	10.51	8.15	5.61	14.72	12.70	10.51	8.15	5.61	11.64	9.66	7.51
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116	0.291	0.233	0.174
<b>F<sub>y</sub> = 50 ksi</b>														
Effective length KL in feet	0													
	2	86	76	64	51	36	77	68	57	45	32	60	51	40
	3	57	51	43	34	24	51	45	38	30	21	40	34	27
	4	43	38	32	25	18	38	34	29	23	16	30	25	20
	5	34	30	26	20	14	31	27	23	18	13	24	20	16
	6	29	25	21	17	12	26	23	19	15	11	20	17	13
	7	24	22	18	14	10	22	19	16	13	9	17	14	11
	8	21	19	16	13	9	19	17	14	11	8	15	13	10
	9	19	17	14	11	8	17	15	13	10	7	13	11	9
	10	17	15	13	10	7	15	14	11	9	6	12	10	8
	11	16	14	12	9	6								
	12	14	13	11	8	6								
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<b>PROPERTIES</b>														
$I_x$ , in. <sup>4</sup>	10.3	9.34	8.08	6.50	4.65	7.92	7.13	6.15	4.93	3.52	6.13	5.32	4.30	
$S_x$ , in. <sup>3</sup>	4.14	3.74	3.23	2.60	1.86	3.96	3.57	3.07	2.47	1.76	3.06	2.66	2.15	
$Z_x$ , in. <sup>3</sup>	5.71	5.05	4.27	3.37	2.37	5.12	4.51	3.81	3.00	2.11	3.97	3.38	2.67	
$\Phi_v V_n$ , (kips)	94.2	78.6	62.9	47.0	31.3	75.4	62.9	50.3	37.6	25.1	62.9	50.3	37.6	
$\Phi_b W_c$ , (kip-ft)	171	152	128	101	71.1	154	135	114	90.0	63.3	119	101	80.1	



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

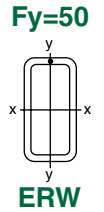


Nominal Size		4 x 2					3 1/2 x 2 1/2				
Wall Thickness		3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		12.17	10.58	8.81	6.87	4.75	12.17	10.58	8.81	6.87	4.75
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0										
	2	58	51	44	35	25	54	48	41	33	23
	3	38	34	29	23	17	36	32	27	22	15
	4	29	26	22	18	12	27	24	21	16	12
	5	23	21	18	14	10	22	19	16	13	9
	6	19	17	15	12	8	18	16	14	11	8
	7	16	15	13	10	7	15	14	12	9	7
	8	14	13	11	9	6	13	12	10	8	6
	9	13	11	10	8	6					
	10	12	10	9	7	5					
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<b>PROPERTIES</b>											
$I_x$ , in. <sup>4</sup>	5.59	5.12	4.49	3.66	2.65	4.74	4.34	3.79	3.09	2.23	
$S_x$ , in. <sup>3</sup>	2.80	2.56	2.25	1.83	1.32	2.71	2.48	2.17	1.76	1.28	
$Z_x$ , in. <sup>3</sup>	3.84	3.43	2.94	2.34	1.66	3.59	3.20	2.74	1.18	1.54	
$\Phi_v V_n$ , (kips)	75.4	62.9	50.3	37.6	25.1	66.0	55.0	44.0	32.9	21.9	
$\Phi_b W_c$ , (kip-ft)	115	103	88.2	70.2	49.8	108	96.0	82.2	65.4	46.2	



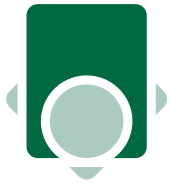
# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		3 x 2 1/2				3 x 2				3 x 1 1/2			
Wall Thickness		5/16	1/4	3/16	1/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8	
Weight Per Foot		9.51	7.96	6.23	4.33	8.45	7.11	5.59	3.90	6.26	4.96	3.48	
Design Wall Thickness		0.291	0.233	0.174	0.116	0.291	0.233	0.174	0.116	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	38	32	26	18	32	27	22	16	23	19	13	
	3	25	22	17	12	21	18	15	11	15	12	9	
	4	19	16	13	9	16	14	11	8	11	9	7	
	5	15	13	10	7	13	11	9	6	9	7	5	
	6	13	11	9	6	11	9	7	5	8	6	4	
	7	11	9	7	5	9	8	6	5	6	5	4	
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	2.91	2.57	2.11	1.54	2.38	2.12	1.76	1.30	1.68	1.42	1.06		
S <sub>x</sub> , in. <sup>3</sup>	1.94	1.71	1.41	1.03	1.58	1.42	1.18	0.866	1.12	0.945	0.706		
Z <sub>x</sub> , in. <sup>3</sup>	2.51	2.16	1.73	1.23	2.11	1.83	1.48	1.06	1.51	1.24	0.895		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	47.1	37.7	28.2	18.8	47.1	37.7	28.2	18.8	37.7	28.2	18.8		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	75.3	64.8	51.9	36.9	63.3	54.9	44.4	31.8	45.3	37.2	26.8		

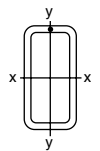




# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50



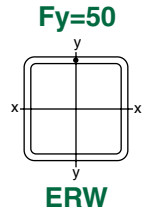
ERW

Nominal Size		3 x 1		2 1/2 x 1 1/2			2 x 1 1/2		2 x 1	
Wall Thickness		3/16	1/8	1/4	3/16	1/8	3/16	1/8	3/16	1/8
Weight Per Foot		4.32	3.05	5.41	4.32	3.05	3.68	2.63	3.04	2.20
Design Wall Thickness		0.174	0.116	0.233	0.174	0.116	0.174	0.116	0.174	0.116
<b>F<sub>y</sub> = 50 ksi</b>										
Effective length K <sub>L</sub> in feet	0									
	2	15	11	17	14	10	10	7	7	6
	3	10	7	11	9	7	6	5	5	4
	4	7	5	8	7	5	5	4	4	3
	5	6	4	7	6	4	4	3	3	2
	6	5	4	6	5	3				
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<b>PROPERTIES</b>										
I <sub>x</sub> , in. <sup>4</sup>	1.07	0.817	1.03	0.881	0.668	0.494	0.383	0.349	0.280	
S <sub>x</sub> , in. <sup>3</sup>	0.713	0.545	0.820	0.705	0.535	0.494	0.383	0.349	0.280	
Z <sub>x</sub> , in. <sup>3</sup>	0.989	0.728	1.11	0.915	0.671	0.639	0.475	0.480	0.366	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	28.2	18.8	31.5	23.5	15.7	18.8	12.5	18.8	12.5	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	29.7	21.8	33.3	27.5	20.1	19.2	14.3	14.4	11.0	



# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		16 x 16				14 x 14				12 x 12				
Wall Thickness		5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	5/8	1/2	3/8	5/16	1/4
Weight Per Foot		127.37	103.30	78.52	65.87	110.36	89.68	68.31	57.36	93.34	76.07	58.10	48.86	39.43
Design Wall Thickness		0.581	0.465	0.349*	0.291*	0.581	0.465	0.349*	0.291*	0.581	0.465	0.349	0.291*	0.233*
<b>F<sub>y</sub> = 50 ksi</b>														
Effective length KL in feet	0													
	2													
	3													
	4			<u>603</u>	<u>503</u>			<u>528</u>	<u>440</u>	<u>753</u>	<u>603</u>	<u>452</u>	<u>377</u>	<u>302</u>
	5	<u>1000</u>	<u>804</u>	593	463	<u>878</u>	<u>704</u>	474	372	654	538	377	288	213
	6	1000	744	494	385	755	618	395	310	545	448	314	240	178
	7	857	638	423	330	647	530	339	266	467	384	269	206	152
	8	750	558	370	289	566	464	296	233	409	336	236	180	133
	9	667	496	329	257	503	412	263	207	363	299	210	160	119
	10	600	447	296	231	453	371	237	186	327	269	189	144	107
	11	545	406	269	210	412	337	215	169	297	244	171	131	97
	12	500	372	247	193	378	309	198	155	273	224	157	120	89
	13	462	344	228	178	348	285	182	143	252	207	145	111	82
	14	429	319	212	165	324	265	169	133	234	192	135	103	76
	15	400	298	198	154	302	247	158	124	218	179	126	96	71
	16	375	279	185	145	283	232	148	116	204	168	118	90	67
	17	353	263	174	136	266	218	139	109	192	158	111	85	63
	18	333	248	165	128	252	206	132	103	182	149	105	80	59
	19	316	235	156	122	238	195	125	98	172	141	99	76	56
	20	300	223	148	116	227	186	119	93	164	134	94	72	53
	21	286	213	141	110	216	177	113	89	156	128	90	69	51
	22	273	203	135	105	206	169	108	85	149	122	86	66	49
	23	261	194	129	101	197	161	103	81	142	117	82	63	46
	24	250	186	123	96	189	155	99	78	136	112	79	60	44
	25	240	179	119	93	181	148	95	74	131	108	75	58	43
	26	231	172	114	89	174	143	91	72	126	103	73	55	41
	27	222	165	110	86	168	137	88	69	121	100	70	53	40
	28	214	160	106	83	162	133	85	66	117	96	67	51	38
	29	207	154	102	80	156	128	82	64	113	93	65	50	37
	30	200	149	99	77	151	124	79	62	109	90	63	48	36
	31	194	144	96	75	146	120	76	60					
	32	188	140	93	72	142	116	74	58					
	33	182	135	90	70	137	112	72	56					
	34	176	131	87	68	133	109	70	55					
	35	171	128	85	66	129	106	68	53					
	36	167	124	82	64									
	37	162	121	80	63									
	38	158	118	78	61									
	39	154	115	76	59									
	40	150	112	74	58									
<b>PROPERTIES</b>														
I <sub>x</sub> , in. <sup>4</sup>	1370	1130	873	739	896	743	577	490	548	457	357	304	248	
S <sub>x</sub> , in. <sup>3</sup>	171	141	98.8**	77.1**	128	106	79.1**	62.0**	91.3	76.2	59.5	48.0**	35.6**	
Z <sub>x</sub> , in. <sup>3</sup>	200	164	126	106	151	124	95.4	80.5	109	89.6	69.2	58.6	47.6	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	502	402	302	251	439	352	264	220	376	301	226	189	151	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	6000	4470	2960	2310	4530	3710	2370	1860	3270	2690	1890	1440	1070	

Load above heavy horizontal line is limited by design shear strength.

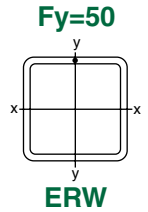
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		10 x 10						9 x 9					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	1/2	3/8	5/16	1/4	3/16	
Weight Per Foot		76.33	62.46	47.90	40.35	32.63	24.73	55.66	42.79	36.10	29.23	22.18	
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233*	0.174*	0.465	0.349	0.291	0.233*	0.174*	
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2												
	3	627	502	377	314	252	177	452	339	283	221	149	
	4	549	455	354	273	198	133	363	284	236	166	112	
	5	439	364	283	219	158	106	290	227	189	133	90	
	6	366	304	236	182	132	89	242	189	157	110	75	
	7	314	260	202	156	113	76	207	162	135	95	64	
	8	275	228	177	137	99	66	182	142	118	83	56	
	9	244	202	157	122	88	59	161	126	105	74	50	
	10	220	182	142	109	79	53	145	113	94	66	45	
	11	200	166	129	99	72	48	132	103	86	60	41	
	12	183	152	118	91	66	44	121	95	79	55	37	
	13	169	140	109	84	61	41	112	87	73	51	34	
	14	157	130	101	78	56	38	104	81	67	47	32	
	15	146	121	94	73	53	35	97	76	63	44	30	
	16	137	114	89	68	49	33	91	71	59	41	28	
	17	129	107	83	64	47	31	85	67	56	39	26	
	18	122	101	79	61	44	30	81	63	52	37	25	
	19	116	96	75	58	42	28	76	60	50	35	24	
	20	110	91	71	55	40	27	73	57	47	33	22	
	21	105	87	67	52	38	25	69	54	45	32	21	
	22	100	83	64	50	36	24	66	52	43	30	20	
	23	95	79	62	48	34	23						
	24	92	76	59	46	33	22						
	25	88	73	57	44	32	21						
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	304	256	202	172	141	108	182	145	124	102	78.2		
S <sub>x</sub> , in. <sup>3</sup>	60.8	51.2	40.4	34.5	26.4**	17.7**	40.6	32.2	27.6	22.1**	14.9**		
Z <sub>x</sub> , in. <sup>3</sup>	73.2	60.7	47.2	40.1	32.7	24.8	48.4	37.8	32.1	26.2	20.0		
Φ <sub>v</sub> V <sub>n</sub> , (kips)	314	251	188	157	126	94.0	226	170	141	113	84.6		
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	2200	1820	1420	1090	791	531	1450	1130	944	663	448		

Load above heavy horizontal line is limited by design shear strength.

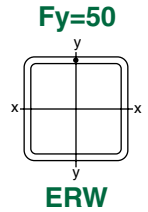
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		8 x 8						7 x 7					
Wall Thickness		5/8	1/2	3/8	5/16	1/4	3/16	5/8	1/2	3/8	5/16	1/4	3/16
Weight Per Foot		59.32	48.85	37.69	31.84	25.82	19.63	50.81	42.05	32.58	27.59	22.42	17.08
Design Wall Thickness		0.581	0.465	0.349	0.291	0.233	0.174*	0.581	0.465	0.349	0.291	0.233	0.174*
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	<u>502</u>	<u>402</u>	<u>302</u>	<u>251</u>	<u>201</u>	<u>150</u>	<u>439</u>	<u>352</u>	<u>264</u>	<u>220</u>	<u>176</u>	<u>132</u>
	3	447	375	294	251	187	123	331	279	221	189	155	99
	4	335	281	221	188	140	92	248	209	166	142	116	74
	5	268	225	176	151	112	74	199	167	133	113	93	59
	6	224	188	147	126	93	62	166	140	111	95	77	49
	7	192	161	126	108	80	53	142	120	95	81	66	42
	8	168	141	110	94	70	46	124	105	83	71	58	37
	9	149	125	98	84	62	41	110	93	74	63	52	33
	10	134	113	88	75	56	37	99	84	66	57	46	30
	11	122	102	80	68	51	34	90	76	60	52	42	27
	12	112	94	74	63	47	31	83	70	55	47	39	25
	13	103	87	68	58	43	28	76	64	51	44	36	23
	14	96	80	63	54	40	26	71	60	47	41	33	21
	15	89	75	59	50	37	25	66	56	44	38	31	20
	16	84	70	55	47	35	23	62	52	41	35	29	18
	17	79	66	52	44	33	22	58	49	39	33	27	17
	18	75	63	49	42	31	21						
	19	71	59	46	40	30	19						
	20	67	56	44	38	28	18						
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	146	125	99.6	85.6	70.7	54.4	93.3	80.5	64.9	56.1	46.5	36.0	
S <sub>x</sub> , in. <sup>3</sup>	36.5	31.2	24.9	21.4	17.7	12.3**	26.7	23.0	18.6	16.0	13.3	9.85**	
Z <sub>x</sub> , in. <sup>3</sup>	44.7	37.5	29.4	25.1	20.5	15.7	33.1	27.9	22.1	18.9	15.5	11.9	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	251	201	151	126	101	75.2	220	176	132	110	88.1	65.8	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	1340	1130	882	753	561	369	993	837	663	567	464	296	

Load above heavy horizontal line is limited by design shear strength.

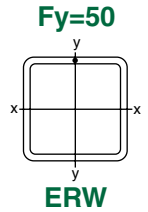
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus,  $S_{eff}$  calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		6 x 6						5 1/2 x 5 1/2					
Wall Thickness	5/8	1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot	42.30	35.24	27.48	23.34	19.02	14.53	9.86	24.93	21.21	17.32	13.25	9.01	
Design Wall Thickness	0.581	0.465	0.349	0.291	0.233	0.174	0.116*	0.349	0.291	0.233	0.174	0.116*	
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	348	297	<u>226</u>	<u>189</u>	<u>151</u>	<u>113</u>	66	197	170	<u>138</u>	<u>103</u>	58
	3	232	198	<u>158</u>	<u>136</u>	<u>112</u>	<u>78</u>	44	131	113	<u>93</u>	<u>69</u>	38
	4	174	149	119	102	84	59	33	98	85	70	52	29
	5	139	119	95	82	67	47	27	79	68	56	42	23
	6	116	99	79	68	56	39	22	66	57	47	35	19
	7	99	85	68	58	48	34	19	56	48	40	30	16
	8	87	74	59	51	42	29	17	49	42	35	26	14
	9	77	66	53	45	37	26	15	44	38	31	23	13
	10	70	59	47	41	34	23	13	39	34	28	21	12
	11	63	54	43	37	31	21	12	36	31	25	19	10
	12	58	50	40	34	28	20	11	33	28	23	17	10
	13	54	46	36	31	26	18	10	30	26	22	16	9
	14	50	42	34	29	24	17	9					
	15	46	40	32	27	22	16	9					
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	55.1	48.2	39.4	34.3	28.6	22.3	15.5	29.7	25.9	21.7	17.0	11.8	
S <sub>x</sub> , in. <sup>3</sup>	18.4	16.1	13.1	11.4	9.54	7.42	4.42**	10.8	9.43	7.90	6.17	3.83**	
Z <sub>x</sub> , in. <sup>3</sup>	23.2	19.8	15.8	13.6	11.2	8.63	5.92	13.1	11.3	9.32	7.19	4.95	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	188	151	113	94.3	75.5	56.4	37.6	104	86.4	69.2	51.7	34.5	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	696	594	474	408	336	235	133	393	339	280	208	115	

Load above heavy horizontal line is limited by design shear strength.

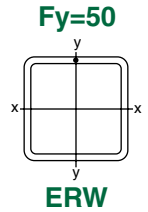
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		5 x 5						4 1/2 x 4 1/2					
Wall Thickness		1/2	3/8	5/16	1/4	3/16	1/8	1/2	3/8	5/16	1/4	3/16	1/8
Weight Per Foot		28.43	22.37	19.08	15.62	11.97	8.16	25.03	19.82	16.96	13.91	10.70	7.31
Design Wall Thickness		0.465	0.349	0.291	0.233	0.174	0.116*	0.465	0.349	0.291	0.233	0.174	0.116*
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	197	159	137	114	88	49	153	125	109	91	71	41
	3	131	106	92	76	59	33	102	84	73	61	47	27
	4	98	80	69	57	44	25	77	63	55	45	35	21
	5	79	64	55	46	35	20	61	50	44	36	28	16
	6	66	53	46	38	29	16	51	42	36	30	24	14
	7	56	45	39	33	25	14	44	36	31	26	20	12
	8	49	40	34	29	22	12	38	31	27	23	18	10
	9	44	35	31	25	20	11	34	28	24	20	16	9
	10	39	32	27	23	18	10	31	25	22	18	14	8
	11	36	29	25	21	16	9	28	23	20	17	13	7
	12	33	27	23	19	15	8						
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	26.0	21.7	19.0	16.0	12.6	8.80	18.0	15.3	13.5	11.4	9.02	6.35	
S <sub>x</sub> , in. <sup>3</sup>	10.4	8.67	7.61	6.41	5.03	3.28**	8.02	6.78	5.99	5.08	4.01	2.75**	
Z <sub>x</sub> , in. <sup>3</sup>	13.1	10.6	9.16	7.61	5.89	4.07	10.2	8.36	7.27	6.06	4.71	3.27	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	126	94.2	78.6	62.9	47.0	31.3	113	84.8	70.7	56.6	42.3	28.2	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	393	318	275	228	177	98.3	306	251	218	182	141	82.4	

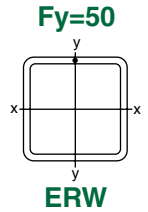
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

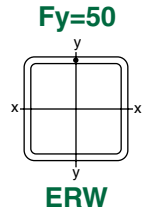


Nominal Size		4 x 4					3 1/2 x 3 1/2					
Wall Thickness	1/2	3/8	5/16	1/4	3/16	1/8	3/8	5/16	1/4	3/16	1/8	
Weight Per Foot	21.63	17.27	14.83	12.21	9.42	6.46	14.72	12.70	10.51	8.15	5.61	
Design Wall Thickness	0.465	0.349	0.291	0.233	0.174	0.116	0.349	0.291	0.233	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>												
Effective length KL in feet	0											
	2	116	96	84	70	55	35	70	62	53	41	29
	3	77	64	56	47	37	23	47	41	35	28	19
	4	58	48	42	35	28	17	35	31	26	21	14
	5	46	38	34	28	22	14	28	25	21	17	12
	6	39	32	28	23	18	12	23	21	18	14	10
	7	33	27	24	20	16	10	20	18	15	12	8
	8	29	24	21	18	14	9	18	16	13	10	7
	9	26	21	19	16	12	8					
	10	23	19	17	14	11	7					
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<b>PROPERTIES</b>												
I <sub>x</sub> , in. <sup>4</sup>	11.9	10.3	9.14	7.80	6.21	4.40	6.48	5.84	5.04	4.05	2.90	
S <sub>x</sub> , in. <sup>3</sup>	5.95	5.13	4.57	3.90	3.10	2.20	3.70	3.34	2.88	2.31	1.66	
Z <sub>x</sub> , in. <sup>3</sup>	7.70	6.39	5.59	4.69	3.67	2.56	4.69	4.14	3.50	2.76	1.93	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	100	75.4	62.9	50.3	37.6	25.1	66.0	55.0	44.0	32.9	21.9	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	231	192	168	141	110	69.6	141	124	105	82.8	57.7	



# LRFD Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



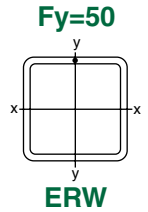
Nominal Size		3 x 3					2 1/2 x 2 1/2				2 1/4 x 2 1/4		
Wall Thickness		3/8	5/16	1/4	3/16	1/8	5/16	1/4	3/16	1/8	1/4	3/16	1/8
Weight Per Foot		12.17	10.58	8.81	6.87	4.75	8.45	7.11	5.59	3.90	6.26	4.96	3.48
Design Wall Thickness		0.349	0.291	0.233	0.174	0.116	0.291	0.233	0.174	0.116	0.233	0.174	0.116
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	0												
	2	49	44	37	30	21	28	24	20	14	19	16	11
	3	33	29	25	20	14	19	16	13	9	13	10	8
	4	24	22	19	15	11	14	12	10	7	10	8	6
	5	20	17	15	12	8	11	10	8	6	8	6	5
	6	16	15	12	10	7	9	8	7	5			
	7	14	12	11	8	6							
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<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	3.77	3.45	3.02	2.46	1.78	1.82	1.63	1.35	0.998	1.13	0.952	0.712	
S <sub>x</sub> , in. <sup>3</sup>	2.51	2.30	2.01	1.64	1.19	1.45	1.30	1.08	0.798	1.00	0.847	0.633	
Z <sub>x</sub> , in. <sup>3</sup>	3.25	2.90	2.48	1.97	1.40	1.88	1.63	1.32	0.947	1.28	1.04	0.755	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	56.5	47.1	37.7	28.2	18.8	39.3	31.5	23.5	15.7	28.3	21.1	14.1	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	97.5	87.0	74.4	59.1	42.0	56.4	48.9	39.6	28.4	38.4	31.2	22.7	



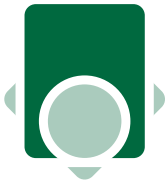


# LRF Beams Square HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



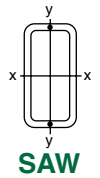
Nominal Size		2 x 2			1 3/4 x 1 3/4	1 5/8 x 1 5/8		1 1/2 x 1 1/2		1 1/4 x 1 1/4	
Wall Thickness	1/4	3/16	1/8	3/16	3/16	1/8	3/16	1/8	3/16	1/8	
Weight Per Foot	5.41	4.32	3.05	3.68	3.36	2.42	3.04	2.20	2.40	1.78	
Design Wall Thickness	0.233	0.174	0.116	0.174	0.174	0.116	0.174	0.116	0.174	0.116	
<b>F<sub>y</sub> = 50 ksi</b>											
Effective length KL in feet	0	14	12	9	9	7	6	6	5	4	3
	2	10	8	6	6	5	4	4	3	3	2
	3	7	6	4	4	4	3				
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<b>PROPERTIES</b>											
I <sub>x</sub> , in. <sup>4</sup>	0.745	0.640	0.486	0.405	0.312	0.246	0.235	0.188	0.121	0.101	
S <sub>x</sub> , in. <sup>3</sup>	0.745	0.640	0.486	0.462	0.384	0.302	0.314	0.251	0.194	0.162	
Z <sub>x</sub> , in. <sup>3</sup>	0.964	0.797	0.584	0.585	0.491	0.370	0.406	0.309	0.259	0.204	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	25.2	18.8	12.5	16.4	15.3	10.2	14.1	9.40	11.7	7.83	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	28.9	23.9	17.5	17.6	14.7	11.1	12.2	9.27	7.77	6.12	



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=46

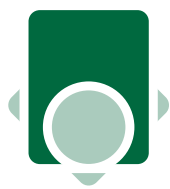


Nominal Size		32 x 24			30 x 24			28 x 24		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		225.80	183.50	138.95	217.30	176.70	133.84	208.79	169.89	128.74
Design Wall Thickness		0.625*	0.500*	0.375*	0.625*	0.500*	0.375*	0.625*	0.500*	0.375*
<b>F<sub>y</sub> = 46 ksi</b>										
Effective length KL in feet	7					1490			1390	
	8	1990	1590		1860	1470	893	1740	1330	896
	9	1880	1430		1720	1300	890	1570	1190	807
	10	1690	1280	835	1550	1170	801	1410	1070	726
	11	1540	1170	799	1410	1070	728	1280	970	660
	12	1410	1070	732	1290	978	667	1180	889	605
	13	1300	988	676	1190	903	616	1090	821	559
	14	1210	917	627	1110	838	572	1010	762	519
	15	1130	856	586	1030	783	534	941	712	484
	16	1060	803	549	969	734	500	882	667	454
	17	996	755	517	912	690	471	830	628	427
	18	941	713	488	861	652	445	784	593	403
	19	891	676	462	816	618	421	743	562	382
	20	847	642	439	775	587	400	706	534	363
	22	770	584	399	705	534	364	642	485	330
	24	706	535	366	646	489	334	588	445	303
	26	651	494	338	596	451	308	543	411	279
	28	605	459	314	554	419	286	504	381	259
	30	564	428	293	517	391	267	470	356	242
	32	529	401	275	484	367	250	441	334	227
	34	498	378	258	456	345	236	415	314	214
	36	470	357	244	431	326	222	392	296	202
	38	446	338	231	408	309	211	371	281	191
	40	423	321	220	388	293	200	353	267	182
	42	403	306	209	369	279	191	336	254	173
	44	385	292	200	352	267	182	321	243	165
	46	368	279	191	337	255	174	307	232	158
	48	353	268	183	323	245	167	294	222	151
	50	339	257	176	310	235	160	282	213	145
	52	326	247	169	298	226	154	271	205	140
	54	314	238	163	287	217	148	261	198	134
	56	302	229	157	277	210	143	252	191	130
58	292	221	151	267	202	138	243	184	125	
60	282	214	146	258	196	133	235	178	121	
62	273	207	142	250	189	129	228	172	117	
64	265	201	137	242	183	125	221	167	113	
66	257	195	133	235	178	121	214	162	110	
68	249	189	129	228	173	118	208	157	107	
70	242	183	125	221	168	114	202	152	104	
72	235	178	122	215	163	111				
<b>PROPERTIES</b>										
I <sub>x</sub> , in. <sup>4</sup>	9880	8160	6250	8480	7010	5380	7210	5970	4580	
S <sub>x</sub> , in. <sup>3</sup>	614**	465**	318**	562**	425**	290**	511**	387**	263**	
Z <sub>x</sub> , in. <sup>3</sup>	733	601	458	668	548	418	605	497	379	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	994	795	418	932	745	447	869	696	448	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	16900	12800	8780	15500	11700	8010	14100	10700	7260	

Load above heavy horizontal line is limited by design shear strength.

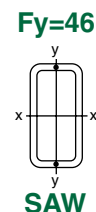
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRF Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		26 x 24			24 x 22			22 x 20			20 x 18		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		200.28	163.08	123.64	183.27	149.47	113.43	166.25	135.86	103.22	149.24	122.25	93.01
Design Wall Thickness		0.625*	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500	0.375*
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	7	1610	1290	898	1490	1190	818	1370	1030	707	1210	904	602
	8	1600	1210	818	1440	1050	715	1280	905	619	1060	791	527
	9	1420	1070	727	1280	935	636	1140	805	550	941	703	468
	10	1280	965	654	1160	842	572	1030	724	495	847	633	421
	11	1160	877	595	1050	765	520	933	658	450	770	575	383
	12	1060	804	545	963	701	477	855	603	412	706	527	351
	13	982	742	503	889	648	440	789	557	381	652	487	324
	14	912	689	467	825	601	409	733	517	353	605	452	301
	15	851	643	436	770	561	382	684	483	330	565	422	281
	16	798	603	409	722	526	358	641	453	309	530	396	263
	17	751	567	385	680	495	337	604	426	291	498	372	248
	18	710	536	363	642	468	318	570	402	275	471	352	234
	19	672	508	344	608	443	301	540	381	260	446	333	222
	20	639	482	327	578	421	286	513	362	247	424	316	211
	21	608	459	312	550	401	273	489	345	236	403	301	201
	22	581	438	297	525	383	260	466	329	225	385	288	191
	23	555	419	284	502	366	249	446	315	215	368	275	183
	24	532	402	273	481	351	238	428	302	206	353	264	176
	25	511	386	262	462	337	229	410	290	198	339	253	169
	26	491	371	252	444	324	220	395	279	190	326	243	162
	27	473	357	242	428	312	212	380	268	183	314	234	156
	29	440	333	226	398	290	197	354	250	171	292	218	145
	31	412	311	211	373	272	185	331	234	160	273	204	136
	33	387	292	198	350	255	173	311	219	150	257	192	128
	35	365	276	187	330	241	164	293	207	141	242	181	120
	37	345	261	177	312	228	155	277	196	134	229	171	114
	39	327	247	168	296	216	147	263	186	127	217	162	108
	41	312	235	160	282	205	140	250	177	121	207	154	103
	43	297	224	152	269	196	133	239	168	115	197	147	98
	45	284	214	145	257	187	127	228	161	110	188	141	94
	47	272	205	139	246	179	122	218	154	105	180	135	90
	49	261	197	134	236	172	117	209	148	101	173	129	86
51	250	189	128	227	165	112	201	142	97				
53	241	182	123	218	159	108	194	137	93				
55	232	175	119	210	153	104	187	132	90				
57	224	169	115	203	148	100							
59	216	163	111	196	143	97							
61	209	158	107										
63	203	153	104										
65	196	148	101										
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	6060	5020	3860	4680	3900	3000	3530	2950	2280	2590	2180	1690	
S <sub>x</sub> , in. <sup>3</sup>	463**	349**	237**	390	305**	207**	321	262**	179**	259	218	153**	
Z <sub>x</sub> , in. <sup>3</sup>	545	448	342	458	378	289	379	313	240	307	255	196	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	807	646	449	745	596	447	683	546	410	621	497	373	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	12800	9650	6540	11600	8420	5720	10300	7240	4950	8470	6330	4210	

Load above heavy horizontal line is limited by design shear strength.

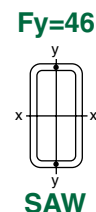
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		20 x 16			20 x 12	18 x 12			16 x 12	14 x 12		
Wall Thickness		5/8	1/2	3/8	5/8	5/8	1/2	3/8	5/8	1/2	3/8	
Weight Per Foot		140.73	115.45	87.91	123.72	115.21	95.03	72.59	106.71	81.42	62.39	
Design Wall Thickness		0.625	0.500	0.375*	0.625	0.625	0.500	0.375	0.625	0.500	0.375	
<b>F<sub>y</sub> = 46 ksi</b>												
Effective length KL in feet	7	1120	912	579	923	785	662	502	658	457	348	
	8	976	798	507	807	687	580	439	576	400	305	
	9	868	710	451	718	610	515	390	512	356	271	
	10	781	639	406	646	549	464	351	461	320	244	
	11	710	581	369	587	499	422	319	419	291	222	
	12	651	532	338	538	458	386	293	384	267	203	
	13	601	491	312	497	422	357	270	355	246	187	
	14	558	456	290	461	392	331	251	329	229	174	
	15	521	426	270	431	366	309	234	307	213	162	
	16	488	399	254	404	343	290	220	288	200	152	
	17	459	376	239	380	323	273	207	271	188	143	
	18	434	355	225	359	305	258	195	256	178	135	
	19	411	336	213	340	289	244	185	243	169	128	
	20	391	319	203	323	275	232	176	230	160	122	
	21	372	304	193	308	262	221	167	219	152	116	
	22	355	290	184	294	250	211	160	210	146	111	
	23	340	278	176	281	239	202	153	200	139	106	
	24	325	266	169	269	229	193	146	192	133	102	
	25	312	255	162	258	220	185	140	184	128	97	
	26	300	246	156	248	211	178	135	177	123	94	
	27	289	237	150	239	203	172	130	171	119	90	
	28	279	228	145	231	196	166	125	165	114	87	
	29	269	220	140	223	189	160	121	159	110	84	
	30	260	213	135	215	183	155	117	154	107	81	
	31	252	206	131	208	177	150	113	149	103	79	
	32	244	200	127	202	172	145	110	144	100	76	
	33	237	194	123	196	166	141	106	140	97	74	
	34	230	188	119	190	162	136	103	136	94	72	
	35	223	182	116	185	157	132	100	132	91	70	
	36	217	177	113	179	153	129	98	128			
	37	211	173	110	175	148	125	95	125			
	38	206	168	107	170	145	122	92	121			
	39	200	164	104	166	141	119	90	118			
	40	195	160	101	161	137	116	88	115			
	42	186	152	97	154	131	110	84				
	44	178	145	92	147	125	105	80				
	46	170	139	88	140							
	48	163	133	85	135							
	50	156	128	81	129							
	<b>PROPERTIES</b>											
	I <sub>x</sub> , in. <sup>4</sup>	2360	1990	1540	1890	1450	1240	971	1090	678	534	
	S <sub>x</sub> , in. <sup>3</sup>	236	199	147**	189	161	138	108	136	96.9	76.3	
	Z <sub>x</sub> , in. <sup>3</sup>	283	236	181	234	199	168	130	167	116	90.0	
	Φ <sub>v</sub> V <sub>n</sub> , (kips)	621	497	373	621	559	447	335	497	348	261	
	Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	7810	6390	4060	6460	5490	4640	3510	4610	3200	2440	

Load above heavy horizontal line is limited by design shear strength.

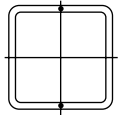
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus,  $S_{eff}$ , calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

F<sub>y</sub>=46



Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

SAW

Nominal Size		32 x 32			30 x 30			28 x 28			26 x 26		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		259.83	210.72	159.37	242.82	197.11	149.16	225.80	183.50	138.95	208.79	169.89	128.74
Design Wall Thickness		0.625*	0.500*	0.375*	0.625*	0.500*	0.375*	0.625*	0.500*	0.375*	0.625*	0.500*	0.375*
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	7												
	8		<u>1590</u>		<u>1860</u>	<u>1490</u>		<u>1740</u>	<u>1390</u>	<u>896</u>	<u>1610</u>	<u>1290</u>	<u>898</u>
	9	<u>1990</u>	<u>1540</u>		<u>1860</u>	<u>1390</u>	<u>893</u>	<u>1660</u>	<u>1240</u>	<u>836</u>	<u>1460</u>	<u>1100</u>	<u>741</u>
	10	<u>1860</u>	<u>1390</u>		<u>1670</u>	<u>1250</u>	<u>842</u>	<u>1490</u>	<u>1120</u>	<u>752</u>	<u>1320</u>	<u>988</u>	<u>667</u>
	11	1690	1260	<u>835</u>	1520	1130	766	1360	1010	684	1200	898	606
	12	1550	1160	<u>780</u>	1390	1040	702	1240	929	627	1100	823	556
	13	1430	1070	720	1290	960	648	1150	858	579	1010	760	513
	14	1330	991	669	1200	892	602	1070	797	537	940	705	476
	15	1240	925	624	1120	832	561	994	743	502	877	658	444
	16	1160	867	585	1050	780	526	932	697	470	823	617	417
	17	1100	816	551	984	734	495	877	656	443	774	581	392
	18	1030	771	520	930	694	468	829	620	418	731	549	370
	19	980	730	493	881	657	443	785	587	396	693	520	351
	20	931	694	468	837	624	421	746	558	376	658	494	333
	22	847	630	426	761	567	383	678	507	342	598	449	303
	24	776	578	390	697	520	351	621	465	313	548	411	278
	26	716	533	360	644	480	324	574	429	289	506	380	256
	28	665	495	334	598	446	301	533	398	269	470	353	238
	30	621	462	312	558	416	281	497	372	251	439	329	222
	32	582	433	293	523	390	263	466	349	235	411	309	208
	34	548	408	275	492	367	248	439	328	221	387	290	196
	36	517	385	260	465	347	234	414	310	209	366	274	185
	38	490	365	246	440	329	222	392	293	198	346	260	175
	40	466	347	234	418	312	211	373	279	188	329	247	167
	42	443	330	223	398	297	201	355	266	179	313	235	159
	44	423	315	213	380	284	191	339	253	171	299	224	152
	46	405	302	204	364	271	183	324	242	164	286	215	145
	48	388	289	195	349	260	175	311	232	157	274	206	139
	50	372	277	187	335	250	168	298	223	150	263	198	133
	52	358	267	180	322	240	162	287	214	145	253	190	128
	54	345	257	173	310	231	156	276	207	139	244	183	123
	56	333	248	167	299	223	150	266	199	134	235	176	119
58	321	239	161	289	215	145	257	192	130	227	170	115	
60	310	231	156	279	208	140	249	186	125	219	165	111	
62	300	224	151	270	201	136	241	180	121	212	159	108	
64	291	217	146	261	195	132	233	174	118	206	154	104	
66	282	210	142	254	189	128	226	169	114				
68	274	204	138	246	184	124	219	164	111				
70	266	198	134	239	178	120	213	159	107				
72	259	193	130	232	173	117							
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	12300	10100	7750	10100	8320	6370	8140	6730	5150	6460	5350	4110	
S <sub>x</sub> , in. <sup>3</sup>	675**	503**	339**	606**	452**	305**	540**	404**	273**	477**	358**	242**	
Z <sub>x</sub> , in. <sup>3</sup>	890	727	553	778	637	485	674	552	421	577	474	362	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	994	795	418	932	745	447	869	696	448	807	646	449	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	18600	13900	9360	16700	12500	8420	14900	11200	7520	13200	9880	6670	

Load above heavy horizontal line is limited by design shear strength.

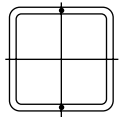
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

F<sub>y</sub>=46



Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

SAW

Nominal Size		24 x 24			22 x 22			20 x 20			18 x 18		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		191.78	156.28	118.53	174.76	142.67	108.32	157.75	129.06	98.12	140.73	115.45	87.91
Design Wall Thickness		0.625*	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500	0.375*
<b>F<sub>y</sub> = 46 ksi</b>													
Effective length KL in feet	6			894		1090	820		994	724	1120	894	608
	7	1490	1190	836	1370	1070	725	1240	911	620	1040	783	521
	8	1430	1080	731	1280	936	635	1120	797	543	911	685	456
	9	1280	962	650	1140	832	564	997	709	483	810	609	405
	10	1150	865	585	1030	749	508	897	638	434	729	548	365
	11	1040	787	532	933	681	462	815	580	395	662	498	332
	12	956	721	488	855	624	423	748	531	362	607	457	304
	13	883	666	450	789	576	391	690	491	334	560	421	281
	14	820	618	418	733	535	363	641	455	310	520	391	261
	15	765	577	390	684	499	338	598	425	290	486	365	243
	16	717	541	366	641	468	317	561	399	271	455	342	228
	17	675	509	344	604	440	299	528	375	255	429	322	215
	18	638	481	325	570	416	282	498	354	241	405	304	203
	19	604	456	308	540	394	267	472	336	229	383	288	192
	20	574	433	293	513	374	254	449	319	217	364	274	182
	21	547	412	279	489	357	242	427	304	207	347	261	174
	22	522	393	266	466	340	231	408	290	197	331	249	166
	23	499	376	254	446	326	221	390	277	189	317	238	159
	24	478	361	244	428	312	212	374	266	181	304	228	152
	25	459	346	234	410	300	203	359	255	174	291	219	146
	26	441	333	225	395	288	195	345	245	167	280	211	140
	27	425	321	217	380	277	188	332	236	161	270	203	135
	28	410	309	209	366	267	181	320	228	155	260	196	130
	29	396	298	202	354	258	175	309	220	150	251	189	126
	30	383	288	195	342	250	169	299	213	145	243	183	122
	32	359	270	183	321	234	159	280	199	136	228	171	114
	34	338	255	172	302	220	149	264	188	128	214	161	107
	36	319	240	163	285	208	141	249	177	121	202	152	101
	38	302	228	154	270	197	134	236	168	114	192	144	96
	40	287	216	146	257	187	127	224	159	109	182	137	91
42	273	206	139	244	178	121	214	152	103	173	130	87	
44	261	197	133	233	170	115	204	145	99	166	125	83	
46	250	188	127	223	163	110	195	139	94				
48	239	180	122	214	156	106	187	133	90				
50	230	173	117	205	150	102	179	128	87				
52	221	166	113	197	144	98							
54	213	160	108	190	139	94							
56	205	155	104										
58	198	149	101										
60	191	144	98										
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	5030	4170	3210	3820	3190	2460	2830	2370	1830	2020	1700	1320	
S <sub>x</sub> , in. <sup>3</sup>	416**	314**	212**	347	271**	184**	283	231**	157**	224	189	132**	
Z <sub>x</sub> , in. <sup>3</sup>	487	401	307	406	335	256	331	275	211	264	220	169	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	745	596	447	683	546	410	621	497	373	559	447	335	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	11500	8650	5850	10300	7490	5080	8970	6380	4340	7290	5480	3650	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

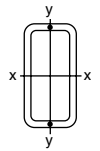
\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

F<sub>y</sub>=50



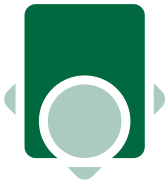
SAW

Nominal Size		32 x 24			30 x 24			28 x 24		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		225.80	183.50	138.95	217.30	176.70	133.84	208.79	169.89	128.74
Design Wall Thickness		0.625*	0.500*	0.375*	0.625*	0.500*	0.375*	0.625*	0.500*	0.375*
<b>F<sub>y</sub> = 50 ksi</b>										
Effective length KL in feet	7					1620			1510	
	8	2160	1670		2030	1570		1890	1430	934
	9	2020	1530		1840	1400		1680	1270	863
	10	1810	1370		1660	1260	895	1510	1140	776
	11	1650	1250	835	1510	1140	779	1370	1040	706
	12	1510	1150	784	1380	1050	714	1260	951	647
	13	1400	1060	723	1280	966	659	1160	878	597
	14	1300	982	672	1190	897	612	1080	815	555
	15	1210	916	627	1110	837	571	1010	761	518
	16	1130	859	588	1040	785	536	944	713	485
	17	1070	808	553	977	739	504	889	671	457
	18	1010	764	522	922	698	476	839	634	431
	19	955	723	495	874	661	451	795	601	409
	20	907	687	470	830	628	428	755	571	388
	22	825	625	427	755	571	390	687	519	353
	24	756	573	392	692	523	357	630	476	324
	26	698	529	362	638	483	330	581	439	299
	28	648	491	336	593	449	306	540	408	277
	30	605	458	313	553	419	286	504	380	259
	32	567	430	294	519	392	268	472	357	243
	34	534	404	277	488	369	252	444	336	228
	36	504	382	261	461	349	238	420	317	216
	38	477	362	247	437	330	226	398	300	204
	40	454	344	235	415	314	214	378	285	194
	42	432	327	224	395	299	204	360	272	185
	44	412	312	214	377	285	195	343	259	176
	46	394	299	204	361	273	186	328	248	169
	48	378	286	196	346	262	179	315	238	162
	50	363	275	188	332	251	171	302	228	155
	52	349	264	181	319	242	165	291	219	149
	54	336	255	174	307	233	159	280	211	144
	56	324	245	168	296	224	153	270	204	139
58	313	237	162	286	217	148	260	197	134	
60	302	229	157	277	209	143	252	190	129	
62	293	222	152	268	203	138	244	184	125	
64	283	215	147	259	196	134	236	178	121	
66	275	208	142	252	190	130	229	173	118	
68	267	202	138	244	185	126	222	168	114	
70	259	196	134	237	179	122	216	163	111	
72	252	191	131	231	174	119				
<b>PROPERTIES</b>										
I <sub>x</sub> , in. <sup>4</sup>	9880	8160	6250	8480	7010	5380	7210	5970	4580	
S <sub>x</sub> , in. <sup>3</sup>	605**	458**	313**	553**	419**	286**	504**	380**	259**	
Z <sub>x</sub> , in. <sup>3</sup>	733	601	458	668	548	418	605	497	379	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	1080	836	418	1010	810	448	945	756	467	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	18100	13700	9400	16600	12600	8570	15100	11400	7760	

Load above heavy horizontal line is limited by design shear strength.

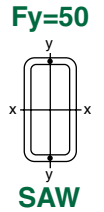
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



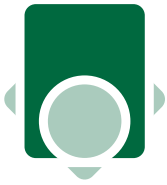
Nominal Size		26 x 24			24 x 22			22 x 20			20 x 18		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		200.28	163.08	123.64	183.27	149.47	113.43	166.25	135.86	103.22	149.24	122.25	93.01
Design Wall Thickness		0.625*	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500	0.375*
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	7	1760	1400	937	1620	1290	874	1490	1110	756	1320	951	643
	8	1710	1290	874	1520	1120	765	1360	969	661	1150	832	563
	9	1520	1150	777	1350	1000	680	1210	861	588	1020	740	500
	10	1370	1030	699	1220	900	612	1080	775	529	921	666	450
	11	1240	937	636	1110	818	556	986	704	481	837	605	409
	12	1140	859	583	1010	750	510	904	646	441	768	555	375
	13	1050	793	538	935	692	471	834	596	407	708	512	346
	14	976	736	499	868	643	437	775	553	378	658	476	322
	15	911	687	466	811	600	408	723	517	353	614	444	300
	16	854	644	437	760	562	382	678	484	331	576	416	281
	17	804	606	411	715	529	360	638	456	311	542	392	265
	18	759	573	388	675	500	340	603	430	294	512	370	250
	19	719	543	368	640	474	322	571	408	278	485	350	237
	20	683	515	350	608	450	306	542	387	264	461	333	225
	21	651	491	333	579	429	291	517	369	252	439	317	214
	22	621	469	318	553	409	278	493	352	240	419	303	205
	23	594	448	304	529	391	266	472	337	230	400	289	196
	24	569	430	291	507	375	255	452	323	220	384	277	188
	25	547	412	280	486	360	245	434	310	212	368	266	180
	26	526	396	269	468	346	235	417	298	203	354	256	173
	27	506	382	259	450	333	227	402	287	196	341	247	167
	29	471	355	241	419	310	211	374	267	182	318	230	155
	31	441	333	226	392	290	197	350	250	171	297	215	145
	33	414	312	212	368	273	185	329	235	160	279	202	136
	35	390	295	200	347	257	175	310	221	151	263	190	129
	37	369	279	189	329	243	165	293	209	143	249	180	122
	39	350	264	179	312	231	157	278	199	136	236	171	115
	41	333	251	171	297	220	149	265	189	129	225	162	110
	43	318	240	163	283	209	142	252	180	123	214	155	105
	45	304	229	155	270	200	136	241	172	118	205	148	100
	47	291	219	149	259	191	130	231	165	113	196	142	96
	49	279	210	143	248	184	125	221	158	108	188	136	92
	51	268	202	137	238	176	120	213	152	104	180	130	88
	53	258	195	132	229	170	115	205	146	100	172	124	84
	55	248	187	127	221	164	111	197	141	96	164	118	80
57	240	181	123	213	158	107	189	136	92	156	112	76	
59	232	175	119	206	153	104	181	131	88	148	108	72	
61	224	169	115	198	148	100	173	126	84	140	104	68	
63	217	164	111	191	143	96	165	121	80	132	100	64	
65	210	159	108	184	138	92	157	116	76	124	96	60	
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	6060	5020	3860	4680	3900	3000	3530	2950	2280	2590	2180	1690	
S <sub>x</sub> , in. <sup>3</sup>	456**	344**	233**	390	300**	204**	321	258**	176**	259	218	150**	
Z <sub>x</sub> , in. <sup>3</sup>	545	448	342	458	378	289	379	313	240	307	255	196	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	877	702	468	810	648	470	743	594	446	675	540	405	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	13700	10310	6990	12200	9000	6120	10800	7750	5290	9210	6660	4500	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

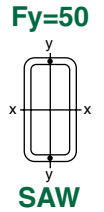
\*\* Effective section modulus, S<sub>eff</sub>, calculated in accordance with AISC "HSS Specification" Section 5.1(b).





# LRFD Beams Rectangular HSS

Maximum Factored Uniform Loads in Kips for Beams Laterally Supported



Nominal Size		20 x 16			20 x 12	18 x 12			16 x 12	14 x 12		
Wall Thickness		5/8	1/2	3/8	5/8	5/8	1/2	3/8	5/8	1/2	3/8	
Weight Per Foot		140.73	115.45	87.91	123.72	115.21	95.03	72.59	106.71	81.42	62.39	
Design Wall Thickness		0.625	0.500	0.375*	0.625	0.625	0.500	0.375	0.625	0.500	0.375*	
<b>F<sub>y</sub> = 50 ksi</b>												
Effective length KL in feet	7	1210	964	620	1000	853	720	529	716	497	368	
	8	1060	843	543	878	746	630	463	626	435	322	
	9	943	750	482	780	663	560	411	557	387	286	
	10	849	675	434	702	597	504	370	501	348	258	
	11	772	613	395	638	543	458	337	455	316	234	
	12	708	562	362	585	498	420	308	418	290	215	
	13	653	519	334	540	459	388	285	385	268	198	
	14	606	482	310	501	426	360	264	358	249	184	
	15	566	450	289	468	398	336	247	334	232	172	
	16	531	422	271	439	373	315	231	313	218	161	
	17	499	397	255	413	351	296	218	295	205	152	
	18	472	375	241	390	332	280	206	278	193	143	
	19	447	355	229	369	314	265	195	264	183	136	
	20	425	337	217	351	299	252	185	251	174	129	
	21	404	321	207	334	284	240	176	239	166	123	
	22	386	307	197	319	271	229	168	228	158	117	
	23	369	293	189	305	260	219	161	218	151	112	
	24	354	281	181	293	249	210	154	209	145	107	
	25	340	270	174	281	239	202	148	200	139	103	
	26	327	259	167	270	230	194	142	193	134	99	
	27	314	250	161	260	221	187	137	186	129	95	
	28	303	241	155	251	213	180	132	179	124	92	
	29	293	233	150	242	206	174	128	173	120	89	
	30	283	225	145	234	199	168	123	167	116	86	
	31	274	218	140	226	193	163	119	162	112	83	
	32	265	211	136	219	187	158	116	157	109	81	
	33	257	204	132	213	181	153	112	152	105	78	
	34	250	198	128	206	176	148	109	147	102	76	
	35	243	193	124	201	171	144	106	143	99	74	
	36	236	187	121	195	166	140	103	139			
	37	229	182	117	190	161	136	100	135			
	38	223	178	114	185	157	133	97	132			
	39	218	173	111	180	153	129	95	128			
	40	212	169	109	176	149	126	93	125			
	42	202	161	103	167	142	120	88				
	44	193	153	99	160	136	115	84				
	46	185	147	94	153							
	48	177	141	90	146							
	50	170	135	87	140							
	<b>PROPERTIES</b>											
	I <sub>x</sub> , in. <sup>4</sup>	2360	1990	1540	1890	1450	1240	971	1090	678	534	
	S <sub>x</sub> , in. <sup>3</sup>	236	199	145**	189	161	138	108	136	96.9	76.3	
	Z <sub>x</sub> , in. <sup>3</sup>	283	236	181	234	199	168	130	167	116	90.0	
	Φ <sub>v</sub> V <sub>n</sub> , (kips)	675	540	405	675	608	486	364	540	378	283	
	Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	8490	6750	4340	7020	5970	5040	3700	5010	3480	2580	

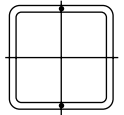
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

F<sub>y</sub>=50



Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

SAW

Nominal Size		32 x 32			30 x 30			28 x 28			26 x 26		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		259.83	210.72	159.37	242.82	197.11	149.16	225.80	183.50	138.95	208.79	169.89	128.74
Design Wall Thickness		0.625*	0.500*	0.375*	0.625*	0.500*	0.375*	0.625*	0.500*	0.375*	0.625*	0.500*	0.375*
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	7								1510			1400	937
	8		1670		2030	1620		1890	1490	934	1760	1320	890
	9	2160	1650		1990	1480		1770	1320	893	1560	1170	791
	10	1990	1480		1790	1330	895	1590	1190	804	1410	1050	712
	11	1810	1350	835	1620	1210	818	1450	1080	731	1280	959	648
	12	1660	1230	834	1490	1110	750	1330	993	670	1170	879	594
	13	1530	1140	770	1370	1030	693	1230	916	618	1080	811	548
	14	1420	1060	715	1280	952	643	1140	851	574	1000	753	509
	15	1330	988	667	1190	889	600	1060	794	536	938	703	475
	16	1240	926	626	1120	833	563	996	744	503	879	659	445
	17	1170	871	589	1051	784	530	937	701	473	827	620	419
	18	1100	823	556	993	741	500	885	662	447	781	586	396
	19	1047	780	527	941	702	474	839	627	423	740	555	375
	20	994	741	501	894	667	450	797	596	402	703	527	356
	22	904	673	455	812	606	409	724	541	365	639	479	324
	24	829	617	417	745	556	375	664	496	335	586	439	297
	26	765	570	385	687	513	346	613	458	309	541	406	274
	28	710	529	358	638	476	322	569	425	287	502	377	254
	30	663	494	334	596	444	300	531	397	268	469	352	237
	32	621	463	313	559	417	281	498	372	251	440	330	223
	34	585	436	294	526	392	265	469	350	236	414	310	209
	36	552	412	278	496	370	250	443	331	223	391	293	198
	38	523	390	263	470	351	237	419	313	212	370	278	187
	40	497	370	250	447	333	225	398	298	201	352	264	178
	42	474	353	238	426	317	214	379	284	191	335	251	170
	44	452	337	228	406	303	205	362	271	183	320	240	162
	46	432	322	218	389	290	196	346	259	175	306	229	155
	48	414	309	209	372	278	188	332	248	168	293	220	148
50	398	296	200	357	267	180	319	238	161	281	211	142	
52	382	285	193	344	256	173	306	229	155	270	203	137	
54	368	274	185	331	247	167	295	221	149	260	195	132	
56	355	265	179	319	238	161	285	213	144	251	188	127	
58	343	255	173	308	230	155	275	205	139	243	182	123	
60	331	247	167	298	222	150	266	199	134	234	176	119	
62	321	239	161	288	215	145	257	192	130	227	170	115	
64	311	231	156	279	208	141	249	186	126	220	165	111	
66	301	224	152	271	202	136	241	180	122				
68	292	218	147	263	196	132	234	175	118				
70	284	212	143	255	190	129	228	170	115				
72	276	206	139	248	185	125							
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	12300	10100	7750	10100	8320	6370	8140	6730	5150	6460	5350	4110	
S <sub>x</sub> , in. <sup>3</sup>	663**	494**	334**	596**	444**	300**	531**	397**	268**	469**	352**	237**	
Z <sub>x</sub> , in. <sup>3</sup>	890	727	553	778	637	485	674	552	421	577	474	362	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	1080	836	418	1010	810	448	945	756	467	877	702	468	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	19900	14800	10000	17900	13300	9000	15900	11900	8040	14100	10550	7120	

Load above heavy horizontal line is limited by design shear strength.

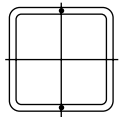
\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



# LRFD Beams Square HSS

F<sub>y</sub>=50



Maximum Factored Uniform Loads in Kips for Beams Laterally Supported

SAW

Nominal Size		24 x 24			22 x 22			20 x 20			18 x 18		
Wall Thickness		5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8	5/8	1/2	3/8
Weight Per Foot		191.78	156.28	118.53	174.76	142.67	108.32	157.75	129.06	98.12	140.73	115.45	87.91
Design Wall Thickness		0.625*	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500*	0.375*	0.625	0.500	0.375*
<b>F<sub>y</sub> = 50 ksi</b>													
Effective length KL in feet	6			940		1190	891		1080	773	1220	961	650
	7	1620	1300	893	1490	1140	775	1350	974	663	1130	824	557
	8	1530	1160	781	1350	1000	678	1190	852	580	990	721	488
	9	1360	1030	694	1200	889	602	1060	758	515	880	641	433
	10	1230	924	625	1080	800	542	950	682	464	792	577	390
	11	1120	840	568	983	727	493	863	620	422	720	524	355
	12	1020	770	521	901	667	452	791	568	387	660	481	325
	13	944	711	481	831	616	417	731	524	357	609	444	300
	14	877	660	446	772	572	387	678	487	331	566	412	279
	15	818	616	417	721	533	361	633	455	309	528	385	260
	16	767	578	391	676	500	339	594	426	290	495	361	244
	17	722	544	368	636	471	319	559	401	273	466	339	229
	18	682	514	347	600	445	301	528	379	258	440	320	217
	19	646	487	329	569	421	285	500	359	244	417	304	205
	20	614	462	312	540	400	271	475	341	232	396	288	195
	21	584	440	298	515	381	258	452	325	221	377	275	186
	22	558	420	284	491	364	246	432	310	211	360	262	177
	23	534	402	272	470	348	236	413	296	202	344	251	170
	24	511	385	260	450	333	226	396	284	193	330	240	163
	25	491	370	250	432	320	217	380	273	186	317	231	156
	26	472	356	240	416	308	209	365	262	178	305	222	150
	27	455	342	231	400	296	201	352	253	172	293	214	144
	28	438	330	223	386	286	194	339	243	166	283	206	139
	29	423	319	216	373	276	187	327	235	160	273	199	134
	30	409	308	208	360	267	181	317	227	155	264	192	130
	32	384	289	195	338	250	169	297	213	145	248	180	122
	34	361	272	184	318	235	159	279	201	136	233	170	115
	36	341	257	174	300	222	151	264	189	129	220	160	108
	38	323	243	164	284	211	143	250	179	122	208	152	103
	40	307	231	156	270	200	136	237	170	116	198	144	98
42	292	220	149	257	191	129	226	162	110	189	137	93	
44	279	210	142	246	182	123	216	155	105	180	131	89	
46	267	201	136	235	174	118	206	148	101				
48	256	193	130	225	167	113	198	142	97				
50	245	185	125	216	160	108	190	136	93				
52	236	178	120	208	154	104							
54	227	171	116	200	148	100							
56	219	165	112										
58	212	159	108										
60	205	154	104										
<b>PROPERTIES</b>													
I <sub>x</sub> , in. <sup>4</sup>	5030	4170	3210	3820	3190	2460	2830	2370	1830	2020	1700	1320	
S <sub>x</sub> , in. <sup>3</sup>	409**	308**	208**	347	267**	181**	283	227**	155**	224	189	130**	
Z <sub>x</sub> , in. <sup>3</sup>	487	401	307	406	335	256	331	275	211	264	220	169	
Φ <sub>v</sub> V <sub>n</sub> , (kips)	810	648	470	743	594	446	675	540	405	608	486	364	
Φ <sub>b</sub> W <sub>c</sub> , (kip-ft)	12300	9240	6250	10800	8000	5420	9500	6820	4640	7920	5770	3900	

Load above heavy horizontal line is limited by design shear strength.

\* Section contains slender compression element; i.e.  $\lambda > \lambda_r$ .

\*\* Effective section modulus, S<sub>eff</sub> calculated in accordance with AISC "HSS Specification" Section 5.1(b).



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