

HOLLOW STRUCTURAL SECTIONS

DIMENSIONS AND SECTION PROPERTIES



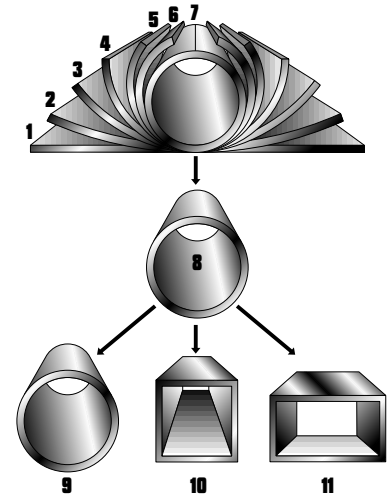
**Steel Tube
Institute**
OF NORTH AMERICA

HSS Manufacturing Methods

The transformation of steel strip into hollow structural sections (HSS) is the result of a series of operations including forming, welding and sizing. Currently three methods are being used in North America for the manufacture of HSS. These methods are described below. Each method meets ASTM A-500 and CSA G-40.21-92 requirements for the the manufacture of HSS, and the sizes listed in this brochure may be produced to either standard.

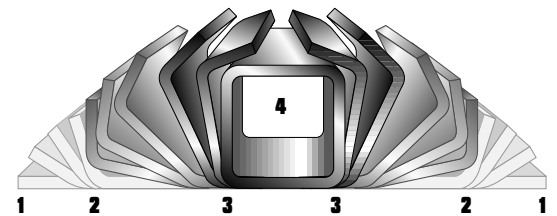
Electric Resistance Welding (ERW) Process

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.



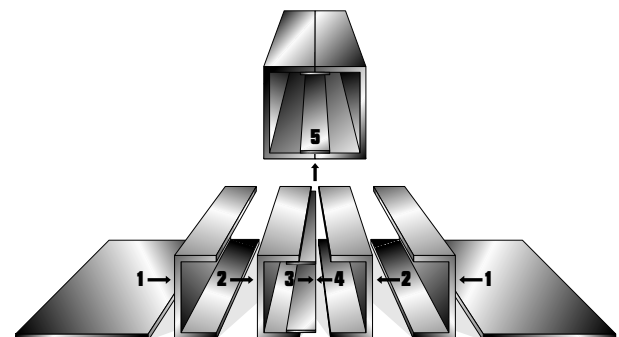
Form-Square Weld-Square (ERW) Process

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).



STI/HSS Member Companies

Atlas Tube, Inc.

200 Clark Street, P.O. Box 970
Harrow, Ontario Canada N0R 1G0
Telephone: (519) 738-3541
(800) 265-6912
Fax: (519) 738-3537

Bull Moose Tube Company

1819 Clarkson Road, Suite 100
Chesterfield, MO 63017
Telephone: (636) 537-2600
(800) 325-4467
Fax: (636) 537-5848

Columbia Structural Tubing

8735 N Harborage ST
Portland, OR 97203
Telephone: (503) 737-1200
(877) 737-1202
Fax: (503) 737-1202

Copperweld

1855 East 122nd Street
Chicago, IL 60633
Telephone: (800) 733-5683
Fax: (773) 646-6305
(In Canada)
14 Holtby Avenue
Brampton, Ontario
Canada L6X 2M3
Telephone: (905) 451-2400
(800) 268-3005
Fax: (905) 451-2795

Eugene Welding Company

P.O. Box 249
Marysville, MI 48040
Telephone: (810) 364-7421
(800) 336-3926
Fax: (810) 364-4347

Hannibal Industries, Inc.

P.O. Box 58814,
3851 Santa Fe Avenue
Los Angeles, CA 90058
Telephone: (323) 588-4261
Fax: (323) 589-5640

Independence Tube Corporation

6226 W. 74th Street
Chicago, IL 60638-6196
Telephone: (708) 496-0380
(800) 376-6000
Fax: (708) 563-1950

IPSCO Tubulars Inc.

P.O. Box 18, 2011 7th Avenue
Camanche, IA 52730
Telephone: (563) 242-0000
(800) 945-8936
Fax: (563) 242-9137

Maruichi American Corp.

P.O. Box 3187
11529 Greenstone Ave.
Santa Fe Springs, CA 90670
Telephone: (562) 903-8600
(800) 654-5495
Fax: (562) 903-8601

Novamerican Steel Inc.

2175 Hymus Boulevard
Dorval, Quebec, Canada H9P 1J8
Telephone: (514) 335-6682
(800) 361-1496
Fax: (514) 683-5285
(In United States)
600 Dean Sievres Place
Morrisville, PA 19067
Telephone: (215) 295-8813
Fax: (215) 295-8798

Productos Laminados de Monterrey, SA de CV

Headquarters & Monterrey Plant
Ave. Lazaro Cardenas 1525 Pte.
Col. Nino Artillero
Monterrey, N.L. Mexico C.P. 64280
Telephone: (8) 351-1625
(8) 351-1070

Fax: (8) 351-0322
(U.S. Office)

Prolamsa, Inc.

770 South Post Oak Lane,
Suite 200, Houston, TX 77056
Telephone: (281) 494-0900
Fax: (281) 494-0990

Southland Tube Inc.

P.O. Box 2425
Birmingham, AL 35201-2425
Telephone: (205) 251-1884
(800) 543-9024
FAX: (205) 251-1553

Valmont Industries

(Structural Tube Division)
HWY 275, P.O. Box 358
Valley, NB 68064
Telephone: (800) 345-6825
Fax: (402) 359-4481

Vest, Incorporated

6023 Alcoa Avenue
Los Angeles, CA 90058
Telephone: (323) 581-8823
(800) 421-6370
Fax: (323) 581-3465

Welded Tube of Canada Limited

111 Rayette Road
Concord, Ontario,
Canada L4K 2E9
Telephone: (905) 669-1111
(800) 565-8823
Fax: (905) 669-8570

Please Note:

We've tried to make this brochure as comprehensive and factual as possible. It contains the most popular sizes, shapes and gauges of HSS. Please check our member companies for other, or special order sizes, shapes and gauges. Some information may have been updated since the time of printing. Your HSS producer is your best source for up-to-date information.

To contact any of the suppliers on the information given in this publication, select the company name and the appropriate website will launch.



FOREWORD

This publication presents tables of dimensions and section properties for rectangular, square, and round Hollow Structural Sections (HSS). HSS with a maximum periphery of 64 inches are manufactured by the electric-resistance welding (ERW) process. HSS with peripheries greater than 64 inches are manufactured by the submerged arc welding (SAW) process. See HSS Manufacturing Methods inside front cover in this publication.

The dimensions, including nominal width, nominal depth, nominal diameter and nominal wall thickness are subject to the permissible variations stipulated in ASTM A500 "Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes".

With today's manufacturing methods, HSS are produced with more precision than in the past. The strip used to produce HSS is now ordered to thicknesses with tighter tolerances. As a result, ERW HSS manufactured to A500 will often have a wall thickness close to the Specification allowable value.

In a change from past practice, section property data is now based upon the design wall thickness. The design wall thickness, t , for ERW HSS is less than the specified nominal wall thickness. For SAW HSS, the design wall thickness, t , is equal to the specified nominal wall thickness. The design wall thickness for each HSS size is included in the tabulated data.

The section property data based upon the design wall thickness, t , results in variations in the published area data that do not exceed 3.50% of the data based upon the minimum permissible wall thickness stipulated in ASTM A500. This is consistent with the similar section property data published for hot rolled structural shapes and the manufacturing tolerances associated with those products.

The section property data for rectangular and square ERW HSS are based upon outside corner radii equal to 2.0 times the design wall thickness. The section property data for rectangular and square SAW HSS are based upon outside corner radii equal to 3.6 times the design wall thickness for SAW sections with 5/8 inch nominal wall thicknesses; and 3.0 times the design wall thickness for SAW sections with nominal wall thicknesses equal to 1/2 inch and 3/8 inch.

General availability information for each size of HSS manufactured to ASTM A500 Grade B is contained in The Steel Tube Institute's companion publication "Principal Producers and Capabilities". Tables, summarizing the capabilities of principal producers by specific size and wall thickness, are included for rectangular, square and round HSS.

NOTE: The more universal terms "Hollow Structural Section" and "HSS" are used in this publication to designate rectangular, square and round structural steel tubing. These terms replace "structural tubing" and "pipe", which had been used previously. The round Hollow Structural Sections include typical "pipe" size diameters and wall thicknesses, as well as typical HSS sizes.

The information presented in this publication has been prepared in accordance with recognized engineering principles and is for general information only. While it is believed to be accurate, this information should not be used or relied upon for any specific application without competent professional examination and verification of its accuracy, suitability, and applicability by a licensed professional engineer, designer, or architect. The publication of the material contained herein is not intended as a representation or warranty on the part of The Steel Tube Institute of North America or of any other person named herein, that this information is suitable for any general or particular use or of freedom from infringement of any patent or patents. Anyone making use of this information assumes all liability arising from such use.

Caution must be exercised when relying upon other specifications and codes developed by other bodies and incorporated by reference herein since such material may be modified or amended from time to time subsequent to the printing of this edition. The Institute bears no responsibility for such material other than to refer to it and incorporate it by reference at the time of the initial publication of this edition.

"Designs for the 21st Century"



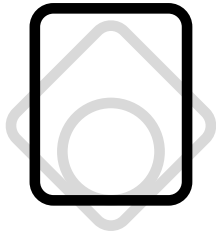
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NOMENCLATURE

b	Nominal width minus 3 times the design wall thickness, t (in.)
C	Torsional shear constant of cross-section (in. ³)
D	Outside diameter of round HSS (in.)
h	Nominal depth minus 3 times the design wall thickness, t (in.)
I	Moment of inertia of cross-section (in. ⁴)
I_x	Moment of inertia of cross-section about the X-X axis (in. ⁴)
I_y	Moment of inertia of cross-section about the Y-Y axis (in. ⁴)
J	Torsional stiffness constant of cross-section (in. ⁴)
r	Governing radius of gyration (in.)
r_x	Radius of gyration with respect to the X-X axis (in.)
r_y	Radius of gyration with respect to the Y-Y axis (in.)
S	Elastic section modulus (in. ³)
S_x	Elastic section modulus about the X-X axis (in. ³)
S_y	Elastic section modulus about the Y-Y axis (in. ³)
t	Design wall thickness (in.)... “units added”
Z	Plastic section modulus (in. ³)
Z_x	Plastic section modulus about the X-X axis (in. ³)
Z_y	Plastic section modulus about the Y-Y axis (in. ³)





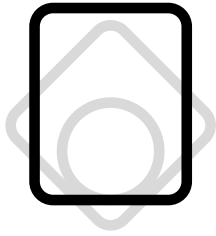
DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
in.	in.	in.	lb.	in.			in. ²	I _x in. ⁴	S _x in. ³	r _x in.	Z _x in. ³	I _y in. ⁴	S _y in. ³	r _y in.	Z _y in. ³	in. ⁴	in. ³	ft. ²	
32	x	24	x 5/8*	225.80	0.625	35.4	48.2	66.4	9880	617	12.2	733	6390	533	9.81	604	12600	913	9.01
			x 1/2*	183.50	0.500	45.0	61.0	53.9	8160	510	12.3	601	5280	440	9.89	495	10100	739	9.12
			x 3/8*	138.95	0.375	61.0	82.3	40.8	6250	391	12.4	458	4050	337	9.96	378	7670	560	9.17
30	x	24	x 5/8*	217.30	0.625	35.4	45.0	63.9	8480	565	11.5	668	6050	504	9.73	575	11400	854	8.68
			x 1/2*	176.70	0.500	45.0	57.0	51.9	7010	468	11.6	548	5000	417	9.82	472	9220	692	8.79
			x 3/8*	133.84	0.375	61.0	77.0	39.3	5380	359	11.7	418	3840	320	9.88	360	6990	524	8.84
28	x	24	x 5/8*	208.79	0.625	35.4	41.8	61.4	7210	515	10.8	605	5710	476	9.65	546	10300	796	8.34
			x 1/2*	169.89	0.500	45.0	53.0	49.9	5970	426	10.9	497	4730	394	9.73	448	8330	645	8.45
			x 3/8*	128.74	0.375	61.0	71.7	37.8	4580	327	11.0	379	3630	302	9.79	342	6320	489	8.51
26	x	24	x 5/8*	200.28	0.625	35.4	38.6	58.9	6060	466	10.1	545	5370	447	9.55	517	9240	737	8.01
			x 1/2*	163.08	0.500	45.0	49.0	47.9	5020	386	10.2	448	4450	371	9.64	425	7460	598	8.12
			x 3/8*	123.64	0.375	61.0	66.3	36.3	3860	297	10.3	342	3420	285	9.70	324	5660	453	8.17
24	x	22	x 5/8*	183.27	0.625	32.2	35.4	53.9	4680	390	9.33	458	4110	373	8.73	432	7150	621	7.34
			x 1/2*	149.47	0.500	41.0	45.0	43.9	3900	325	9.42	378	3420	311	8.82	356	5780	504	7.45
			x 3/8*	113.43	0.375	55.7	61.0	33.3	3000	250	9.49	289	2630	239	8.89	273	4390	383	7.51
22	x	20	x 5/8*	166.25	0.625	29.0	32.2	48.9	3530	321	8.51	379	3060	306	7.91	355	5400	514	6.68
			x 1/2*	135.86	0.500	37.0	41.0	39.9	2950	269	8.60	313	2560	256	8.00	294	4370	418	6.79
			x 3/8*	103.22	0.375	50.3	55.7	30.3	2280	207	8.67	240	1970	197	8.07	225	3330	318	6.84



* This size produced by the submerged arc weld (SAW) process

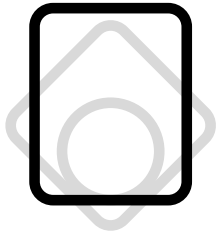


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size				Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
in.	in.	in.	in.	lb.	in.			in. ²	I _x in. ⁴	S _x in. ³	r _x in.	Z _x in. ³	I _y in. ⁴	S _y in. ³	r _y in.	Z _y in. ³	in. ⁴	in. ³	ft. ²	
20	x	18	x	5/8*	149.24	0.625	25.8	29.0	43.9	2590	259	7.69	307	2210	245	7.10	286	3960	417	6.01
				1/2*	122.25	0.500	33.0	37.0	35.9	2180	218	7.78	255	1850	206	7.19	238	3220	340	6.12
				3/8*	93.01	0.375	45.0	50.3	27.3	1690	169	7.85	196	1440	160	7.25	183	2450	259	6.17
20	x	16	x	5/8*	140.73	0.625	22.6	29.0	41.4	2360	236	7.55	283	1680	210	6.37	243	3280	368	5.68
				1/2*	115.45	0.500	29.0	37.0	33.9	1990	199	7.65	236	1410	177	6.46	203	2670	301	5.79
				3/8*	87.91	0.375	39.7	50.3	25.8	1540	154	7.72	181	1100	137	6.52	156	2040	229	5.84
20	x	12	x	5/8*	123.72	0.625	16.2	29.0	36.4	1890	189	7.20	234	864	144	4.87	166	2030	271	5.01
				1/2	103.30	0.465	22.8	40.0	28.3	1550	155	7.39	188	705	117	4.99	132	1540	209	5.20
				3/8	78.52	0.349	31.4	54.3	21.5	1200	120	7.45	144	547	91.1	5.04	102	1180	160	5.23
				5/16	65.87	0.291	38.2	65.7	18.1	1010	101	7.48	122	464	77.3	5.07	85.8	997	134	5.25
20	x	8	x	5/8	110.36	0.581	10.8	31.4	30.3	1440	144	6.89	185	338	84.6	3.34	96.4	916	167	4.50
				1/2	89.68	0.465	14.2	40.0	24.6	1190	119	6.96	152	283	70.8	3.39	79.5	757	137	4.53
				3/8	68.31	0.349	19.9	54.3	18.7	926	92.6	7.03	117	222	55.6	3.44	61.5	586	105	4.57
				5/16	57.36	0.291	24.5	65.7	15.7	786	78.6	7.07	98.6	189	47.4	3.47	52.0	496	88.3	4.58
20	x	4	x	1/2	76.07	0.465	5.6	40.0	20.9	838	83.8	6.33	115	58.7	29.3	1.68	34.0	195	63.8	3.87
				3/8	58.10	0.349	8.5	54.3	16.0	657	65.7	6.42	89.3	47.6	23.8	1.73	26.8	156	49.9	3.90
				5/16	48.86	0.291	10.7	65.7	13.4	560	56.0	6.46	75.6	41.2	20.6	1.75	22.9	134	42.4	3.92
18	x	12	x	5/8*	115.21	0.625	16.2	25.8	33.9	1450	161	6.55	199	783	131	4.81	152	1740	243	4.68
				1/2*	95.03	0.500	21.0	33.0	27.9	1240	138	6.67	168	668	111	4.89	127	1430	200	4.79
				3/8*	72.59	0.375	29.0	45.0	21.3	971	108	6.75	130	524	87.3	4.95	98.6	1100	153	4.84
18	x	6	x	5/8	93.34	0.581	7.3	28.0	25.7	923	103	6.00	135	158	52.6	2.48	61.0	462	109	3.83
				1/2	76.07	0.465	9.9	35.7	20.9	770	85.6	6.07	112	134	44.6	2.53	50.7	387	89.9	3.87
				3/8	58.10	0.349	14.2	48.6	16.0	602	66.9	6.15	86.4	106	35.5	2.58	39.5	302	69.5	3.90
				5/16	48.86	0.291	17.6	58.9	13.4	513	57.0	6.18	73.1	91.3	30.4	2.61	33.5	257	58.7	3.92
				1/4	39.43	0.233	22.8	74.3	10.8	419	46.5	6.22	59.4	75.1	25.0	2.63	27.3	210	47.7	3.93

* This size produced by the submerged arc weld (SAW) process

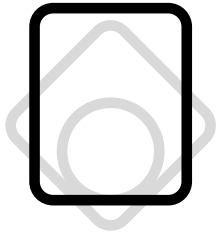


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size				Weight per Foot	Wall Thickness t			Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
in.	in.	in.	in.			b/t	h/t		in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y
16	x	12	x	5/8*	106.71	0.625	16.2	22.6	31.4	1090	136	5.89	167	702	117	4.73	137	1470	215	4.34
				1/2	89.68	0.465	22.8	31.4	24.6	904	113	6.06	135	581	96.8	4.86	111	1120	166	4.53
				3/8	68.31	0.349	31.4	42.8	18.7	702	87.7	6.12	104	452	75.3	4.91	85.5	862	127	4.57
				5/16	57.36	0.291	38.2	52.0	15.7	595	74.4	6.15	87.7	384	64.0	4.94	72.2	727	107	4.58
16	x	8	x	5/8	93.34	0.581	10.8	24.5	25.7	815	102	5.63	129	274	68.5	3.27	79.2	681	132	3.83
				1/2	76.07	0.465	14.2	31.4	20.9	679	84.9	5.70	106	230	57.6	3.32	65.5	563	108	3.87
				3/8	58.10	0.349	19.9	42.8	16.0	531	66.3	5.77	82.1	181	45.3	3.37	50.8	436	83.4	3.90
				5/16	48.86	0.291	24.5	52.0	13.4	451	56.4	5.80	69.4	155	38.7	3.40	43.0	369	70.4	3.92
16	x	4	x	1/2	62.46	0.465	5.6	31.4	17.2	455	56.9	5.15	77.3	47.0	23.5	1.65	27.4	150	50.7	3.20
				3/8	47.90	0.349	8.5	42.8	13.2	360	45.0	5.23	60.2	38.3	19.1	1.71	21.7	120	39.7	3.23
				5/16	40.35	0.291	10.7	52.0	11.1	308	38.5	5.27	51.1	33.2	16.6	1.73	18.5	103	33.8	3.25
14	x	12	x	1/2*	81.42	0.500	21.0	25.0	23.9	678	96.9	5.32	116	536	89.3	4.73	104	990	154	4.12
				3/8*	62.39	0.375	29.0	34.3	18.3	534	76.3	5.40	90.0	422	70.4	4.80	81.2	762	118	4.17
14	x	10	x	5/8	93.34	0.581	14.2	21.1	25.7	687	98.2	5.17	120	407	81.5	3.98	95.1	832	146	3.83
				1/2	76.07	0.465	18.5	27.1	20.9	573	81.8	5.23	98.8	341	68.1	4.04	78.5	685	120	3.87
				3/8	58.10	0.349	25.7	37.1	16.0	447	63.9	5.29	76.3	267	53.4	4.09	60.7	528	91.8	3.90
				5/16	48.86	0.291	31.4	45.1	13.4	380	54.3	5.32	64.6	227	45.5	4.12	51.4	446	77.4	3.92
				1/4	39.43	0.233	39.9	57.1	10.8	310	44.3	5.35	52.4	186	37.2	4.14	41.8	362	62.6	3.93
14	x	6	x	5/8	76.33	0.581	7.3	21.1	21.0	478	68.2	4.77	88.7	124	41.2	2.43	48.4	334	83.7	3.17
				1/2	62.46	0.465	9.9	27.1	17.2	402	57.4	4.84	73.6	105	35.1	2.48	40.4	279	69.3	3.20
				3/8	47.90	0.349	14.2	37.1	13.2	317	45.3	4.91	57.3	84.1	28.0	2.53	31.6	219	53.7	3.23
				5/16	40.35	0.291	17.6	45.1	11.1	271	38.7	4.94	48.6	72.3	24.1	2.55	26.9	186	45.5	3.25
				1/4	32.63	0.233	22.8	57.1	8.96	222	31.7	4.98	39.6	59.6	19.9	2.58	22.0	152	36.9	3.27
				3/16	24.73	0.174	31.5	77.5	6.76	170	24.3	5.01	30.1	45.9	15.3	2.61	16.7	116	28.0	3.28
14	x	4	x	5/8	67.82	0.581	3.9	21.1	18.7	373	53.3	4.47	73.1	47.1	23.6	1.59	28.5	148	52.6	2.83
				1/2	55.66	0.465	5.6	27.1	15.3	317	45.3	4.55	61.0	41.1	20.6	1.64	24.1	127	44.1	2.87
				3/8	42.79	0.349	8.5	37.1	11.8	252	36.0	4.63	47.8	33.6	16.8	1.69	19.1	102	34.6	2.90
				5/16	36.10	0.291	10.7	45.1	9.92	216	30.9	4.67	40.6	29.2	14.6	1.72	16.4	87.7	29.5	2.92
				1/4	29.23	0.233	14.2	57.1	8.03	178	25.4	4.71	33.2	24.4	12.2	1.74	13.5	72.4	24.1	2.93
				3/16	22.18	0.174	20.0	77.5	6.06	137	19.5	4.74	25.3	19.0	9.48	1.77	10.3	55.8	18.4	2.95

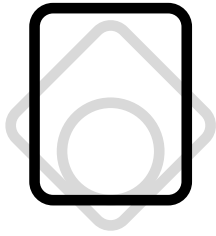
* This size produced by the submerged arc weld (SAW) process



DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



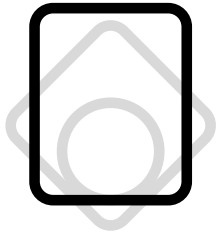
Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot		
in.	in.	in.						in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y	
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²		
12	x	10	x	1/2	69.27	0.465	18.5	22.8	19.0	395	65.9	4.56	78.8	298	59.7	3.96	69.6	545	102	3.53
				3/8	53.00	0.349	25.7	31.4	14.6	310	51.6	4.61	61.1	234	46.9	4.01	54.0	421	78.3	3.57
				5/16	44.60	0.291	31.4	38.2	12.2	264	44.0	4.64	51.7	200	40.0	4.04	45.7	356	66.1	3.58
				1/4	36.03	0.233	39.9	48.5	9.90	216	36.0	4.67	42.1	164	32.7	4.07	37.2	289	53.5	3.60
12	x	8	x	5/8	76.33	0.581	10.8	17.7	21.0	396	66.1	4.34	82.1	210	52.5	3.16	61.9	454	97.7	3.17
				1/2	62.46	0.465	14.2	22.8	17.2	333	55.5	4.40	68.1	177	44.4	3.21	51.5	377	80.4	3.20
				3/8	47.90	0.349	19.9	31.4	13.2	262	43.7	4.47	53.0	140	35.1	3.27	40.1	293	62.1	3.23
				5/16	40.35	0.291	24.5	38.2	11.1	224	37.4	4.50	44.9	120	30.1	3.29	34.1	248	52.4	3.25
				1/4	32.63	0.233	31.3	48.5	8.96	184	30.6	4.53	36.6	98.8	24.7	3.32	27.8	202	42.5	3.27
				3/16	24.73	0.174	43.0	66.0	6.76	140	23.4	4.56	27.8	75.7	18.9	3.35	21.1	153	32.2	3.28
12	x	6	x	5/8	67.82	0.581	7.3	17.7	18.7	321	53.4	4.14	68.8	106	35.5	2.39	42.1	271	71.1	2.83
				1/2	55.66	0.465	9.9	22.8	15.3	271	45.2	4.21	57.4	91.1	30.4	2.44	35.2	227	59.0	2.87
				3/8	42.79	0.349	14.2	31.4	11.8	215	35.8	4.28	44.8	72.9	24.3	2.49	27.7	178	45.8	2.90
				5/16	36.10	0.291	17.6	38.2	9.92	184	30.7	4.31	38.1	62.8	20.9	2.52	23.6	152	38.8	2.92
				1/4	29.23	0.233	22.8	48.5	8.03	151	25.2	4.34	31.1	51.9	17.3	2.54	19.3	124	31.6	2.93
				3/16	22.18	0.174	31.5	66.0	6.06	116	19.4	4.38	23.7	40.0	13.3	2.57	14.7	94.6	24.0	2.95
12	x	4	x	5/8	59.32	0.581	3.9	17.7	16.4	245	40.8	3.87	55.5	40.3	20.1	1.57	24.5	122	44.6	2.50
				1/2	48.85	0.465	5.6	22.8	13.5	209	34.9	3.95	46.7	35.3	17.6	1.62	20.9	105	37.5	2.53
				3/8	37.69	0.349	8.5	31.4	10.4	168	28.0	4.02	36.7	28.9	14.5	1.67	16.6	84.1	29.5	2.57
				5/16	31.84	0.291	10.7	38.2	8.76	144	24.0	4.06	31.3	25.2	12.6	1.70	14.2	72.4	25.2	2.58
				1/4	25.82	0.233	14.2	48.5	7.10	119	19.9	4.10	25.6	21.0	10.5	1.72	11.7	59.8	20.6	2.60
				3/16	19.63	0.174	20.0	66.0	5.37	91.8	15.3	4.13	19.6	16.4	8.20	1.75	9.00	46.1	15.7	2.62
12	x	3 1/2	x	3/8	36.41	0.349	7.0	31.4	10.0	156	26.0	3.94	34.7	21.3	12.2	1.46	14.0	64.7	25.5	2.48
				5/16	24.97	0.291	9.0	38.2	8.46	134	22.4	3.98	29.6	18.6	10.6	1.48	12.1	56.0	21.8	2.50
12	x	3	x	5/16	29.72	0.291	7.3	38.2	8.17	124	20.7	3.90	27.9	13.1	8.73	1.27	10.0	41.3	18.4	2.42
				1/4	24.12	0.233	9.9	48.5	6.63	103	17.2	3.94	22.9	11.1	7.38	1.29	8.28	34.5	15.1	2.43
				3/16	18.35	0.174	14.2	66.0	5.02	79.6	13.3	3.98	17.5	8.72	5.81	1.32	6.40	26.8	11.6	2.45
12	x	2	x	1/4	22.42	0.233	5.6	48.5	6.17	86.9	14.5	3.75	20.1	4.40	4.40	0.845	5.08	15.1	9.64	2.27
				3/16	17.08	0.174	8.5	66.0	4.67	67.4	11.2	3.80	15.5	3.55	3.55	0.872	3.97	12.0	7.49	2.28



DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size				Weight per Foot	Wall Thickness t	b/t		h/t		Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot
in.	in.	in.	in.	lb.	in.					in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y	Z _y	in. ⁴	in. ³	ft. ²
10	x	8	x 1/2	55.66	0.465	14.2	18.5	15.3	214	42.7	3.73	51.9	151	37.8	3.14	44.5	288	66.4	2.87		
			3/8	42.79	0.349	19.9	25.7	11.8	169	33.9	3.79	40.5	120	30.0	3.19	34.8	224	51.4	2.90		
			5/16	36.10	0.291	24.5	31.4	9.92	145	29.0	3.82	34.4	103	25.7	3.22	29.6	190	43.5	2.92		
			1/4	29.23	0.233	31.3	39.9	8.03	119	23.8	3.85	28.1	84.7	21.2	3.25	24.2	155	35.3	2.93		
			3/16	22.18	0.174	43.0	54.5	6.06	91.4	18.3	3.88	21.4	65.1	16.3	3.28	18.4	118	26.7	2.95		
10	x	6	x 5/8	59.32	0.581	7.3	14.2	16.4	201	40.2	3.50	51.3	89.4	29.8	2.34	35.8	209	58.6	2.50		
			1/2	48.85	0.465	9.9	18.5	13.5	171	34.3	3.57	43.0	76.8	25.6	2.39	30.1	176	48.7	2.53		
			3/8	37.69	0.349	14.2	25.7	10.4	137	27.3	3.63	33.8	61.8	20.6	2.44	23.7	139	37.9	2.57		
			5/16	31.84	0.291	17.6	31.4	8.76	118	23.5	3.66	28.8	53.3	17.8	2.47	20.2	118	32.2	2.58		
			1/4	25.82	0.233	22.8	39.9	7.10	96.9	19.4	3.69	23.6	44.1	14.7	2.49	16.6	96.7	26.2	2.60		
3/16	19.63	0.174	31.5	54.5	5.37	74.6	14.9	3.73	18.0	34.1	11.4	2.52	12.7	73.8	19.9	2.62					
10	x	5	x 3/8	35.13	0.349	11.3	25.7	9.67	120	24.1	3.53	30.4	40.6	16.2	2.05	18.7	100	31.2	2.40		
			5/16	29.72	0.291	14.2	31.4	8.17	104	20.8	3.56	26.0	35.2	14.1	2.07	16.0	86.0	26.5	2.42		
			1/4	24.12	0.233	18.5	39.9	6.63	85.8	17.2	3.60	21.3	29.3	11.7	2.10	13.2	70.7	21.6	2.43		
			3/16	18.35	0.174	25.7	54.5	5.02	66.2	13.2	3.63	16.3	22.7	9.09	2.13	10.1	54.1	16.5	2.45		
10	x	4	x 5/8	50.81	0.581	3.9	14.2	14.0	149	29.9	3.26	40.3	33.4	16.7	1.54	20.6	95.7	36.7	2.17		
			1/2	42.05	0.465	5.6	18.5	11.6	129	25.8	3.34	34.1	29.4	14.7	1.59	17.6	82.6	31.0	2.20		
			3/8	32.58	0.349	8.5	25.7	8.97	104	20.8	3.41	27.0	24.3	12.1	1.64	14.0	66.5	24.4	2.23		
			5/16	27.59	0.291	10.7	31.4	7.59	90.1	18.0	3.44	23.1	21.2	10.6	1.67	12.1	57.3	20.9	2.25		
			1/4	22.42	0.233	14.2	39.9	6.17	74.7	14.9	3.48	19.0	17.7	8.87	1.70	9.96	47.4	17.1	2.27		
3/16	17.08	0.174	20.0	54.5	4.67	57.8	11.6	3.52	14.6	13.9	6.93	1.72	7.66	36.5	13.1	2.28					
10	x	3 1/2	x 3/16	16.44	0.174	17.1	54.5	4.50	53.6	10.7	3.45	13.7	10.3	5.89	1.51	6.52	28.6	11.4	2.20		
10	x	3	x 3/8	30.03	0.349	5.6	25.7	8.27	88.0	17.6	3.26	23.7	12.4	8.27	1.22	9.73	37.8	17.7	2.07		
			5/16	25.46	0.291	7.3	31.4	7.01	76.3	15.3	3.30	20.3	11.0	7.30	1.25	8.42	33.0	15.2	2.08		
			1/4	20.72	0.233	9.9	39.9	5.70	63.6	12.7	3.34	16.7	9.28	6.18	1.28	6.99	27.6	12.5	2.10		
			3/16	15.80	0.174	14.2	54.5	4.32	49.4	9.87	3.38	12.8	7.33	4.89	1.30	5.41	21.5	9.64	2.12		
1/8	10.71	0.116	22.9	83.2	2.93	34.2	6.83	3.42	8.80	5.16	3.44	1.33	3.74	14.9	6.61	2.13					
10	x	2	x 3/8	27.48	0.349	2.7	25.7	7.58	71.7	14.3	3.08	20.3	4.69	4.69	0.786	5.76	15.9	11.0	1.90		
			5/16	23.34	0.291	3.9	31.4	6.43	62.6	12.5	3.12	17.5	4.24	4.24	0.812	5.06	14.2	9.56	1.92		
			1/4	19.02	0.233	5.6	39.9	5.24	52.5	10.5	3.17	14.4	3.67	3.67	0.837	4.26	12.2	7.99	1.93		
			3/16	14.53	0.174	8.5	54.5	3.98	41.0	8.19	3.21	11.1	2.97	2.97	0.864	3.34	9.74	6.22	1.95		

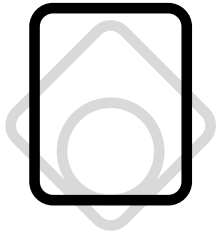


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot		
in.	in.	in.						in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y	
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²		
9	x	7	x	5/8	59.32	0.581	9.0	12.5	16.4	174	38.7	3.26	48.3	117	33.5	2.68	40.5	235	62.0	2.50
				1/2	48.85	0.465	12.1	16.4	13.5	149	33.0	3.32	40.5	100	28.7	2.73	34.0	197	51.5	2.53
				3/8	37.69	0.349	17.1	22.8	10.4	119	26.4	3.38	31.8	80.4	23.0	2.78	26.7	154	40.0	2.57
				5/16	31.84	0.291	21.1	27.9	8.76	102	22.6	3.41	27.1	69.2	19.8	2.81	22.8	131	33.9	2.58
				1/4	25.82	0.233	27.0	35.6	7.10	84.1	18.7	3.44	22.2	57.2	16.3	2.84	18.7	107	27.6	2.60
				3/16	19.63	0.174	37.2	48.7	5.37	64.7	14.4	3.47	16.9	44.1	12.6	2.87	14.3	81.7	20.9	2.62
9	x	5	x	5/8	50.81	0.581	5.6	12.5	14.0	133	29.6	3.08	38.5	51.9	20.8	1.92	25.3	128	42.5	2.17
				1/2	42.05	0.465	7.8	16.4	11.6	115	25.5	3.14	32.5	45.2	18.1	1.97	21.5	109	35.6	2.20
				3/8	32.58	0.349	11.3	22.8	8.97	92.5	20.5	3.21	25.7	36.8	14.7	2.03	17.1	86.9	27.9	2.23
				5/16	27.59	0.291	14.2	27.9	7.59	79.8	17.7	3.24	22.0	32.0	12.8	2.05	14.6	74.4	23.8	2.25
				1/4	22.42	0.233	18.5	35.6	6.17	66.1	14.7	3.27	18.1	26.6	10.6	2.08	12.0	61.2	19.4	2.27
				3/16	17.08	0.174	25.7	48.7	4.67	51.1	11.4	3.31	13.8	20.7	8.28	2.10	9.25	46.9	14.8	2.28
9	x	3	x	1/2	35.24	0.465	3.5	16.4	9.74	80.8	17.9	2.88	24.6	13.2	8.79	1.16	10.8	40.0	19.7	1.87
				3/8	27.48	0.349	5.6	22.8	7.58	66.3	14.7	2.96	19.7	11.2	7.45	1.21	8.80	33.1	15.8	1.90
				5/16	23.34	0.291	7.3	27.9	6.43	57.7	12.8	3.00	16.9	9.88	6.59	1.24	7.63	28.9	13.6	1.92
				1/4	19.02	0.233	9.9	35.6	5.24	48.2	10.7	3.04	14.0	8.38	5.59	1.27	6.35	24.2	11.3	1.93
				3/16	14.53	0.174	14.2	48.7	3.98	37.6	8.35	3.07	10.8	6.63	4.42	1.29	4.92	18.9	8.66	1.95

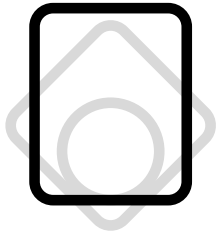




DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



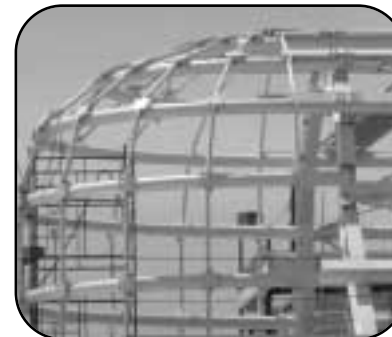
Nominal Size			Weight per Foot	Wall Thickness t	b/t		h/t		Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot
in.	in.	in.	lb.	in.					in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y	Z _y	in. ⁴	in. ³	ft. ²
					b/t	h/t			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²
8	x	6	x	5/8	50.81	0.581	7.3	10.8	14.0	114	28.5	2.85	36.1	72.2	24.1	2.27	29.5	150	46.0	2.17
				1/2	42.05	0.465	9.9	14.2	11.6	98.2	24.5	2.91	30.5	62.5	20.8	2.32	24.9	127	38.4	2.20
				3/8	32.58	0.349	14.2	19.9	8.97	79.1	19.8	2.97	24.1	50.6	16.9	2.38	19.8	100	30.0	2.23
				5/16	27.59	0.291	17.6	24.5	7.59	68.3	17.1	3.00	20.6	43.8	14.6	2.40	16.9	85.8	25.5	2.25
				1/4	22.42	0.233	22.8	31.3	6.17	56.6	14.1	3.03	16.9	36.4	12.1	2.43	13.9	70.3	20.8	2.27
				3/16	17.08	0.174	31.5	43.0	4.67	43.7	10.9	3.06	13.0	28.2	9.39	2.46	10.7	53.7	15.8	2.28
8	x	4	x	5/8	42.30	0.581	3.9	10.8	11.7	81.9	20.5	2.64	27.4	26.6	13.3	1.51	16.6	70.3	28.7	1.83
				1/2	35.24	0.465	5.6	14.2	9.74	71.7	17.9	2.71	23.5	23.6	11.8	1.56	14.3	61.1	24.4	1.87
				3/8	27.48	0.349	8.5	19.9	7.58	58.7	14.7	2.78	18.8	19.6	9.79	1.61	11.5	49.3	19.3	1.90
				5/16	23.34	0.291	10.7	24.5	6.43	51.0	12.8	2.82	16.1	17.2	8.58	1.63	9.91	42.6	16.5	1.92
				1/4	19.02	0.233	14.2	31.3	5.24	42.5	10.6	2.85	13.3	14.4	7.21	1.66	8.20	35.3	13.6	1.93
				3/16	14.53	0.174	20.0	43.0	3.98	33.1	8.27	2.88	10.2	11.3	5.65	1.69	6.33	27.2	10.4	1.95
8	x	3	x	1/2	31.84	0.465	3.5	14.2	8.81	58.5	14.6	2.58	20.0	11.7	7.78	1.15	9.64	34.3	17.4	1.70
				3/8	24.93	0.349	5.6	19.9	6.88	48.5	12.1	2.65	16.1	9.94	6.62	1.20	7.88	28.5	14.0	1.73
				5/16	21.21	0.291	7.3	24.5	5.85	42.4	10.6	2.69	13.9	8.81	5.87	1.23	6.84	24.9	12.1	1.75
				1/4	17.32	0.233	9.9	31.3	4.77	35.5	8.88	2.73	11.5	7.49	4.99	1.25	5.70	20.8	9.97	1.77
				3/16	13.25	0.174	14.2	43.0	3.63	27.8	6.94	2.77	8.87	5.94	3.96	1.28	4.43	16.2	7.68	1.78
				1/8	9.01	0.116	22.9	66.0	2.46	19.3	4.83	2.80	6.11	4.20	2.80	1.31	3.07	11.3	5.27	1.80
8	x	2	x	3/8	22.37	0.349	2.7	19.9	6.18	38.2	9.56	2.49	13.4	3.72	3.72	0.776	4.61	12.1	8.65	1.57
				5/16	19.08	0.291	3.9	24.5	5.26	33.7	8.43	2.53	11.6	3.38	3.38	0.801	4.06	10.9	7.57	1.58
				1/4	15.62	0.233	5.6	31.3	4.30	28.5	7.12	2.57	9.68	2.94	2.94	0.827	3.43	9.36	6.35	1.60
				3/16	11.97	0.174	8.5	43.0	3.28	22.4	5.61	2.61	7.51	2.39	2.39	0.853	2.70	7.48	4.95	1.62
				1/8	8.16	0.116	14.2	66.0	2.23	15.7	3.93	2.65	5.19	1.72	1.72	0.879	1.90	5.30	3.44	1.63

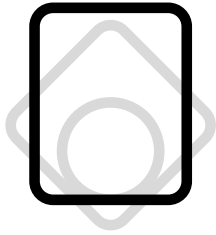


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot		
in.	in.	in.						in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y	
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²		
7	x	5	x	5/8	42.30	0.581	5.6	9.0	11.7	69.3	19.8	2.43	25.6	40.5	16.2	1.86	20.2	88.5	32.2	1.83
				1/2	35.24	0.465	7.8	12.1	9.74	60.6	17.3	2.49	21.9	35.6	14.2	1.91	17.3	75.8	27.2	1.87
				3/8	27.48	0.349	11.3	17.1	7.58	49.5	14.1	2.56	17.5	29.2	11.7	1.96	13.8	60.6	21.4	1.90
				5/16	23.34	0.291	14.2	21.1	6.43	43.0	12.3	2.59	15.0	25.5	10.2	1.99	11.9	52.1	18.3	1.92
				1/4	19.02	0.233	18.5	27.0	5.24	35.8	10.2	2.62	12.4	21.3	8.53	2.02	9.83	42.9	15.0	1.93
				3/16	14.53	0.174	25.7	37.2	3.98	27.9	7.96	2.65	9.52	16.6	6.65	2.05	7.57	32.9	11.4	1.95
				1/8	9.86	0.116	40.1	57.3	2.70	19.3	5.52	2.68	6.53	11.6	4.63	2.07	5.20	22.5	7.79	1.97
7	x	4	x	1/2	31.84	0.465	5.6	12.1	8.81	50.6	14.5	2.40	18.8	20.7	10.3	1.53	12.6	50.5	21.1	1.70
				3/8	24.93	0.349	8.5	17.1	6.88	41.8	11.9	2.46	15.1	17.3	8.63	1.58	10.2	41.0	16.8	1.73
				5/16	21.21	0.291	10.7	21.1	5.85	36.4	10.4	2.50	13.1	15.2	7.58	1.61	8.83	35.4	14.4	1.75
				1/4	17.32	0.233	14.2	27.0	4.77	30.5	8.72	2.53	10.8	12.8	6.38	1.64	7.33	29.3	11.8	1.77
				3/16	13.25	0.174	20.0	37.2	3.63	23.8	6.80	2.56	8.33	10.0	5.02	1.66	5.67	22.7	9.07	1.78
				1/8	9.01	0.116	31.5	57.3	2.46	16.6	4.73	2.59	5.73	7.03	3.51	1.69	3.91	15.6	6.20	1.80
7	x	3	x	1/2	28.43	0.465	3.5	12.1	7.88	40.7	11.6	2.27	15.8	10.2	6.78	1.14	8.46	28.6	15.0	1.53
				3/8	22.37	0.349	5.6	17.1	6.18	34.0	9.73	2.35	12.8	8.70	5.80	1.19	6.95	23.9	12.1	1.57
				5/16	19.08	0.291	7.3	21.1	5.26	29.9	8.54	2.38	11.1	7.74	5.16	1.21	6.05	20.9	10.5	1.58
				1/4	15.62	0.233	9.9	27.0	4.30	25.2	7.19	2.42	9.22	6.59	4.40	1.24	5.06	17.5	8.68	1.60
				3/16	11.97	0.174	14.2	37.2	3.28	19.8	5.65	2.45	7.14	5.24	3.50	1.26	3.94	13.7	6.69	1.62
				1/8	8.16	0.116	22.9	57.3	2.23	13.8	3.95	2.49	4.93	3.71	2.48	1.29	2.73	9.48	4.60	1.63



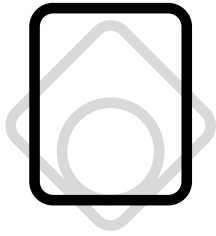


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
in.	in.	in.						in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y
6	x	5	x 3/8	24.93	0.349	11.3	14.2	6.88	33.9	11.3	2.22	13.8	25.5	10.2	1.92	12.2	48.1	18.2	1.73
			x 5/16	21.21	0.291	14.2	17.6	5.85	29.6	9.85	2.25	11.9	22.3	8.91	1.95	10.5	41.4	15.6	1.75
			x 1/4	17.32	0.233	18.5	22.8	4.77	24.7	8.25	2.28	9.87	18.7	7.47	1.98	8.72	34.2	12.8	1.77
			x 3/16	13.25	0.174	25.7	31.5	3.63	19.3	6.44	2.31	7.62	14.6	5.84	2.01	6.73	26.3	9.76	1.78
6	x	4	x 1/2	28.43	0.465	5.6	9.9	7.88	33.9	11.3	2.08	14.6	17.7	8.87	1.50	11.0	40.3	17.8	1.53
			x 3/8	22.37	0.349	8.5	14.2	6.18	28.3	9.43	2.14	11.9	14.9	7.46	1.55	8.94	32.8	14.2	1.57
			x 5/16	19.08	0.291	10.7	17.6	5.26	24.8	8.27	2.17	10.3	13.1	6.57	1.58	7.75	28.4	12.2	1.58
			x 1/4	15.62	0.233	14.2	22.8	4.30	20.9	6.96	2.20	8.53	11.1	5.56	1.61	6.45	23.6	10.1	1.60
			x 3/16	11.97	0.174	20.0	31.5	3.28	16.4	5.46	2.23	6.60	8.76	4.38	1.63	5.00	18.2	7.74	1.62
			x 1/8	8.16	0.116	31.5	48.7	2.23	11.4	3.81	2.26	4.56	6.15	3.08	1.66	3.46	12.6	5.30	1.63
6	x	3	x 1/2	25.03	0.465	3.5	9.9	6.95	26.8	8.94	1.96	12.1	8.65	5.77	1.12	7.28	23.1	12.7	1.37
			x 3/8	19.82	0.349	5.6	14.2	5.48	22.7	7.57	2.04	9.90	7.47	4.98	1.17	6.03	19.3	10.3	1.40
			x 5/16	16.96	0.291	7.3	17.6	4.68	20.1	6.69	2.07	8.61	6.66	4.44	1.19	5.27	16.9	8.91	1.42
			x 1/4	13.91	0.233	9.9	22.8	3.84	17.0	5.66	2.10	7.19	5.70	3.80	1.22	4.41	14.2	7.39	1.43
			x 3/16	10.70	0.174	14.2	31.5	2.93	13.4	4.47	2.14	5.59	4.55	3.03	1.25	3.45	11.1	5.71	1.45
			x 1/8	7.31	0.116	22.9	48.7	2.00	9.43	3.14	2.17	3.87	3.23	2.15	1.27	2.40	7.73	3.93	1.47
6	x	2	x 3/8	17.27	0.349	2.7	14.2	4.78	17.1	5.71	1.89	7.93	2.75	2.75	0.759	3.46	8.42	6.35	1.23
			x 5/16	14.83	0.291	3.9	17.6	4.10	15.3	5.11	1.93	6.95	2.52	2.52	0.784	3.07	7.60	5.58	1.25
			x 1/4	12.21	0.233	5.6	22.8	3.37	13.1	4.37	1.97	5.84	2.21	2.21	0.809	2.61	6.55	4.70	1.27
			x 3/16	9.42	0.174	8.5	31.5	2.58	10.5	3.49	2.01	4.58	1.80	1.80	0.835	2.07	5.24	3.68	1.28
			x 1/8	6.46	0.116	14.2	48.7	1.77	7.42	2.47	2.05	3.19	1.31	1.31	0.861	1.46	3.72	2.57	1.30



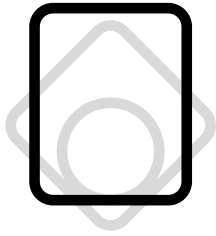


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size				Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
in.	in.	in.	in.						in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y
5	x	4	x	1/2	25.03	0.465	5.6	7.8	6.95	21.2	8.48	1.75	10.9	14.8	7.41	1.46	9.35	30.3	14.5	1.37
				3/8	19.82	0.349	8.5	11.3	5.48	17.9	7.16	1.81	8.96	12.6	6.29	1.52	7.67	24.9	11.7	1.40
				5/16	16.96	0.291	10.7	14.2	4.68	15.8	6.32	1.84	7.79	11.1	5.57	1.54	6.67	21.7	10.1	1.42
				1/4	13.91	0.233	14.2	18.5	3.84	13.4	5.35	1.87	6.49	9.46	4.73	1.57	5.57	18.0	8.32	1.43
				3/16	10.70	0.174	20.0	25.7	2.93	10.6	4.22	1.90	5.05	7.48	3.74	1.60	4.34	14.0	6.41	1.45
5	x	3	x	1/2	21.63	0.465	3.5	7.8	6.02	16.4	6.56	1.65	8.83	7.14	4.76	1.09	6.10	17.6	10.3	1.20
				3/8	17.27	0.349	5.6	11.3	4.78	14.1	5.65	1.72	7.34	6.23	4.16	1.14	5.10	14.9	8.44	1.23
				5/16	14.83	0.291	7.3	14.2	4.10	12.6	5.03	1.75	6.42	5.59	3.73	1.17	4.48	13.1	7.33	1.25
				1/4	12.21	0.233	9.9	18.5	3.37	10.7	4.29	1.78	5.38	4.81	3.20	1.19	3.77	11.0	6.10	1.27
				3/16	9.42	0.174	14.2	25.7	2.58	8.53	3.41	1.82	4.21	3.85	2.57	1.22	2.96	8.64	4.73	1.28
				1/8	6.46	0.116	22.9	40.1	1.77	6.03	2.41	1.85	2.93	2.75	1.83	1.25	2.07	6.02	3.26	1.30
5	x	2 1/2	x	1/4	11.36	0.233	7.7	18.5	3.14	9.40	3.76	1.73	4.83	3.13	2.50	0.998	2.95	7.93	4.99	1.18
				3/16	8.78	0.174	11.4	25.7	2.41	7.51	3.01	1.77	3.79	2.53	2.03	1.02	2.33	6.26	3.89	1.20
				1/8	6.03	0.116	18.6	40.1	1.65	5.34	2.14	1.80	2.65	1.82	1.46	1.05	1.64	4.40	2.70	1.22
5	x	2	x	3/8	14.72	0.349	2.7	11.3	4.09	10.3	4.14	1.59	5.71	2.27	2.27	0.746	2.88	6.61	5.20	1.07
				5/16	12.70	0.291	3.9	14.2	3.52	9.34	3.74	1.63	5.05	2.09	2.09	0.771	2.57	5.99	4.59	1.08
				1/4	10.51	0.233	5.6	18.5	2.91	8.08	3.23	1.67	4.27	1.84	1.84	0.796	2.20	5.17	3.88	1.10
				3/16	8.15	0.174	8.5	25.7	2.24	6.50	2.60	1.70	3.37	1.51	1.51	0.822	1.75	4.15	3.05	1.12
				1/8	5.61	0.116	14.2	40.1	1.54	4.65	1.86	1.74	2.37	1.10	1.10	0.848	1.24	2.95	2.13	1.13



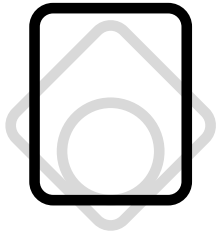


DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot		
in.	in.	in.						in. ²	I _x	S _x	r _x	Z _x	I _y	S _y	r _y				Z _y	
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²		
4	x	3	x	3/8	14.72	0.349	5.6	8.5	4.09	7.92	3.96	1.39	5.12	5.00	3.33	1.11	4.18	10.6	6.59	1.07
				5/16	12.70	0.291	7.3	10.7	3.52	7.13	3.57	1.42	4.51	4.52	3.01	1.13	3.69	9.41	5.75	1.08
				1/4	10.51	0.233	9.9	14.2	2.91	6.15	3.07	1.45	3.81	3.91	2.61	1.16	3.12	7.96	4.81	1.10
				3/16	8.15	0.174	14.2	20.0	2.24	4.93	2.47	1.49	3.00	3.16	2.10	1.19	2.46	6.26	3.74	1.12
				1/8	5.61	0.116	22.9	31.5	1.54	3.52	1.76	1.51	2.11	2.27	1.51	1.21	1.73	4.38	2.59	1.13
4	x	2 1/2	x	5/16	11.64	0.291	5.6	10.7	3.23	6.13	3.06	1.38	3.97	2.89	2.31	0.946	2.85	6.77	4.67	1.00
				1/4	9.66	0.233	7.7	14.2	2.67	5.32	2.66	1.41	3.38	2.53	2.02	0.973	2.43	5.78	3.93	1.02
				3/16	7.51	0.174	11.4	20.0	2.06	4.30	2.15	1.44	2.67	2.06	1.65	0.999	1.93	4.59	3.08	1.03
4	x	2	x	3/8	12.17	0.349	2.7	8.5	3.39	5.59	2.80	1.28	3.84	1.79	1.79	0.727	2.31	4.83	4.04	0.90
				5/16	10.58	0.291	3.9	10.7	2.94	5.12	2.56	1.32	3.43	1.66	1.66	0.752	2.08	4.40	3.59	0.92
				1/4	8.81	0.233	5.6	14.2	2.44	4.49	2.25	1.36	2.94	1.48	1.48	0.778	1.79	3.82	3.05	0.93
				3/16	6.87	0.174	8.5	20.0	1.89	3.66	1.83	1.39	2.34	1.22	1.22	0.804	1.43	3.08	2.41	0.95
				1/8	4.75	0.116	14.2	31.5	1.30	2.65	1.32	1.43	1.66	0.898	0.898	0.830	1.02	2.20	1.69	0.97

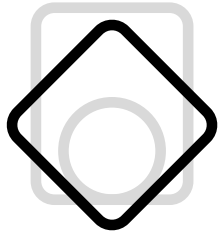




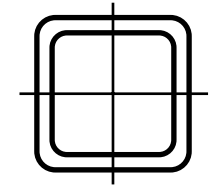
DIMENSIONS AND SECTION PROPERTIES OF *RECTANGULAR* HSS



Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	X-X Axis				Y-Y Axis				Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot
in.	in.	in.	lb.	in.			in. ²	I _x in. ⁴	S _x in. ³	r _x in.	Z _x in. ³	I _y in. ⁴	S _y in. ³	r _y in.	Z _y in. ³	in. ⁴	in. ³	ft. ²
3 1/2	x 2 1/2	x 3/8	12.17	0.349	4.2	7.0	3.39	4.74	2.71	1.18	3.59	2.75	2.20	0.902	2.82	6.16	4.57	0.90
		x 5/16	10.58	0.291	5.6	9.0	2.94	4.34	2.48	1.22	3.20	2.53	2.03	0.929	2.52	5.53	4.03	0.92
		x 1/4	8.81	0.233	7.7	12.0	2.44	3.79	2.17	1.25	2.74	2.23	1.78	0.956	2.16	4.75	3.40	0.93
		x 3/16	6.87	0.174	11.4	17.1	1.89	3.09	1.76	1.28	2.18	1.82	1.46	0.983	1.72	3.78	2.67	0.95
		x 1/8	4.75	0.116	18.6	27.2	1.30	2.23	1.28	1.31	1.54	1.33	1.06	1.01	1.22	2.67	1.87	0.97
3	x 2 1/2	x 5/16	9.51	0.291	5.6	7.3	2.64	2.91	1.94	1.05	2.51	2.17	1.74	0.907	2.20	4.34	3.39	0.83
		x 1/4	7.96	0.233	7.7	9.9	2.21	2.57	1.71	1.08	2.16	1.93	1.54	0.935	1.90	3.74	2.87	0.85
		x 3/16	6.23	0.174	11.4	14.2	1.71	2.11	1.41	1.11	1.73	1.59	1.27	0.962	1.52	3.00	2.27	0.87
		x 1/8	4.33	0.116	18.6	22.9	1.19	1.54	1.03	1.14	1.23	1.16	0.930	0.990	1.09	2.13	1.59	0.88
3	x 2	x 5/16	8.45	0.291	3.9	7.3	2.35	2.38	1.58	1.00	2.11	1.23	1.23	0.724	1.58	2.87	2.60	0.75
		x 1/4	7.11	0.233	5.6	9.9	1.97	2.12	1.42	1.04	1.83	1.11	1.11	0.750	1.38	2.52	2.23	0.77
		x 3/16	5.59	0.174	8.5	14.2	1.54	1.76	1.18	1.07	1.48	0.931	0.931	0.777	1.12	2.05	1.78	0.78
		x 1/8	3.90	0.116	14.2	22.9	1.07	1.30	0.866	1.10	1.06	0.692	0.692	0.804	0.803	1.47	1.25	0.80
3	x 1 1/2	x 1/4	6.26	0.233	3.4	9.9	1.74	1.68	1.12	0.982	1.51	0.541	0.722	0.558	0.911	1.44	1.58	0.68
		x 3/16	4.96	0.174	5.6	14.2	1.37	1.42	0.945	1.02	1.24	0.466	0.621	0.584	0.752	1.21	1.28	0.70
		x 1/8	3.48	0.116	9.9	22.9	0.96	1.06	0.706	1.05	0.895	0.355	0.474	0.610	0.550	0.886	0.920	0.72
3	x 1	x 3/16	6.32	0.174	2.7	14.2	1.19	1.07	0.713	0.947	0.989	0.172	0.344	0.380	0.432	0.526	0.792	0.62
		x 1/8	3.05	0.116	5.6	22.9	0.84	0.817	0.545	0.987	0.728	0.138	0.275	0.405	0.325	0.408	0.585	0.63
2 1/2	x 1 1/2	x 1/4	5.41	0.233	3.4	7.7	1.51	1.03	0.820	0.825	1.11	0.447	0.596	0.544	0.764	1.10	1.29	0.60
		x 3/16	4.32	0.174	5.6	11.4	1.19	0.881	0.705	0.859	0.915	0.389	0.519	0.571	0.636	0.929	1.05	0.62
		x 1/8	3.05	0.116	9.9	18.6	0.84	0.668	0.535	0.892	0.671	0.299	0.399	0.597	0.469	0.687	0.759	0.63
2	x 1 1/2	x 3/16	3.68	0.174	5.6	8.5	1.02	0.494	0.494	0.697	0.639	0.312	0.416	0.553	0.521	0.664	0.822	0.53
		x 1/8	2.63	0.116	9.9	14.2	0.72	0.383	0.383	0.727	0.475	0.244	0.325	0.580	0.389	0.496	0.599	0.55
2	x 1	x 3/16	3.04	0.174	2.7	8.5	0.84	0.349	0.349	0.643	0.480	0.112	0.223	0.364	0.288	0.301	0.505	0.45
		x 1/8	2.20	0.116	5.6	14.2	0.61	0.280	0.280	0.679	0.366	0.092	0.184	0.389	0.223	0.238	0.380	0.47

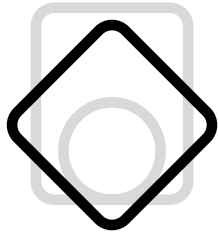


DIMENSIONS AND SECTION PROPERTIES OF *SQUARE* HSS

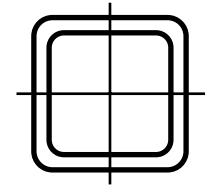


Nominal Size					Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²		
32	x	32	x	5/8*	259.83	0.625	48.2	48.2	76.4	12300	771	12.7	890	19700	1230	10.34
				1/2*	210.72	0.500	61.0	61.0	61.9	10100	634	12.8	727	15900	991	10.45
				3/8*	159.37	0.375	82.3	82.3	46.8	7750	485	12.9	553	12000	750	10.51
30	x	30	x	5/8*	242.82	0.625	45.0	45.0	71.4	10100	673	11.9	778	16200	1070	9.68
				1/2*	197.11	0.500	57.0	57.0	57.9	8320	555	12.0	637	13000	869	9.79
				3/8*	149.16	0.375	77.0	77.0	43.8	6370	424	12.1	485	9870	658	9.84
28	x	28	x	5/8*	225.80	0.625	41.8	41.8	66.4	8140	582	11.1	674	13100	933	9.01
				1/2*	183.50	0.500	53.0	53.0	53.9	6730	480	11.2	552	10600	755	9.12
				3/8*	138.95	0.375	71.7	71.7	40.8	5150	368	11.2	421	8010	572	9.17
26	x	26	x	5/8*	208.79	0.625	38.6	38.6	61.4	6460	497	10.3	577	10500	801	8.34
				1/2*	169.89	0.500	49.0	49.0	49.9	5350	411	10.4	474	8430	649	8.45
				3/8*	128.74	0.375	66.3	66.3	37.8	4110	316	10.4	362	6400	492	8.51
24	x	24	x	5/8*	191.78	0.625	35.4	35.4	56.4	5030	419	9.44	487	8180	679	7.68
				1/2*	156.28	0.500	45.0	45.0	45.9	4170	348	9.53	401	6610	551	7.79
				3/8*	118.53	0.375	61.0	61.0	34.8	3210	268	9.60	307	5020	418	7.84
22	x	22	x	5/8*	174.76	0.625	32.2	32.2	51.4	3820	347	8.62	406	6260	567	7.01
				1/2*	142.67	0.500	41.0	41.0	41.9	3190	290	8.72	335	5070	461	7.12
				3/8*	108.32	0.375	55.7	55.7	31.8	2460	223	8.78	256	3850	350	7.17
20	x	20	x	5/8*	157.75	0.625	29.0	29.0	46.4	2830	283	7.81	331	4670	465	6.34
				1/2*	129.06	0.500	37.0	37.0	37.9	2370	237	7.90	275	3790	379	6.45
				3/8*	98.12	0.375	50.3	50.3	28.8	1830	183	7.97	211	2880	288	6.51
18	x	18	x	5/8*	140.73	0.625	25.8	25.8	41.4	2020	224	6.99	264	3370	373	5.68
				1/2*	115.45	0.500	33.0	33.0	33.9	1700	189	7.08	220	2740	305	5.79
				3/8*	87.91	0.375	45.0	45.0	25.8	1320	147	7.15	169	2090	232	5.84
16	x	16	x	5/8	127.37	0.581	24.5	24.5	35.0	1370	171	6.25	200	2170	276	5.17
				1/2	103.30	0.465	31.4	31.4	28.3	1130	141	6.31	164	1770	224	5.20
				3/8	78.52	0.349	42.8	42.8	21.5	873	109	6.37	126	1350	171	5.23
				5/16	65.87	0.291	52.0	52.0	18.1	739	92.3	6.39	106	1140	144	5.25

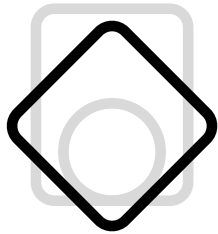
* This size produced by the submerged arc weld (SAW) process



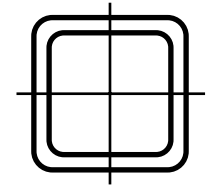
DIMENSIONS AND SECTION PROPERTIES OF *SQUARE* HSS



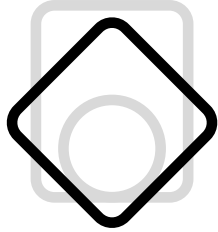
Nominal Size				Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
in.	in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²	
14	x	14	x	5/8	110.36	0.581	21.1	21.1	30.3	896	128	5.44	151	1430	208	4.50
				1/2	89.68	0.465	27.1	27.1	24.6	743	106	5.49	124	1170	170	4.53
				3/8	68.31	0.349	37.1	37.1	18.7	577	82.5	5.55	95.4	900	130	4.57
				5/16	57.36	0.291	45.1	45.1	15.7	490	69.9	5.58	80.5	759	109	4.58
12	x	12	x	5/8	93.34	0.581	17.7	17.7	25.7	548	91.3	4.62	109	885	151	3.83
				1/2	76.07	0.465	22.8	22.8	20.9	457	76.2	4.68	89.6	728	123	3.87
				3/8	58.10	0.349	31.4	31.4	16.0	357	59.5	4.73	69.2	561	94.6	3.90
				5/16	48.86	0.291	38.2	38.2	13.4	304	50.7	4.76	58.6	474	79.7	3.92
				1/4	39.43	0.233	48.5	48.5	10.8	248	41.4	4.79	47.6	384	64.5	3.93
10	x	10	x	5/8	76.33	0.581	14.2	14.2	21.0	304	60.8	3.80	73.2	498	102	3.17
				1/2	62.46	0.465	18.5	18.5	17.2	256	51.2	3.86	60.7	412	84.2	3.20
				3/8	47.90	0.349	25.7	25.7	13.2	202	40.4	3.92	47.2	320	64.8	3.23
				5/16	40.35	0.291	31.4	31.4	11.1	172	34.5	3.94	40.1	271	54.8	3.25
				1/4	32.63	0.233	39.9	39.9	8.96	141	28.3	3.97	32.7	220	44.4	3.27
				3/16	24.73	0.174	54.5	54.5	6.76	108	21.6	4.00	24.8	167	33.6	3.28
9	x	9	x	1/2	55.66	0.465	16.4	16.4	15.3	182	40.6	3.45	48.4	296	67.4	2.87
				3/8	42.79	0.349	22.8	22.8	11.8	145	32.2	3.51	37.8	231	52.1	2.90
				5/16	36.10	0.291	27.9	27.9	9.92	124	27.6	3.54	32.1	196	44.0	2.92
				1/4	29.23	0.233	35.6	35.6	8.03	102	22.7	3.56	26.2	159	35.8	2.93
				3/16	22.18	0.174	48.7	48.7	6.06	78.2	17.4	3.59	20.0	121	27.1	2.95
8	x	8	x	5/8	59.32	0.581	10.8	10.8	16.4	146	36.5	2.99	44.7	244	63.2	2.50
				1/2	48.85	0.465	14.2	14.2	13.5	125	31.2	3.04	37.5	204	52.4	2.53
				3/8	37.69	0.349	19.9	19.9	10.4	99.6	24.9	3.10	29.4	160	40.7	2.57
				5/16	31.84	0.291	24.5	24.5	8.76	85.6	21.4	3.13	25.1	136	34.5	2.58
				1/4	25.82	0.233	31.3	31.3	7.10	70.7	17.7	3.15	20.5	111	28.1	2.60
				3/16	19.63	0.174	43.0	43.0	5.37	54.4	13.6	3.18	15.7	84.5	21.3	2.62
7	x	7	x	5/8	50.81	0.581	9.0	9.0	14.0	93.3	26.7	2.58	33.1	158	47.1	2.17
				1/2	42.05	0.465	12.1	12.1	11.6	80.5	23.0	2.63	27.9	133	39.3	2.20
				3/8	32.58	0.349	17.1	17.1	8.97	64.9	18.6	2.69	22.1	105	30.7	2.23
				5/16	27.59	0.291	21.1	21.1	7.59	56.1	16.0	2.72	18.9	89.7	26.1	2.25
				1/4	22.42	0.233	27.0	27.0	6.17	46.5	13.3	2.75	15.5	73.5	21.3	2.27
				3/16	17.08	0.174	37.2	37.2	4.67	36.0	10.3	2.77	11.9	56.1	16.2	2.28



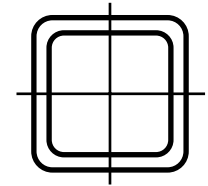
DIMENSIONS AND SECTION PROPERTIES OF *SQUARE* HSS



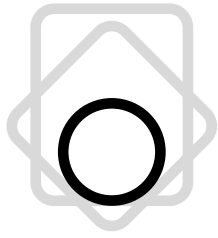
Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot		
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²		
6	x	6	x	5/8	42.30	0.581	7.3	7.3	11.7	55.1	18.4	2.17	23.2	94.9	33.4	1.83
				1/2	35.24	0.465	9.9	9.9	9.74	48.2	16.1	2.23	19.8	81.1	28.1	1.87
				3/8	27.48	0.349	14.2	14.2	7.58	39.4	13.1	2.28	15.8	64.6	22.1	1.90
				5/16	23.34	0.291	17.6	17.6	6.43	34.3	11.4	2.31	13.6	55.4	18.9	1.92
				1/4	19.02	0.233	22.8	22.8	5.24	28.6	9.54	2.34	11.2	45.6	15.4	1.93
				3/16	14.53	0.174	31.5	31.5	3.98	22.3	7.42	2.37	8.63	35.0	11.8	1.95
				1/8	9.86	0.116	48.7	48.7	2.70	15.5	5.15	2.39	5.92	23.9	8.03	1.97
5 1/2	x	5 1/2	x	3/8	24.93	0.349	12.8	12.8	6.88	29.7	10.8	2.08	13.1	49.0	18.4	1.73
				5/16	21.21	0.291	15.9	15.9	5.85	25.9	9.43	2.11	11.3	42.2	15.7	1.75
				1/4	17.32	0.233	20.6	20.6	4.77	21.7	7.90	2.13	9.32	34.8	12.9	1.77
				3/16	13.25	0.174	28.6	28.6	3.63	17.0	6.17	2.16	7.19	26.7	9.85	1.78
				1/8	9.01	0.116	44.4	44.4	2.46	11.8	4.30	2.19	4.95	18.3	6.72	1.80
5	x	5	x	1/2	28.43	0.465	7.8	7.8	7.88	26.0	10.4	1.82	13.1	44.6	18.7	1.53
				3/8	22.37	0.349	11.3	11.3	6.18	21.7	8.67	1.87	10.6	36.1	14.9	1.57
				5/16	19.08	0.291	14.2	14.2	5.26	19.0	7.61	1.90	9.16	31.2	12.8	1.58
				1/4	15.62	0.233	18.5	18.5	4.30	16.0	6.41	1.93	7.61	25.8	10.5	1.60
				3/16	11.97	0.174	25.7	25.7	3.28	12.6	5.03	1.96	5.89	19.9	8.08	1.62
				1/8	8.16	0.116	40.1	40.1	2.23	8.80	3.52	1.99	4.07	13.7	5.53	1.63
4 1/2	x	4 1/2	x	1/2	25.03	0.465	6.7	6.7	6.95	18.0	8.02	1.61	10.2	31.3	14.8	1.37
				3/8	19.82	0.349	9.9	9.9	5.48	15.3	6.78	1.67	8.36	25.7	11.9	1.40
				5/16	16.96	0.291	12.5	12.5	4.68	13.5	5.99	1.70	7.27	22.3	10.2	1.42
				1/4	13.91	0.233	16.3	16.3	3.84	11.4	5.08	1.73	6.06	18.5	8.44	1.43
				3/16	10.70	0.174	22.9	22.9	2.93	9.02	4.01	1.75	4.71	14.4	6.49	1.45
				1/8	7.31	0.116	35.8	35.8	2.00	6.35	2.82	1.78	3.27	9.92	4.45	1.47
4	x	4	x	1/2	21.63	0.465	5.6	5.6	6.02	11.9	5.95	1.41	7.70	21.0	11.2	1.20
				3/8	17.27	0.349	8.5	8.5	4.78	10.3	5.13	1.46	6.39	17.5	9.14	1.23
				5/16	14.83	0.291	10.7	10.7	4.10	9.14	4.57	1.49	5.59	15.3	7.91	1.25
				1/4	12.21	0.233	14.2	14.2	3.37	7.80	3.90	1.52	4.69	12.8	6.56	1.27
				3/16	9.42	0.174	20.0	20.0	2.58	6.21	3.10	1.55	3.67	9.96	5.07	1.28
				1/8	6.46	0.116	31.5	31.5	1.77	4.40	2.20	1.58	2.56	6.91	3.49	1.30



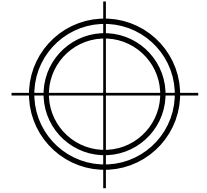
DIMENSIONS AND SECTION PROPERTIES OF *SQUARE* HSS



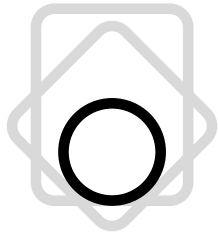
Nominal Size			Weight per Foot	Wall Thickness t	b/t	h/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot
in.	in.	in.	lb.	in.			in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²
3 1/2	x 3 1/2	x 3/8	14.72	0.349	7.0	7.0	4.09	6.48	3.70	1.26	4.69	11.2	6.77	1.07
		x 5/16	12.70	0.291	9.0	9.0	3.52	5.84	3.34	1.29	4.14	9.89	5.90	1.08
		x 1/4	10.51	0.233	12.0	12.0	2.91	5.04	2.88	1.32	3.50	8.35	4.92	1.10
		x 3/16	8.15	0.174	17.1	17.1	2.24	4.05	2.31	1.35	2.76	6.56	3.83	1.12
		x 1/8	5.61	0.116	27.2	27.2	1.54	2.90	1.66	1.37	1.93	4.58	2.65	1.13
3	x 3	x 3/8	12.17	0.349	5.6	5.6	3.39	3.77	2.51	1.05	3.25	6.64	4.74	0.90
		x 5/16	10.58	0.291	7.3	7.3	2.94	3.45	2.30	1.08	2.90	5.94	4.18	0.92
		x 1/4	8.81	0.233	9.9	9.9	2.44	3.02	2.01	1.11	2.48	5.08	3.52	0.93
		x 3/16	6.87	0.174	14.2	14.2	1.89	2.46	1.64	1.14	1.97	4.03	2.76	0.95
		x 1/8	4.75	0.116	22.9	22.9	1.30	1.78	1.19	1.17	1.40	2.84	1.92	0.97
2 1/2	x 2 1/2	x 5/16	8.45	0.291	5.6	5.6	2.35	1.82	1.45	0.879	1.88	3.20	2.74	0.75
		x 1/4	7.11	0.233	7.7	7.7	1.97	1.63	1.30	0.908	1.63	2.79	2.35	0.77
		x 3/16	5.59	0.174	11.4	11.4	1.54	1.35	1.08	0.937	1.32	2.25	1.86	0.78
		x 1/8	3.90	0.116	18.6	18.6	1.07	0.998	0.798	0.965	0.947	1.61	1.31	0.80
2 1/4	x 2 1/4	x 1/4	6.26	0.233	6.7	6.7	1.74	1.13	1.00	0.805	1.28	1.96	1.85	0.68
		x 3/16	4.96	0.174	9.9	9.9	1.37	0.952	0.847	0.835	1.04	1.60	1.48	0.70
		x 1/8	3.48	0.116	16.4	16.4	0.96	0.712	0.633	0.863	0.755	1.15	1.05	0.72
2	x 2	x 1/4	5.41	0.233	5.6	5.6	1.51	0.745	0.745	0.703	0.964	1.31	1.41	0.60
		x 3/16	4.32	0.174	8.5	8.5	1.19	0.640	0.640	0.732	0.797	1.09	1.14	0.62
		x 1/8	3.05	0.116	14.2	14.2	0.84	0.486	0.486	0.761	0.584	0.796	0.817	0.63
1 3/4	x 1 3/4	x 3/16	3.68	0.174	7.1	7.1	1.02	0.405	0.462	0.630	0.585	0.699	0.844	0.53
1 5/8	x 1 5/8	x 3/16	3.36	0.174	6.3	6.3	0.93	0.312	0.384	0.579	0.491	0.544	0.712	0.49
		x 1/8	2.42	0.116	11.0	11.0	0.67	0.246	0.302	0.608	0.370	0.410	0.522	0.51
1 1/2	x 1 1/2	x 3/16	3.04	0.174	5.6	5.6	0.84	0.235	0.314	0.528	0.406	0.414	0.592	0.45
		x 1/8	2.20	0.116	9.9	9.9	0.61	0.188	0.251	0.556	0.309	0.316	0.438	0.47
1 1/4	x 1 1/4	x 3/16	2.40	0.174	4.2	4.2	0.67	0.121	0.194	0.425	0.259	0.218	0.383	0.37
		x 1/8	1.78	0.116	7.8	7.8	0.49	0.101	0.162	0.454	0.204	0.174	0.292	0.38



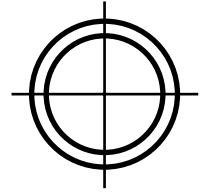
DIMENSIONS AND SECTION PROPERTIES OF *ROUND* HSS



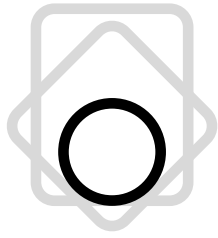
Nominal Size		Weight per Foot	Wall Thickness t	D/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot
Outside Diameter	Wall											
in.	in.	lb.	in.		in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²
20.000	x 0.500	104.23	0.465	43.0	28.5	1360	136	6.91	177	2720	272	5.24
	0.375	78.67	0.349	57.3	21.5	1040	104	6.95	135	2080	208	5.24
18.000	x 0.500	93.54	0.465	38.7	25.6	985	109	6.20	143	1970	219	4.71
	0.375	70.65	0.349	51.6	19.4	754	83.8	6.24	109	1510	168	4.71
16.000	x 0.500	82.85	0.465	34.4	22.7	685	85.7	5.49	112	1370	171	4.19
	0.438	72.86	0.407	39.3	19.9	606	75.8	5.51	99.0	1210	152	4.19
	0.375	62.64	0.349	45.8	17.2	526	65.7	5.53	85.5	1050	131	4.19
	0.312	52.32	0.291	55.0	14.4	443	55.4	5.55	71.8	886	111	4.19
14.000	x 0.500	72.16	0.465	30.1	19.8	453	64.8	4.79	85.2	907	130	3.67
	0.375	54.62	0.349	40.1	15.0	349	49.8	4.83	65.1	698	99.7	3.67
	0.312	45.65	0.291	48.1	12.5	295	42.1	4.85	54.7	589	84.2	3.67
12.750	x 0.500	65.48	0.465	27.4	17.9	339	53.2	4.35	70.2	678	106	3.34
	0.375	49.61	0.349	36.5	13.6	262	41.0	4.39	53.7	523	82.1	3.34
	0.250	33.41	0.233	54.7	9.16	180	28.2	4.43	36.5	359	56.3	3.34
12.500	x 0.625	79.34	0.581	21.5	21.8	387	62.0	4.22	82.6	774	124	3.27
	0.500	64.14	0.465	26.9	17.6	319	51.0	4.26	67.4	638	102	3.27
	0.375	48.61	0.349	35.8	13.3	246	39.4	4.30	51.5	492	78.7	3.27
	0.312	40.65	0.291	43.0	11.2	208	33.3	4.32	43.4	416	66.6	3.27
	0.250	32.74	0.233	53.6	8.98	169	27.0	4.34	35.1	338	54.1	3.27
	0.188	24.74	0.174	71.8	6.74	128	20.5	4.36	26.4	256	41.0	3.27
12.313	x 0.625	78.09	0.581	21.2	21.4	369	60.0	4.15	80.0	739	120	3.22
	0.500	63.14	0.465	26.5	17.3	304	49.4	4.19	65.3	608	98.8	3.22
	0.375	47.86	0.349	35.3	13.1	235	38.2	4.23	50.0	470	76.3	3.22
	0.312	40.03	0.291	42.3	11.0	199	32.3	4.25	42.1	397	64.5	3.22
	0.250	32.24	0.233	52.8	8.84	161	26.2	4.27	34.0	323	52.4	3.22
	0.188	24.37	0.174	70.8	6.64	122	19.9	4.29	25.6	244	39.7	3.22
12.250	x 0.625	77.67	0.581	21.1	21.3	363	59.3	4.13	79.2	727	119	3.21
	0.500	62.80	0.465	26.3	17.2	299	48.9	4.17	64.6	599	97.7	3.21
	0.375	47.60	0.349	35.1	13.0	231	37.7	4.21	49.4	462	75.5	3.21
	0.312	39.82	0.291	42.1	10.9	196	31.9	4.23	41.6	391	63.9	3.21
	0.250	32.07	0.233	52.6	8.80	159	25.9	4.25	33.7	318	51.9	3.21
	0.188	24.24	0.174	70.4	6.60	120	19.6	4.27	25.4	241	39.3	3.21



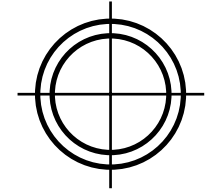
DIMENSIONS AND SECTION PROPERTIES OF *ROUND* HSS



Nominal Size		Weight per Foot	Wall Thickness t	D/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
Outside Diameter	Wall												
in.	in.	lb.	in.		in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²	
11.250	x	0.625	70.99	0.581	19.4	19.5	278	49.4	3.78	66.2	556	98.8	2.95
		0.500	57.46	0.465	24.2	15.8	229	40.8	3.82	54.1	459	81.6	2.95
		0.375	43.60	0.349	32.2	12.0	178	31.6	3.86	41.5	355	63.2	2.95
		0.312	36.48	0.291	38.7	10.0	151	26.8	3.88	35.0	301	53.5	2.95
		0.250	29.40	0.233	48.3	8.06	122	21.8	3.90	28.3	245	43.5	2.95
	0.188	22.23	0.174	64.7	6.05	92.9	16.5	3.92	21.3	186	33.0	2.95	
10.750	x	0.500	54.79	0.465	23.1	15.0	199	37.0	3.64	49.2	398	74.1	2.81
		0.365	40.52	0.340	31.6	11.1	151	28.1	3.68	36.9	302	56.1	2.81
		0.250	28.06	0.233	46.1	7.70	106	19.8	3.72	25.8	213	39.6	2.81
10.000	x	0.625	62.64	0.581	17.2	17.2	191	38.3	3.34	51.6	383	76.6	2.62
		0.500	50.78	0.465	21.5	13.9	159	31.7	3.38	42.3	317	63.5	2.62
		0.375	38.58	0.349	28.7	10.6	123	24.7	3.41	32.5	247	49.3	2.62
		0.312	32.31	0.291	34.4	8.88	105	20.9	3.43	27.4	209	41.9	2.62
		0.250	26.06	0.233	42.9	7.15	85.3	17.1	3.45	22.2	171	34.1	2.62
	0.188	19.72	0.174	57.5	5.37	64.8	13.0	3.47	16.8	130	25.9	2.62	
9.625	x	0.500	48.77	0.465	20.7	13.4	141	29.2	3.24	39.0	281	58.5	2.52
		0.375	37.08	0.349	27.6	10.2	110	22.8	3.28	30.0	219	45.5	2.52
		0.312	31.06	0.291	33.1	8.53	93.0	19.3	3.30	25.4	186	38.7	2.52
		0.250	25.05	0.233	41.3	6.87	75.9	15.8	3.32	20.6	152	31.5	2.52
		0.188	18.97	0.174	55.3	5.17	57.7	12.0	3.34	15.5	115	24.0	2.52
8.750	x	0.500	44.10	0.465	18.8	12.1	104	23.8	2.93	32.0	208	47.6	2.29
		0.375	33.57	0.349	25.1	9.21	81.4	18.6	2.97	24.6	163	37.2	2.29
		0.312	28.14	0.291	30.1	7.73	69.3	15.8	2.99	20.8	139	31.7	2.29
		0.250	22.72	0.233	37.6	6.23	56.6	12.9	3.01	16.9	113	25.9	2.29
		0.188	17.21	0.174	50.3	4.69	43.1	9.86	3.03	12.8	86.2	19.7	2.29
8.625	x	0.500	43.43	0.465	18.5	11.9	99.5	23.1	2.89	31.0	199	46.2	2.26
		0.375	33.07	0.349	24.7	9.07	77.8	18.0	2.93	23.9	156	36.1	2.26
		0.322	28.58	0.300	28.7	7.85	68.1	15.8	2.95	20.8	136	31.6	2.26
		0.250	22.38	0.233	37.0	6.14	54.1	12.5	2.97	16.4	108	25.1	2.26
		0.188	16.96	0.174	49.6	4.62	41.3	9.57	2.99	12.4	82.5	19.1	2.26

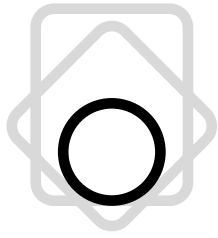


DIMENSIONS AND SECTION PROPERTIES OF *ROUND* HSS

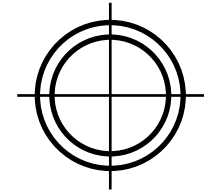


Nominal Size		Weight per Foot	Wall Thickness t	D/t	Cross Sectional Area					Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
Outside Diameter	Wall					I	S	r	Z				
in.	in.	lb.	in.		in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²	
7.625	x	0.375	29.06	0.349	21.8	7.98	52.9	13.9	2.58	18.5	106	27.8	2.00
		0.328	25.59	0.305	25.0	7.01	47.1	12.3	2.59	16.4	94.1	24.7	2.00
		0.125	10.02	0.116	65.7	2.74	19.3	5.06	2.66	6.54	38.6	10.1	2.00
7.500	x	0.500	37.42	0.465	16.1	10.3	63.9	17.0	2.49	23.0	128	34.1	1.96
		0.375	28.56	0.349	21.5	7.84	50.2	13.4	2.53	17.9	100	26.8	1.96
		0.312	23.97	0.291	25.8	6.59	42.9	11.4	2.55	15.1	85.8	22.9	1.96
		0.250	19.38	0.233	32.2	5.32	35.2	9.37	2.57	12.3	70.3	18.7	1.96
		0.188	14.70	0.174	43.1	4.00	26.9	7.17	2.59	9.34	53.8	14.3	1.96
7.000	x	0.500	34.74	0.465	15.1	9.55	51.2	14.6	2.32	19.9	102	29.3	1.83
		0.375	26.56	0.349	20.1	7.29	40.4	11.6	2.35	15.5	80.9	23.1	1.83
		0.312	22.31	0.291	24.1	6.13	34.6	9.88	2.37	13.1	69.1	19.8	1.83
		0.250	18.04	0.233	30.0	4.95	28.4	8.11	2.39	10.7	56.8	16.2	1.83
		0.188	13.69	0.174	40.2	3.73	21.7	6.21	2.41	8.11	43.5	12.4	1.83
		0.125	9.19	0.116	60.3	2.51	14.9	4.25	2.43	5.50	29.7	8.49	1.83

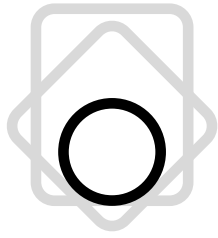




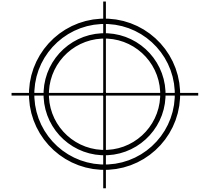
DIMENSIONS AND SECTION PROPERTIES OF *ROUND* HSS



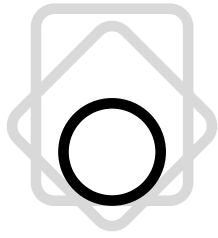
Nominal Size		Weight per Foot	Wall Thickness t	D/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
Outside Diameter	Wall												
in.	in.	lb.	in.		in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²	
6.875	x	0.500	34.07	0.465	14.8	9.36	48.3	14.1	2.27	19.1	96.7	28.1	1.80
		0.375	26.06	0.349	19.7	7.16	38.2	11.1	2.31	14.9	76.4	22.2	1.80
		0.312	21.89	0.291	23.6	6.02	32.7	9.51	2.33	12.6	65.4	19.0	1.80
		0.250	17.71	0.233	29.5	4.86	26.8	7.81	2.35	10.3	53.7	15.6	1.80
		0.188	13.44	0.174	39.5	3.66	20.6	5.99	2.37	7.81	41.1	12.0	1.80
6.625	x	0.500	32.74	0.465	14.2	9.00	42.9	13.0	2.18	17.7	85.9	25.9	1.73
		0.432	28.60	0.403	16.4	7.88	38.3	11.6	2.20	15.6	76.6	23.1	1.73
		0.375	25.05	0.349	19.0	6.88	34.0	10.3	2.22	13.8	68.0	20.5	1.73
		0.312	21.06	0.291	22.8	5.79	29.1	8.79	2.24	11.7	58.2	17.6	1.73
		0.280	18.99	0.261	25.4	5.22	26.5	7.99	2.25	10.6	52.9	16.0	1.73
		0.250	17.04	0.233	28.4	4.68	23.9	7.22	2.26	9.52	47.9	14.4	1.73
		0.188	12.94	0.174	38.1	3.53	18.4	5.54	2.28	7.24	36.7	11.1	1.73
	0.125	8.69	0.116	57.1	2.37	12.6	3.79	2.30	4.92	25.1	7.59	1.73	
6.125	x	0.500	30.07	0.465	13.2	8.27	33.3	10.9	2.01	14.9	66.7	21.8	1.60
		0.375	23.05	0.349	17.6	6.33	26.5	8.66	2.05	11.7	53.0	17.3	1.60
		0.312	19.39	0.291	21.0	5.33	22.7	7.43	2.07	9.91	45.5	14.9	1.60
		0.250	15.70	0.233	26.3	4.31	18.7	6.12	2.08	8.09	37.5	12.2	1.60
		0.188	11.93	0.174	35.2	3.25	14.4	4.71	2.10	6.16	28.8	9.41	1.60
6.000	x	0.500	29.40	0.465	12.9	8.09	31.2	10.4	1.96	14.3	62.4	20.8	1.57
		0.375	22.55	0.349	17.2	6.20	24.8	8.28	2.00	11.2	49.7	16.6	1.57
		0.312	18.97	0.291	20.6	5.22	21.3	7.11	2.02	9.49	42.6	14.2	1.57
		0.280	17.12	0.261	23.0	4.71	19.4	6.47	2.03	8.60	38.8	12.9	1.57
		0.250	15.37	0.233	25.8	4.22	17.6	5.86	2.04	7.75	35.2	11.7	1.57
		0.188	11.68	0.174	34.5	3.18	13.5	4.51	2.06	5.91	27.0	9.02	1.57
		0.125	7.85	0.116	51.7	2.14	9.28	3.09	2.08	4.02	18.6	6.19	1.57



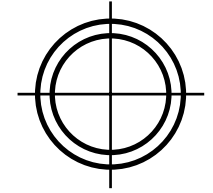
DIMENSIONS AND SECTION PROPERTIES OF *ROUND* HSS



Nominal Size		Weight per Foot	Wall Thickness t	D/t	Cross Sectional Area					Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
Outside Diameter	Wall					I	S	r	Z				
in.	in.	lb.	in.		in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²	
5.563	x	0.375	20.80	0.349	15.9	5.72	19.5	7.02	1.85	9.50	39.0	14.0	1.46
		0.258	14.63	0.241	23.1	4.03	14.3	5.14	1.88	6.83	28.6	10.3	1.46
		0.188	10.80	0.174	32.0	2.95	10.7	3.85	1.91	5.05	21.4	7.70	1.46
		0.134	7.78	0.125	44.5	2.14	7.90	2.84	1.92	3.70	15.8	5.68	1.46
5.500	x	0.500	26.73	0.465	11.8	7.36	23.5	8.55	1.79	11.8	47.0	17.1	1.44
		0.375	20.54	0.349	15.8	5.65	18.8	6.84	1.83	9.27	37.6	13.7	1.44
		0.258	14.46	0.241	22.8	3.98	13.8	5.02	1.86	6.67	27.6	10.0	1.44
5.000	x	0.500	24.05	0.465	10.8	6.62	17.2	6.88	1.61	9.60	34.4	13.8	1.31
		0.375	18.54	0.349	14.3	5.10	13.9	5.55	1.65	7.56	27.7	11.1	1.31
		0.312	15.64	0.291	17.2	4.30	12.0	4.79	1.67	6.46	24.0	9.58	1.31
		0.258	13.08	0.241	20.7	3.60	10.2	4.09	1.68	5.46	20.5	8.18	1.31
		0.250	12.69	0.233	21.5	3.49	9.94	3.97	1.69	5.30	19.9	7.95	1.31
		0.188	9.67	0.174	28.7	2.64	7.69	3.08	1.71	4.05	15.4	6.15	1.31
4.500	x	0.125	6.51	0.116	43.1	1.78	5.31	2.12	1.73	2.77	10.6	4.25	1.31
		0.337	15.00	0.315	14.3	4.14	9.12	4.05	1.48	5.53	18.2	8.11	1.18
		0.237	10.80	0.221	20.4	2.97	6.82	3.03	1.51	4.05	13.6	6.06	1.18
		0.188	8.67	0.174	25.9	2.36	5.54	2.46	1.53	3.26	11.1	4.93	1.18
4.000	x	0.125	5.85	0.116	38.8	1.60	3.84	1.71	1.55	2.23	7.68	3.41	1.18
		0.337	13.20	0.315	12.7	3.65	6.24	3.12	1.31	4.29	12.5	6.24	1.05
		0.313	12.34	0.291	13.7	3.39	5.87	2.93	1.32	4.01	11.7	5.87	1.05
		0.250	10.02	0.233	17.2	2.76	4.91	2.45	1.33	3.31	9.82	4.91	1.05
		0.237	9.53	0.221	18.1	2.62	4.70	2.35	1.34	3.16	9.40	4.70	1.05
		0.226	9.12	0.211	19.0	2.51	4.52	2.26	1.34	3.03	9.04	4.52	1.05
		0.220	8.89	0.205	19.5	2.44	4.41	2.21	1.34	2.96	8.83	4.41	1.05
		0.188	7.66	0.174	23.0	2.09	3.83	1.92	1.35	2.55	7.67	3.83	1.05
0.125	5.18	0.116	34.5	1.42	2.67	1.34	1.37	1.75	5.34	2.67	1.05		



DIMENSIONS AND SECTION PROPERTIES OF *ROUND* HSS



Nominal Size		Weight per Foot	Wall Thickness t	D/t	Cross Sectional Area	I	S	r	Z	Torsional Stiffness Constant J	Torsional Shear Constant C	Surface Area Per Foot	
Outside Diameter	Wall												
in.	in.	lb.	in.		in. ²	in. ⁴	in. ³	in.	in. ³	in. ⁴	in. ³	ft. ²	
3.500	x	0.313	10.66	0.291	12.0	2.93	3.81	2.18	1.14	3.00	7.61	4.35	0.92
		0.300	10.26	0.280	12.5	2.83	3.70	2.11	1.14	2.91	7.40	4.23	0.92
		0.250	8.69	0.233	15.0	2.39	3.21	1.83	1.16	2.49	6.41	3.66	0.92
		0.216	7.58	0.201	17.4	2.08	2.84	1.63	1.17	2.19	5.69	3.25	0.92
		0.203	7.15	0.189	18.5	1.97	2.70	1.54	1.17	2.07	5.41	3.09	0.92
		0.188	6.66	0.174	20.1	1.82	2.52	1.44	1.18	1.93	5.04	2.88	0.92
		0.125	4.51	0.116	30.2	1.23	1.77	1.01	1.20	1.33	3.53	2.02	0.92
3.000	x	0.300	8.66	0.280	10.7	2.39	2.24	1.49	0.967	2.08	4.47	2.98	0.79
		0.250	7.35	0.233	12.9	2.03	1.95	1.30	0.982	1.79	3.90	2.60	0.79
		0.216	6.43	0.201	14.9	1.77	1.74	1.16	0.992	1.58	3.48	2.32	0.79
		0.203	6.07	0.189	15.9	1.67	1.66	1.10	0.996	1.50	3.31	2.21	0.79
		0.188	5.65	0.174	17.2	1.54	1.55	1.03	1.00	1.39	3.10	2.06	0.79
		0.152	4.63	0.142	21.1	1.27	1.30	0.870	1.01	1.16	2.61	1.74	0.79
		0.134	4.11	0.125	24.0	1.13	1.17	0.779	1.02	1.03	2.34	1.56	0.79
		0.120	3.69	0.112	26.8	1.02	1.06	0.707	1.02	0.935	2.12	1.41	0.79
2.875	x	0.250	7.02	0.233	12.3	1.93	1.70	1.18	0.938	1.63	3.40	2.37	0.75
		0.203	5.80	0.189	15.2	1.59	1.45	1.01	0.952	1.37	2.89	2.01	0.75
		0.188	5.40	0.174	16.5	1.48	1.35	0.941	0.957	1.27	2.70	1.88	0.75
		0.125	3.67	0.116	24.8	1.01	0.958	0.667	0.976	0.884	1.92	1.33	0.75
2.500	x	0.250	6.01	0.233	10.7	1.66	1.08	0.862	0.806	1.20	2.15	1.72	0.65
		0.188	4.65	0.174	14.4	1.27	0.865	0.692	0.825	0.943	1.73	1.38	0.65
		0.125	3.17	0.116	21.6	0.87	0.619	0.495	0.844	0.660	1.24	0.990	0.65
2.375	x	0.250	5.68	0.233	10.2	1.57	0.910	0.766	0.762	1.07	1.82	1.53	0.62
		0.218	5.03	0.204	11.6	1.39	0.827	0.696	0.771	0.964	1.65	1.39	0.62
		0.188	4.40	0.174	13.6	1.20	0.733	0.617	0.781	0.845	1.47	1.23	0.62
		0.154	3.66	0.143	16.6	1.00	0.627	0.528	0.791	0.713	1.25	1.06	0.62
		0.125	3.01	0.116	20.5	0.82	0.527	0.443	0.800	0.592	1.05	0.887	0.62
1.900	x	0.145	2.72	0.135	14.1	0.75	0.293	0.309	0.626	0.421	0.586	0.617	0.50
1.660	x	0.140	2.27	0.130	12.8	0.62	0.184	0.222	0.543	0.305	0.368	0.444	0.43



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