

**MANUAL DE ESTRUCTURAS METÁLICAS
COLOMBIA. 1996**

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**ALFREDO STECKERL
E HIJOS S.A.**



**La gran tradición en metales,
su centro del hierro y el acero**

Un 10 de abril de 1941 ALFREDO STECKERL (Q.E.P.D.) fundó en Barranquilla, la primera comercializadora de aceros especializados que se conoció en Colombia. Hoy, 55 años más tarde y conmemorando el aniversario de esa legendaria fundación, los familiares sucesores entregamos orgullosamente a los Ingenieros de Colombia y diseñadores de estructuras metálicas este manual de consulta que ha sido impreso bajo la exclusiva autorización de la más reconocida institución en su género que existe en el hemisferio occidental, la AISC (American Institute Of Steel Construction Inc.) que hoy está festejando sus bodas de diamante; y además, de uno de los más grandes fabricantes de perfiles en el mundo, Trade Arbed.

El acta pública de 1988 conocida como la Ley 100-418 de los Estados Unidos, designó la utilización del sistema métrico como la medida preferente para llevar a cabo el intercambio y el comercio.

La AISC en cooperación con el Comité de Operación Métrica, preparó la mayoría de las tablas métricas y propiedades de los perfiles aquí contenidos. Nuestro catálogo recoge un sumario de todas las especificaciones en concordancia con el ASTM en las especificaciones A6M-92 y conjuntamente con las modalidades que ya eran de común utilización en el Viejo Continente.

Por ello hoy cuando se ha llegado a la homologación del sistema métrico y su imposición en los Estados Unidos de Norte América, entregamos orgullosamente este manual técnico que recopila lo que necesita la ingeniería colombiana para todo tipo de diseños de **estructuras metálicas**; cuya mundial aceptación ha proliferado de tal forma que desde hace ya medio siglo se han constituido en un sustituto indiscutible del concreto reforzado por la esbeltez, versatilidad, rapidez, bajo peso, características antisísmicas, que se traduce en ahorros de cimentación, en construcciones estructurales usando perfiles de acero.

Igualmente, hemos incluido para tener en un solo compendio, otros productos, como los Aceros Inoxidables, las láminas Cold Rolled al carbono, las ya tradicionales bar ras de refuerzo de 60,000 PSI según norma ASTM 706 y las láminas en caliente Hot Rolled en sus distintas calidades.

Para los que tenemos hoy la responsabilidad legada por Alfredo Steckerl, es un orgullo como lo fue en sus comienzos, 55 años atrás, y por ello, hoy complacidos hemos recogido esa herencia de más de medio siglo para convertir este catálogo en un libro de consulta.

ALFREDO STECKERL E HIJOS S.A.

La gran tradición en metales

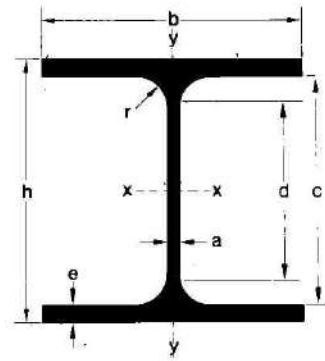
Fundada en 1941

Perfiles Americanos de Ala Ancha (W.F)

Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)				Imperial Designation h x b x weight (nominal)				Dimensions Sizes Abmessungen					F cm²	G kg/m	c mm	d mm	F _a cm²	U m²/m
								h mm	b mm	a mm	e mm	r mm						
M 100 X 100	X 19.3	M 4 X 4	X 13	102	100	6.5	9.4	6	24.5	19.35	83.2	71.2	5.41	0.581				
	X 20.5		X 13.8	102	102	8	9.4	6	26.1	20.54	83.2	71.2	6.66	0.586				
	X 24.2		X 16.3	107	100	7.9	12	6	30.9	24.26	83.0	71.0	6.56	0.588				
W 130 X 130	X 23.8	W 5 X 5	X 16	127	127	6.1	9.1	8	30.3	23.81	108.8	92.8	6.64	0.736				
	X 28.1		X 19	131	128	6.9	10.9	8	36.0	28.28	109.2	93.2	7.53	0.746				
W 150 X 150	X 22.5	W 6 X 6	X 15	152	152	5.8	6.6	6	28.4	22.32	138.8	126.8	8.05	0.890				
	X 29.8		X 20	157	153	6.6	9.3	6	37.9	29.76	138.4	126.4	9.13	0.902				
	X 37.1		X 25	162	154	8.1	11.6	6	47.3	37.20	138.8	126.8	11.2	0.913				
W 200 X 135	X 26.6	W 8 X 5.25	X 18	207	133	5.8	8.4	8	33.9	26.79	190.2	174.2	11.0	0.921				
	X 31.3		X 21	210	134	6.4	10.2	8	40.0	31.25	189.6	173.6	12.1	0.929				
W 200 X 165	X 35.9	W 8 X 6.5	X 24	201	165	6.2	10.2	10	45.7	35.72	180.6	160.6	11.2	1.03				
	X 41.7		X 28	205	166	7.2	11.8	10	53.1	41.67	181.4	161.4	13.1	1.04				
W 200 X 200	X 46.1	W 8 X 8	X 31	203	203	7.2	11	10	58.6	46.13	181.0	161.0	13.0	1.19				
	X 52		X 35	206	204	7.9	12.6	10	66.5	52.09	180.8	160.8	14.3	1.20				
	X 59		X 40	210	205	9.1	14.2	10	75.6	59.53	181.6	161.6	16.5	1.20				
	X 71		X 48	216	206	10.2	17.4	10	91.0	71.43	181.2	161.2	18.5	1.22				
	X 86		X 58	222	209	13	20.6	10	110	86.31	180.8	160.8	23.5	1.24				
	X 100		X 67	229	210	14.5	23.7	10	127	99.71	181.6	161.6	26.3	1.25				
W 250 X 145	X 32.7	W 10 X 5.75	X 22	258	146	6.1	9.1	8	41.7	32.74	239.8	223.8	14.6	1.07				
	X 38.5		X 26	262	147	6.6	11.2	8	49.3	38.69	239.6	223.6	15.8	1.09				
	X 44.8		X 30	266	148	7.6	13	8	57.3	44.65	240.0	224.0	18.2	1.10				
W 250 X 200	X 49.1	W 10 X 8	X 33	247	202	7.4	11	13	62.5	49.11	225.0	199.0	16.7	1.26				
	X 58		X 39	252	203	8	13.5	13	74.3	58.04	225.0	199.0	18.0	1.28				
	X 67		X 45	257	204	8.9	15.7	13	85.6	66.97	225.6	199.6	20.1	1.29				
W 250 X 250	X 73	W 10 X 10	X 49	253	254	8.6	14.2	13	92.9	72.92	224.6	198.6	19.3	1.48				
	X 80		X 54	256	255	9.4	15.6	13	102	80.36	224.8	198.8	21.1	1.49				
	X 89		X 60	260	256	10.7	17.3	13	114	89.29	225.4	199.4	24.1	1.50				
	X 101		X 68	264	257	11.9	19.6	13	129	101.20	224.8	198.8	26.8	1.51				
	X 115		X 77	269	259	13.5	22.1	13	146	114.59	224.8	198.8	30.3	1.52				
	X 131		X 88	275	261	15.4	25.1	13	167	130.96	224.8	198.8	34.6	1.54				
	X 149		X 100	282	263	17.3	28.4	13	190	148.82	225.2	199.2	39.0	1.56				
	X 167		X 112	289	265	19.2	31.8	13	213	166.67	225.4	199.4	43.3	1.58				
W 310 X 165	X 38.7	W 12 X 6.5	X 26	310	165	5.8	9.7	8	49.4	38.69	290.6	274.6	16.9	1.25				
	X 44.5		X 30	313	166	6.6	11.2	8	56.9	44.65	290.6	274.6	19.2	1.26				
	X 52		X 35	317	167	7.6	13.2	8	66.7	52.09	290.6	274.6	22.1	1.27				
W 310 X 250	X 79	W 12 X 10	X 53	306	254	8.8	14.6	15	100	78.87	276.8	246.8	24.4	1.58				
	X 86		X 58	310	254	9.1	16.3	15	110	86.31	277.4	247.4	25.2	1.59				

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{pix} cm ²	W _{ply} cm ²	J _t cm ⁴	C _m x 10 ⁻³ cm ³	i _r cm
	I _x cm ⁴	W _x cm ³	I _y cm ⁴	W _y cm ³	I _y cm ⁴	W _y cm ³					
W 100 X 100 X 19.3	441	86.4	4.24	157	31.4	2.53	99.5	48.0	6.90	3.36	2.74
X 20.5	456	89.4	4.18	167	32.7	2.53	104	50.4	8.13	3.56	2.77
X 24.2	587	110	4.36	200	40.1	2.55	129	61.5	13.7	4.51	2.75
W 130 X 130 X 23.8	886	139	5.41	311	49	3.20	157	74.7	8.10	10.8	3.46
X 28.1	1099	168	5.53	381	59.6	3.26	191	90.9	13.4	13.7	3.51
W 150 X 150 X 22.5	1205	159	6.51	387	50.9	3.69	176	77.5	4.31	20.4	4.09
X 29.8	1714	218	6.73	556	72.6	3.83	244	111	10.2	30.3	4.18
X 37.1	2219	274	6.85	707	91.8	3.87	310	140	19.5	39.9	4.21
W 200 X 135 X 26.6	2585	250	8.73	330	49.6	3.12	279	76.2	7.31	32.5	3.52
X 31.3	3142	299	8.86	410	61.1	3.20	336	93.8	12.1	40.8	3.58
W 200 X 165 X 35.9	3437	342	8.67	764	92.6	4.09	379	141	14.5	69.5	4.47
X 41.7	4086	399	8.77	900	108	4.12	445	165	22.3	83.9	4.50
W 200 X 200 X 46.1	4543	448	8.81	1535	151	5.12	495	229	22.2	141	5.54
X 52	5270	512	8.90	1784	175	5.18	569	266	32.5	167	5.59
X 59	6111	582	8.99	2040	199	5.20	653	303	46.8	195	5.62
X 71	7660	709	9.17	2537	246	5.28	803	375	82.1	250	5.68
X 86	9469	853	9.26	3138	300	5.33	981	458	141	318	5.75
X 100	11330	989	9.45	3664	349	5.38	1149	533	211	385	5.79
W 250 X 145 X 32.7	4895	379	10.8	473	64.7	3.36	425	99.5	10.0	73.1	3.84
X 38.5	6014	459	11.0	594	80.8	3.47	514	124	17.0	93.2	3.91
X 44.8	7115	535	11.1	703	95.1	3.50	603	146	26.4	112	3.95
W 250 X 200 X 49.1	7069	572	10.6	1513	150	4.92	634	228	24.5	210	5.42
X 58	8736	693	10.8	1884	186	5.04	771	283	41.1	268	5.50
X 67	10360	807	11.0	2224	218	5.10	902	332	62.6	323	5.55
W 250 X 250 X 73	11280	892	11.0	3880	306	6.46	986	463	57.8	553	6.96
X 80	12570	982	11.1	4314	338	6.50	1091	513	76.2	623	7.00
X 89	14260	1097	11.2	4841	378	6.51	1227	575	105	712	7.02
X 101	16380	1241	11.3	5549	432	6.56	1397	657	150	828	7.06
X 115	18940	1409	11.4	6405	495	6.62	1600	753	216	975	7.13
X 131	22160	1611	11.5	7446	571	6.68	1848	870	316	1161	7.19
X 149	25940	1840	11.7	8622	656	6.74	2129	1001	457	1384	7.25
X 167	30020	2078	11.9	9879	746	6.81	2427	1139	640	1631	7.31
W 310 X 165 X 38.7	8518	550	13.1	727	88.1	3.84	611	135	12.7	164	4.36
X 44.5	9934	635	13.2	855	103	3.88	708	158	19.3	194	4.40
X 52	11850	747	13.3	1026	123	3.92	838	189	31.1	236	4.44
W 310 X 250 X 79	17670	1155	13.3	3990	314	6.30	1275	478	65.5	846	6.88
X 86	19850	1280	13.4	4455	351	6.36	1417	533	87.0	960	6.91



Perfiles Americanos de Ala Ancha (W.F)

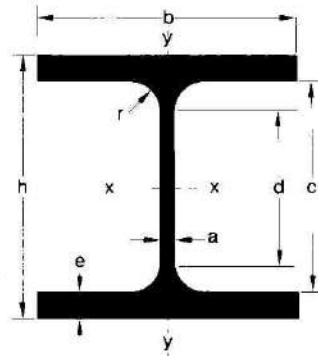
Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)			Imperial Designation h x b x weight (nominal)			Dimensions Sizes Abmessungen					F cm²	G kg/m	c mm	d mm	F _a cm²	U m²/m
						h mm	b mm	a mm	e mm	r mm						
W 310 X 310	X 97	W 12 X 12	X 65	308	305	9.9	15.4	15	123	96.73	277.2	247.2	27.4	1.79		
	X 107		X 72	311	306	10.9	17	15	136	107.15	277.0	247.0	30.2	1.80		
	X 117		X 79	314	307	11.9	18.7	15	150	117.57	276.6	246.6	32.9	1.81		
	X 129		X 87	318	308	13.1	20.6	15	165	129.47	276.8	246.8	36.3	1.82		
	X 143		X 96	323	309	14	22.9	15	182	142.86	277.2	247.2	38.8	1.83		
	X 158		X 106	327	310	15.5	25.1	15	200	157.75	276.8	246.8	42.9	1.84		
	X 179		X 120	333	313	18	28.1	15	228	178.58	276.8	246.8	49.8	1.86		
	X 202		X 136	341	315	20.1	31.7	15	257	202.39	277.6	247.6	55.8	1.88		
	X 226		X 152	348	317	22.1	35.6	15	289	226.20	276.8	246.8	61.2	1.89		
	X 253		X 170	356	319	24.4	39.6	15	322	252.99	276.8	246.8	67.5	1.91		
	X 283		X 190	365	322	26.9	44.1	15	360	282.75	276.8	246.8	74.5	1.94		
	X 313		X 210	374	325	30	48.3	15	399	312.52	277.4	247.4	83.2	1.96		
	X 342		X 230	382	328	32.6	52.6	15	437	342.28	276.8	246.8	90.2	1.99		
	X 375		X 252	391	330	35.4	57.2	15	477	375.02	276.6	246.6	97.9	2.01		
	X 415		X 279	403	334	38.9	62.7	15	529	415.20	277.6	247.6	108	2.04		
	X 454		X 305	415	336	41.3	68.7	15	578	453.89	277.6	247.6	115	2.07		
	X 500		X 336	427	340	45.1	75.1	15	637	500.02	276.8	246.8	125	2.10		
W 360 X 170	X 44.8	W 14 X 6.75	X 30	352	171	6.9	9.8	10	57.3	44.65	332.4	312.4	22.9	1.36		
	X 51		X 34	355	171	7.2	11.6	10	64.4	50.60	331.8	311.8	23.9	1.36		
	X 57		X 38	358	172	7.9	13.1	10	72.1	56.55	331.8	311.8	26.2	1.37		
W 360 X 250	X 91	W 14 X 10	X 61	353	254	9.5	16.4	15	116	90.78	320.2	290.2	30.4	1.68		
	X 101		X 68	357	255	10.5	18.3	15	129	101.20	320.4	290.4	33.6	1.69		
	X 110		X 74	360	256	11.4	19.9	15	140	110.12	320.2	290.2	36.5	1.70		
	X 122		X 82	363	257	13	21.7	15	155	122.03	319.6	289.6	41.5	1.70		
W 360 X 370	X 134	W 14 X 14.5	X 90	356	369	11.2	18	15	171	133.93	320.0	290.0	35.8	2.14		
	X 147		X 99	360	370	12.3	19.8	15	188	147.33	320.4	290.4	39.4	2.15		
	X 162		X 109	364	371	13.3	21.8	15	206	162.21	320.4	290.4	42.6	2.16		
	X 179		X 120	368	373	15	23.9	15	228	178.58	320.2	290.2	48.0	2.17		
	X 196		X 132	372	374	16.4	26.2	15	250	196.44	319.6	289.6	52.4	2.18		
W 360 X 410	X 216	W 14 X 16	X 145	375	394	17.3	27.7	15	275	215.78	319.6	289.6	55.3	2.27		
	X 237		X 159	380	395	18.9	30.2	15	301	236.62	319.6	289.6	60.4	2.28		
	X 262		X 176	387	398	21.1	33.3	15	335	261.92	320.4	290.4	67.6	2.30		
	X 287		X 193	393	399	22.6	36.6	15	366	287.22	319.8	289.8	72.3	2.31		
	X 314		X 211	399	401	24.9	39.6	15	399	314.00	319.8	289.8	79.6	2.33		
	X 347		X 233	407	404	27.2	43.7	15	442	346.74	319.6	289.6	86.9	2.35		
	X 382		X 257	416	406	29.8	48	15	487	382.46	320.0	290.0	95.4	2.37		
	X 421		X 283	425	409	32.8	52.6	15	537	421.15	319.8	289.8	105	2.39		
	X 463		X 311	435	412	35.8	57.4	15	590	462.82	320.2	290.2	115	2.42		
	X 509		X 342	446	416	39.1	62.7	15	649	508.95	320.6	290.6	125	2.45		
	X 551		X 370	455	418	42	67.6	15	701	550.62	319.8	289.8	134	2.47		
	X 592		X 398	465	421	45	72.3	15	755	592.29	320.4	290.4	144	2.50		
	X 634		X 426	474	424	47.6	77.1	15	808	633.96	319.8	289.8	152	2.52		
	X 677		X 455	483	428	51.2	81.5	15	863	677.12	320.0	290.0	164	2.55		
	X 744		X 500	498	432	55.6	88.9	15	948	744.08	320.2	290.2	178	2.59		
	X 818		X 550	514	437	60.5	97	15	1043	818.49	320.0	290.0	194	2.63		
	X 901		X 605	531	442	65.9	106	15	1149	900.34	319.0	289.0	210	2.67		
	X 990		X 665	550	448	71.9	115	15	1262	989.63	320.0	290.0	230	2.72		
	X 1086 #		X 730	569	454	78	125	15	1386	1086.36	319.0	289.0	249	2.77		



W

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx}	W _{ply}	J _t	C _m × 10 ⁻³	I _r
	I _x cm ⁴	W _x cm ³	i _x cm	I _y cm ⁴	W _y cm ³	i _y cm					
W 310 X 310 X 97	22240	1444	13.4	7286	478	7.69	1591	725	91.5	1559	8.33
X 107	24790	1594	13.5	8123	531	7.72	1765	806	122	1754	8.36
X 117	27510	1753	13.6	9024	588	7.76	1949	893	161	1966	8.40
X 129	30770	1935	13.7	10040	652	7.80	2164	991	214	2218	8.44
X 143	34760	2153	13.8	11270	729	7.86	2419	1109	288	2535	8.48
X 158	38630	2363	13.9	12470	806	7.89	2672	1225	380	2840	8.52
X 179	44530	2675	14.0	14380	919	7.95	3053	1401	544	3338	8.59
X 202	51870	3042	14.2	16540	1050	8.01	3502	1603	777	3949	8.66
X 226	59560	3423	14.4	18930	1194	8.10	3975	1825	1089	4611	8.73
X 253	68230	3833	14.6	21460	1346	8.16	4490	2059	1495	5362	8.80
X 283	78680	4311	14.8	24590	1527	8.26	5098	2340	2062	6317	8.89
X 313	89560	4789	15.0	27700	1705	8.33	5716	2617	2742	7329	8.97
X 342	100500	5262	15.2	31020	1892	8.42	6334	2907	3552	8392	9.06
X 375	112800	5769	15.4	34370	2083	8.49	7004	3205	4570	9543	9.12
X 415	129900	6448	15.7	39080	2340	8.60	7902	3607	6065	11270	9.24
X 454	147900	7130	16.0	43610	2596	8.68	8816	4001	7868	13020	9.31
X 500	168800	7907	16.3	49420	2907	8.81	9875	4487	10330	15230	9.43
W 360 X 170 X 44.8	12160	691	14.6	818	95.7	3.78	778	148	16.2	239	4.41
X 51	14120	796	14.8	968	113	3.88	893	174	23.8	285	4.46
X 57	16040	896	14.9	1113	129	3.93	1009	199	33.5	330	4.51
W 360 X 250 X 91	26690	1512	15.2	4483	353	6.23	1676	538	91.2	1269	6.85
X 101	30150	1689	15.3	5062	397	6.27	1880	605	125	1450	6.89
X 110	33090	1838	15.4	5570	435	6.30	2055	664	160	1609	6.93
X 122	36530	2013	15.4	6147	478	6.30	2266	732	212	1788	6.94
W 360 X 370 X 134	41510	2332	15.6	15080	817	9.40	2562	1237	169	4305	10.1
X 147	46290	2572	15.7	16720	904	9.43	2838	1369	224	4836	10.2
X 162	51540	2832	15.8	18560	1001	9.49	3139	1516	296	5432	10.2
X 179	57440	3122	15.9	20680	1109	9.52	3482	1683	394	6119	10.3
X 196	63630	3421	15.9	22860	1222	9.56	3837	1856	517	6829	10.3
W 360 X 410 X 216	71140	3794	16.1	28250	1434	10.1	4262	2176	637	8515	10.9
X 237	78780	4146	16.2	31040	1572	10.2	4686	2387	825	9489	10.9
X 262	89410	4620	16.3	35020	1760	10.2	5260	2676	1116	10940	11.0
X 287	99710	5074	16.5	38780	1944	10.3	5813	2957	1464	12300	11.0
X 314	110200	5525	16.6	42600	2125	10.3	6374	3236	1870	13740	11.1
X 347	124900	6140	16.8	48090	2380	10.4	7139	3629	2510	15850	11.2
X 382	141300	6794	17.0	53620	2641	10.5	7965	4031	3326	18130	11.2
X 421	159600	7510	17.2	60080	2938	10.6	8880	4489	4398	20800	11.3
X 463	180200	8283	17.5	67040	3254	10.7	9878	4978	5735	23850	11.4
X 509	204500	9172	17.8	75400	3625	10.8	11030	5552	7513	27630	11.5
X 551	226100	9939	18.0	82490	3947	10.8	12050	6051	9410	30870	11.6
X 592	250200	10760	18.2	90170	4284	10.9	13140	6574	11560	34670	11.7
X 634	274200	11570	18.4	98250	4634	11.0	14220	7117	14020	38570	11.8
X 677	299500	12400	18.6	106900	4994	11.1	15350	7680	16790	42920	11.9
X 744	342100	13740	19.0	119900	5552	11.2	17170	8549	21840	49980	12.0
X 818	392200	15260	19.4	135500	6203	11.4	19260	9561	28510	58650	12.2
X 901	450200	16960	19.8	153300	6938	11.6	21620	10710	37350	68890	12.3
X 990	518900	18870	20.3	173400	7739	11.7	24280	11960	48210	81530	12.5
X 1086	595700	20940	20.7	196200	8645	11.9	27210	13380	62290	96080	12.7



Perfiles Americanos de Ala Ancha (W.F)

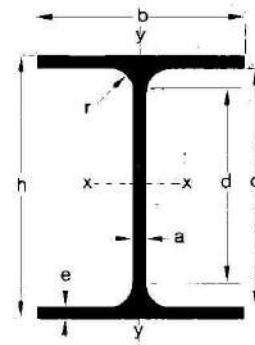
Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)				Imperial Designation h x b x weight (nominal)				Dimensions Sizes Abmessungen					F cm²	G kg/m	c mm	d mm	F _e cm²	U m²/m
								h mm	b mm	a mm	e mm	r mm						
W 410 X 180	X 53	W 16 X 7	X 36	403	177	7.5	10.9	10	68.0	50.57	381.2	361.2	28.6	1.48				
	X 60		X 40	407	178	7.7	12.8	10	75.8	59.53	381.4	361.4	29.4	1.49				
	X 67		X 45	410	179	8.8	14.4	10	86.0	66.97	381.2	361.2	33.5	1.50				
	X 75		X 50	413	180	9.7	16	10	95.4	74.41	381.0	361.0	37.0	1.51				
	X 85		X 57	417	181	10.9	18.2	10	108	84.83	380.6	360.6	41.5	1.52				
W 410 X 260	X 100	W 16 X 10.25	X 67	415	260	10	16.9	10	127	99.71	381.2	361.2	38.1	1.83				
	X 114		X 77	420	261	11.6	19.3	10	146	114.59	381.4	361.4	44.2	1.84				
	X 132		X 89	425	263	13.3	22.2	10	168	132.45	380.6	360.6	50.6	1.86				
	X 149		X 100	431	265	14.9	25	10	190	148.82	381.0	361.0	56.8	1.88				
W 460 X 150	X 52	W 18 X 6	X 35	450	152	7.6	10.8	10	66.2	52.09	428.4	408.4	32.6	1.48				
	X 60		X 40	455	153	8	13.3	10	75.8	59.53	428.4	408.4	34.3	1.49				
	X 68		X 46	459	154	9.1	15.4	10	87.3	68.46	428.2	408.2	39.0	1.50				
W 460 X 190	X 74	W 18 X 7.5	X 50	457	190	9	14.5	10	94.5	74.41	428.0	408.0	38.5	1.64				
	X 82		X 55	460	191	9.9	16	10	104	81.85	428.0	408.0	42.4	1.65				
	X 89		X 60	463	192	10.5	17.7	10	114	89.29	427.6	407.6	44.9	1.66				
	X 97		X 65	466	193	11.4	19	10	123	96.73	428.0	408.0	48.8	1.66				
	X 106		X 71	469	194	12.6	20.6	10	135	105.66	427.8	407.8	53.9	1.67				
W 460 X 280	X 113	W 18 X 11	X 76	463	280	10.8	17.3	10	144	113.10	428.4	408.4	46.3	2.01				
	X 128		X 86	467	282	12.2	19.6	10	164	127.98	427.8	407.8	52.2	2.02				
	X 144		X 97	472	283	13.6	22.1	10	184	144.35	427.8	407.8	58.2	2.03				
	X 158		X 106	476	284	15	23.9	10	201	157.75	428.2	408.2	64.2	2.04				
	X 177		X 119	482	286	16.6	26.9	10	226	177.09	428.2	408.2	71.1	2.06				
	X 193		X 130	489	283	17	30.5	10	246	193.46	428.0	408.0	72.8	2.06				
	X 213		X 143	495	285	18.5	33.5	10	271	212.81	428.0	408.0	79.2	2.08				
	X 235		X 158	501	287	20.6	36.6	10	299	235.13	427.8	407.8	88.1	2.09				
	X 260		X 175	509	289	22.6	40.4	10	331	260.43	428.2	408.2	96.8	2.11				
	X 286		X 192	517	291	24.4	44.4	10	364	285.73	428.2	408.2	104	2.13				
	X 315		X 211	525	293	26.9	48.5	10	400	314.00	428.0	408.0	115	2.15				
	X 349		X 234	535	296	29.5	53.6	10	444	348.23	427.8	407.8	126	2.18				
	X 384		X 258	545	299	32.5	58.4	10	489	383.95	428.2	408.2	139	2.20				
	X 421		X 283	555	302	35.6	63.5	10	537	421.15	428.0	408.0	152	2.23				
	X 464		X 311	567	305	38.6	69.6	10	591	462.82	427.8	407.8	165	2.26				
W 530 X 165	X 66	W 21 X 6.5	X 44	525	165	8.9	11.4	13	83.8	65.48	502.2	476.2	44.7	1.67				
	X 74		X 50	529	166	9.7	13.6	13	95.3	74.41	501.8	475.8	48.7	1.68				
	X 85		X 57	535	166	10.3	16.5	13	108	84.83	502.0	476.0	51.7	1.69				
W 530 X 210	X 92	W 21 X 8.25	X 62	533	209	10.2	15.6	13	118	92.27	501.8	475.8	51.2	1.86				
	X 101		X 68	537	210	10.9	17.4	13	129	101.20	502.2	476.2	54.7	1.87				
	X 109		X 73	539	211	11.6	18.8	13	139	108.64	501.4	475.4	58.2	1.88				
	X 123		X 83	544	212	13.1	21.2	13	157	123.52	501.6	475.6	65.7	1.89				
	X 138		X 93	549	214	14.7	23.6	13	176	138.40	501.8	475.8	73.8	1.90				



W

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx}	W _{ply}	J _x	C _m x 10 ⁻³	I _x
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm	cm ³	cm ³	cm ⁴	cm ³	cm
W 410 X 180 X 53	18600	923	16.5	1009	114	3.85	1045	177	22.8	387	4.54
X 60	21570	1060	16.9	1205	135	3.99	1194	209	32.8	467	4.63
X 67	24550	1197	16.9	1379	154	4.01	1356	239	47.1	539	4.65
X 75	27480	1331	17.0	1559	173	4.04	1512	269	64.0	613	4.69
X 85	31530	1512	17.1	1803	199	4.08	1725	310	93.1	715	4.73
W 410 X 260 X 100	39760	1916	17.7	4954	381	6.25	2129	581	99.7	1961	6.99
X 114	46140	2197	17.8	5725	439	6.27	2456	671	149	2296	7.01
X 132	53830	2533	17.9	6739	512	6.33	2850	785	227	2730	7.07
X 149	61840	2870	18.0	7765	586	6.39	3247	900	324	3195	7.14
W 460 X 150 X 52	21200	942	17.9	634	83.4	3.09	1088	131	21.2	305	3.77
X 60	25480	1120	18.3	796	104	3.24	1284	163	33.6	387	3.87
X 68	29680	1293	18.4	941	122	3.28	1487	192	51.1	461	3.91
W 460 X 190 X 74	33250	1455	18.8	1661	175	4.19	1649	271	51.9	811	4.91
X 82	36990	1608	18.8	1862	195	4.22	1828	303	69.5	916	4.94
X 89	40940	1768	19.0	2093	218	4.29	2011	339	91.1	1035	4.99
X 97	44490	1909	19.0	2282	237	4.31	2179	368	114	1137	5.02
X 106	48810	2081	19.0	2515	259	4.32	2387	405	147	1260	5.04
W 460 X 280 X 113	55600	2402	19.6	6335	452	6.63	2673	691	119	3143	7.48
X 128	63700	2728	19.7	7333	520	6.70	3049	796	173	3666	7.54
X 144	72610	3076	19.9	8358	591	6.74	3454	906	246	4224	7.58
X 158	79630	3346	19.9	9137	643	6.74	3774	989	314	4662	7.60
X 177	91010	3776	20.1	10510	735	6.82	4280	1131	445	5431	7.67
X 193	102400	4186	20.4	11540	816	6.85	4754	1253	607	6055	7.63
X 213	114300	4619	20.5	12950	909	6.91	5272	1398	803	6882	7.70
X 235	127300	5083	20.6	14450	1007	6.95	5839	1554	1059	7775	7.75
X 260	143700	5646	20.8	16300	1128	7.01	6525	1743	1423	8922	7.81
X 286	161100	6231	21.0	18290	1257	7.09	7243	1945	1877	10180	7.88
X 315	179800	6851	21.2	20400	1393	7.14	8021	2161	2461	11540	7.93
X 349	204200	7635	21.4	23260	1572	7.24	9006	2443	3323	13420	8.02
X 384	229400	8417	21.7	26140	1749	7.31	10000	2725	4339	15400	8.11
X 421	256600	9246	21.9	29310	1941	7.39	11070	3033	5621	17600	8.19
X 464	289900	10230	22.2	33120	2172	7.49	12340	3398	7385	20360	8.29
W 530 X 165 X 66	35100	1337	20.5	857	104	3.20	1563	166	33.3	563	3.98
X 74	41100	1554	20.8	1042	125	3.31	1810	200	49.2	689	4.06
X 85	48580	1816	21.2	1264	152	3.42	2105	242	74.5	845	4.14
W 530 X 210 X 92	55290	2075	21.7	2379	228	4.49	2365	355	77.2	1589	5.33
X 101	61740	2300	21.9	2692	256	4.56	2622	400	103	1813	5.38
X 109	66770	2478	21.9	2951	280	4.61	2829	437	128	1991	5.42
X 123	76120	2799	22.0	3377	319	4.64	3210	499	163	2300	5.45
X 138	86120	3138	22.1	3870	362	4.69	3615	569	254	2660	5.51



Perfiles Americanos de Ala Ancha (W.F)

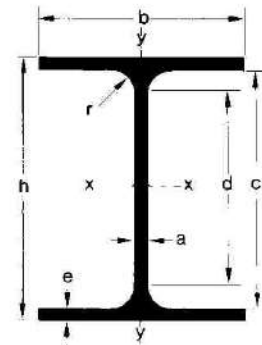
Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)	Imperial Designation h x b x weight (nominal)	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
		h mm	b mm	a mm	e mm	r mm						
W 530 X 315 X 150	W 21 X 12.25 X 101	543	312	12.7	20.3	13	192	150.30	502.4	476.4	63.8	2.2
X 165	X 111	546	313	14	22.2	13	211	165.19	501.6	475.6	70.2	2.2
X 182	X 122	551	315	15.2	24.4	13	232	181.56	502.2	476.2	76.3	2.3
X 196	X 132	554	316	16.5	26.3	13	250	196.44	501.4	475.4	82.7	2.3
X 219	X 147	560	318	18.3	29.2	13	279	218.76	501.6	475.6	91.8	2.3
X 248	X 166	571	315	19	34.5	13	314	247.04	502.0	476.0	95.4	2.3
X 272	X 182	577	317	21.1	37.6	13	346	270.85	501.8	475.8	106	2.3
X 300	X 201	585	319	23.1	41.4	13	382	299.12	502.2	476.2	116	2.3
X 331	X 223	593	322	25.4	45.5	13	422	331.86	502.0	476.0	128	2.4
X 370	X 248	603	324	26.2	50.5	13	460	369.07	502.0	476.0	132	2.4
X 409	X 275	613	327	31	55.6	13	521	409.25	501.8	475.8	156	2.4
X 447	X 300	623	330	33.5	60.5	13	569	446.45	502.0	476.0	168	2.4
X 496	X 333	635	334	37.1	66.5	13	632	495.56	502.0	476.0	186	2.5
X 543	X 364	647	337	40.4	72.4	13	692	541.69	502.2	476.2	203	2.5
X 599	X 402	661	340	43.9	79.5	13	762	598.24	502.0	476.0	220	2.5
W 610 X 180 X 82	W 24 X 7 X 55	599	178	10	12.8	13	104	81.85	573.4	547.4	57.3	1.8
X 92	X 62	603	179	10.9	15	13	118	92.27	573.0	547.0	62.5	1.8
W 610 X 230 X 101	W 24 X 9 X 68	603	228	10.5	14.9	13	130	101.20	573.2	547.2	80.2	2.0
X 113	X 76	608	228	11.2	17.3	13	145	113.10	573.4	547.4	84.2	2.0
X 125	X 84	612	229	11.9	19.6	13	159	125.01	572.8	546.8	88.2	2.0
X 140	X 94	617	230	13.1	22.2	13	179	139.89	572.6	546.6	95.0	2.1
W 610 X 325 X 155	W 24 X 12.75 X 104	611	324	12.7	19	13	197	154.77	573.0	547.0	72.8	2.4
X 174	X 117	616	325	14	21.6	13	222	174.12	572.8	546.8	80.2	2.4
X 195	X 131	622	327	15.4	24.4	13	249	194.95	573.2	547.2	88.3	2.5
X 217	X 146	628	328	16.5	27.7	13	278	217.27	572.6	546.6	94.5	2.5
X 241	X 162	635	329	17.9	31	13	308	241.08	573.0	547.0	103	2.5
X 262	X 176	641	327	19	34	13	333	261.92	573.0	547.0	109	2.5
X 285	X 192	647	329	20.6	37.1	13	364	285.73	572.8	546.8	118	2.5
X 307	X 207	653	330	22.1	39.9	13	391	308.05	573.2	547.2	127	2.5
X 341	X 229	661	333	24.4	43.9	13	434	340.79	573.2	547.2	140	2.5
X 372	X 250	669	335	26.4	48	13	474	372.04	573.0	547.0	151	2.6
X 415	X 279	679	338	29.5	53.1	13	529	415.20	572.8	546.8	169	2.6
X 455	X 306	689	340	32	57.9	13	579	455.38	573.2	547.2	183	2.6
X 498	X 335	699	343	35.1	63	13	635	498.54	573.0	547.0	201	2.6
X 551	X 370	711	347	38.6	69.1	13	702	550.62	572.8	546.8	221	2.7
X 608	X 408	725	351	41.9	75.9	13	774	607.17	573.2	547.2	240	2.7
X 670	X 450	739	354	46	83.1	13	853	669.67	572.8	546.8	263	2.7
X 732	X 492	753	359	50	89.9	13	934	732.18	573.2	547.2	287	2.8
W 690 X 250 X 125	W 27 X 10 X 84	678	253	11.7	16.3	15	160	125.01	645.4	615.4	75.5	2.3
X 140	X 94	684	254	12.4	18.9	15	178	139.89	646.2	616.2	80.1	2.3
X 152	X 102	688	254	13.1	21.1	15	194	151.79	645.8	615.8	84.6	2.3
X 170	X 114	693	256	14.5	23.6	15	216	169.65	645.8	615.8	93.6	2.3



W

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx}	W _{ply}	J _x	C _x x 10 ⁻³	I _x
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm	cm ³	cm ³	cm ⁴	cm ³	cm
530 X 315 X 150	100900	3716	22.9	10290	659	7.32	4148	1010	218	7019	8.29
X 165	111000	4066	23.0	11360	726	7.34	4556	1113	286	7782	8.32
X 182	123600	4486	23.1	12730	808	7.41	5042	1241	378	8812	8.39
X 196	134000	4839	23.1	13850	877	7.44	5459	1349	475	9629	8.42
X 219	151100	5396	23.3	15680	986	7.50	6116	1520	650	11020	8.48
X 248	177500	6219	23.8	18000	1143	7.57	7063	1759	986	12330	8.47
X 272	196800	6821	23.9	20000	1262	7.61	7793	1947	1289	14520	8.52
X 300	220800	7548	24.1	22450	1408	7.67	8672	2176	1718	16550	8.58
X 331	247800	8356	24.2	25390	1577	7.76	9658	2442	2290	18970	8.67
X 370	278900	9252	24.6	28710	1772	7.90	10730	2739	3030	21850	8.77
X 409	316900	10340	24.7	32530	1990	7.90	12120	3096	4191	25170	8.82
X 447	353300	11340	24.9	36400	2206	8.00	13380	3438	5400	28660	8.91
X 496	400600	12620	25.2	41520	2486	8.11	15000	3885	7236	33370	9.03
X 543	448400	13860	25.5	46470	2758	8.19	16600	4319	9364	38120	9.11
X 599	507000	15340	25.8	52440	3085	8.29	18520	4841	12350	44020	9.21
610 X 180 X 82	56030	1871	23.2	1209	136	3.40	2199	218	50.6	1034	4.27
X 92	64680	2145	23.5	1441	161	3.50	2515	259	72.8	1239	4.35
610 X 230 X 101	76410	2534	24.3	2950	259	4.77	2902	404	79.6	2545	5.74
X 113	87600	2882	24.6	3425	300	4.87	3292	469	113	2981	5.80
X 125	98590	3222	24.9	3932	343	4.97	3676	535	156	3442	5.87
X 140	112000	3631	25.0	4514	393	5.03	4152	613	220	3982	5.92
610 X 325 X 155	129000	4222	25.6	10780	666	7.39	4728	1022	198	9437	8.51
X 174	147200	4778	25.7	12370	761	7.46	5362	1170	283	10920	8.56
X 195	167900	5398	26.0	14240	871	7.56	6074	1340	401	12700	8.64
X 217	190800	6076	26.2	16310	995	7.67	6848	1531	565	14680	8.71
X 241	215400	6785	26.4	18430	1120	7.74	7671	1725	776	16780	8.76
X 262	236000	7363	26.6	19850	1214	7.72	8349	1871	998	18250	8.73
X 285	260700	8059	26.8	22060	1341	7.79	9175	2071	1295	20480	8.79
X 307	283700	8688	26.9	23950	1452	7.82	9929	2245	1608	22460	8.83
X 341	318300	9630	27.1	27090	1627	7.90	11070	2522	2153	25720	8.91
X 372	353200	10560	27.3	30170	1801	7.98	12190	2796	2802	29000	8.98
X 415	399800	11780	27.5	34300	2030	8.05	13690	3160	3824	33470	9.06
X 455	444500	12900	27.7	38090	2241	8.11	15090	3496	4948	37770	9.12
X 498	494700	14150	27.9	42580	2483	8.19	16670	3885	6420	42850	9.21
X 551	557500	15680	28.2	48400	2790	8.30	18600	4377	8525	49570	9.32
X 608	630700	17400	28.5	55060	3137	8.43	20780	4931	11280	57620	9.45
X 670	709400	19200	28.8	61920	3498	8.52	23110	5514	14850	66080	9.53
X 732	793500	21080	29.2	69930	3896	8.66	25550	6155	18980	76210	9.68
W 690 X 250 X 125	118500	3495	27.2	4410	349	5.25	4009	546	119	4816	6.34
X 140	136100	3979	27.6	5174	407	5.39	4549	636	168	5709	6.44
X 152	150600	4378	27.9	5777	455	5.46	5002	710	221	6408	6.48
X 170	169900	4904	28.0	6618	517	5.53	5618	809	307	7393	6.55



Perfiles Americanos de Ala Ancha (W.F)

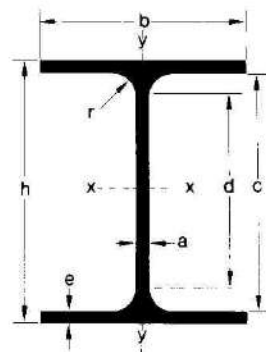
Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)			Imperial Designation h x b x weight (nominal)			Dimensions Sizes Abmessungen					F	G	c	d	F _a
						h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²
W 690 X 360	X 217		W 27 X 14	X 146		695	355	15.4	24.8	15	277	217.27	645.4	615.4	99.4
	X 240			X 161		701	356	16.8	27.4	15	306	239.59	646.2	616.2	109
	X 265			X 178		706	358	18.4	30.2	15	337	264.89	645.6	615.6	119
	X 289			X 194		714	356	19	34	15	367	288.70	646.0	616.0	123
	X 323			X 217		722	359	21.1	38.1	15	412	322.93	645.8	615.8	136
	X 350			X 235		728	360	23.1	40.9	15	446	349.72	646.2	616.2	149
	X 384			X 258		736	362	24.9	45	15	489	383.95	646.0	616.0	161
	X 419			X 281		744	364	26.9	49	15	532	418.17	646.0	616.0	174
	X 457			X 307		752	367	29.5	53.1	15	582	456.87	645.8	615.8	191
	X 500			X 336		762	369	32	57.9	15	636	500.02	646.2	616.2	207
	X 533			X 358		772	372	35.1	63	15	697	532.76	646.0	616.0	227
	X 605			X 407		784	376	38.6	69.1	15	771	605.68	645.8	615.8	249
	X 667			X 448		798	379	41.9	75.9	15	848	666.70	646.2	616.2	271
	X 735			X 494		812	383	46	83.1	15	936	735.15	645.8	615.8	297
	X 802			X 539		826	387	50	89.9	15	1021	802.12	646.2	616.2	323
W 760 X 265	X 147		W 30 X 10.5	X 99		753	265	13.2	17	17	187	147.33	719.0	685.0	94.9
	X 161			X 108		758	266	13.8	19.3	17	204	160.72	719.4	685.4	99.3
	X 173			X 116		762	267	14.4	21.6	17	221	172.63	718.8	684.8	104
	X 185			X 124		766	267	14.9	23.6	17	236	184.53	718.8	684.8	107
	X 196			X 132		770	268	15.6	25.4	17	251	196.44	719.2	685.2	112
W 760 X 380	X 257		W 30 X 15	X 173		773	381	16.6	27.1	17	328	257.45	718.8	684.8	119
	X 284			X 191		779	382	18	30.1	17	362	284.24	718.8	684.8	129
	X 314			X 211		786	384	19.7	33.4	17	401	314.00	719.2	685.2	142
	X 350			X 235		795	382	21.1	38.1	17	445	349.72	718.8	684.8	152
	X 389			X 261		803	385	23.6	41.9	17	495	388.41	719.2	685.2	170
	X 434			X 292		813	387	25.9	47	17	552	434.54	719.0	685.0	186
	X 484			X 326		823	390	29	52.1	17	617	485.14	718.8	684.8	206
	X 531			X 357		833	393	31.5	56.9	17	676	531.28	719.2	685.2	227
	X 582			X 391		843	396	34.5	62	17	742	581.87	719.0	685.0	248
	X 644			X 433		855	399	38.1	68.1	17	820	644.38	718.8	684.8	274
	X 710			X 477		869	403	41.4	74.9	17	904	709.86	719.2	685.2	298
	X 783			X 526		883	407	45.5	82	17	997	782.78	719.0	685.0	327
	X 865			X 581		899	411	50	89.9	17	1101	864.62	719.2	685.2	360
W 840 X 295	X 176		W 33 X 11.5	X 118		835	292	14	18.8	18	224	175.60	797.4	761.4	112
	X 193			X 130		840	292	14.7	21.7	18	247	193.46	796.6	760.6	117
	X 210			X 141		846	293	15.4	24.4	18	269	209.83	797.2	761.2	123
	X 226			X 152		851	294	16.1	26.8	18	289	226.20	797.4	761.4	128
W 840 X 400	X 299		W 33 X 15.75	X 201		855	400	18.2	29.2	18	381	299.12	796.6	760.6	145
	X 329			X 221		862	401	19.7	32.4	18	420	328.88	797.2	761.2	157
	X 359			X 241		868	403	21.1	35.6	18	458	358.65	796.8	760.8	168
	X 392			X 263		877	401	22.1	39.9	18	499	391.39	797.2	761.2	176
	X 433			X 291		885	404	24.4	43.9	18	552	433.06	797.2	761.2	195
	X 473			X 318		893	406	26.4	48	18	603	473.24	797.0	761.0	210
	X 527			X 354		903	409	29.5	53.1	18	672	526.81	796.8	760.8	235
	X 577			X 387		913	411	32	57.9	18	734	575.92	797.2	761.2	255
	X 631			X 424		923	414	35.1	63	18	804	630.98	797.0	761.0	280
	X 697			X 468		935	418	38.6	69.1	18	888	696.46	796.8	760.8	308
	X 767			X 515		949	421	41.9	75.9	18	976	766.41	797.2	761.2	334
	X 845			X 567		963	425	46	83.1	18	1076	843.79	796.8	760.8	367
	X 922			X 619		977	430	50	89.9	18	1175	921.18	797.2	761.2	399



W

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x		Axe y-y Axis y-y Achse y-y				W _{plx}	W _{ply}	J _t	C _m x 10 ⁻³	i _r
	I _x cm ⁴	W _x cm ³	I _y cm ⁴	W _y cm ³	I _y cm ⁴	W _y cm ³					
W 690 X 360 X 217	234300	6742	29.1	18510	1043	8.17	7568	1603	459	20770	9.36
X 240	261200	7451	29.2	20630	1159	8.22	8386	1784	612	23370	9.40
X 265	290300	8223	29.4	23130	1292	8.29	9285	1992	817	26370	9.47
X 289	324700	9096	29.8	25610	1439	8.36	10270	2215	1099	29560	9.47
X 323	369500	10240	30.0	29430	1640	8.45	11620	2530	1543	34350	9.57
X 350	401900	11040	30.0	31870	1771	8.46	12590	2739	1927	37540	9.59
X 384	447400	12160	30.3	35670	1971	8.54	13920	3052	2541	42470	9.66
X 419	493900	13280	30.5	39500	2170	8.61	15260	3366	3270	47560	9.73
X 457	545000	14500	30.6	43890	2392	8.68	16760	3720	4200	53420	9.81
X 500	604700	15870	30.8	48670	2638	8.75	18450	4111	5433	60090	9.87
X 548	671400	17390	31.0	54290	2919	8.82	20340	4562	7047	67930	9.95
X 605	754600	19250	31.3	61540	3273	8.93	22660	5129	9352	78220	10.1
X 667	848900	21280	31.6	69270	3656	9.04	25210	5739	12330	89770	10.2
X 735	954400	23510	31.9	78350	4091	9.15	28060	6442	16270	103400	10.3
X 802	1061700	25710	32.2	87530	4524	9.26	30890	7141	20740	117600	10.4
W 760 X 265 X 147	166100	4411	29.8	5289	399	5.31	5110	631	162	7141	6.52
X 161	186100	4909	30.2	6073	457	5.45	5666	720	212	8259	6.62
X 173	205800	5402	30.5	6873	515	5.57	6218	810	274	9391	6.71
X 185	223000	5821	30.8	7510	563	5.65	6691	884	337	10320	6.75
X 196	240300	6241	31.0	8175	610	5.71	7174	959	409	11290	6.81
W 760 X 380 X 257	341900	8845	32.3	25010	1313	8.73	9934	2019	643	34750	10.0
X 284	381500	9794	32.5	28000	1466	8.80	11020	2258	866	39210	10.1
X 314	427700	10880	32.7	31570	1644	8.88	12290	2536	1172	44630	10.1
X 350	485700	12220	33.0	35460	1856	8.92	13830	2863	1662	50700	10.1
X 389	544000	13550	33.2	39940	2075	8.98	15420	3209	2237	57710	10.2
X 434	617700	15190	33.4	45510	2352	9.08	17370	3644	3117	66600	10.3
X 484	697600	16950	33.6	51660	2649	9.15	19500	4118	4276	76530	10.4
X 531	775500	18620	33.9	57760	2939	9.24	21520	4577	5567	86680	10.5
X 582	860400	20410	34.1	64430	3254	9.32	23720	5080	7238	97850	10.6
X 644	964400	22560	34.3	72440	3631	9.40	26390	5687	9634	111600	10.6
X 710	1086000	24990	34.7	82140	4077	9.53	29410	6396	12780	128800	10.8
X 783	1218500	27600	35.0	92720	4556	9.64	32700	7170	16860	147800	10.9
X 865	1372500	30530	35.3	104800	5099	9.76	36450	8050	22310	170200	11.0
W 840 X 295 X 176	246400	5901	33.1	7823	536	5.91	6816	844	227	12990	7.22
X 193	278400	6630	33.6	9029	618	6.05	7627	971	310	15070	7.31
X 210	310700	7346	34.0	10260	700	6.18	8430	1098	409	17260	7.40
X 226	340100	7992	34.3	11380	774	6.28	9163	1213	518	19280	7.48
W 840 X 400 X 299	479400	11210	35.5	31190	1560	9.04	12640	2406	863	53100	10.5
X 329	534800	12410	35.7	34880	1739	9.12	14020	2686	1155	59910	10.5
X 359	590600	13610	35.9	38900	1931	9.22	15400	2984	1507	67270	10.6
X 392	658600	15020	36.3	42960	2143	9.28	17010	3310	2021	75120	10.6
X 433	735300	16620	36.5	48350	2394	9.36	18900	3706	2702	85330	10.7
X 473	812200	18190	36.7	53670	2644	9.43	20770	4100	3512	95570	10.8
X 527	914100	20250	36.9	60730	2970	9.51	23250	4620	4788	109300	10.8
X 577	1010800	22140	37.1	67230	3271	9.57	25540	5100	6190	122500	10.9
X 631	1118600	24240	37.3	74810	3614	9.64	28110	5650	8026	137800	11.0
X 697	1252200	26780	37.6	84510	4043	9.76	31250	6340	10640	157700	11.1
X 767	1402200	29550	37.9	94900	4508	9.86	34670	7083	14030	179900	11.2
X 845	1569500	32600	38.2	107000	5035	9.97	38490	7934	18490	205800	11.3
X 922	1741700	35650	38.5	120000	5581	10.1	42350	8818	23600	234400	11.5



Perfiles Americanos de Ala Ancha (W.F)

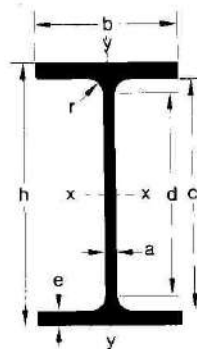
Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)		Imperial Designation h x b x weight (nominal)		Dimensions Sizes Abmessungen					F	G	c	d	F _a	m
				h	b	a	e	r						
				mm	mm	mm	mm	mm	cm ²	kg/m	mm	mm	cm ²	m ²
W 920 X 310	X 201	W 36 X 12	X 135	903	304	15.2	20.1	19	256	200.90	862.8	824.8	131	2.1
	X 223		X 150	911	304	15.9	23.9	19	286	223.23	863.2	825.2	137	2.1
	X 238		X 160	915	305	16.5	25.9	19	304	238.11	863.2	825.2	142	2.1
	X 253		X 170	919	306	17.2	27.9	19	323	252.99	863.2	825.2	149	2.1
	X 271		X 182	923	307	18.4	30	19	346	270.85	863.0	825.0	159	3.1
	X 289		X 194	927	308	19.4	32	19	368	288.70	863.0	825.0	167	3.1
	X 313		X 210	932	309	21.1	34.5	19	398	312.52	863.0	825.0	182	3.1
W 920 X 420	X 342	W 36 X 16.5	X 230	912	418	19.3	32	24	436	342.28	848.0	800.0	164	3.1
	X 365		X 245	916	419	20.3	34.3	24	464	364.60	847.4	799.4	172	3.1
	X 387		X 260	921	420	21.3	36.6	24	493	386.92	847.8	799.8	181	3.1
	X 417		X 280	928	422	22.5	39.9	24	533	416.69	848.2	800.2	191	3.1
	X 446		X 300	933	423	24	42.7	24	570	446.45	847.6	799.6	203	3.1
	X 488		X 328	942	422	25.9	47	24	621	488.12	848.0	800.0	220	3.1
	X 534		X 359	950	425	28.4	51.1	24	680	534.25	847.8	799.8	241	3.1
	X 585		X 393	960	427	31	55.9	24	745	584.85	848.2	800.2	263	3.1
	X 653		X 439	972	431	34.5	62	24	832	653.31	848.0	800.0	293	3.1
	X 722		X 485	984	434	38.1	68.1	24	919	721.76	847.8	799.8	323	3.1
	X 784		X 527	996	437	40.9	73.9	24	998	784.26	848.2	800.2	347	3.1
	X 876		X 588	1012	442	45.5	82	24	1116	875.04	848.0	800.0	386	3.1
	X 967		X 650	1028	446	50	89.9	24	1231	967.31	848.2	800.2	424	3.1
	X 1072		X 720	1046	451	55	99.1	24	1365	1071.48	847.8	799.8	466	3.1
	X 1188		X 798	1066	457	60.5	109	24	1514	1187.56	848.0	800.0	513	3.1
	X 1262		X 848	1078	461	64	115.1	24	1609	1261.97	847.8	799.8	543	3.1
W 1000 X 300	X 222	W 40 X 12	X 149	970	300	16	21	30	282	221.74	928.0	868.0	148	3.1
	X 249		X 167	980	300	16.5	26	30	317	248.52	928.0	868.0	153	3.1
	X 272		X 183	990	300	16.5	31	30	347	272.33	928.0	868.0	153	3.1
	X 314 °		X 211	1000	300	19	36	30	400	314.00	928.0	868.0	176	3.1
	X 349 °		X 235	1008	302	21	40	30	444	349.72	928.0	868.0	195	3.1
W 1000 X 400	X 258 °	W 40 X 16	X 174	970	400	16.5	21	30	329	258.94	928.0	868.0	153	3.1
	X 296		X 199	982	400	16.5	27	30	377	296.15	928.0	868.0	153	3.1
	X 321		X 215	990	400	16.5	31	30	409	319.96	928.0	868.0	153	3.1
	X 371		X 249	1000	400	19	36	30	472	370.55	928.0	868.0	176	3.1
	X 412		X 277	1008	402	21	40	30	524	412.22	928.0	868.0	195	3.1
	X 443		X 297	1012	402	23.6	41.9	30	564	441.99	928.2	868.2	219	3.1
	X 483		X 324	1020	404	25.4	46	30	615	482.17	928.0	868.0	236	3.1
	X 539		X 362	1030	407	28.4	51.1	30	687	538.72	927.8	867.8	263	3.1
	X 591		X 397	1040	409	31	55.9	30	753	590.80	928.2	868.2	288	3.1
	X 649		X 436	1050	412	34	61	30	826	648.84	928.0	868.0	316	3.1
	X 714		X 480	1062	416	37.1	67.1	30	910	714.32	927.8	867.8	344	3.1
	X 790		X 531	1075	419	40.9	73.9	30	1006	790.22	927.2	867.2	379	3.1
	X 883		X 593	1092	424	45.5	82	30	1125	882.48	928.0	868.0	422	3.1
	X 976		X 655	1108	428	50	89.9	30	1241	974.75	928.2	868.2	464	3.1
W 1000 X 450	X 286	W 40 X 18	X 192	970	450	18	21	30	364	285.73	928.0	868.0	167	3.1
	X 328		X 221	982	450	18	27	30	418	328.86	928.0	868.0	167	3.1
	X 363		X 244	992	450	18	32	30	463	363.11	928.0	868.0	167	3.1
	X 399		X 268	1000	451	19	36	30	509	398.83	928.0	868.0	176	3.1
	X 444		X 298	1008	453	21	40	30	565	443.47	928.0	868.0	195	3.1
	X 488		X 328	1016	455	23	44	30	622	488.12	928.0	868.0	213	3.1



W

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{pl} cm ³	W _{pl} cm ³	J _t cm ⁴	C _m x 10 ⁻³		I _t cm
	I _x cm ⁴	W _x cm ³	i _x cm	I _y cm ⁴	W _y cm ³	i _y cm				cm ⁴	cm	
20 X 310 X 201	325200	7203	35.6	9442	621	6.07	8356	982	298	18340	7.46	
X 223	376800	8273	36.3	11220	738	6.27	9540	1163	427	22020	7.59	
X 238	406400	8883	36.6	12290	806	6.36	10230	1267	519	24200	7.67	
X 253	437500	9520	36.8	13370	874	6.43	10960	1375	631	26450	7.72	
X 271	471800	10220	36.9	14520	946	6.48	11780	1491	775	28840	7.76	
X 289	504500	10880	37.0	15640	1016	6.52	12570	1603	930	31210	7.81	
X 313	548200	11760	37.1	17040	1103	6.54	13630	1748	1171	34160	7.83	
20 X 420 X 342	624900	13700	37.9	39010	1867	9.46	15450	2882	1193	75410	10.9	
X 365	670500	14640	38.0	42120	2011	9.52	16520	3106	1446	81730	11.0	
X 387	718300	15600	38.2	45280	2156	9.58	17630	3332	1734	88370	11.0	
X 417	787600	16970	38.5	50070	2373	9.70	19210	3668	2200	98540	11.1	
X 446	846800	18150	38.6	53980	2552	9.73	20600	3951	2685	106700	11.1	
X 488	935400	19860	38.8	59010	2797	9.75	22610	4336	3514	117900	11.1	
X 534	1031200	21710	38.9	65560	3085	9.82	24830	4796	4542	132100	11.2	
X 585	1143100	23810	39.2	72770	3408	9.88	27360	5310	5932	148200	11.3	
X 653	1292100	26590	39.4	83050	3854	9.99	30730	6022	8124	171300	11.4	
X 722	1444100	29350	39.6	93200	4295	10.1	34120	6733	10800	194600	11.5	
X 784	1592500	31980	40.0	103300	4728	10.2	37340	7424	13730	218500	11.6	
X 876	1811300	35800	40.3	118700	5372	10.3	42090	8463	18850	255200	11.7	
X 967	2032600	39540	40.6	133900	6003	10.4	46810	9486	24930	292400	11.9	
X 1072	2299000	43960	41.0	152700	6774	10.6	52410	10740	33450	339600	12.0	
X 1188	2607000	48910	41.5	175000	7659	10.8	58750	12180	44720	397000	12.2	
X 1262	2805200	52040	41.8	189900	8237	10.9	62800	13120	52910	435600	12.3	
W 1000X 300 X 222	406500	8380	38.0	9501	633	5.80	9777	1016	403	21280	7.19	
X 249	481100	9818	39.0	11750	784	6.09	11350	1245	584	26620	7.39	
X 272	553800	11190	40.0	14000	934	6.35	12820	1470	822	32070	7.55	
X 314	644700	12890	40.1	16280	1085	6.38	14860	1716	1254	37640	7.58	
X 349	722300	14330	40.3	18460	1222	6.45	16570	1940	1701	43020	7.65	
W 1000X 400 X 258	504400	10400	39.2	22450	1123	8.26	11880	1755	483	50430	9.94	
X 296	618700	12600	40.5	28850	1443	8.75	14220	2235	757	65670	10.2	
X 321	696400	14070	41.3	33120	1656	9.00	15800	2555	1021	76030	10.4	
X 371	812100	16240	41.5	38480	1924	9.03	18330	2976	1565	89210	10.4	
X 412	909800	18050	41.7	43410	2160	9.10	20440	3348	2128	101500	10.5	
X 443	966500	19100	41.4	45500	2264	8.98	21780	3529	2545	106700	10.4	
X 483	1067500	20930	41.7	50710	2510	9.08	23920	3919	3311	119900	10.5	
X 539	1202500	23350	41.8	57630	2832	9.16	26820	4436	4546	137600	10.6	
X 591	1331000	25600	42.1	64010	3130	9.22	29530	4916	5927	154300	10.7	
X 649	1473300	28060	42.2	71450	3468	9.30	32530	5464	7723	173900	10.8	
X 714	1646600	31010	42.5	80960	3892	9.43	36110	6145	10240	199200	10.9	
X 790	1842200	34270	42.8	91190	4353	9.52	40140	6896	13670	227000	11.0	
X 883	2096400	38400	43.2	105000	4952	9.66	45260	7874	18750	265700	11.1	
X 976	2348700	42400	43.5	118500	5538	9.77	50300	8839	24770	304400	11.2	
W 1000X 450 X 286	561600	11580	39.3	31960	1420	9.37	13200	2214	574	71810	11.2	
X 328	690200	14060	40.6	41070	1825	9.92	15830	2821	882	93500	11.6	
X 363	799800	16130	41.6	48670	2163	10.3	18050	3327	1268	112000	11.8	
X 399	897400	17950	42.0	55120	2444	10.4	20100	3757	1724	127900	11.9	
X 444	1005400	19950	42.2	62070	2740	10.5	22410	4220	2346	145200	11.9	
X 488	1115700	21960	42.4	69200	3042	10.6	24760	4691	3103	163200	12.0	



Perfiles Americanos de Ala Ancha (W.F)

Dimensiones de Acuerdo al ASTM -A6

Metric Designation h x b x mass (nominal)	Imperial Designation h x b x weight (nominal)	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
		h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /l
W 1100 X 300 X 293	W 44 X 12 X 198	1090	300	18	31	20	374	294.66	1028.0	988.0	185	3.3
X 333	X 224	1100	300	20	36	20	425	333.35	1028.0	988.0	206	3.3
X 369	X 248	1108	302	22	40	20	471	369.07	1028.0	988.0	226	3.3
X 427	X 285	1118	305	26	45	20	545	424.13	1028.0	988.0	267	3.3
W 1100 X 400 X 342	W 44 X 16 X 230	1090	400	18	31	20	436	342.28	1028.0	988.0	185	3.7
X 390	X 262	1100	400	20	36	20	497	389.90	1028.0	988.0	206	3.7
X 432	X 290	1108	402	22	40	20	551	431.57	1028.0	988.0	226	3.7
X 498	X 335	1118	405	26	45	20	635	498.54	1028.0	988.0	267	3.7



Perfiles Americanos de Ala Ancha (W.F)

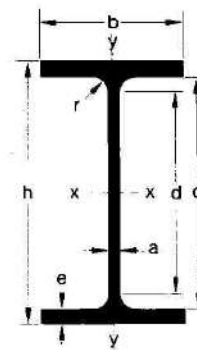
Dimensiones de Acuerdo al ASTM -A6

Metric Designation h x b x mass (nominal)	Imperial Designation h x b x weight (nominal)	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
		h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /l
W 1100 X 300 X 293	W 44 X 12 X 198	1090	300	18	31	20	374	294.66	1028.0	988.0	185	3.3
X 333	X 224	1100	300	20	36	20	425	333.35	1028.0	988.0	206	3.3
X 369	X 248	1108	302	22	40	20	471	369.07	1028.0	988.0	226	3.3
X 427	X 285	1118	305	26	45	20	545	424.13	1028.0	988.0	267	3.3
W 1100 X 400 X 342	W 44 X 16 X 230	1090	400	18	31	20	436	342.28	1028.0	988.0	185	3.7
X 390	X 262	1100	400	20	36	20	497	389.90	1028.0	988.0	206	3.7
X 432	X 290	1108	402	22	40	20	551	431.57	1028.0	988.0	226	3.7
X 498	X 335	1118	405	26	45	20	635	498.54	1028.0	988.0	267	3.7



W

Perfiles Americanos de Ala Ancha (W.F)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ³	W _{ply} cm ³	J _t cm ⁴	C _m x 10 ⁻³ cm ³	i _t cm
	I _x cm ⁴	W _x cm ³	i _x cm	I _y cm ⁴	W _y cm ³	i _y cm					
W 1100 X 300 X 293	693500	12720	43.0	14010	934	6.12	14780	1483	839	39110	7.46
X 333	801500	14570	43.4	16280	1085	6.19	16950	1728	1253	45850	7.51
X 369	897300	16200	43.6	18460	1223	6.26	18890	1954	1703	52360	7.58
X 427	1034900	18510	43.6	21440	1406	6.27	21770	2273	2527	61250	7.62
W 1100 X 400 X 342	867400	15920	44.6	33120	1656	8.71	18060	2568	1037	92710	10.3
X 390	1005400	18280	45.0	38480	1924	8.80	20780	2988	1564	108700	10.3
X 432	1125600	20320	45.2	43410	2160	8.87	23160	3362	2130	123500	10.4
X 498	1294100	23150	45.1	49980	2468	8.87	26600	3870	3135	143400	10.4

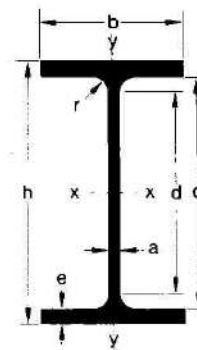
Tolerances de laminage pour W 44 / Rolling margins for W 44 / Walztoleranzen für W 44

Hauteur/Depth/Höhe H = +5 mm -5 mm		Largeur d'alo/Flange width/Flanschbreite B = +8 mm -5 mm		Poids/Weight/Gewicht G = +5.5 % -2.5 %	
	Paral. des ailes Flange paral. Flansch Paral. 4 mm		Excentr. de l'âme Web excentr. Excentr. des Steges $\frac{b1-b2}{2}$ 6 mm		Déformat. de l'âme Web deformation Stegausbiegung 3 mm
				Rectit. suiv. norme Recit. acc. stand. Geradheit (normgericht.) 1.5 x Lm	



W

Perfiles Americanos de Ala Ancha (W.F)



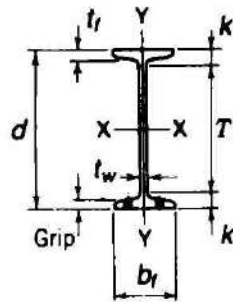
Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ³	W _{ply} cm ³	J _t cm ⁴	C _m x 10 ⁻³ cm ³	i _t cm
	I _x cm ⁴	W _x cm ³	i _x cm	I _y cm ⁴	W _y cm ³	i _y cm					
W 1100 X 300 X 293	693500	12720	43.0	14010	934	6.12	14760	1483	839	39110	7.46
X 333	801500	14570	43.4	16280	1085	6.19	16950	1728	1253	45850	7.51
X 369	897300	16200	43.6	18460	1223	6.26	18890	1954	1703	52360	7.58
X 427	1034900	18510	43.6	21440	1406	6.27	21770	2273	2527	61250	7.62
W 1100 X 400 X 342	867400	15920	44.6	33120	1656	8.71	18060	2568	1037	92710	10.3
X 390	1005400	18280	45.0	38480	1924	8.80	20780	2988	1564	108700	10.3
X 432	1125600	20320	45.2	43410	2160	8.87	23160	3362	2130	123500	10.4
X 498	1294100	23150	45.1	49980	2468	8.87	26600	3870	3135	143400	10.4

Tolerances de laminage pour W 44 / Rolling margins for W 44 / Walztoleranzen für W 44

Hauteur/Depth/Höhe H = +5 mm -5 mm		Largeur d'âlle/Flange width/Flanschbreite B = +8 mm -5 mm		Poids/Weight/Gewicht G = +5.5 % -2.5 %	
	Paral. des ailes Flange paral. Flansch Paral. 4 mm		Excentr. de l'âme Web excentr. Excentr. des Steges $\frac{b_1 - b_2}{2}$ 6 mm		Déformet. de l'âme Web deformation Stegausbiegung 3 mm
					Rectit. suiv. norme Rectit. acc. stand. Geradheit (normgericht.) 1.5 x L _m



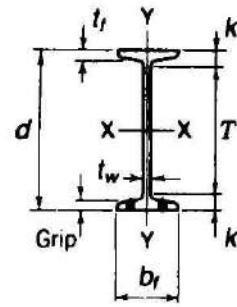


Perfiles Americanos TIPO S

Dimensiones de Acuerdo al ASTM - A6

Designation		Area A	Depth d	Web		Flange		Distance		Grip	Max. Fig. Fas- tener
				Thick- ness t _w	$\frac{t_w}{2}$	Width b _f	Thick- ness t _f	T	k		
mm x kg/m	in. x lb/ft	mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm
S 610 x 180	S 24 x 121	23000	622.0	20.30	10.15	204.0	27.7	520	51	29	M24
S 610 x 158	S 24 x 106	20100	622.0	15.70	7.85	200.0	27.7	520	51	29	M24
S 610 x 149	S 24 x 100	18900	610.0	18.90	9.45	184.0	22.1	522	44	22	M24
S 610 x 134	S 24 x 90	17100	610.0	15.90	7.95	181.0	22.1	522	44	22	M24
S 610 x 119	S 24 x 80	15200	610.0	12.70	6.35	178.0	22.1	522	44	22	M24
S 510 x 143	S 20 x 96	18200	516.0	20.30	10.15	183.0	23.4	428	44	24	M24
S 510 x 128	S 20 x 86	16300	516.0	16.80	8.40	179.0	23.4	428	44	24	M24
S 510 x 112	S 20 x 75	14200	508.0	16.10	8.05	162.0	20.2	426	41	21	M22
S 510 x 98.2	S 20 x 66	12500	508.0	12.80	6.40	159.0	20.2	426	41	21	M22
S 460 x 104	S 18 x 70	13300	457.0	18.10	9.05	159.0	17.6	381	38	17	M22
S 460 x 81.4	S 18 x 54.7	10400	457.0	11.70	5.85	152.0	17.6	381	38	17	M22
S 380 x 74	S 15 x 50	9480	381.0	14.00	7.00	143.0	15.8	311	35	14	M20
S 380 x 64	S 15 x 42.9	8130	381.0	10.40	5.20	140.0	15.8	311	35	14	M20
S 310 x 74	S 12 x 50	9480	305.0	17.40	8.70	139.0	16.7	231	37	17	M20
S 310 x 60.7	S 12 x 40.8	7740	305.0	11.70	5.85	133.0	16.7	231	37	16	M20
S 310 x 52	S 12 x 35	6650	305.0	10.90	5.45	129.0	13.8	245	30	13	M20
S 310 x 47	S 12 x 31.8	6030	305.0	8.89	4.45	127.0	13.8	245	30	13	M20
S 250 x 52	S 10 x 35	6650	254.0	15.10	7.55	126.0	12.5	196	29	13	M20
S 250 x 38	S 10 x 25.4	4810	254.0	7.90	3.95	118.0	12.5	196	29	13	M20
S 200 x 34	S 8 x 23	4370	203.0	11.20	5.60	106.0	10.8	153	25	11	M20
S 200 x 27	S 8 x 18.4	3490	203.0	6.88	3.44	102.0	10.8	153	25	11	M20
S 180 x 30	S 7 x 20	3790	178.0	11.40	5.70	98.0	10.0	130	24	10	M16
S 180 x 22.8	S 7 x 15.3	2900	178.0	6.40	3.20	93.0	10.0	130	24	10	M16
S 150 x 26	S 6 x 17.25	3270	152.0	11.80	5.90	90.6	9.1	108	22	10	M16
S 150 x 19	S 6 x 12.5	2370	152.0	5.89	2.95	84.6	9.1	108	22	10	—
S 130 x 22	S 5 x 14.75	2806	127.0	12.50	6.25	83.4	8.3	85	21	8	—
S 130 x 15	S 5 x 10	1900	127.0	5.44	2.72	76.3	8.3	85	21	8	—
S 100 x 14.1	S 4 x 9.5	1800	102.0	8.28	4.14	71.0	7.4	64	19	8	—
S 100 x 11	S 4 x 7.7	1460	102.0	4.90	2.45	67.6	7.4	64	19	8	—
S 75 x 11	S 3 x 7.5	1430	76.2	8.86	4.43	63.7	6.6	42	17	6	—
S 75 x 8	S 3 x 5.7	1080	76.2	4.32	2.16	59.2	6.6	42	17	6	—

Perfiles Americanos TIPO S



Dimensiones de Acuerdo al ASTM - A6

Nom- inal Mass per Meter kg/m	Compact Section Criteria			X_1	X_2	Elastic Properties						Plastic Modulus	
						Axis X-X			Axis Y-Y				
						I	S	r	I	S	r	Z_x	Z_y
	b_f $2t_f$	h_c t_w	F_y''' $\frac{N}{mm^2}$			$\frac{N}{mm^2}$	$\frac{10^{-8}mm^4}{N^2}$	10^6mm^4	10^3mm^3	mm	10^6mm^4	10^3mm^3	mm
180	3.7	26.4	—	22 800	3 720	1 320	4 240	240	34.7	340	38.8	5 010	593
158	3.6	34.1	379	20 400	5 200	1 220	3 920	246	32.1	321	40.0	4 570	544
149	4.2	28.3	—	20 700	6 180	995	3 260	229	19.9	216	32.4	3 930	392
134	4.1	33.7	386	18 700	8 600	937	3 070	234	18.7	207	33.1	3 640	365
119	4.0	42.1	248	16 900	11 500	874	2 870	240	17.6	198	34.0	3 340	339
143	3.9	21.6	—	25 700	2 440	695	2 690	195	20.9	228	33.9	3 240	408
128	3.8	26.2	—	23 100	3 430	658	2 550	201	19.5	218	34.6	3 000	377
112	4.0	27.1	—	21 600	4 820	533	2 100	194	12.4	153	29.6	2 510	274
98.2	3.9	34.1	379	19 300	6 840	495	1 950	199	11.5	145	30.3	2 290	251
104	4.5	21.8	—	24 800	3 090	385	1 680	170	10.0	126	27.4	2 050	236
81.4	4.3	33.6	393	19 100	7 150	335	1 470	179	8.66	114	28.9	1 720	198
74	4.5	23.2	—	23 800	3 240	202	1 060	146	6.53	91.3	26.2	1 260	163
64	4.4	31.0	—	20 400	5 200	186	976	151	5.99	85.6	27.1	1 140	148
74	4.2	13.9	—	35 000	700	127	833	116	6.53	94.0	26.2	1 000	169
60.7	4.0	20.7	—	27 900	1 430	113	741	121	5.66	85.1	27.0	870	145
52	4.7	23.4	—	24 100	2 760	95.3	625	120	4.11	63.7	24.9	734	111
47	4.6	28.6	—	22 000	3 600	90.7	595	123	3.90	61.4	25.4	688	105
52	5.0	13.8	—	34 200	787	61.2	482	95.9	3.48	55.2	22.9	580	102
38	4.7	26.4	—	23 600	2 570	51.6	406	104	2.83	48.0	24.3	465	81.3
34	4.9	14.5	—	32 900	835	27.0	266	78.6	1.79	33.8	20.2	316	60.3
27	4.7	23.7	—	26 000	1 730	24.0	236	82.9	1.55	30.4	21.1	270	51.8
30	4.9	12.3	—	37 100	530	17.6	198	68.1	1.32	26.9	18.7	238	48.5
22.8	4.7	21.9	—	27 300	1 400	15.3	172	72.6	1.10	23.7	19.5	198	40.0
26	5.0	9.9	—	43 100	301	10.9	143	57.7	0.961	21.2	17.1	174	38.7
19	4.6	19.9	—	29 600	1 000	9.20	121	62.3	0.758	17.9	17.9	139	30.3
22	5.0	7.5	—	53 400	133	6.33	99.7	47.5	0.695	16.7	15.8	122	30.8
15	4.6	17.4	—	31 900	732	5.12	80.6	51.9	0.508	13.3	16.4	92.9	22.5
14.1	4.8	8.7	—	47 100	184	2.83	55.5	39.7	0.376	10.6	14.5	66.2	18.5
11	4.5	14.7	—	36 100	435	2.53	49.6	41.6	0.318	9.41	14.8	57.5	15.8
11	4.8	5.6	—	63 200	59	1.22	32.0	29.2	0.244	7.66	13.1	38.7	13.5
8	4.5	11.4	—	42 500	223	1.05	27.6	31.2	0.189	6.39	13.2	32.0	10.7



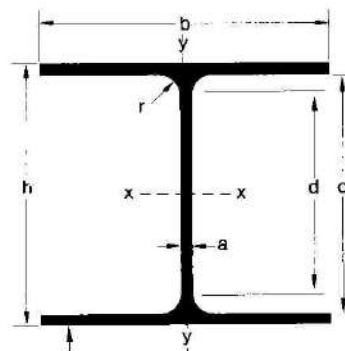
Perfiles Americanos de Ala Ancha TIPO HP (Bearing Piles)

Dimensiones de Acuerdo al ASTM - A6

Metric Designation h x b x mass (nominal)	Imperial Designation h x b x weight (nominal)	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U	P _o	A _{tot}
		h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /m	m ² /m	cm ²
HP 200 X 200 X 43	HP 8 X 8 X 29	200	205	9	9	10	54.1	43.16	182.0	162.0	16.4	1.18	0.81	410
X 53 °	X 36	204	207	11.3	11.3	10	68.1	53.57	181.4	161.4	20.5	1.20	0.82	422
HP 250 X 250 X 53	HP 10 X 10 X 36	243	254	9	9	13	67.4	53.57	225.0	199.0	20.3	1.46	0.99	617
X 62 °	X 42	246	256	10.5	10.7	13	79.8	62.50	224.6	198.6	23.6	1.47	1.00	629
X 85 °	X 57	254	260	14.4	14.4	13	109	84.83	225.2	199.2	32.4	1.50	1.03	660
HP 310 X 310 X 64	HP 12 X 12 X 43	295	304	9	9	15	81.6	63.99	277.0	247.0	24.9	1.76	1.20	896
X 79 °	X 53	299	306	11	11	15	99.7	78.87	277.0	247.0	30.5	1.77	1.21	914
X 93 °	X 63	303	308	13.1	13.1	15	119	93.75	276.8	246.8	36.3	1.79	1.22	933
X 110 °	X 74	308	310	15.4	15.5	15	141	110.12	277.0	247.0	42.7	1.80	1.24	954
X 125 °	X 84	312	312	17.4	17.4	15	159	125.01	277.2	247.2	48.2	1.81	1.25	973
HP 360 X 370 X 84	HP 14 X 14.5 X 56	340	367	10	10	15	107	83.34	320.0	290.0	32.0	2.10	1.41	1 247
X 108 °	X 73	346	370	12.8	12.8	15	138	108.64	320.4	290.4	41.0	2.12	1.43	1 280
X 132 °	X 89	351	373	15.6	15.6	15	168	132.45	319.8	289.8	49.9	2.14	1.45	1 309
X 152 °	X 102	356	376	17.9	17.9	15	194	151.79	320.2	290.2	57.3	2.15	1.46	1 338
X 174 °	X 117	361	378	20.4	20.4	15	221	174.12	320.2	290.2	65.3	2.17	1.48	1 364
HP 360 X 410 X 104	HP 14 X 16 X 70	344	387	12	12	15	133	104.17	320.0	290.0	38.4	2.19	1.46	1 331
X 122	X 82	348	390	14	14	15	156	122.03	320.0	290.0	44.8	2.20	1.48	1 357
X 140	X 94	352	392	16	16	15	179	139.89	320.0	290.0	51.2	2.21	1.49	1 379
X 158	X 106	356	394	18	18	15	201	157.75	320.0	290.0	57.6	2.23	1.50	1 402
X 176	X 118	360	396	20	20	15	224	175.60	320.0	290.0	64.0	2.24	1.51	1 425
X 194	X 130	364	398	22	22	15	247	193.46	320.0	290.0	70.4	2.25	1.52	1 448
X 213	X 143	368	400	24	24	15	271	212.81	320.0	290.0	76.8	2.26	1.54	1 472
X 231	X 155	372	402	26	26	15	294	230.67	320.0	290.0	83.2	2.27	1.55	1 495

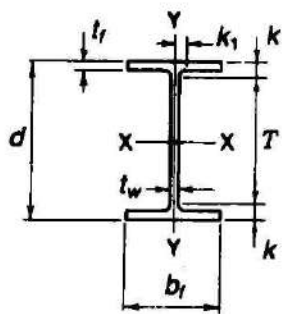


Perfiles Americanos de Ala Ancha TIPO HP (Bearing Piles)



Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx}	W _{ply}	J _x	C _m x 10 ⁻³	it
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm	cm ²	cm ²	cm ⁴	cm ³	cm
HP 200 X 200 X 43	3888	389	8.47	1294	126	4.89	435	193	17.7	118	5.47
X 53	4977	488	8.55	1673	162	4.96	551	249	34.2	155	5.54
HP 250 X 250 X 53	7290	600	10.4	2460	194	6.04	665	296	23.3	336	6.75
X 62	8753	712	10.5	2995	234	6.13	793	358	37.0	414	6.83
X 85	12300	969	10.6	4225	325	6.23	1096	500	89.3	605	6.96
HP 310 X 310 X 64	13140	891	12.7	4217	277	7.19	981	423	28.9	862	8.05
X 79	16270	1088	12.8	5258	344	7.26	1207	525	50.3	1089	8.13
X 93	19630	1296	12.9	6387	415	7.33	1447	635	82.5	1340	8.21
X 110	23650	1536	13.0	7707	497	7.40	1727	763	133	1646	8.28
X 125	27030	1733	13.0	8823	566	7.46	1960	870	188	1911	8.34
HP 360 X 370 X 84	23190	1364	14.7	8243	449	8.76	1497	683	44.2	2243	9.78
X 108	30290	1751	14.8	10810	585	8.86	1937	891	89.0	2999	9.90
X 132	37480	2135	14.9	13510	724	8.96	2381	1107	158	3795	10.0
X 152	43880	2465	15.0	15880	845	9.05	2765	1293	237	4532	10.1
X 174	50840	2816	15.2	18390	973	9.11	3180	1493	349	5326	10.2
HP 360 X 410 X 104	29360	1707	14.8	11600	599	9.33	1879	912	76.0	3194	10.4
X 122	34770	1998	14.9	13850	710	9.42	2212	1082	119	3860	10.5
X 140	40270	2288	15.0	16080	820	9.49	2547	1252	175	4534	10.5
X 158	45940	2581	15.1	18370	932	9.55	2888	1425	248	5241	10.6
X 176	51770	2876	15.2	20720	1047	9.61	3235	1603	339	5982	10.7
X 194	57760	3174	15.3	23150	1163	9.67	3588	1784	450	6759	10.7
X 213	63920	3474	15.4	25640	1282	9.73	3947	1969	584	7574	10.8
X 231	70260	3777	15.5	28200	1403	9.79	4312	2158	743	8425	10.9

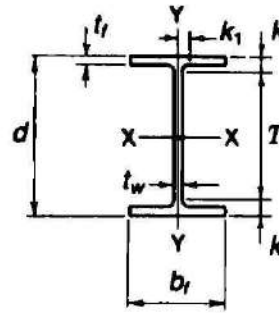


Perfiles Americanos TIPO M

Dimensiones de Acuerdo al ASTM - A6

Designation		Area <i>A</i>	Depth <i>d</i>	Web		Flange		Distance		Grip	Max. Flg. Fas- tener
				Thick- ness <i>t_w</i>	$\frac{t_w}{2}$	Width <i>b_f</i>	Thick- ness <i>t_f</i>	<i>T</i>	<i>k</i>		
mm x kg/m	in. x lb/ft	mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm
M 310 x 17.6	M 12 x 11.8	2240	305	4.50	2.25	77.9	5.7	277	14	6	—
M 310 x 16.1	M 12 x 10.8	2050	304	4.06	2.03	77.9	5.3	278	13	6	—
M 250 x 13.4	M 10 x 9	1710	254	3.99	2.00	68.3	5.2	226	14	5	—
M 250 x 11.9	M 10 x 8	1530	253	3.58	1.79	68.3	4.6	231	11	5	—
M 200 x 9.7	M 8 x 6.5	1240	203	3.43	1.72	57.9	4.8	177	13	5	—
M 130 x 28.1	M 5 x 18.9	3590	127	8.03	4.02	127.0	10.6	83	22	11	M22

Perfiles Americanos TIPO M



Dimensiones de Acuerdo al ASTM -A6

Nom- inal Mass per Meter kg/m	Compact Section Criteria			X_1	X_2	Elastic Properties						Plastic Modulus	
						Axis X-X			Axis Y-Y				
						I	S	r	I	S	r	Z_x	Z_y
	$\frac{b_f}{2t_f}$	$\frac{h_c}{t_w}$	$\frac{F_y'''}{N}$ $\frac{N}{mm^2}$			$\frac{N}{mm^2}$	$\frac{10^{-8}mm^4}{N^2}$	10^6mm^4	10^3mm^3	mm	10^6mm^4	10^3mm^3	mm
17.6	6.8	62.5	110	9588	134000	29.9	196	116	0.408	10.5	13.5	234	17.9
16.1	7.3	63.6	110	9037	172000	27.1	178	115	0.377	9.68	13.6	216	17.2
13.4	6.5	58.4	131	10002	108000	16.1	127	97.0	0.253	7.41	12.2	151	12.5
11.9	7.4	59.3	124	8623	193000	14.4	114	97.3	0.224	6.56	12.1	134	10.9
9.7	6.0	53.8	152	11700	54700	7.70	75.9	78.8	0.143	4.94	10.7	88.8	8.23
28.1	6.0	11.2	—	39400	282	10.0	157	52.9	3.27	51.5	30.2	180	82.3



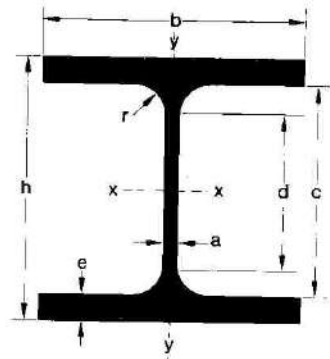
Perfiles de Ala Ancha para Columna TIPO HD

Dimensiones de Acuerdo al ASTM - A6

Designation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm						
HD 210 X 210 X 46	203	203	7	11	10	58.2	46.0	181.0	161.0	12.7	1.19
X 52	206	204	8	12.5	10	66.3	52.0	181.0	161.0	14.5	1.19
X 59	209	205	9	14	10	74.5	59.0	181.0	161.0	16.3	1.20
X 71	216	206	10	17.5	10	91.1	71.0	181.0	161.0	18.1	1.22
X 87	222	209	13.5	20.5	10	111	87.0	181.0	161.0	24.4	1.24
X 100	229	210	14.5	24	10	128	100	181.0	161.0	26.2	1.25
X 118	237	213	17	28	10	151	118	181.0	161.0	30.8	1.27
X 138	245	216	20	32	10	175	138	181.0	161.0	36.2	1.30
X 161	255	219	23	37	10	205	161	181.0	161.0	41.6	1.32
X 198	271	224	27.5	45	10	252	198	181.0	161.0	49.8	1.37
X 249	291	231	34.5	55	10	317	249	181.0	161.0	62.4	1.42
HD 260 X 260 X 73	253	254	9	14	13	92.8	73.0	225.0	199.0	20.3	1.48
X 80	256	255	9.5	15.5	13	102	80.0	225.0	199.0	21.4	1.49
X 89	260	256	10	17.5	13	114	89.0	225.0	199.0	22.5	1.50
X 101	264	257	12	19.5	13	129	101	225.0	199.0	27.0	1.51
X 115	269	259	14	22	13	147	115	225.0	199.0	31.5	1.52
X 131	275	261	15.5	25	13	167	131	225.0	199.0	34.9	1.54
X 149	282	263	17	28.5	13	190	149	225.0	199.0	38.3	1.56
X 167	288	265	19.5	31.5	13	212	167	225.0	199.0	43.9	1.57
X 191	297	267	22	36	13	243	191	225.0	199.0	49.5	1.60
X 219	307	270	25	41	13	279	219	225.0	199.0	56.3	1.62
X 252	319	273	28	47	13	321	252	225.0	199.0	63.0	1.65
X 288	331	277	32	53	13	367	288	225.0	199.0	72.0	1.68
X 329	345	281	36	60	13	420	329	225.0	199.0	81.0	1.72
HD 310 X 310 X 97	308	305	10	15.5	15	124	97.0	277.0	247.0	27.7	1.79
X 107	311	306	11	17	15	136	107	277.0	247.0	30.5	1.80
X 117	314	307	12	18.5	15	149	117	277.0	247.0	33.2	1.81
X 130	318	308	13.5	20.5	15	166	130	277.0	247.0	37.4	1.82
X 143	323	308	14	23	15	182	143	277.0	247.0	38.8	1.82
X 158	327	310	16	25	15	201	158	277.0	247.0	44.3	1.84
X 179	333	313	18.5	28	15	228	179	277.0	247.0	51.2	1.86
X 202	340	315	20.5	31.5	15	257	202	277.0	247.0	56.8	1.87
X 227	348	317	22.5	35.5	15	289	227	277.0	247.0	62.3	1.89
X 253	356	319	24.5	39.5	15	322	253	277.0	247.0	67.9	1.91
X 283	365	322	27	44	15	360	283	277.0	247.0	74.8	1.94
X 313	374	325	29.5	48.5	15	399	313	277.0	247.0	81.7	1.96
X 343	382	328	32.5	52.5	15	436	343	277.0	247.0	90.0	1.99
X 375	391	330	36	57	15	478	375	277.0	247.0	99.7	2.00
X 415	403	334	38	63	15	528	415	277.0	247.0	105	2.04
X 454	415	336	40.5	69	15	578	454	277.0	247.0	112	2.07
X 500	427	340	45	75	15	637	500	277.0	247.0	125	2.10
HD 360 X 360 X 134	356	368	11.5	18	15	171	134	320.0	290.0	36.8	2.14
X 148	360	370	12	20	15	188	148	320.0	290.0	38.4	2.15
X 162	364	371	13	22	15	207	162	320.0	290.0	41.6	2.16
X 179	368	372	15	24	15	228	179	320.0	290.0	48.0	2.17
X 196	372	374	16.5	26	15	249	196	320.0	290.0	52.8	2.18



Perfiles de Ala Ancha para Columna TIPO HD



Dimensiones de Acuerdo al ASTM - A6

Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ²	W _{ply} cm ²	J _t cm ⁴	C _m x 10 ⁻³ cm ³	I _r cm
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm					
HD 210 X 210 X 46	4533	447	8.83	1534	151	5.14	494	229	21.9	141	5.55
X 52	5243	509	8.89	1770	174	5.17	567	264	32.0	166	5.59
X 59	5978	572	8.95	2012	196	5.19	641	298	44.9	191	5.62
X 71	7682	711	9.18	2552	248	5.29	805	376	82.7	251	5.68
X 87	9462	852	9.23	3124	299	5.31	981	457	142	317	5.74
X 100	11420	998	9.45	3710	353	5.39	1160	540	218	389	5.79
X 118	14010	1182	9.64	4518	424	5.47	1393	649	349	492	5.88
X 138	16850	1376	9.80	5388	499	5.54	1644	766	531	610	5.97
X 161	20640	1619	10.0	6497	593	5.64	1962	912	823	770	6.06
X 198	27510	2030	10.4	8463	756	5.79	2511	1165	1484	1076	6.21
X 249	37790	2597	10.9	11360	984	5.98	3289	1523	2789	1573	6.41
HD 260 X 260 X 73	11200	885	11.0	3826	301	6.42	980	457	57.0	546	6.94
X 80	12520	978	11.1	4286	336	6.49	1087	510	75.3	619	6.99
X 89	14320	1101	11.2	4896	383	6.57	1229	580	105	719	7.05
X 101	16320	1237	11.3	5521	430	6.55	1393	653	149	824	7.06
X 115	18930	1407	11.4	6377	492	6.59	1600	750	217	972	7.11
X 131	22100	1608	11.5	7417	568	6.67	1843	867	314	1158	7.18
X 149	25970	1842	11.7	8652	658	6.76	2131	1004	458	1388	7.26
X 167	29620	2057	11.8	9786	739	6.79	2404	1129	629	1607	7.31
X 191	35210	2371	12.0	11440	857	6.86	2803	1312	933	1945	7.37
X 219	42020	2738	12.3	13480	999	6.95	3277	1532	1382	2379	7.46
X 252	50770	3183	12.6	15980	1171	7.06	3860	1798	2066	2948	7.56
X 288	60630	3663	12.9	18840	1360	7.16	4502	2094	3000	3627	7.68
X 329	73080	4236	13.2	22280	1586	7.29	5277	2445	4365	4506	7.80
HD 310 X 310 X 97	22370	1452	13.4	7333	481	7.68	1601	729	93.4	1568	8.32
X 107	24810	1595	13.5	8123	531	7.72	1766	806	123	1754	8.36
X 117	27310	1739	13.5	8927	582	7.75	1935	884	158	1948	8.39
X 130	30730	1933	13.6	9991	649	7.77	2163	987	215	2209	8.42
X 143	34770	2153	13.8	11210	728	7.84	2420	1107	291	2520	8.46
X 158	38610	2361	13.9	12430	802	7.86	2674	1221	382	2830	8.50
X 179	44510	2673	14.0	14330	916	7.92	3054	1398	546	3328	8.58
X 202	51370	3021	14.1	16430	1043	7.99	3480	1595	772	3904	8.65
X 227	59520	3421	14.3	18880	1191	8.08	3974	1822	1090	4601	8.72
X 253	68130	3828	14.6	21410	1342	8.16	4484	2054	1488	5352	8.79
X 283	78590	4306	14.8	24530	1524	8.25	5092	2335	2054	6307	8.89
X 313	89700	4797	15.0	27810	1712	8.35	5723	2625	2750	7350	8.98
X 343	100400	5255	15.2	30960	1888	8.42	6324	2901	3530	8381	9.06
X 375	112700	5763	15.4	34260	2076	8.47	6999	3198	4567	9521	9.12
X 415	130100	6456	15.7	39260	2351	8.62	7909	3618	6072	11310	9.25
X 454	148100	7139	16.0	43790	2606	8.71	8825	4013	7886	13060	9.32
X 500	168700	7901	16.3	49350	2903	8.81	9865	4480	10280	15220	9.43
HD 360 X 360 X 134	41490	2331	15.6	14960	813	9.35	2564	1231	170	4270	10.1
X 148	46570	2587	15.7	16890	913	9.47	2853	1382	227	4880	10.2
X 162	51820	2847	15.8	18730	1010	9.52	3154	1529	300	5475	10.2
X 179	57480	3124	15.9	20600	1108	9.50	3485	1681	397	6092	10.2
X 196	63300	3403	15.9	22680	1213	9.54	3817	1842	509	6785	10.3

Perfiles de Ala Ancha para Columna TIPO HD

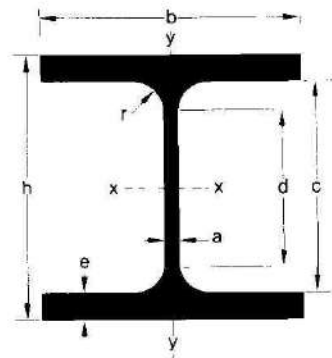
Dimensiones de Acuerdo al ASTM - A6

Désignation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /m
HD 400 X 400 X 187	368	391	15	24	15	238	187	320.0	290.0	48.0	2.24
X 216	375	394	17.5	27.5	15	275	216	320.0	290.0	56.0	2.27
X 237	381	395	18.5	30.5	15	302	237	320.0	290.0	59.2	2.28
X 262	387	397	20.5	32.5	15	334	262	320.0	290.0	65.6	2.30
X 288	393	399	23	36.5	15	367	288	320.0	290.0	73.6	2.31
X 314	400	400	24.5	40	15	400	314	320.0	290.0	78.4	2.33
X 347	407	404	27.5	43.5	15	441	347	320.0	290.0	88.0	2.35
X 383	416	406	30	48	15	488	383	320.0	290.0	96.0	2.37
X 422	425	409	33	52.5	15	537	422	320.0	290.0	106	2.39
X 463	435	412	35.5	57.5	15	589	463	320.0	290.0	114	2.42
X 509	445	416	39.5	62.5	15	648	509	320.0	290.0	126	2.45
X 551	455	418	42.5	67.5	15	702	551	320.0	290.0	136	2.47
X 593	465	421	44.5	72.5	15	755	593	320.0	290.0	142	2.50
X 634	475	423	47	77.5	15	808	634	320.0	290.0	150	2.52
X 678	484	427	50.5	82	15	864	678	320.0	290.0	162	2.55
X 744	499	431	54.5	89.5	15	948	744	320.0	290.0	174	2.59
X 818	514	437	60.5	97	15	1043	818	320.0	290.0	194	2.63
X 900	531	442	65.9	106	15	1149	900	319.0	289.0	210	2.67
X 990	550	448	71.9	115	15	1262	990	320.0	290.0	230	2.72
X 1086	569	454	78	125	15	1386	1086	319.0	289.0	249	2.77



HD

Perfiles de Ala Ancha para Columna TIPO HD



Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ²	W _{ply} cm ²	J _t cm ⁴	C _m x 10 ⁻³ cm ³	I _r cm
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm					
HD 400 X 400 X 187	60180	3271	15.9	23920	1224	10.0	3642	1855	415	7074	10.8
X 216	70810	3776	16.1	28050	1424	10.1	4243	2161	629	8463	10.9
X 237	79710	4184	16.2	31350	1587	10.2	4727	2409	840	9622	10.9
X 262	89420	4621	16.4	34960	1761	10.2	5256	2676	1117	10910	11.0
X 288	99620	5070	16.5	38680	1939	10.3	5811	2951	1464	12280	11.0
X 314	111300	5564	16.7	42710	2136	10.3	6417	3251	1903	13820	11.1
X 347	124600	6125	16.8	47870	2370	10.4	7122	3614	2492	15790	11.2
X 383	141400	6797	17.0	53620	2641	10.5	7970	4032	3335	18130	11.2
X 422	159400	7503	17.2	59970	2932	10.6	8874	4482	4388	20770	11.3
X 463	180300	8288	17.5	67150	3260	10.7	9882	4985	5740	23880	11.4
X 509	203200	9130	17.7	75170	3614	10.8	10990	5537	7483	27430	11.5
X 551	226100	9936	17.9	82380	3942	10.8	12050	6046	9423	30840	11.6
X 593	250400	10770	18.2	90410	4295	10.9	13150	6588	11590	34730	11.7
X 634	275600	11600	18.5	98050	4636	11.0	14260	7115	14100	38620	11.8
X 678	301100	12440	18.7	106800	5000	11.1	15400	7685	16910	42990	11.9
X 744	343900	13780	19.0	119900	5563	11.2	17220	8556	21970	50070	12.0
X 818	392200	15260	19.4	135500	6203	11.4	19260	9561	28510	58650	12.2
X 900	450200	16960	19.8	153300	6938	11.6	21620	10710	37350	68890	12.3
X 990	518900	18870	20.3	173400	7739	11.7	24280	11960	48210	81530	12.5
X 1086	595700	20940	20.7	196200	8645	11.9	27210	13380	62290	96080	12.7

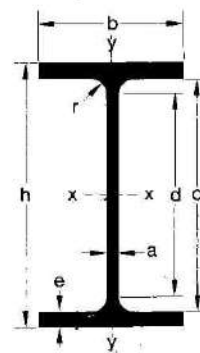


Perfiles Europeos de Alas Paralelas TIPO IPE

Désignation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm						
IPE 80	80	46	3.8	5.2	5	7.64	6.00	69.6	59.6	2.64	0.328
IPE 100	100	55	4.1	5.7	7	10.3	8.10	88.6	74.6	3.63	0.400
IPE A 120	117.6	64	3.8	5.1	7	11.0	8.66	107.4	93.4	4.08	0.472
IPE 120	120	64	4.4	6.3	7	13.2	10.4	107.4	93.4	4.73	0.475
IPE A 140	137.4	73	3.8	5.6	7	13.4	10.5	126.2	112.2	4.80	0.547
IPE 140	140	73	4.7	6.9	7	16.4	12.9	126.2	112.2	5.93	0.551
IPE R 140	142	72	5.3	7.8	7	18.4	14.4	126.4	112.4	6.70	0.549
IPE A 160	157	82	4	5.9	9	16.2	12.7	145.2	127.2	5.81	0.619
IPE 160	160	82	5	7.4	9	20.1	15.8	145.2	127.2	7.26	0.623
IPE R 160	162	81	5.6	8.5	9	22.6	17.7	145.0	127.0	8.12	0.621
IPE A 180	177	91	4.3	6.5	9	19.6	15.4	164.0	146.0	7.05	0.694
IPE 180	180	91	5.3	8	9	23.9	18.8	164.0	146.0	8.69	0.698
IPE O 180	182	92	6	9	9	27.1	21.3	164.0	146.0	9.84	0.705
IPE R 180	183	89	6.4	9.5	9	28.1	22.1	164.0	146.0	10.5	0.694
IPE A 200	197	100	4.5	7	12	23.5	18.4	183.0	159.0	8.24	0.764
IPE 200	200	100	5.6	8.5	12	28.5	22.4	183.0	159.0	10.2	0.768
IPE O 200	202	102	6.2	9.5	12	32.0	25.1	183.0	159.0	11.3	0.779
IPE R 200	204	98	6.6	10.5	12	33.9	26.6	183.0	159.0	12.1	0.766
IPE A 220	217	110	5	7.7	12	28.3	22.2	201.6	177.6	10.1	0.843
IPE 220	220	110	5.9	9.2	12	33.4	26.2	201.6	177.6	11.9	0.848
IPE O 220	222	112	6.6	10.2	12	37.4	29.4	201.6	177.6	13.3	0.858
IPE R 220	225	108	6.7	11.8	12	40.2	31.6	201.4	177.4	13.5	0.848
IPE A 240	237	120	5.2	8.3	15	33.3	26.2	220.4	190.4	11.5	0.918
IPE 240	240	120	6.2	9.8	15	39.1	30.7	220.4	190.4	13.7	0.922
IPE O 240	242	122	7	10.8	15	43.7	34.3	220.4	190.4	15.4	0.932
IPE R 240	245	118	7.5	12.3	15	47.5	37.3	220.4	190.4	16.5	0.921
IPE A 270	267	135	5.5	8.7	15	39.1	30.7	249.6	219.6	13.7	1.04
IPE 270	270	135	6.6	10.2	15	45.9	36.1	249.6	219.6	16.5	1.04
IPE O 270	274	136	7.5	12.2	15	53.8	42.3	249.6	219.6	18.7	1.05
IPE R 270	276	133	7.7	13.1	15	56.0	44.0	249.8	219.8	19.2	1.04
IPE A 300	297	150	6.1	9.2	15	46.5	36.5	278.6	248.6	17.0	1.16
IPE 300	300	150	7.1	10.7	15	53.8	42.2	278.6	248.6	19.8	1.16
IPE O 300	304	152	8	12.7	15	62.8	49.3	278.6	248.6	22.3	1.17
IPE R 300	306	147	8.5	13.7	15	65.9	51.7	278.6	248.6	23.7	1.16
IPE A 330	327	160	6.5	10	18	54.7	43.0	307.0	271.0	20.0	1.25
IPE 330	330	160	7.5	11.5	18	62.6	49.1	307.0	271.0	23.0	1.25
IPE O 330	334	162	8.5	13.5	18	72.6	57.0	307.0	271.0	26.1	1.27
IPE R 330	336	158	9.2	14.5	18	76.8	60.3	307.0	271.0	28.2	1.25



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Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ³	W _{ply} cm ³	J _t cm ⁴	C _m x 10 ⁻³ cm ³	i _t cm
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm					
IPE 80	80.1	20.0	3.24	8.5	3.7	1.05	23.2	5.80	0.698	0.120	1.20
IPE 100	171	34.2	4.07	15.9	5.8	1.24	39.4	9.10	1.20	0.350	1.42
IPE A 120	257	43.8	4.83	22.4	7	1.42	49.9	11.0	1.04	0.710	1.64
IPE 120	318	53.0	4.90	27.7	8.6	1.45	60.7	13.6	1.74	0.890	1.66
IPE A 140	435	63.3	5.70	36.4	10	1.65	71.6	15.5	1.36	1.58	1.89
IPE 140	541	77.3	5.74	44.9	12.3	1.65	88.3	19.2	2.45	1.98	1.89
IPE R 140	611	86.1	5.77	48.8	13.5	1.63	99.1	21.3	3.43	2.18	1.87
IPE A 160	689	87.8	6.53	54.4	13.3	1.83	99.1	20.7	1.96	3.09	2.10
IPE 160	869	109	6.58	68.3	16.7	1.84	124	26.1	3.60	3.96	2.11
IPE R 160	989	122	6.62	75.7	18.7	1.83	140	29.4	5.13	4.43	2.10
IPE A 180	1063	120	7.37	81.9	18	2.05	135	28.0	2.70	5.93	2.34
IPE 180	1317	146	7.42	101	22.2	2.05	166	34.6	4.79	7.43	2.35
IPE O 180	1505	165	7.45	117	25.5	2.08	189	39.9	6.76	8.74	2.39
IPE R 180	1554	170	7.44	112	25.2	2.00	195	39.7	7.78	8.40	2.30
IPE A 200	1591	162	8.23	117	23.4	2.23	182	36.5	4.11	10.5	2.55
IPE 200	1943	194	8.26	142	28.5	2.24	221	44.6	6.98	13.0	2.56
IPE O 200	2211	219	8.32	169	33.1	2.30	249	51.9	9.45	15.6	2.63
IPE R 200	2363	232	8.35	166	33.8	2.21	265	53.2	11.7	15.4	2.53
IPE A 220	2317	214	9.05	171	31.2	2.46	240	48.5	5.69	18.7	2.82
IPE 220	2772	252	9.11	205	37.3	2.48	285	58.1	9.07	22.7	2.83
IPE O 220	3134	282	9.16	240	42.8	2.53	321	66.9	12.3	26.8	2.90
IPE R 220	3474	309	9.29	249	46.1	2.49	352	71.8	16.2	28.2	2.82
IPE A 240	3290	278	9.94	240	40	2.68	312	62.4	8.35	31.3	3.05
IPE 240	3892	324	9.97	284	47.3	2.69	367	73.9	12.9	37.4	3.07
IPE O 240	4369	361	10.0	329	53.9	2.74	410	84.4	17.2	43.7	3.13
IPE R 240	4823	394	10.1	339	57.4	2.67	449	90.1	22.7	45.6	3.04
IPE A 270	4917	368	11.2	358	53	3.02	412	82.3	10.3	59.5	3.45
IPE 270	5790	429	11.2	420	62.2	3.02	484	97.0	15.9	70.6	3.46
IPE O 270	6947	507	11.4	513	75.5	3.09	575	118	24.9	87.6	3.52
IPE R 270	7312	530	11.4	516	77.6	3.03	602	121	28.8	88.8	3.45
IPE A 300	7173	483	12.4	519	69.2	3.34	542	107	13.4	107	3.83
IPE 300	8356	557	12.5	604	80.5	3.35	628	125	20.1	126	3.85
IPE O 300	9994	658	12.6	746	98.1	3.45	744	153	31.1	158	3.94
IPE R 300	10500	686	12.6	728	99	3.32	780	155	37.1	155	3.81
IPE A 330	10230	626	13.7	685	85.6	3.54	702	133	19.6	172	4.06
IPE 330	11770	713	13.7	788	98.5	3.55	804	154	28.1	199	4.08
IPE O 330	13910	833	13.8	960	119	3.64	943	185	42.2	246	4.16
IPE R 330	14690	874	13.8	958	121	3.53	995	190	50.8	246	4.06

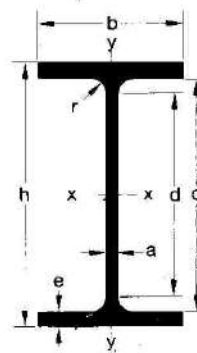


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Désignation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _e	U
	h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /m
IPE 80	80	46	3.8	5.2	5	7.64	6.00	69.6	59.6	2.64	0.328
IPE 100	100	56	4.1	5.7	7	10.3	8.10	88.6	74.6	3.63	0.400
IPE A 120	117.6	64	3.8	5.1	7	11.0	8.66	107.4	93.4	4.08	0.472
IPE 120	120	64	4.4	6.3	7	13.2	10.4	107.4	93.4	4.73	0.475
IPE A 140	137.4	73	3.8	5.6	7	13.4	10.5	126.2	112.2	4.80	0.547
IPE 140	140	73	4.7	6.9	7	16.4	12.9	126.2	112.2	5.93	0.551
IPE R 140	142	72	5.3	7.8	7	18.4	14.4	126.4	112.4	6.70	0.549
IPE A 160	157	82	4	5.9	9	16.2	12.7	145.2	127.2	5.81	0.619
IPE 160	160	82	5	7.4	9	20.1	15.8	145.2	127.2	7.26	0.623
IPE R 160	162	81	5.6	8.5	9	22.6	17.7	145.0	127.0	8.12	0.621
IPE A 180	177	91	4.3	6.5	9	19.6	15.4	164.0	146.0	7.05	0.694
IPE 180	180	91	5.3	8	9	23.9	18.8	164.0	146.0	8.69	0.698
IPE O 180	182	92	6	9	9	27.1	21.3	164.0	146.0	9.84	0.705
IPE R 180	183	89	6.4	9.5	9	28.1	22.1	164.0	146.0	10.5	0.694
IPE A 200	197	100	4.5	7	12	23.5	18.4	183.0	159.0	8.24	0.764
IPE 200	200	100	5.6	8.5	12	28.5	22.4	183.0	159.0	10.2	0.768
IPE O 200	202	102	6.2	9.5	12	32.0	25.1	183.0	159.0	11.3	0.779
IPE R 200	204	98	6.6	10.5	12	33.9	26.6	183.0	159.0	12.1	0.766
IPE A 220	217	110	5	7.7	12	28.3	22.2	201.6	177.6	10.1	0.843
IPE 220	220	110	5.9	9.2	12	33.4	26.2	201.6	177.6	11.9	0.848
IPE O 220	222	112	6.6	10.2	12	37.4	29.4	201.6	177.6	13.3	0.858
IPE R 220	225	108	6.7	11.8	12	40.2	31.6	201.4	177.4	13.5	0.848
IPE A 240	237	120	5.2	8.3	15	33.3	26.2	220.4	190.4	11.5	0.918
IPE 240	240	120	6.2	9.8	15	39.1	30.7	220.4	190.4	13.7	0.922
IPE O 240	242	122	7	10.8	15	43.7	34.3	220.4	190.4	15.4	0.932
IPE R 240	245	118	7.5	12.3	15	47.5	37.3	220.4	190.4	16.5	0.921
IPE A 270	267	135	5.5	8.7	15	39.1	30.7	249.6	219.6	13.7	1.04
IPE 270	270	135	6.6	10.2	15	45.9	36.1	249.6	219.6	16.5	1.04
IPE O 270	274	136	7.5	12.2	15	53.8	42.3	249.6	219.6	18.7	1.05
IPE R 270	276	133	7.7	13.1	15	56.0	44.0	249.8	219.8	19.2	1.04
IPE A 300	297	150	6.1	9.2	15	46.5	36.5	278.6	248.6	17.0	1.16
IPE 300	300	150	7.1	10.7	15	53.8	42.2	278.6	248.6	19.8	1.16
IPE O 300	304	152	8	12.7	15	62.8	49.3	278.6	248.6	22.3	1.17
IPE R 300	306	147	8.5	13.7	15	65.9	51.7	278.6	248.6	23.7	1.16
IPE A 330	327	160	6.5	10	18	54.7	43.0	307.0	271.0	20.0	1.25
IPE 330	330	160	7.5	11.5	18	62.6	49.1	307.0	271.0	23.0	1.25
IPE O 330	334	162	8.5	13.5	18	72.6	57.0	307.0	271.0	26.1	1.27
IPE R 330	336	158	9.2	14.5	18	76.8	60.3	307.0	271.0	28.2	1.25



Perfiles Europeos de Alas Paralelas TIPO IPE



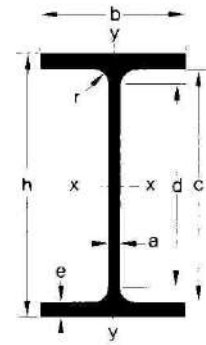
Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx}	W _{ply}	J _t	C _m x 10 ⁻³	i _t
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm	cm ³	cm ³	cm ⁴	cm ³	cm
IPE 80	80.1	20.0	3.24	8.5	3.7	1.05	23.2	5.80	0.698	0.120	1.20
IPE 100	171	34.2	4.07	15.9	5.8	1.24	39.4	9.10	1.20	0.350	1.42
IPE A 120	257	43.8	4.83	22.4	7	1.42	49.9	11.0	1.04	0.710	1.64
IPE 120	318	53.0	4.90	27.7	8.6	1.45	60.7	13.6	1.74	0.890	1.66
IPE A 140	435	63.3	5.70	36.4	10	1.65	71.6	15.5	1.36	1.58	1.89
IPE 140	541	77.3	5.74	44.9	12.3	1.65	88.3	19.2	2.45	1.98	1.89
IPE R 140	611	86.1	5.77	48.8	13.5	1.63	99.1	21.3	3.43	2.18	1.87
IPE A 160	689	87.8	6.53	54.4	13.3	1.83	99.1	20.7	1.96	3.09	2.10
IPE 160	869	109	6.58	68.3	16.7	1.84	124	26.1	3.60	3.96	2.11
IPE R 160	989	122	6.62	75.7	18.7	1.83	140	29.4	5.13	4.43	2.10
IPE A 180	1063	120	7.37	81.9	18	2.05	135	28.0	2.70	5.93	2.34
IPE 180	1317	146	7.42	101	22.2	2.05	166	34.6	4.79	7.43	2.35
IPE O 180	1505	166	7.45	117	25.5	2.08	189	39.9	6.76	8.74	2.39
IPE R 180	1554	170	7.44	112	25.2	2.00	195	39.7	7.78	8.40	2.30
IPE A 200	1591	162	8.23	117	23.4	2.23	182	36.5	4.11	10.5	2.55
IPE 200	1943	194	8.26	142	28.5	2.24	221	44.6	6.98	13.0	2.56
IPE O 200	2211	219	8.32	169	33.1	2.30	249	51.9	9.45	15.6	2.63
IPE R 200	2363	232	8.35	166	33.8	2.21	265	53.2	11.7	15.4	2.53
IPE A 220	2317	214	9.05	171	31.2	2.46	240	48.5	5.69	18.7	2.82
IPE 220	2772	252	9.11	205	37.3	2.48	285	58.1	9.07	22.7	2.83
IPE O 220	3134	282	9.16	240	42.8	2.53	321	66.9	12.3	26.8	2.90
IPE R 220	3474	309	9.29	249	46.1	2.49	352	71.8	16.2	28.2	2.82
IPE A 240	3290	278	9.94	240	40	2.68	312	62.4	8.35	31.3	3.05
IPE 240	3892	324	9.97	284	47.3	2.69	367	73.9	12.9	37.4	3.07
IPE O 240	4369	361	10.0	329	53.9	2.74	410	84.4	17.2	43.7	3.13
IPE R 240	4823	394	10.1	339	57.4	2.67	449	90.1	22.7	45.6	3.04
IPE A 270	4917	368	11.2	358	53	3.02	412	82.3	10.3	59.5	3.45
IPE 270	5790	429	11.2	420	62.2	3.02	484	97.0	15.9	70.6	3.46
IPE O 270	6947	507	11.4	513	75.5	3.09	575	118	24.9	87.6	3.52
IPE R 270	7312	530	11.4	516	77.6	3.03	602	121	28.8	88.8	3.45
IPE A 300	7173	483	12.4	519	69.2	3.34	542	107	13.4	107	3.83
IPE 300	8356	557	12.5	604	80.5	3.35	628	125	20.1	126	3.85
IPE O 300	9994	658	12.6	746	98.1	3.45	744	153	31.1	158	3.94
IPE R 300	10500	686	12.6	728	99	3.32	780	155	37.1	155	3.81
IPE A 330	10230	626	13.7	685	85.6	3.54	702	133	19.6	172	4.06
IPE 330	11770	713	13.7	788	98.5	3.55	804	154	28.1	199	4.08
IPE O 330	13910	833	13.8	960	119	3.64	943	185	42.2	246	4.16
IPE R 330	14690	874	13.8	958	121	3.53	995	190	50.8	246	4.06

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Désignation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm						
IPE A 360	357.6	170	6.6	11.5	18	84.0	50.2	334.6	298.6	22.1	1.35
IPE 360	360	170	8	12.7	18	72.7	57.1	334.6	298.6	26.8	1.35
IPE O 360	364	172	9.2	14.7	18	84.1	66.0	334.6	298.6	30.8	1.37
IPE R 360	366	168	9.9	16	18	89.6	70.3	334.0	298.0	33.1	1.35
IPE A 400	397	180	7	12	21	73.1	57.4	373.0	331.0	26.1	1.46
IPE 400	400	180	8.6	13.5	21	84.5	66.3	373.0	331.0	32.1	1.47
IPE O 400	404	182	9.7	15.5	21	96.4	75.7	373.0	331.0	36.2	1.48
IPE R 400	407	178	10.6	17	21	104	81.5	373.0	331.0	39.5	1.47
IPE V 400	408	182	10.6	17.5	21	107	84.0	373.0	331.0	39.5	1.49
IPE A 450	447	190	7.6	13.1	21	85.5	67.2	420.8	378.8	32.0	1.60
IPE 450	450	190	9.4	14.6	21	98.8	77.6	420.8	378.8	39.6	1.61
IPE O 450	456	192	11	17.6	21	118	92.4	420.8	378.8	46.3	1.62
IPE R 450	458	188	11.3	18.6	21	121	95.2	420.8	378.8	47.6	1.61
IPE V 450	460	194	12.4	19.6	21	132	104	420.8	378.8	52.2	1.64
IPE A 500	497	200	8.4	14.5	21	101	79.4	468.0	426.0	39.3	1.74
IPE 500	500	200	10.2	16	21	116	90.7	468.0	426.0	47.7	1.74
IPE O 500	506	202	12	19	21	137	107	468.0	426.0	56.2	1.76
IPE R 500	508	198	12.6	20	21	142	111	468.0	426.0	59.0	1.75
IPE V 500	514	204	14.2	23	21	164	129	468.0	426.0	66.5	1.78
IPE A 550	547	210	9	15.7	24	117	92.1	515.6	467.6	46.4	1.87
IPE 550	550	210	11.1	17.2	24	134	106	515.6	467.6	57.2	1.88
IPE O 550	556	212	12.7	20.2	24	156	123	515.6	467.6	65.5	1.89
IPE R 550	560	210	14	22.2	24	170	134	515.6	467.6	72.2	1.89
IPE V 550	566	216	17.1	25.2	24	202	159	515.6	467.6	88.2	1.92
IPE A 600	597	220	9.8	17.5	24	137	108	562.0	514.0	55.1	2.01
IPE 600	600	220	12	19	24	156	122	562.0	514.0	67.4	2.01
IPE O 600	610	224	15	24	24	197	154	562.0	514.0	84.3	2.04
IPE R 600	608	218	14	23	24	184	144	562.0	514.0	78.7	2.02
IPE V 600	618	228	18	28	24	234	184	562.0	514.0	101	2.07
IPE 750 X 137	753	263	11.5	17	17	175	137	719.0	685.0	82.7	2.51
IPE 750 X 147	753	265	13.2	17	17	187	147	719.0	685.0	94.9	2.51
IPE 750 X 161	758	266	13.8	19.3	17	204	161	719.4	685.4	99.3	2.62
IPE 750 X 173	762	267	14.4	21.6	17	221	173	718.8	684.8	104	2.53
IPE 750 X 185	766	267	14.9	23.6	17	236	185	718.8	684.8	107	2.54
IPE 750 X 196	770	268	15.6	25.4	17	251	196	719.2	685.2	112	2.55
IPE 750 X 210	775	268	16	28	17	268	210	719.0	685.0	115	2.56
IPE 750 X 222	778	269	17	29.5	17	283	222	719.0	685.0	122	2.57



Perfiles Europeos de Alas Paralelas TIPO IPE



Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ³	W _{ply} cm ³	J _x cm ⁴	C _m x 10 ⁻³ cm ³	i _t cm
	I _x cm ⁴	W _x cm ³	i _x cm	I _y cm ⁴	W _y cm ³	i _y cm					
IPE A 360	14520	812	15.1	944	111	3.84	907	172	26.5	282	4.37
IPE 360	16270	904	15.0	1043	123	3.79	1019	191	37.3	314	4.35
IPE O 360	19050	1047	15.0	1251	145	3.86	1186	227	55.8	380	4.43
IPE R 360	20290	1109	15.0	1270	151	3.76	1262	236	68.8	387	4.33
IPE A 400	20290	1022	16.7	1171	130	4.00	1144	202	34.8	432	4.58
IPE 400	23130	1156	16.5	1318	146	3.95	1307	229	51.1	490	4.56
IPE O 400	26750	1324	16.7	1564	172	4.03	1502	269	73.1	588	4.64
IPE R 400	28860	1418	16.7	1606	180	3.93	1618	284	92.4	608	4.54
IPE V 400	30140	1477	16.8	1766	194	4.06	1681	304	99.0	670	4.67
IPE A 450	29760	1331	18.7	1502	158	4.19	1494	246	45.7	705	4.83
IPE 450	33740	1500	18.5	1676	176	4.12	1702	276	66.9	791	4.80
IPE O 450	40920	1795	18.6	2085	217	4.21	2046	341	109	998	4.89
IPE R 450	42400	1851	18.7	2070	220	4.13	2115	346	122	994	4.80
IPE V 450	46200	2009	18.7	2397	247	4.26	2301	369	150	1156	4.96
IPE A 500	42930	1728	20.6	1939	194	4.38	1946	302	62.8	1125	5.08
IPE 500	48200	1928	20.4	2142	214	4.31	2194	336	89.3	1249	5.05
IPE O 500	57780	2284	20.6	2622	260	4.38	2613	409	143	1548	5.13
IPE R 500	59930	2360	20.5	2600	263	4.28	2709	415	163	1540	5.02
IPE V 500	70720	2752	20.8	3271	321	4.47	3168	507	243	1961	5.22
IPE A 550	59980	2193	22.6	2432	232	4.55	2475	362	86.5	1710	5.30
IPE 550	67120	2441	22.3	2688	254	4.45	2787	401	123	1884	5.25
IPE O 550	79160	2847	22.5	3224	304	4.55	3263	481	188	2302	5.35
IPE R 550	86600	3093	22.5	3447	328	4.50	3562	521	243	2478	5.30
IPE V 550	102300	3616	22.5	4265	395	4.60	4205	632	380	3095	5.44
IPE A 600	82920	2778	24.6	3116	283	4.77	3141	442	119	2607	5.57
IPE 600	92080	3069	24.3	3387	308	4.66	3512	486	165	2846	5.51
IPE O 600	118300	3879	24.5	4521	404	4.79	4471	640	318	3860	5.66
IPE R 600	110300	3628	24.5	3993	366	4.66	4175	580	271	3398	5.50
IPE V 600	141600	4582	24.6	5570	489	4.88	5324	780	512	4813	5.77
IPE 750 X 137	159900	4246	30.3	5166	393	5.44	4865	614	137	6980	6.57
IPE 750 X 147	166100	4411	29.8	5289	399	5.31	5110	631	162	7141	6.52
IPE 750 X 161	186100	4909	30.2	6073	457	5.45	5666	720	212	8259	6.62
IPE 750 X 173	205800	5402	30.5	6873	515	5.57	6218	810	274	9391	6.71
IPE 750 X 185	223000	5821	30.8	7510	563	5.65	6691	884	337	10320	6.75
IPE 750 X 196	240300	6241	31.0	8175	610	5.71	7174	959	409	11290	6.81
IPE 750 X 210	262200	6765	31.3	9011	672	5.80	7762	1054	514	12530	6.86
IPE 750 X 222	278200	7152	31.3	9604	714	5.82	8225	1122	605	13400	6.89

Perfiles Europeos de Ala Ancha TIPO HE

Désignation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /m
HE 100 AA	91	100	4.2	5.5	12	15.6	12.2	80.0	56.0	3.36	0.553
HE 100 A	96	100	5	8	12	21.2	16.7	80.0	56.0	4.00	0.561
DIL 100	100	100	5	10	12	25.2	19.8	80.0	56.0	4.00	0.569
HE 100 B	100	100	6	10	12	26.0	20.4	80.0	56.0	4.80	0.567
HE 100 M	120	106	12	20	12	53.2	41.8	80.0	56.0	9.60	0.619
HE 120 AA	109	120	4.2	5.5	12	18.6	14.6	98.0	74.0	4.12	0.689
HE 120 A	114	120	5	8	12	25.3	19.9	98.0	74.0	4.90	0.677
DIL 120	120	120	5	11	12	32.5	25.5	98.0	74.0	4.90	0.689
HE 120 B	120	120	6.5	11	12	34.0	26.7	98.0	74.0	6.37	0.686
HE 120 M	140	126	12.5	21	12	66.4	52.1	98.0	74.0	12.3	0.738
HE 140 AA	128	140	4.3	6	12	23.0	18.1	116.0	92.0	4.99	0.787
HE 140 A	133	140	5.5	8.5	12	31.4	24.7	116.0	92.0	6.38	0.794
DIL 140	140	140	5	12	12	40.6	31.9	116.0	92.0	5.80	0.809
HE 140 B	140	140	7	12	12	43.0	33.7	116.0	92.0	8.12	0.806
HE 140 M	160	146	13	22	12	80.6	63.2	116.0	92.0	15.1	0.857
HE 160 AA	148	160	4.5	7	15	30.4	23.8	134.0	104.0	6.03	0.901
HE 160 A	152	160	6	9	15	38.8	30.4	134.0	104.0	8.04	0.906
DIL 160	160	160	5	13	15	50.2	39.4	134.0	104.0	6.70	0.924
HE 160 B	160	160	8	13	15	54.3	42.6	134.0	104.0	10.7	0.918
HE 160 M	180	166	14	23	15	97.1	76.2	134.0	104.0	18.8	0.970
HE 180 AA	167	180	5	7.5	15	36.5	28.7	152.0	122.0	7.60	1.02
HE 180 A	171	180	6	9.5	15	45.3	35.5	152.0	122.0	9.12	1.02
DIL 180	180	180	5.5	14	15	60.7	47.6	152.0	122.0	8.36	1.04
HE 180 B	180	180	8.5	14	15	65.3	51.2	152.0	122.0	12.9	1.04
HE 180 M	200	186	14.5	24	15	113	88.9	152.0	122.0	22.0	1.09
HE 200 AA	186	200	5.5	8	18	44.1	34.6	170.0	134.0	9.35	1.13
HE 200 A	190	200	6.5	10	18	53.8	42.3	170.0	134.0	11.0	1.14
DIL 200	200	200	6	15	18	73.0	57.3	170.0	134.0	10.2	1.16
HE 200 B	200	200	9	15	18	78.1	61.3	170.0	134.0	15.3	1.15
HE 200 M	220	206	15	25	18	131	103	170.0	134.0	25.5	1.20
HE 220 AA	205	220	6	8.5	18	51.5	40.4	188.0	152.0	11.3	1.25
HE 220 A	210	220	7	11	18	64.3	50.5	188.0	152.0	13.2	1.26
DIL 220	220	220	6.5	16	18	85.4	67.0	188.0	152.0	12.2	1.28
HE 220 B	220	220	9.5	16	18	91.0	71.5	188.0	152.0	17.9	1.27
HE 220 M	240	226	15.5	26	18	149	117	188.0	152.0	29.1	1.32
HE 240 AA	224	240	6.5	9	21	60.4	47.4	206.0	164.0	13.4	1.36
HE 240 A	230	240	7.5	12	21	76.8	60.3	206.0	164.0	15.5	1.37
DIL 240	240	240	7	17	21	99.8	78.3	206.0	164.0	14.4	1.39
HE 240 B	240	240	10	17	21	106	83.2	206.0	164.0	20.6	1.38
HE 240 M	270	248	18	32	21	200	157	206.0	164.0	37.1	1.46
HE 260 AA	244	260	6.5	9.5	24	69.0	54.1	225.0	177.0	14.6	1.47
HE 260 A	250	260	7.5	12.5	24	86.8	68.2	225.0	177.0	16.9	1.48
DIL 260	260	260	7.5	17.5	24	113	88.6	225.0	177.0	16.9	1.50
HE 260 B	260	260	10	17.5	24	118	93.0	225.0	177.0	22.5	1.50
HE 260 M	290	268	18	32.5	24	220	172	225.0	177.0	40.5	1.57



Angulos Europeos según normas DIN 1028

Table 1: (concluded)

Angle size (symbol) ¹⁾	a	s	r1	r2	Section area ²⁾ , in cm ²	Mass, in kg/m	Surface area, in m ² /m	Distance of centre of gravity				Static parameters ³⁾							
								e	w	v1	v2	x - x = y - y		I _x	W _x	I _y	I	i	i
90 x 7	90	7	11	5.5	12.2	9.61	0.351	2.45	6.36	3.47	3.16	92.6	14.1	2.75	147	3.46	38.3	11.0	1.77
90 x 9		9			15.5	12.2		2.54		3.59	3.18	116	18.0	2.74	184	3.45	47.8	13.3	1.76
100 x 8	100	8	12	6	15.5	12.2	0.390	2.74	7.07	3.87	3.52	145	19.9	3.06	230	3.85	59.9	15.5	1.96
100 x 10		10			19.2	15.1		2.82		3.99	3.54	177	24.7	3.04	280	3.82	73.3	18.4	1.95
100 x 12	100	12	12	6	22.7	17.8	0.430	2.90	7.78	4.10	3.57	207	29.2	3.02	328	3.80	86.2	21.0	1.95
110 x 10		10			21.2	16.6		3.07		4.34	3.89	239	30.1	3.36	379	4.23	98.6	22.7	2.16
120 x 10	120	10	13	6.5	23.2	18.2	0.469	3.31	8.49	4.69	4.22	313	36.0	3.67	497	4.63	129	27.5	2.36
(120 x 11)		11			25.4	19.9		3.36		4.75	4.24	341	39.5	3.66	541	4.62	140	29.5	2.35
120 x 12	120	12	13	6.5	27.5	21.6	0.547	3.40	9.90	4.80	4.26	368	42.7	3.65	584	4.60	152	31.6	2.35
130 x 12		12			30	23.6		3.64		5.15	4.60	472	50.4	3.97	750	5.00	194	37.7	2.54
140 x 13	140	13	15	7.5	35	27.5	0.586	3.92	10.6	5.54	4.96	638	63.3	4.27	1010	5.38	262	47.3	2.74
150 x 12		12			34.8	27.3		4.12		5.83	5.29	737	67.7	4.60	1170	5.80	303	52.0	2.95
(150 x 14)	150	14	16	8	40.3	31.6	0.625	4.21	11.3	5.95	5.31	845	78.2	4.58	1340	5.77	347	58.3	2.94
150 x 15		15			43	33.8		4.25		6.01	5.33	898	83.5	4.57	1430	5.76	370	61.6	2.93
160 x 15	160	15	17	8.5	46.1	36.2	0.705	4.49	12.7	6.35	5.67	1100	95.6	4.88	1750	6.15	453	71.3	3.14
(160 x 17)		17			51.8	40.7		4.57		6.46	5.70	1230	108	4.86	1950	6.13	506	78.3	3.13
180 x 16	180	16	18	9	55.4	43.5	0.785	5.02	14.1	7.11	6.39	1680	130	5.51	2690	6.96	679	95.5	3.50
180 x 18		18			61.9	48.6		5.10		7.22	6.41	1870	145	5.49	2970	6.93	757	105	3.49
200 x 16	200	16	18	9	61.8	48.5	0.785	5.52	14.1	7.80	7.09	2430	162	6.15	3740	7.78	943	121	3.91
(200 x 18)		18			69.1	54.3		5.60		7.92	7.12	2600	181	6.13	4150	7.75	1050	133	3.90
200 x 20	200	20	18	9	76.4	59.9	0.785	5.68	14.1	8.04	7.15	2850	199	6.11	4540	7.72	1160	144	3.89
200 x 24		24			90.6	71.1		5.84		8.26	7.21	3330	235	6.06	5280	7.64	1380	167	3.90

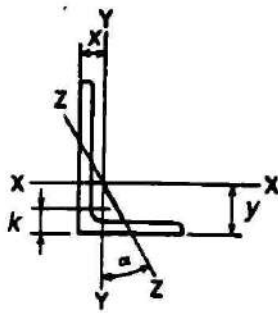
1) The symbol indicates preferred sizes (cf. subclause 3.1.).

2) The cross-sectional area is equal to approximately $2a \cdot s - s^2 + 0.2146 (r_1^2 + 2r_2^2)$.

3) I = moment of inertia, W = section modulus, i = radius of gyration (subscripts x and y denoting the relevant axis).

The values specified for cross-sectional area, mass, surface area and static parameters have been specified as a function of the other dimensions.





Angulos Americanos de Alas Iguales y Desiguales

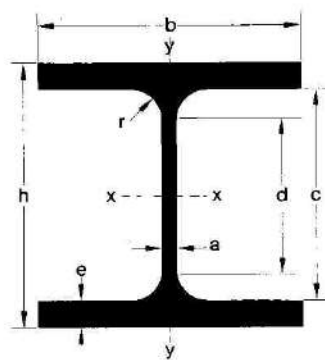
Dimensiones de Acuerdo al ASTM - A6

Size and Thickness		k	Mass per Meter	Area	Axis X-X					
					I	S	r	y	Z	y _p
mm	in.	mm	kg	mm ²	10 ⁸ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm
L 203 x 203 x 28.6	L 8 x 8 x 1 1/8	44	84.7	10800	40.7	287	61.4	61.2	518	26.6
L 203 x 203 x 25.4	L 8 x 8 x 1	41	75.9	9680	36.9	258	61.7	60.1	467	23.8
L 203 x 203 x 22.2	L 8 x 8 x 7/8	38	67.0	8540	33.0	229	62.2	58.9	415	21.0
L 203 x 203 x 19.0	L 8 x 8 x 3/4	35	57.9	7380	28.9	199	62.6	57.8	361	18.1
L 203 x 203 x 15.9	L 8 x 8 x 5/8	32	48.7	6200	24.7	169	63.1	56.6	305	15.3
L 203 x 203 x 14.3	L 8 x 8 x 9/16	30	44.0	5600	22.5	153	63.4	56.0	275	13.8
L 203 x 203 x 12.7	L 8 x 8 x 1/2	29	39.3	5000	20.2	137	63.6	55.5	247	12.3
L 203 x 152 x 25.4	L 8 x 6 x 1	38	65.8	8390	33.5	247	63.2	67.4	447	38.2
L 203 x 152 x 22.2	L 8 x 6 x 7/8	35	58.2	7410	30.0	219	63.6	66.2	397	36.6
L 203 x 152 x 19.0	L 8 x 6 x 3/4	32	50.3	6410	26.2	190	63.9	65.1	346	35.0
L 203 x 152 x 15.9	L 8 x 6 x 5/8	29	42.4	5390	22.5	162	64.6	64.0	293	33.5
L 203 x 152 x 14.3	L 8 x 6 x 9/16	27	38.2	4880	20.4	146	64.7	63.4	265	32.6
L 203 x 152 x 12.7	L 8 x 6 x 1/2	25	34.2	4350	18.4	131	65.0	62.8	238	31.9
L 203 x 152 x 11.1	L 8 x 6 x 7/16	24	30.1	3830	16.3	116	65.2	62.2	210	31.0
L 203 x 102 x 25.4	L 8 x 4 x 1	38	55.7	7100	29.0	231	63.9	77.2	398	63.2
L 203 x 102 x 19.0	L 8 x 4 x 3/4	32	42.7	5440	22.8	178	64.7	74.8	310	60.0
L 203 x 102 x 14.3	L 8 x 4 x 9/16	27	32.6	4150	17.8	137	65.5	73.0	238	57.7
L 203 x 102 x 12.7	L 8 x 4 x 1/2	25	29.2	3710	16.0	123	65.7	72.4	213	56.8
L 178 x 102 x 19.0	L 7 x 4 x 3/4	32	39.0	4960	15.8	138	56.4	63.7	243	47.5
L 178 x 102 x 15.9	L 7 x 4 x 5/8	29	32.9	4180	13.6	118	57.0	62.6	206	46.0
L 178 x 102 x 12.7	L 7 x 4 x 1/2	25	26.6	3390	11.1	95.3	57.2	61.4	169	44.3
L 178 x 102 x 9.5	L 7 x 4 x 3/8	22	20.2	2570	8.60	73.1	57.8	60.2	129	42.8



Perfiles Europeos de Ala Ancha

TIPO HE



Designation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ²	W _{ply} cm ²	J _t cm ⁴	C _m × 10 ⁻³ cm ³	i _r cm
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm					
HE 100 AA	237	52.0	3.89	92.1	18.4	2.43	58.4	28.4	2.51	1.68	2.62
HE 100 A	349	72.8	4.06	134	26.8	2.51	83.0	41.1	5.24	2.58	2.68
DIL 100	445	89.1	4.20	167	33.4	2.57	103	51.1	8.40	3.38	2.72
HE 100 B	450	89.9	4.16	167	33.5	2.53	104	51.4	9.25	3.38	2.70
HE 100 M	1143	190	4.63	399	75.3	2.74	236	116	68.2	9.93	2.91
HE 120 AA	413	75.8	4.72	159	26.5	2.93	84.1	40.6	2.78	4.24	3.16
HE 120 A	606	106	4.89	231	38.5	3.02	119	58.9	5.99	6.47	3.23
DIL 120	853	142	5.12	317	52.9	3.12	162	80.5	12.4	9.41	3.29
HE 120 B	864	144	5.04	318	52.9	3.06	165	81.0	13.8	9.41	3.26
HE 120 M	2018	288	5.51	703	112	3.25	351	172	91.7	24.8	3.47
HE 140 AA	719	112	5.59	275	39.3	3.45	124	59.9	3.54	10.2	3.73
HE 140 A	1033	155	5.73	389	55.6	3.52	173	84.8	8.13	15.1	3.78
DIL 140	1483	212	6.04	549	78.5	3.68	239	119	17.8	22.5	3.86
HE 140 B	1509	216	5.93	550	78.5	3.58	245	120	20.1	22.5	3.82
HE 140 M	3291	411	6.39	1144	157	3.77	494	241	120	54.3	4.02
HE 160 AA	1283	173	6.50	479	59.8	3.97	190	91.4	6.33	23.8	4.26
HE 160 A	1673	220	6.57	616	76.9	3.98	245	118	12.2	31.4	4.29
DIL 160	2432	304	6.96	888	111	4.21	340	168	26.1	47.9	4.40
HE 160 B	2492	311	6.78	889	111	4.05	354	170	31.2	47.9	4.34
HE 160 M	5098	566	7.25	1759	212	4.26	675	325	162	108	4.56
HE 180 AA	1967	236	7.34	730	81.1	4.47	258	124	8.33	46.4	4.81
HE 180 A	2510	294	7.45	925	103	4.52	325	156	14.8	60.2	4.85
DIL 180	3743	416	7.85	1362	151	4.74	464	229	36.1	93.7	4.97
HE 180 B	3831	426	7.66	1363	151	4.57	481	231	42.2	93.7	4.90
HE 180 M	7483	748	8.13	2580	277	4.77	883	425	203	199	5.11
HE 200 AA	2944	317	8.17	1068	107	4.92	347	163	12.7	84.5	5.30
HE 200 A	3692	389	8.28	1336	134	4.98	429	204	21.0	108	5.35
DIL 200	5573	557	8.74	2002	200	5.24	621	303	50.7	171	5.49
HE 200 B	5696	570	8.54	2003	200	5.07	643	306	59.3	171	5.43
HE 200 M	10640	967	9.00	3651	354	5.27	1135	543	259	346	5.65
HE 220 AA	4170	407	9.00	1510	137	5.42	445	209	15.9	146	5.85
HE 220 A	5410	515	9.17	1955	178	5.51	568	271	28.5	193	5.92
DIL 220	7925	720	9.63	2842	258	5.77	801	391	66.8	295	6.06
HE 220 B	8091	736	9.43	2843	258	5.59	827	394	76.6	295	5.99
HE 220 M	14600	1217	9.89	5012	444	5.79	1419	679	315	573	6.20
HE 240 AA	5835	521	9.83	2077	173	5.87	571	264	23.0	240	6.34
HE 240 A	7763	675	10.1	2769	231	6.00	745	352	41.6	328	6.44
DIL 240	11040	920	10.5	3921	327	6.27	1021	495	89.5	487	6.59
HE 240 B	11260	938	10.3	3923	327	6.08	1053	498	103	487	6.51
HE 240 M	24290	1799	11.0	8153	657	6.39	2117	1006	628	1152	6.82
HE 260 AA	7981	654	10.8	2788	214	6.36	714	328	30.3	383	6.85
HE 260 A	10450	836	11.0	3668	282	6.50	920	430	52.4	516	6.96
DIL 260	14680	1129	11.4	5132	395	6.74	1251	599	110	754	7.10
HE 260 B	14920	1148	11.2	5135	395	6.58	1283	602	124	754	7.04
HE 260 M	31310	2159	11.9	10450	780	6.90	2524	1192	719	1728	7.36

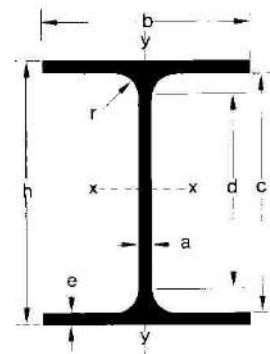
Perfiles Europeos de Ala Ancha

TIPO HE

Désignation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /m
HE 280 AA	264	280	7	10	24	78.0	61.2	244.0	196.0	17.1	1.59
HE 280 A	270	280	8	13	24	97.3	76.4	244.0	196.0	19.5	1.60
DIL 280	280	280	8	18	24	125	98.3	244.0	196.0	19.5	1.62
HE 280 B	280	280	10.5	18	24	131	103	244.0	196.0	25.6	1.62
HE 280 M	310	288	18.5	33	24	240	189	244.0	196.0	45.1	1.89
HE 300 AA	283	300	7.5	10.5	27	88.9	69.8	262.0	208.0	19.7	1.70
HE 300 A	290	300	8.5	14	27	113	88.3	262.0	208.0	22.3	1.72
DIL 300	300	300	8.5	19	27	143	112	262.0	208.0	22.3	1.74
HE 300 B	300	300	11	19	27	149	117	262.0	208.0	28.8	1.73
HE 300 C	320	305	16	29	27	225	177	262.0	208.0	41.9	1.78
HE 300 M	340	310	21	39	27	303	238	262.0	208.0	55.0	1.83
HE 320 AA	301	300	8	11	27	94.6	74.2	279.0	225.0	22.3	1.74
HE 320 A	310	300	9	15.5	27	124	97.6	279.0	225.0	25.1	1.76
DIL 320	320	300	9	20.5	27	154	121	279.0	225.0	25.1	1.78
HE 320 B	320	300	11.5	20.5	27	161	127	279.0	225.0	32.1	1.77
HE 320 M	359	309	21	40	27	312	245	279.0	225.0	58.6	1.87
HE 340 AA	320	300	8.5	11.5	27	101	78.9	297.0	243.0	25.2	1.78
HE 340 A	330	300	9.5	16.5	27	133	105	297.0	243.0	28.2	1.79
DIL 340	340	300	9.5	21.5	27	163	128	297.0	243.0	28.2	1.81
HE 340 B	340	300	12	21.5	27	171	134	297.0	243.0	35.6	1.81
HE 340 M	377	309	21	40	27	316	248	297.0	243.0	62.4	1.90
HE 360 AA	339	300	9	12	27	107	83.7	315.0	261.0	28.4	1.81
HE 360 A	350	300	10	17.5	27	143	112	315.0	261.0	31.5	1.83
DIL 360	360	300	10	22.5	27	173	136	315.0	261.0	31.5	1.85
HE 360 B	360	300	12.5	22.5	27	181	142	315.0	261.0	39.4	1.85
HE 360 M	395	308	21	40	27	319	250	315.0	261.0	66.1	1.93
HE 400 AA	378	300	9.5	13	27	118	92.4	352.0	298.0	33.4	1.89
HE 400 A	390	300	11	19	27	159	125	352.0	298.0	38.7	1.91
DIL 400	400	300	11	24	27	189	148	352.0	298.0	38.7	1.93
HE 400 B	400	300	13.5	24	27	198	155	352.0	298.0	47.5	1.93
HE 400 M	432	307	21	40	27	326	256	352.0	298.0	73.9	2.00
HE 450 AA	425	300	10	13.5	27	127	99.7	398.0	344.0	39.8	1.98
HE 450 A	440	300	11.5	21	27	178	140	398.0	344.0	45.8	2.01
DIL 450	450	300	11.5	26	27	208	163	398.0	344.0	45.8	2.03
HE 450 B	450	300	14	26	27	218	171	398.0	344.0	55.7	2.03
HE 450 M	478	307	21	40	27	335	263	398.0	344.0	83.6	2.10
HE 500 AA	472	300	10.5	14	27	137	107	444.0	390.0	46.6	2.08
HE 500 A	490	300	12	23	27	198	155	444.0	390.0	53.3	2.11
DIL 500	500	300	12	28	27	228	179	444.0	390.0	53.3	2.13
HE 500 B	500	300	14.5	28	27	239	187	444.0	390.0	64.4	2.12
HE 500 M	524	306	21	40	27	344	270	444.0	390.0	93.2	2.18



Perfiles Europeos de Ala Ancha TIPO HE



Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ³	W _{ply} cm ³	J _x cm ⁴	C _m x 10 ⁻³ cm ³	i _T cm
	I _x cm ⁴	W _x cm ³	I _x cm	I _y cm ⁴	W _y cm ³	I _y cm					
HE 280 AA	10560	800	11.6	3664	262	6.85	873	399	36.2	590	7.40
HE 280 A	13870	1013	11.9	4763	340	7.00	1112	518	62.1	785	7.51
DIL 280	18970	1355	12.3	6592	471	7.25	1497	714	128	1130	7.66
HE 280 B	19270	1376	12.1	6595	471	7.09	1534	718	144	1130	7.59
HE 280 M	39550	2551	12.8	13160	914	7.40	2966	1397	807	2520	7.91
HE 300 AA	13800	976	12.5	4734	316	7.30	1065	482	49.3	877	7.89
HE 300 A	18260	1260	12.7	6310	421	7.49	1383	641	85.2	1200	8.03
DIL 300	24790	1653	13.2	8560	571	7.75	1826	866	165	1688	8.18
HE 300 B	25170	1678	13.0	8563	571	7.58	1869	870	185	1688	8.11
HE 300 C	40950	2559	13.5	13740	901	7.81	2927	1374	598	2903	8.34
HE 300 M	59200	3482	14.0	19400	1252	8.00	4078	1913	1408	4386	8.53
HE 320 AA	16450	1093	13.2	4959	331	7.24	1196	506	55.9	1041	7.87
HE 320 A	22930	1479	13.6	6985	466	7.49	1628	710	108	1512	8.05
DIL 320	30370	1898	14.0	9235	616	7.73	2101	935	203	2069	8.18
HE 320 B	30820	1926	13.8	9239	616	7.57	2149	939	225	2069	8.12
HE 320 M	68130	3796	14.8	19710	1276	7.95	4435	1951	1501	5004	8.49
HE 340 AA	19550	1222	13.9	5185	346	7.18	1341	529	63.1	1231	7.86
HE 340 A	27690	1678	14.4	7436	496	7.46	1850	756	127	1824	8.04
DIL 340	36110	2124	14.9	9686	646	7.70	2353	981	234	2454	8.17
HE 340 B	36660	2156	14.6	9690	646	7.53	2408	986	257	2454	8.11
HE 340 M	76370	4052	15.6	19710	1276	7.90	4718	1953	1506	5584	8.47
HE 360 AA	23040	1359	14.7	5410	361	7.12	1495	553	71.0	1444	7.84
HE 360 A	33090	1891	15.2	7887	526	7.43	2088	802	149	2177	8.04
DIL 360	42540	2363	15.7	10140	676	7.66	2621	1027	267	2883	8.17
HE 360 B	43190	2400	15.5	10140	676	7.49	2683	1032	292	2883	8.10
HE 360 M	84870	4297	16.3	19520	1268	7.83	4969	1942	1507	6137	8.42
HE 400 AA	31250	1654	16.3	5861	391	7.06	1824	600	84.7	1948	7.83
HE 400 A	45070	2311	16.8	8564	571	7.34	2562	873	189	2942	8.01
DIL 400	56770	2839	17.3	10810	721	7.56	3154	1098	325	3817	8.13
HE 400 B	57680	2884	17.1	10820	721	7.40	3232	1104	356	3817	8.06
HE 400 M	104100	4820	17.9	19340	1260	7.70	5571	1934	1515	7410	8.35
HE 450 AA	41890	1971	18.2	6088	406	6.92	2183	624	95.6	2572	7.77
HE 450 A	63720	2896	18.9	9465	631	7.29	3216	966	244	4148	8.00
DIL 450	78570	3492	19.4	11720	781	7.50	3883	1191	406	5258	8.12
HE 450 B	79890	3551	19.1	11720	781	7.33	3982	1198	440	5258	8.04
HE 450 M	131500	5501	19.8	19340	1260	7.59	6331	1939	1529	9252	8.31
HE 500 AA	54640	2315	20.0	6314	421	6.79	2576	649	108	3304	7.71
HE 500 A	86970	3550	21.0	10370	691	7.24	3949	1059	309	5643	7.99
DIL 500	105400	4214	21.5	12620	841	7.45	4691	1284	499	7018	8.10
HE 500 B	107200	4287	21.2	12620	842	7.27	4815	1292	538	7018	8.02
HE 500 M	161900	6180	21.7	19150	1252	7.46	7094	1932	1539	11190	8.23



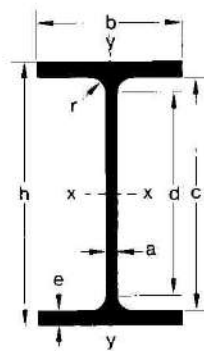
Perfiles Europeos de Ala Ancha

TIPO HE

Designation Section Bezeichnung	Dimensions Sizes Abmessungen					F	G	c	d	F _a	U
	h mm	b mm	a mm	e mm	r mm	cm ²	kg/m	mm	mm	cm ²	m ² /m
HE 550 AA	522	300	11.5	15	27	153	120	492.0	438.0	56.6	2.17
HE 550 A	540	300	12.5	24	27	212	166	492.0	438.0	61.5	2.21
DIL 550	550	300	12.5	29	27	242	190	492.0	438.0	61.5	2.23
HE 550 B	550	300	15	29	27	254	199	492.0	438.0	73.8	2.22
HE 550 M	572	306	21	40	27	354	278	492.0	438.0	103	2.28
HE 600 AA	571	300	12	15.5	27	164	129	540.0	486.0	64.8	2.27
HE 600 A	590	300	13	25	27	226	178	540.0	486.0	70.2	2.31
DIL 600	600	300	13	30	27	256	201	540.0	486.0	70.2	2.33
HE 600 B	600	300	15.5	30	27	270	212	540.0	486.0	83.7	2.32
HE 600 M	620	305	21	40	27	364	285	540.0	486.0	113	2.37
HE 650 AA	620	300	12.5	16	27	176	138	588.0	534.0	73.5	2.37
HE 650 A	640	300	13.5	26	27	242	190	588.0	534.0	79.4	2.41
HE 650 B	650	300	16	31	27	286	225	588.0	534.0	94.1	2.42
HE 650 M	668	305	21	40	27	374	293	588.0	534.0	123	2.47
HE 700 AA	670	300	13	17	27	191	150	636.0	582.0	82.7	2.47
HE 700 A	690	300	14.5	27	27	260	204	636.0	582.0	92.2	2.50
HE 700 B	700	300	17	32	27	306	241	636.0	582.0	108	2.52
HE 700 M	716	304	21	40	27	383	301	636.0	582.0	134	2.56
HE 800 AA	770	300	14	18	30	218	172	734.0	674.0	103	2.66
HE 800 A	790	300	15	28	30	286	224	734.0	674.0	110	2.70
HE 800 B	800	300	17.5	33	30	334	262	734.0	674.0	128	2.71
HE 800 M	814	303	21	40	30	404	317	734.0	674.0	154	2.75
HE 900 AA	870	300	15	20	30	252	198	830.0	770.0	125	2.86
HE 900 A	890	300	16	30	30	321	252	830.0	770.0	133	2.90
HE 900 B	900	300	18.5	35	30	371	291	830.0	770.0	154	2.91
HE 900 M	910	302	21	40	30	424	333	830.0	770.0	174	2.93
HE 1000 AA	970	300	16	21	30	282	222	928.0	868.0	148	3.06
HE 1000 A	990	300	16.5	31	30	347	272	928.0	868.0	153	3.10
HE 1000 B	1000	300	19	36	30	400	314	928.0	868.0	176	3.11
HE 1000 M	1008	302	21	40	30	444	349	928.0	868.0	195	3.13
HE 1100 A	1090	300	18	31	20	374	294	1028.0	988.0	185	3.31
HE 1100 B	1100	300	20	36	20	425	334	1028.0	988.0	206	3.33
HE 1100 M	1108	302	22	40	20	471	370	1028.0	988.0	226	3.35
HE 1100 R	1118	305	26	45	20	545	428	1028.0	988.0	267	3.37

HE

Perfiles Europeos de Ala Ancha TIPO HE



Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx}	W _{ply}	J _t	C _m x 10 ⁻³	i _t
	I _x cm ⁴	W _x cm ³	i _x cm	I _y cm ⁴	W _y cm ³	i _y cm	cm ³	cm ³	cm ⁴	cm ⁴	cm
HE 550 AA	72870	2792	21.8	6767	451	6.65	3128	699	134	4338	7.66
HE 550 A	111900	4146	23.0	10820	721	7.15	4822	1107	352	7189	7.95
DIL 550	134200	4880	23.6	13070	871	7.35	5439	1332	556	8856	8.06
HE 550 B	136700	4971	23.2	13080	872	7.17	5591	1341	600	8856	7.98
HE 550 M	198000	6923	23.6	19160	1252	7.35	7933	1937	1554	13520	8.18
HE 600 AA	91870	3218	23.7	6993	466	6.53	3623	724	150	5381	7.60
HE 600 A	141200	4787	25.0	11270	751	7.05	5350	1156	398	8978	7.91
DIL 600	167800	5592	25.6	13520	901	7.26	6243	1381	618	10970	8.02
HE 600 B	171000	5701	25.2	13530	902	7.08	6425	1391	667	10970	7.94
HE 600 M	237400	7660	25.6	18980	1244	7.22	8772	1930	1564	15910	8.11
HE 650 AA	113900	3676	25.5	7221	481	6.41	4160	751	168	6567	7.54
HE 650 A	175200	5474	26.9	11720	782	6.97	6136	1205	448	11030	7.87
HE 650 B	210600	6480	27.1	13980	932	6.99	7320	1441	739	13360	7.90
HE 650 M	281700	8433	27.5	18980	1245	7.13	9657	1936	1579	18650	8.06
HE 700 AA	142700	4260	27.3	7673	512	6.34	4840	800	195	8155	7.51
HE 700 A	215300	6241	28.8	12180	812	6.84	7032	1257	514	13350	7.81
HE 700 B	256900	7340	29.0	14440	963	6.87	8327	1495	831	16060	7.84
HE 700 M	329300	9198	29.3	18800	1237	7.01	10540	1929	1589	21400	7.99
HE 800 AA	208900	5426	30.9	8134	542	6.10	6225	857	257	11450	7.35
HE 800 A	303400	7682	32.6	12640	843	6.65	8699	1312	597	18290	7.70
HE 800 B	359100	8977	32.8	14900	994	6.68	10230	1552	946	21840	7.73
HE 800 M	442600	10870	33.1	18630	1230	6.79	12490	1930	1646	27780	7.85
HE 900 AA	301100	6923	34.6	9041	603	5.99	7999	958	335	16260	7.30
HE 900 A	422100	9485	36.3	13550	903	6.50	10810	1414	737	24960	7.63
HE 900 B	494100	10980	36.5	15820	1054	6.53	12580	1658	1137	29460	7.66
HE 900 M	570400	12540	36.7	18450	1222	6.60	14440	1929	1671	34750	7.73
HE 1000 AA	406500	8380	38.0	9501	633	5.80	9777	1016	403	21280	7.19
HE 1000 A	553800	11190	40.0	14000	934	6.35	12820	1470	822	32070	7.55
HE 1000 B	644700	12890	40.1	16280	1085	6.38	14860	1716	1254	37640	7.58
HE 1000 M	722300	14330	40.3	18460	1222	6.45	16570	1940	1701	43020	7.65
HE 1100 A	693500	12720	43.0	14010	934	6.12	14780	1483	839	39110	7.46
HE 1100 B	801500	14570	43.4	16280	1085	6.19	16950	1728	1253	45850	7.51
HE 1100 M	897300	16200	43.6	18460	1223	6.26	18890	1954	1703	52360	7.58
HE 1100 R	1034900	18510	43.6	21440	1406	6.27	21770	2273	2527	61250	7.62

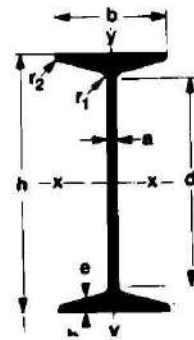


Perfiles Europeos Standar TIPO IPN

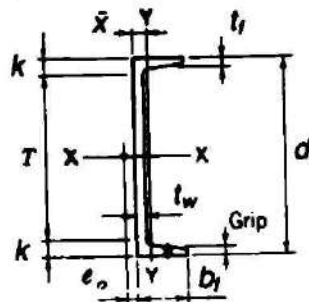
Designation Section Bezeichnung	Dimensions Sizes Abmessungen						F	G	d	F _s	U
	h mm	b mm	a mm	e mm	r ₁ mm	r ₂ mm	cm ²	kg/m	mm	cm ²	m ² /m
IPN 80	80	42	3.9	5.9	3.9	2.3	7.57	5.94			0.304
IPN 100	100	50	4.5	6.8	4.5	2.7	10.6	8.34			0.370
IPN 120	120	58	5.1	7.7	5.1	3.1	14.2	11.1			0.439
IPN 140	140	66	5.7	8.6	5.7	3.4	18.2	14.3			0.502
IPN 160	160	74	6.3	9.5	6.3	3.8	22.8	17.9	125	8.67	0.575
IPN 180	180	82	6.9	10.4	6.9	4.1	27.9	21.9	142	10.8	0.640
IPN 200	200	90	7.5	11.3	7.5	4.5	33.4	26.2	159	13.1	0.709
IPN 220	220	98	8.1	12.2	8.1	4.9	39.5	31.1	176	15.6	0.775
IPN 240	240	106	8.7	13.1	8.7	5.2	46.1	36.2	192	18.2	0.844
IPN 260	260	113	9.4	14.1	9.4	5.6	53.3	41.9	208	21.3	0.906
IPN 280	280	119	10.1	15.2	10.1	6.1	61.0	47.9	225	24.8	0.966
IPN 300	300	125	10.8	16.2	10.8	6.5	69.0	54.2	241	28.4	1.03
IPN 320	320	131	11.5	17.3	11.5	6.9	77.7	61.0	258	32.3	1.09
IPN 340	340	137	12.2	18.3	12.2	7.3	86.7	68.0	274	36.4	1.15
IPN 360	360	143	13.0	19.5	13.0	7.8	97.0	76.1	290	41.1	1.21
IPN 380	380	149	13.7	20.5	13.7	8.2	107	84.0	306	45.7	1.27
IPN 400	400	155	14.4	21.6	14.4	8.6	118	92.4	323	50.7	1.33
IPN 425	425	163	15.3	23.0	15.0	9.2	132	104			1.41
IPN 450	450	170	16.2	24.3	16.2	9.7	147	115	363	64.1	1.48
IPN 475	475	178	17.1	25.6	17.1	10.3	163	128			1.55
IPN 500	500	185	18.0	27.0	18.0	10.8	179	141	404	79.2	1.63
IPN 550	550	200	19.0	30.0	19.0	11.9	212	166	445	91.8	1.80
IPN 600	600	215	21.6	32.4	21.6	13.0	254	199			1.92



Perfiles Europeos Standar TIPO IPN



Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			W _{plx} cm ³	W _{ply} cm ³	J _t cm ⁴	C _m x 10 ⁻³ cm ³	I _r cm
	J _x cm ⁴	W _x cm ³	I _x cm ⁴	J _y cm ⁴	W _y cm ³	I _y cm ⁴					
IPN 80	77.8	19.5	3.20	6.29	3.00	0.91					
IPN 100	171	34.2	4.01	12.2	4.88	1.07					
IPN 120	328	54.7	4.81	21.5	7.41	1.23					
IPN 140	573	81.9	5.61	35.2	10.7	1.40					
IPN 160	935	117	6.40	54.7	14.8	1.55	136	24.9	6.57	3.14	1.78
IPN 180	1450	161	7.20	81.3	19.8	1.71	187	33.2	9.58	5.92	1.97
IPN 200	2140	214	8.00	117	26.0	1.87	250	43.5	13.5	10.5	2.16
IPN 220	3060	278	8.80	162	33.1	2.02	324	55.7	18.6	17.8	2.35
IPN 240	4250	354	9.59	221	41.7	2.20	412	70.0	25.0	28.7	2.53
IPN 260	5740	442	10.4	288	51.0	2.32	514	85.9	33.5	44.1	2.70
IPN 280	7590	542	11.1	364	61.2	2.45	632	103	44.2	64.6	2.84
IPN 300	9800	653	11.9	451	72.2	2.56	762	121	56.8	91.8	2.98
IPN 320	12510	782	12.7	555	84.7	2.67	914	143	72.5	129	3.12
IPN 340	15700	923	13.5	674	98.4	2.80	1080	166	90.4	176	3.26
IPN 360	19610	1090	14.2	818	114	2.90	1276	194	115	240	3.41
IPN 380	24010	1260	15.0	975	131	3.02	1482	221	141	319	3.55
IPN 400	29210	1460	15.7	1160	149	3.13	1714	253	170	420	3.69
IPN 425	36970	1740	16.7	1440	176	3.30					
IPN 450	45850	2040	17.7	1730	203	3.43	2400	345	267	791	4.04
IPN 475	56480	2380	18.6	2090	235	3.60					
IPN 500	68740	2750	19.6	2480	268	3.72	3240	456	402	1400	4.39
IPN 550	99180	3610	21.6	3490	349	4.02	4240	592	544	2390	4.78
IPN 600	139000	4630	23.4	4670	434	4.30					



Canales Americanos (Channels) **TIPO C** Dimensiones

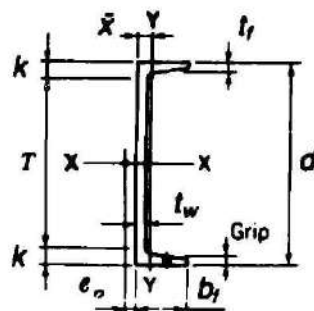
Dimensiones de Acuerdo al ASTM - A6

Designation		Area A	Depth d	Web		Flange		Distance		Grip	Max. Fig. Fas- tener
				Thick- ness t_w	t_w 2	Width b_f	Thick- ness t_f	T	k		
mm x kg/m	in. x lb/ft	mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm
C 380 x 74	C 15 x 50	9480	381.0	18.20	9.10	94.4	16.50	307.0	37	16	M24
C 380 x 60	C 15 x 40	7610	381.0	13.20	6.60	89.4	16.50	307.0	37	16	M24
C 380 x 50	C 15 x 33.9	6430	381.0	10.20	5.10	86.4	16.50	307.0	37	16	M24
C 310 x 45	C 12 x 30	5690	305.0	13.00	6.50	80.5	12.70	247.0	29	13	M22
C 310 x 37	C 12 x 25	4740	305.0	9.83	4.92	77.4	12.70	247.0	29	13	M22
C 310 x 31	C 12 x 20.7	3930	305.0	7.16	3.58	74.7	12.70	247.0	29	13	M22
C 250 x 45	C 10 x 30	5690	254.0	17.10	8.55	77.0	11.10	204.0	25	11	M20
C 250 x 37	C 10 x 25	4740	254.0	13.40	6.70	73.3	11.10	204.0	25	11	M20
C 250 x 30	C 10 x 20	3790	254.0	9.63	4.82	69.6	11.10	204.0	25	11	M20
C 250 x 23	C 10 x 15.3	2900	254.0	6.10	3.05	66.0	11.10	204.0	25	11	M20
C 230 x 30	C 9 x 20	3790	229.0	11.40	5.70	67.3	10.50	181.0	24	11	M20
C 230 x 22	C 9 x 15	2850	229.0	7.24	3.62	63.1	10.50	181.0	24	11	M20
C 230 x 20	C 9 x 13.4	2540	229.0	5.92	2.96	61.8	10.50	181.0	24	11	M20
C 200 x 28	C 8 x 18.75	3550	203.0	12.40	6.20	64.2	9.90	155.0	24	10	M20
C 200 x 20	C 8 x 13.75	2610	203.0	7.70	3.85	59.5	9.90	155.0	24	10	M20
C 200 x 17	C 8 x 11.5	2180	203.0	5.59	2.80	57.4	9.90	155.0	24	10	M20
C 180 x 22	C 7 x 14.75	2790	178.0	10.60	5.30	58.4	9.30	134.0	22	10	M16
C 180 x 18	C 7 x 12.25	2320	178.0	7.98	3.99	55.7	9.30	134.0	22	10	M16
C 180 x 15	C 7 x 9.8	1850	178.0	5.33	2.67	53.1	9.30	134.0	22	10	M16
C 150 x 19	C 6 x 13	2470	152.0	11.10	5.55	54.8	8.70	110.0	21	8	M16
C 150 x 16	C 6 x 10.5	1990	152.0	7.98	3.99	51.7	8.70	110.0	21	10	M16
C 150 x 12	C 6 x 8.2	1550	152.0	5.08	2.54	48.8	8.70	110.0	21	8	M16
C 130 x 13	C 5 x 9	1700	127.0	8.25	4.13	47.9	8.10	89.0	19	8	M16
C 130 x 10	C 5 x 6.7	1270	127.0	4.83	2.42	44.5	8.10	89.0	19	—	—
C 100 x 11	C 4 x 7.25	1370	102.0	8.15	4.08	43.7	7.50	68.0	17	8	M16
C 100 x 8	C 4 x 5.4	1030	102.0	4.67	2.34	40.2	7.50	68.0	17	—	—
C 75 x 9	C 3 x 6	1140	76.2	9.04	4.52	40.5	6.90	42.2	17	—	—
C 75 x 7	C 3 x 5	948	76.2	6.55	3.28	38.0	6.90	42.2	17	—	—
C 75 x 6	C 3 x 4.1	781	76.2	4.32	2.16	35.8	6.90	42.2	17	—	—



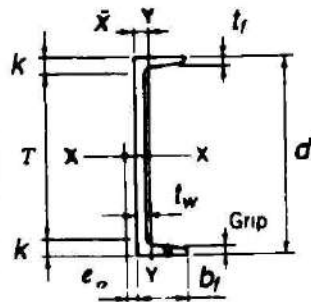
Canales Americanos (Channels) **TIPO C** Propiedades

Dimensiones de Acuerdo al ASTM - A6



Nom- inal Mass. per Meter	$\bar{x}$	Shear Center Loca- tion e_o	PNA Loca- tion x_p	Axis X-X				Axis Y-Y			
				I	Z	S	r	I	Z	S	r
				10^6 mm^4	10^3 mm^3	10^3 mm^3	mm	10^6 mm^4	10^3 mm^3	10^3 mm^3	mm
74	1110	132	12.4	168	1120	882	133	4.58	134	61.8	22.0
60	609	110	9.91	145	937	761	138	3.84	113	55.1	22.5
50	425	96.1	8.38	131	826	688	143	3.38	102	50.9	22.9
45	364	40.5	9.30	67.4	551	442	109	2.14	71.0	33.8	19.4
37	226	34.9	7.75	59.9	479	393	112	1.86	62.9	30.9	19.8
31	154	30.1	6.40	53.7	416	352	117	1.61	57.2	28.3	20.2
45	513	21.3	11.2	42.9	436	338	86.8	1.64	61.9	27.1	17.0
37	291	18.4	9.02	38.0	377	299	89.5	1.40	52.3	24.3	17.2
30	155	15.3	7.42	32.8	316	258	93.0	1.17	44.4	21.6	17.6
23	88.2	12.2	5.66	28.1	259	221	98.4	0.949	38.5	19.0	18.1
30	181	10.6	8.25	25.3	275	221	81.7	1.01	40.5	19.2	16.3
22	87.5	8.32	6.17	21.2	221	185	86.2	0.803	33.6	16.7	16.8
20	70.8	7.57	5.51	19.9	205	174	88.5	0.733	32.0	15.8	17.0
28	183	6.74	8.71	18.3	226	180	71.8	0.824	35.6	16.5	15.2
20	78.4	5.16	6.38	15.0	179	148	75.8	0.637	28.3	14.0	15.6
17	54.6	4.43	5.31	13.6	156	134	79.0	0.549	25.9	12.8	15.9
22	112	3.52	7.82	11.3	159	127	63.6	0.574	26.9	12.8	14.3
18	67.6	3.01	6.48	10.1	138	113	66.0	0.487	23.4	11.5	14.5
15	41.9	2.47	5.16	8.87	117	99.7	69.2	0.403	20.6	10.2	14.8
19	101	1.94	8.05	7.24	119	95.3	54.1	0.437	22.3	10.5	13.3
16	54.7	1.60	6.48	6.33	101	83.3	56.4	0.360	18.8	9.22	13.5
12	31.6	1.27	5.03	5.45	84.1	71.7	59.3	0.288	16.3	8.04	13.6
13	46	0.787	6.65	3.70	71.4	58.3	46.7	0.263	15.0	7.35	12.4
10	23.3	0.596	5.51	3.12	57.5	49.1	49.6	0.199	12.5	6.18	12.5
11	34.7	0.333	6.71	1.91	46.0	37.5	37.3	0.180	11.4	5.62	11.5
8	16.9	0.247	6.12	1.60	37.0	31.4	39.4	0.133	9.32	4.65	11.4
9	30.7	0.124	7.39	0.862	28.2	22.6	27.5	0.127	8.91	4.39	10.6
7	18.1	0.102	6.15	0.770	24.6	20.2	28.5	0.103	7.64	3.83	10.4
6	11.4	0.083	12.0	0.691	21.3	18.1	29.8	0.082	6.57	3.32	10.2





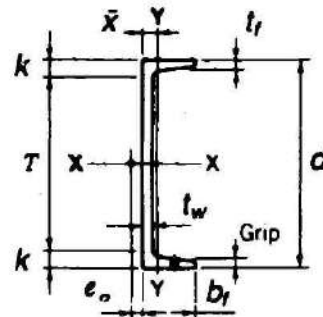
Canales Americanos Misceláneos **TIPO MC** Dimensiones

Dimensiones de Acuerdo al ASTM - A6

Designation		Area A	Depth d	Web		Flange		Distance		Grip	Max. Flg. Fas- tener
				Thick- ness t_w	$\frac{t_w}{2}$	Width b_f	Thick- ness t_f	T	k		
mm x kg/m	in. x lb/ft	mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm
MC 460 x 86	MC 18 x 58	11000	457.0	17.80	8.90	107.0	15.90	387.0	35	16	M24
MC 460 x 77.2	MC 18 x 51.9	9870	457.0	15.20	7.60	104.0	15.90	387.0	35	16	M24
MC 460 x 68.2	MC 18 x 45.8	8710	457.0	12.70	6.35	102.0	15.90	387.0	35	16	M24
MC 460 x 63.5	MC 18 x 42.7	8130	457.0	11.40	5.70	100.0	15.90	387.0	35	16	M24
MC 330 x 74	MC 13 x 50	9480	330.0	20.00	10.00	112.0	15.50	260.0	35	16	M24
MC 330 x 60	MC 13 x 40	7610	330.0	14.20	7.10	106.0	15.50	260.0	35	14	M24
MC 330 x 52	MC 13 x 35	6650	330.0	11.40	5.70	103.0	15.50	260.0	35	14	M24
MC 330 x 47.3	MC 13 x 31.8	6030	330.0	9.52	4.76	102.0	15.50	260.0	35	14	M24
MC 310 x 74	MC 12 x 50	9480	305.0	21.20	10.60	105.0	17.80	239.0	33	17	M24
MC 310 x 67	MC 12 x 45	8520	305.0	18.10	9.05	102.0	17.80	239.0	33	17	M24
MC 310 x 60	MC 12 x 40	7610	305.0	15.00	7.50	98.8	17.80	239.0	33	17	M24
MC 310 x 52	MC 12 x 35	6650	305.0	11.90	5.95	95.7	17.80	239.0	33	17	M24
MC 310 x 46	MC 12 x 31	5880	305.0	9.40	4.70	93.2	17.80	239.0	33	17	M24
MC 310 x 15.8	MC 12 x 10.6	2000	305.0	4.83	2.42	38.1	7.80	271.0	17	—	—
MC 250 x 61.2	MC 10 x 41.1	7810	254.0	20.20	10.10	110.0	14.60	190.0	32	14	M22
MC 250 x 50	MC 10 x 33.6	6370	254.0	14.60	7.30	104.0	14.60	190.0	32	14	M22
MC 250 x 42.4	MC 10 x 28.5	5400	254.0	10.80	5.40	100.0	14.60	190.0	32	14	M22
MC 250 x 37	MC 10 x 25	4740	254.0	9.65	4.83	86.5	14.60	190.0	32	14	M22
MC 250 x 33	MC 10 x 22	4160	254.0	7.37	3.69	84.2	14.60	190.0	32	14	M22
MC 250 x 12.5	MC 10 x 8.4	1590	254.0	4.32	2.16	38.1	7.10	220.0	17	—	—
MC 250 x 9.7	MC 10 x 6.5	1230	254.0	3.86	1.93	28.6	5.10	232.0	11	—	—

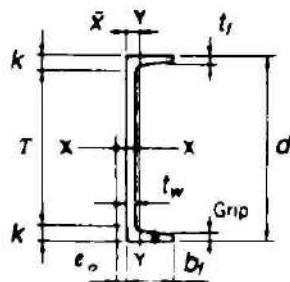
Canales Americanos Misceláneos **TIPO MC** Propiedades

Dimensiones de Acuerdo al ASTM - A6



Nom- inal Mass. per Meter	$\bar{x}$	Shear Center Loca- tion e_o	PNA Loca- tion x_p	Axis X-X				Axis Y-Y			
				I	Z	S	r	I	Z	S	r
				10^6 mm^4	10^3 mm^3	10^3 mm^3	mm	10^6 mm^4	10^3 mm^3	10^3 mm^3	mm
86	1260	287	10.7	281	1550	1230	160	7.41	163	87.1	26.0
77.2	918	265	9.45	261	1420	1140	163	6.83	150	83.1	26.3
68.2	674	241	8.81	241	1280	1050	166	6.29	138	78.6	26.9
63.5	571	229	14.3	231	1220	1010	169	5.99	133	77.1	27.1
74	1260	150	11.4	131	991	794	118	6.87	166	78.7	26.9
60	661	124	10.0	114	834	691	122	5.70	140	69.9	27.4
52	485	111	9.09	105	757	636	126	5.12	130	65.6	27.7
47.3	403	102	15.5	99.5	706	603	128	4.75	125	62.0	28.1
74	1450	110	13.9	112	919	734	109	7.24	167	92.4	27.6
67	1070	100	12.4	105	847	689	111	6.58	153	87.1	27.8
60	783	90.2	10.8	97.4	775	639	113	5.95	141	82.2	28.0
52	580	79.8	10.6	89.9	701	590	116	5.29	130	76.6	28.2
46	463	72.0	3.28	84.5	644	554	120	4.70	122	71.5	28.3
15.8	25	3.14	15.3	23.1	190	151	107	0.159	10.5	5.09	8.92
61.2	1040	72.5	12.4	65.8	637	518	91.8	6.58	143	79.9	29.0
50	571	60.2	10.5	57.9	547	456	95.3	5.49	123	71.7	29.4
42.4	383	52.1	9.25	52.9	485	417	99.0	4.75	112	66.4	29.7
37	299	33.6	11.9	45.8	423	361	98.3	3.06	85.4	49.1	25.4
33	238	29.8	3.10	42.9	387	338	102	2.71	79.6	45.9	25.5
12.5	17.4	1.88	2.44	13.3	129	105	91.5	0.137	9.05	4.44	9.28
9.7	8.33	0.658	10.4	9.20	93.9	72.4	86.5	0.047	4.10	1.94	6.16





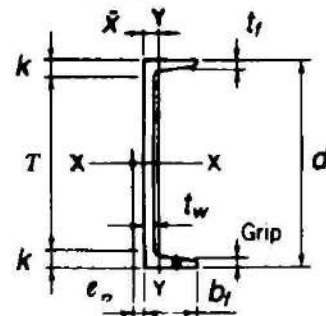
Canales Americanos Misceláneos **TIPO MC** Dimensiones

Dimensiones de Acuerdo al ASTM - A6

Designation		Area A	Depth d	Web		Flange		Distance		Grip	Max. Flg. Fas- tener
				Thick- ness t_w	$\frac{t_w}{2}$	Width b_f	Thick- ness t_f	T	k		
mm x kg/m	in. x lb/ft	mm ²	mm	mm	mm	mm	mm	mm	mm	mm	mm
MC 230 x 37.8	MC 9 x 25.4	4820	229.0	11.40	5.70	88.9	14.00	169.0	30	14	M22
MC 230 x 35.6	MC 9 x 23.9	4530	229.0	10.20	5.10	87.6	14.00	169.0	30	14	M22
MC 200 x 33.9	MC 8 x 22.8	4320	203.0	10.80	5.40	89.0	13.30	143.0	30	13	M22
MC 200 x 31.8	MC 8 x 21.4	4050	203.0	9.52	4.76	87.6	13.30	143.0	30	13	M22
MC 200 x 29.8	MC 8 x 20	3790	203.0	10.20	5.10	76.8	12.70	145.0	29	13	M22
MC 200 x 27.8	MC 8 x 18.7	3550	203.0	8.97	4.49	75.6	12.70	145.0	29	13	M22
MC 200 x 12.6	MC 8 x 8.5	1610	203.0	4.55	2.28	47.6	7.90	165.0	19	8	M16
MC 180 x 33.8	MC 7 x 22.7	4300	178.0	12.80	6.40	91.5	12.70	120.0	29	13	M22
MC 180 x 28.4	MC 7 x 19.1	3620	178.0	8.94	4.47	87.7	12.70	120.0	29	13	M22
MC 150 x 26.8	MC 6 x 18	3410	152.0	9.63	4.82	89.0	12.10	98.0	27	13	M22
MC 150 x 22.8	MC 6 x 15.3	2900	152.0	8.64	4.32	88.9	9.80	108.0	22	10	M22
MC 150 x 24.3	MC 6 x 16.3	3090	152.0	9.52	4.76	76.2	12.10	98.0	27	13	M20
MC 150 x 22.5	MC 6 x 15.1	2860	152.0	8.03	4.02	74.7	12.10	98.0	27	13	M20
MC 150 x 17.9	MC 6 x 12	2280	152.0	7.87	3.94	63.4	9.50	110.0	21	10	M16

Canales Americanos Misceláneos **TIPO MC** Propiedades

Dimensiones de Acuerdo al ASTM - A6



Nom- inal Mass. per Meter	$\bar{x}$	Shear Center Loca- tion e_o	PNA Loca- tion x_p	Axis X-X				Axis Y-Y			
				I	Z	S	r	I	Z	S	r
kg/m	mm	mm	mm	10^6 mm^4	10^3 mm^3	10^3 mm^3	mm	10^6 mm^4	10^3 mm^3	10^3 mm^3	mm
37.8	328	27.9	9.80	36.6	380	320	87.1	3.18	85.7	49.5	25.7
35.6	287	26.4	10.5	35.4	364	309	88.4	3.01	82.8	48.0	25.8
33.9	274	20.2	11.4	26.6	308	262	78.5	2.94	80.0	46.4	26.1
31.8	238	19.0	9.25	25.6	295	252	79.5	2.76	77.2	44.7	26.1
29.8	208	12.9	8.66	22.7	265	224	77.4	1.86	58.5	33.5	22.2
27.8	179	12.1	3.94	21.9	252	216	78.5	1.75	56.4	32.4	22.2
12.6	24.6	2.21	12.0	9.70	113	95.6	77.6	0.261	14.5	7.11	12.7
33.8	303	15.7	14.4	19.8	265	222	67.9	3.03	79.6	46.6	26.5
28.4	201	13.3	9.30	18.0	234	202	70.5	2.54	71.1	42.1	26.5
26.8	192	9.29	15.8	12.4	188	163	60.3	2.47	67.8	40.8	26.9
22.8	120	8.08	12.6	10.6	161	139	60.5	2.07	53.7	33.3	26.7
24.3	162	5.93	11.8	10.8	167	142	59.1	1.59	52.1	30.2	22.7
22.5	137	5.53	13.6	10.4	159	137	60.3	1.46	49.2	28.7	22.6
17.9	74.1	3.01	7.42	7.78	121	102	58.4	0.778	29.3	17.1	18.5

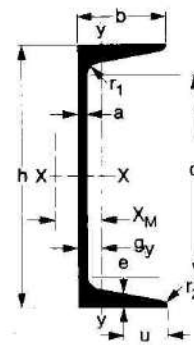


Canales Europeos Standar TIPO UPN

Désignation Section Bezeichnung	Dimensions Sizes Abmessungen						F	G	d	F _s	U
	h mm	b mm	a mm	e mm	r ₁ mm	r ₂ mm	cm ²	kg/m	mm	cm ²	m ² /m
UPN 50x25	50	25	5	6	6	3	4.92	3.86			0.181
UPN 50	50	38	5	7	7	3.5	7.12	5.59			0.232
UPN 60	60	30	6	6	6	3	6.46	5.07			0.215
UPN 65	65	42	5.5	7.5	7.5	4	9.03	7.09			0.273
UPN 80	80	45	6	8	8	4	11.0	8.64	46	3.72	0.312
UPN 100	100	50	6	8.5	8.5	4.5	13.5	10.6	64	4.86	0.372
UPN 120	120	55	7	9	9	4.5	17.0	13.4	82	7.00	0.434
UPN 140	140	60	7	10	10	5	20.4	16.0	98	8.26	0.489
UPN 160	160	65	7.5	10.5	10.5	5.5	24.0	18.8	115	10.2	0.546
UPN 180	180	70	8	11	11	5.5	28.0	22.0	133	12.4	0.611
UPN 200	200	75	8.5	11.5	11.5	6	32.2	25.3	151	14.8	0.661
UPN 220	220	80	9	12.5	12.5	6.5	37.4	29.4	167	17.3	0.718
UPN 240	240	85	9.5	13	13	6.5	42.3	33.2	184	20.0	0.775
UPN 260	260	90	10	14	14	7	48.3	37.9	200	22.8	0.834
UPN 280	280	95	10	15	15	7.5	53.3	41.8	216	24.6	0.890
UPN 300	300	100	10	16	16	8	58.8	46.2	232	26.4	0.950
UPN 320	320	100	14	17.5	17.5	8.75	75.8	59.5	246	39.3	0.982
UPN 350	350	100	14	16	16	8	77.3	60.6	282	44.0	1.05
UPN 380	380	102	13.5	16	16	8	80.4	63.1	313	46.6	1.11
UPN 400	400	110	14	18	18	9	91.5	71.8	324	50.4	1.18

UPN

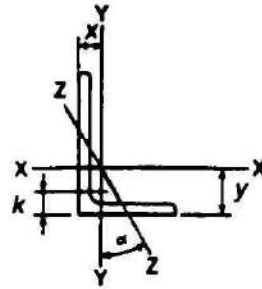
Canales Europeos Standar TIPO UPN



Désignation Section Bezeichnung	Axe x-x Axis x-x Achse x-x			Axe y-y Axis y-y Achse y-y			Jt cm ⁴	Cm x 10 ⁻³ cm ⁵	xm cm	gy cm
	Jx cm ⁴	Wx cm ³	Ix cm ⁴	Jy cm ⁴	Wy cm ³	Iy cm ⁴				
UPN 50x25	16.8	6.73	1.85	2.49	1.48	0.71				
UPN 50	26.4	10.6	1.92	9.12	3.75	1.13				
UPN 60	31.6	10.5	2.21	4.51	2.16	0.84				
UPN 65	57.5	17.7	2.52	14.1	5.07	1.25				
UPN 80	106	26.5	3.10	19.4	6.36	1.33	2.16	0.168	2.67	1.45
UPN 100	206	41.2	3.91	29.3	8.49	1.47	2.81	0.414	2.93	1.55
UPN 120	364	60.7	4.62	43.2	11.1	1.59	4.15	0.900	3.03	1.60
UPN 140	605	86.4	5.45	62.7	14.8	1.75	5.68	1.80	3.37	1.75
UPN 160	925	116	6.21	85.3	18.3	1.89	7.39	3.26	3.56	1.84
UPN 180	1350	150	6.95	114	22.4	2.02	9.55	5.57	3.75	1.92
UPN 200	1910	191	7.70	148	27.0	2.14	11.9	9.07	3.94	2.01
UPN 220	2690	245	8.48	197	33.6	2.30	16.0	14.6	4.20	2.14
UPN 240	3600	300	9.22	248	39.6	2.42	19.7	22.1	4.39	2.23
UPN 260	4820	371	9.99	317	47.7	2.56	25.5	33.3	4.66	2.36
UPN 280	6280	448	10.9	399	57.2	2.74	31.0	48.5	5.02	2.53
UPN 300	8030	535	11.7	495	67.8	2.90	37.4	69.1	5.41	2.70
UPN 320	10870	679	12.1	597	80.6	2.81	66.7	96.1	4.82	2.60
UPN 350	12840	734	12.9	570	75.0	2.72	61.2	114	4.45	2.40
UPN 380	15760	829	14.0	615	78.7	2.77	59.1	146	4.58	2.33
UPN 400	20350	1020	14.9	846	102	3.04	81.6	221	5.11	2.65



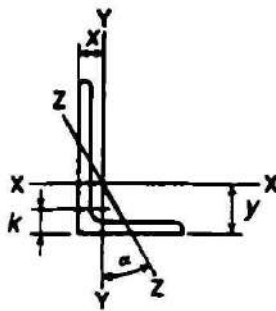
Angulos Americanos de Alas Iguales y Desiguales



Dimensiones de Acuerdo al ASTM - A6

Size and Thickness	Axis Y-Y						Axis Z-Z	
	<i>I</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>Z</i>	<i>x_p</i>	<i>r</i>	Tan α
mm	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm	mm	
L 203 x 203 x 28.6	40.7	287	61.4	61.2	518	26.6	39.6	1.000
L 203 x 203 x 25.4	36.9	258	61.7	60.1	467	23.8	39.6	1.000
L 203 x 203 x 22.2	33.0	229	62.2	58.9	415	21.0	39.9	1.000
L 203 x 203 x 19.0	28.9	199	62.6	57.8	361	18.1	40.1	1.000
L 203 x 203 x 15.9	24.7	169	63.1	56.6	305	15.3	40.1	1.000
L 203 x 203 x 14.3	22.5	153	63.4	56.0	275	13.8	40.4	1.000
L 203 x 203 x 12.7	20.2	137	63.6	55.5	247	12.3	40.4	1.000
L 203 x 152 x 25.4	16.0	145	43.7	41.9	265	20.6	32.5	0.543
L 203 x 152 x 22.2	14.4	129	44.1	40.7	236	18.2	32.5	0.547
L 203 x 152 x 19.0	12.7	113	44.5	39.6	205	15.7	32.8	0.551
L 203 x 152 x 15.9	10.9	96.0	45.0	38.5	172	13.3	32.8	0.554
L 203 x 152 x 14.3	9.94	87.0	45.1	37.9	156	12.0	33.0	0.556
L 203 x 152 x 12.7	8.96	78.1	45.4	37.3	139	10.7	33.0	0.558
L 203 x 152 x 11.1	7.94	68.8	45.5	36.7	123	9.4	33.3	0.560
L 203 x 102 x 25.4	4.90	65.1	26.3	26.7	127	17.5	21.5	0.247
L 203 x 102 x 19.0	3.93	50.6	26.9	24.3	95.2	13.4	21.6	0.258
L 203 x 102 x 14.3	3.13	39.4	27.5	22.5	71.8	10.2	21.9	0.265
L 203 x 102 x 12.7	2.84	35.5	27.7	21.9	63.9	9.1	22.0	0.267
L 178 x 102 x 19.0	3.80	49.8	27.7	25.7	92.6	13.9	21.8	0.324
L 178 x 102 x 15.9	3.31	42.8	28.1	24.6	77.7	11.8	22.0	0.329
L 178 x 102 x 12.7	2.75	35.0	28.5	23.4	62.8	9.5	22.1	0.335
L 178 x 102 x 9.5	2.15	27.0	28.9	22.2	47.5	7.2	22.4	0.340





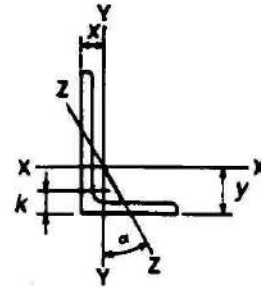
Angulos Americanos de Alas Iguales y Desiguales

Dimensiones de Acuerdo al ASTM - A6

Size and Thickness		k	Mass per Meter	Area	Axis X-X					
					I	S	r	y	Z	y _p
mm	in.	mm	kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm
L 152 x 152 x 25.4	L 6 x 6 x 1	38	55.7	7100	14.6	139	45.3	47.2	254	23.3
L 152 x 152 x 22.2	L 6 x 6 x 7/8	35	49.3	6280	13.2	124	45.8	46.1	226	20.6
L 152 x 152 x 19.0	L 6 x 6 x 3/4	32	42.7	5440	11.6	108	46.2	45.0	197	17.8
L 152 x 152 x 15.9	L 6 x 6 x 5/8	29	36.0	4590	9.99	92.3	46.7	43.9	167	15.1
L 152 x 152 x 14.3	L 6 x 6 x 9/16	27	32.6	4150	9.12	83.8	46.9	43.3	152	13.6
L 152 x 152 x 12.7	L 6 x 6 x 1/2	25	29.2	3710	8.22	75.1	47.1	42.7	136	12.2
L 152 x 152 x 11.1	L 6 x 6 x 7/16	24	25.6	3260	7.29	66.3	47.3	42.1	120	10.7
L 152 x 152 x 9.5	L 6 x 6 x 3/8	22	22.2	2810	6.35	57.4	47.5	41.5	104	9.2
L 152 x 152 x 7.9	L 6 x 6 x 5/16	21	18.5	2360	5.38	48.4	47.7	40.9	87.7	7.7
L 152 x 102 x 22.2	L 6 x 4 x 7/8	35	40.5	5150	11.5	117	47.3	53.7	208	36.1
L 152 x 102 x 19.0	L 6 x 4 x 3/4	32	35.1	4480	10.1	101	47.5	52.5	184	34.5
L 152 x 102 x 15.9	L 6 x 4 x 5/8	29	29.8	3780	8.73	86.8	48.1	51.4	156	32.9
L 152 x 102 x 14.3	L 6 x 4 x 9/16	27	26.9	3420	7.98	79.0	48.3	50.8	142	32.2
L 152 x 102 x 12.7	L 6 x 4 x 1/2	25	24.1	3060	7.20	70.8	48.5	50.2	127	31.3
L 152 x 102 x 11.1	L 6 x 4 x 7/16	24	21.3	2700	6.39	62.4	48.6	49.6	113	30.5
L 152 x 102 x 9.5	L 6 x 4 x 3/8	22	18.3	2330	5.57	54.1	48.9	49.1	97.8	29.8
L 152 x 102 x 7.9	L 6 x 4 x 5/16	21	15.3	1950	4.72	45.6	49.2	48.5	82.4	29.0
L 152 x 89 x 12.7	L 6 x 3 1/2 x 1/2	25	22.8	2900	6.86	69.1	48.6	52.7	123	37.9
L 152 x 89 x 9.5	L 6 x 3 1/2 x 3/8	22	17.4	2210	5.32	52.9	49.1	51.5	94.4	36.3
L 152 x 89 x 7.9	L 6 x 3 1/2 x 5/16	21	14.6	1850	4.50	44.5	49.3	50.9	79.5	35.5
L 127 x 127 x 22.2	L 5 x 5 x 7/8	35	40.5	5150	7.39	84.7	37.9	39.8	153	20.3
L 127 x 127 x 19.0	L 5 x 5 x 3/4	32	35.1	4480	6.54	73.9	38.2	38.7	134	17.6
L 127 x 127 x 15.9	L 5 x 5 x 5/8	29	29.8	3780	5.66	63.3	38.7	37.6	114	14.9
L 127 x 127 x 12.7	L 5 x 5 x 1/2	25	24.1	3060	4.68	51.7	39.1	36.4	93.1	12.1
L 127 x 127 x 11.1	L 5 x 5 x 7/16	24	21.3	2700	4.17	45.7	39.3	35.8	82.4	10.6
L 127 x 127 x 9.5	L 5 x 5 x 3/8	22	18.3	2330	3.64	39.7	39.5	35.3	71.4	9.2
L 127 x 127 x 7.9	L 5 x 5 x 5/16	21	15.3	1950	3.09	33.5	39.8	34.7	60.3	7.7



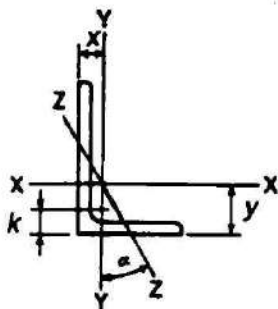
Angulos Americanos de Alas Iguales y Desiguales



Dimensiones de Acuerdo al ASTM - A6

Size and Thickness	Axis Y-Y						Axis Z-Z	
	<i>l</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>Z</i>	<i>x_p</i>	<i>r</i>	Tan <i>α</i>
mm	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm	mm	
L 152 x 152 x 25.4	14.6	139	45.3	47.2	254	23.3	29.7	1.000
L 152 x 152 x 22.2	13.2	124	45.8	46.1	226	20.6	29.7	1.000
L 152 x 152 x 19.0	11.6	108	46.2	45.0	197	17.8	29.7	1.000
L 152 x 152 x 15.9	9.99	92.3	46.7	43.9	167	15.1	30.0	1.000
L 152 x 152 x 14.3	9.12	83.8	46.9	43.3	152	13.6	30.0	1.000
L 152 x 152 x 12.7	8.22	75.1	47.1	42.7	136	12.2	30.0	1.000
L 152 x 152 x 11.1	7.29	66.3	47.3	42.1	120	10.7	30.2	1.000
L 152 x 152 x 9.5	6.35	57.4	47.5	41.5	104	9.2	30.2	1.000
L 152 x 152 x 7.9	5.38	48.4	47.7	40.9	87.7	7.7	30.5	1.000
L 152 x 102 x 22.2	4.10	55.9	28.2	28.7	103	16.9	21.8	0.421
L 152 x 102 x 19.0	3.65	48.9	28.5	27.5	89.6	14.7	21.8	0.428
L 152 x 102 x 15.9	3.17	41.9	29.0	26.4	75.7	12.5	21.9	0.435
L 152 x 102 x 14.3	2.91	38.2	29.2	25.8	68.7	11.3	22.0	0.438
L 152 x 102 x 12.7	2.64	34.4	29.4	25.2	61.5	10.1	22.1	0.440
L 152 x 102 x 11.1	2.35	30.4	29.5	24.6	54.1	8.9	22.2	0.443
L 152 x 102 x 9.5	2.06	26.4	29.7	24.1	46.7	7.7	22.3	0.446
L 152 x 102 x 7.9	1.76	22.4	30.0	23.5	39.3	6.4	22.4	0.448
L 152 x 89 x 12.7	1.77	26.1	24.7	21.2	47.7	9.5	19.3	0.344
L 152 x 89 x 9.5	1.39	20.1	25.1	20.0	36.1	7.3	19.5	0.350
L 152 x 89 x 7.9	1.19	17.1	25.4	19.4	30.3	6.1	19.6	0.352
L 127 x 127 x 22.2	7.39	84.7	37.9	39.8	153	20.3	24.7	1.000
L 127 x 127 x 19.0	6.54	73.9	38.2	38.7	134	17.6	24.8	1.000
L 127 x 127 x 15.9	5.66	63.3	38.7	37.6	114	14.9	24.8	1.000
L 127 x 127 x 12.7	4.68	51.7	39.1	36.4	93.1	12.1	25.0	1.000
L 127 x 127 x 11.1	4.17	45.7	39.3	35.8	82.4	10.6	25.0	1.000
L 127 x 127 x 9.5	3.64	39.7	39.5	35.3	71.4	9.2	25.1	1.000
L 127 x 127 x 7.9	3.09	33.5	39.8	34.7	60.3	7.7	25.2	1.000





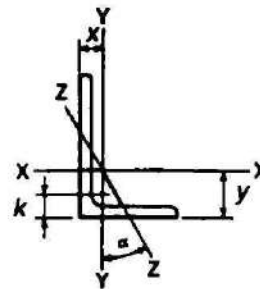
Angulos Americanos de Alas Iguales y Desiguales

Dimensiones de Acuerdo al ASTM - A6

Size and Thickness		k	Mass per Meter	Area	Axis X-X					
					I	S	r	y	Z	y _p
mm	in.	mm	kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm
L 127 x 89 x 19.0	L 5 x 3 1/2 x 3/4	32	29.5	3750	5.78	69.8	39.3	44.3	125	28.5
L 127 x 89 x 15.9	L 5 x 3 1/2 x 5/8	29	25.0	3180	5.01	59.8	39.7	43.2	107	26.9
L 127 x 89 x 12.7	L 5 x 3 1/2 x 1/2	25	20.2	2580	4.16	49.0	40.2	42.1	88.2	25.4
L 127 x 89 x 9.5	L 5 x 3 1/2 x 3/8	22	15.5	1970	3.24	37.6	40.6	40.9	67.8	23.8
L 127 x 89 x 7.9	L 5 x 3 1/2 x 5/16	21	12.9	1650	2.75	31.7	40.8	40.3	57.2	23.0
L 127 x 89 x 6.4	L 5 x 3 1/2 x 1/4	19	10.4	1330	2.24	25.7	41.0	39.7	46.4	22.2
L 127 x 76 x 12.7	L 5 x 3 x 1/2	25	19.0	2420	3.93	47.6	40.3	44.5	84.6	31.9
L 127 x 76 x 11.1	L 5 x 3 x 7/16	24	16.8	2130	3.50	42.1	40.5	43.9	74.9	31.1
L 127 x 76 x 9.5	L 5 x 3 x 3/8	22	14.6	1840	3.06	36.6	40.8	43.3	65.1	30.3
L 127 x 76 x 7.9	L 5 x 3 x 5/16	21	12.2	1550	2.60	30.8	41.0	42.7	55.1	29.5
L 127 x 76 x 6.4	L 5 x 3 x 1/4	19	9.8	1250	2.12	25.0	41.2	42.1	44.6	28.7
L 102 x 102 x 19.0	L 4 x 4 x 3/4	29	27.5	3510	3.23	46.4	30.3	32.4	83.1	17.2
L 102 x 102 x 15.9	L 4 x 4 x 5/8	25	23.4	2970	2.81	39.9	30.8	31.3	71.0	14.7
L 102 x 102 x 12.7	L 4 x 4 x 1/2	22	19.0	2420	2.34	32.6	31.1	30.2	58.3	11.9
L 102 x 102 x 11.1	L 4 x 4 x 7/16	21	16.8	2130	2.09	28.9	31.3	29.6	51.8	10.5
L 102 x 102 x 9.5	L 4 x 4 x 3/8	19	14.6	1840	1.84	25.3	31.6	29.0	44.9	9.1
L 102 x 102 x 7.9	L 4 x 4 x 5/16	17	12.2	1550	1.57	21.4	31.8	28.4	38.0	7.6
L 102 x 102 x 6.4	L 4 x 4 x 1/4	16	9.8	1250	1.28	17.3	32.0	27.9	30.8	6.2
L 102 x 89 x 12.7	L 4 x 3 1/2 x 1/2	24	17.7	2260	2.24	32.0	31.5	31.9	57.4	12.9
L 102 x 89 x 11.1	L 4 x 3 1/2 x 7/16	22	15.8	1990	2.00	28.3	31.7	31.3	51.0	12.1
L 102 x 89 x 9.5	L 4 x 3 1/2 x 3/8	21	13.5	1720	1.76	24.8	32.0	30.8	44.4	11.3
L 102 x 89 x 7.9	L 4 x 3 1/2 x 5/16	19	11.5	1450	1.50	20.9	32.2	30.2	37.5	10.5
L 102 x 89 x 6.4	L 4 x 3 1/2 x 1/4	17	9.2	1170	1.23	17.0	32.4	29.6	30.5	9.7



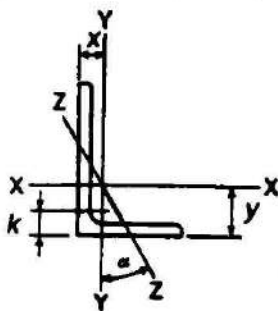
Angulos Americanos de Alas Iguales y Desiguales



Dimensiones de Acuerdo al ASTM - A6

Size and Thickness	Axis Y-Y						Axis Z-Z	
	<i>I</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>Z</i>	<i>x_p</i>	<i>r</i>	Tan α
	mm	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm	
L 127 x 89 x 19.0	2.31	36.2	24.8	25.3	67.2	14.7	19.0	0.464
L 127 x 89 x 15.9	2.02	31.2	25.2	24.2	56.9	12.5	19.1	0.472
L 127 x 89 x 12.7	1.69	25.6	25.6	23.1	46.4	10.2	19.2	0.479
L 127 x 89 x 9.5	1.33	19.8	26.0	21.9	35.4	7.7	19.4	0.486
L 127 x 89 x 7.9	1.14	16.8	26.3	21.3	29.8	6.5	19.5	0.489
L 127 x 89 x 6.4	0.931	13.6	26.5	20.7	24.1	5.2	19.6	0.492
L 127 x 76 x 12.7	1.06	18.6	20.9	19.0	34.6	9.5	16.5	0.357
L 127 x 76 x 11.1	0.956	16.6	21.2	18.4	30.5	8.4	16.5	0.361
L 127 x 76 x 9.5	0.842	14.5	21.4	17.8	26.2	7.3	16.6	0.364
L 127 x 76 x 7.9	0.722	12.3	21.6	17.2	22.1	6.1	16.7	0.368
L 127 x 76 x 6.4	0.594	10.0	21.8	16.6	17.9	4.9	16.8	0.371
L 102 x 102 x 19.0	3.23	46.4	30.3	32.4	83.1	17.2	19.8	1.000
L 102 x 102 x 15.9	2.81	39.9	30.8	31.3	71.0	14.7	19.8	1.000
L 102 x 102 x 12.7	2.34	32.6	31.1	30.2	58.3	11.9	19.9	1.000
L 102 x 102 x 11.1	2.09	28.9	31.3	29.6	51.8	10.5	19.9	1.000
L 102 x 102 x 9.5	1.84	25.3	31.6	29.0	44.9	9.1	20.0	1.000
L 102 x 102 x 7.9	1.57	21.4	31.8	28.4	38.0	7.6	20.1	1.000
L 102 x 102 x 6.4	1.28	17.3	32.0	27.9	30.8	6.2	20.2	1.000
L 102 x 89 x 12.7	1.59	25.0	26.5	25.4	44.7	11.1	18.3	0.750
L 102 x 89 x 11.1	1.42	22.2	26.7	24.8	39.7	9.8	18.4	0.753
L 102 x 89 x 9.5	1.25	19.3	27.0	24.3	34.6	8.5	18.5	0.755
L 102 x 89 x 7.9	1.07	16.4	27.2	23.7	29.2	7.1	18.5	0.757
L 102 x 89 x 6.4	0.875	13.3	27.3	23.1	23.6	5.8	18.6	0.759





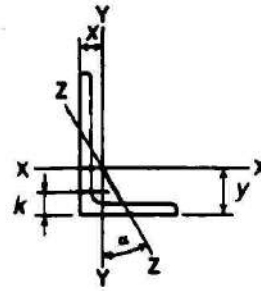
Angulos Americanos de Alas Iguales y Desiguales

Dimensiones de Acuerdo al ASTM - A6

Size and Thickness		k	Mass per Meter	Area	Axis X-X					
					I	S	r	y	Z	y _p
mm	in.	mm	kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm
L 102 x 76 x 12.7	L 4 x 3 x 1/2	24	16.5	2100	2.12	31.1	31.8	33.9	55.9	19.4
L 102 x 76 x 11.1	L 4 x 3 x 7/16	22	14.6	1850	1.90	27.7	32.0	33.3	49.7	18.5
L 102 x 76 x 9.5	L 4 x 3 x 3/8	21	12.6	1600	1.67	24.2	32.3	32.8	43.3	17.8
L 102 x 76 x 7.9	L 4 x 3 x 5/16	19	10.7	1350	1.42	20.3	32.4	32.2	36.5	17.0
L 102 x 76 x 6.4	L 4 x 3 x 1/4	17	8.6	1090	1.16	16.5	32.6	31.6	29.8	16.2
L 89 x 89 x 12.7	L 3 1/2 x 3 1/2 x 1/2	22	16.5	2100	1.52	24.5	26.9	26.9	43.9	11.8
L 89 x 89 x 9.5	L 3 1/2 x 3 1/2 x 3/8	19	12.6	1600	1.20	19.0	27.4	25.8	34.1	9.0
L 89 x 89 x 7.9	L 3 1/2 x 3 1/2 x 5/16	17	10.7	1350	1.02	16.0	27.5	25.2	28.8	7.6
L 89 x 89 x 6.4	L 3 1/2 x 3 1/2 x 1/4	16	8.6	1090	0.840	13.0	27.8	24.6	23.4	6.1
L 89 x 76 x 12.7	L 3 1/2 x 3 x 1/2	24	15.2	1940	1.44	23.8	27.2	28.6	43.1	12.9
L 89 x 76 x 9.5	L 3 1/2 x 3 x 3/8	21	11.8	1480	1.14	18.5	27.8	27.5	33.4	11.3
L 89 x 76 x 7.9	L 3 1/2 x 3 x 5/16	19	9.8	1250	0.972	15.6	27.9	26.9	28.3	10.5
L 89 x 76 x 6.4	L 3 1/2 x 3 x 1/4	17	8.0	1010	0.798	12.7	28.1	26.4	23.1	9.7
L 89 x 64 x 12.7	L 3 1/2 x 2 1/2 x 1/2	24	14.0	1770	1.36	23.3	27.7	30.6	41.5	18.8
L 89 x 64 x 9.5	L 3 1/2 x 2 1/2 x 3/8	21	10.7	1360	1.07	18.0	28.0	29.4	32.3	17.3
L 89 x 64 x 6.4	L 3 1/2 x 2 1/2 x 1/4	17	7.3	927	0.754	12.4	28.5	28.3	22.3	15.7
L 76 x 76 x 12.7	L 3 x 3 x 1/2	21	14.0	1770	0.915	17.5	22.7	23.6	31.6	11.6
L 76 x 76 x 11.1	L 3 x 3 x 7/16	19	12.4	1570	0.823	15.5	22.9	23.1	28.2	10.3
L 76 x 76 x 9.5	L 3 x 3 x 3/8	17	10.7	1360	0.726	13.6	23.1	22.5	24.6	8.9
L 76 x 76 x 7.9	L 3 x 3 x 5/16	16	9.1	1150	0.623	11.5	23.3	21.9	20.8	7.5
L 76 x 76 x 6.4	L 3 x 3 x 1/4	14	7.3	927	0.514	9.39	23.5	21.3	17.0	6.1
L 76 x 76 x 4.8	L 3 x 3 x 3/16	13	5.5	703	0.397	7.18	23.8	20.8	13.0	4.6



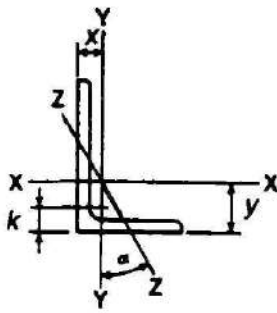
Angulos Americanos de Alas Iguales y Desiguales



Dimensiones de Acuerdo al ASTM - A6

Size and Thickness	Axis Y-Y						Axis Z-Z	
	<i>I</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>Z</i>	<i>x_p</i>	<i>r</i>	Tan α
mm	10^6 mm^4	10^3 mm^3	mm	mm	10^3 mm^3	mm	mm	
L 102 x 76 x 12.7	1.00	18.1	21.8	20.9	33.3	10.3	16.2	0.543
L 102 x 76 x 11.1	0.900	16.2	22.1	20.3	29.3	9.1	16.3	0.547
L 102 x 76 x 9.5	0.794	14.1	22.3	19.8	25.6	7.9	16.4	0.551
L 102 x 76 x 7.9	0.681	12.0	22.5	19.2	21.5	6.6	16.4	0.554
L 102 x 76 x 6.4	0.560	9.76	22.7	18.6	17.4	5.3	16.5	0.558
L 89 x 89 x 12.7	1.52	24.5	26.9	26.9	43.9	11.8	17.3	1.000
L 89 x 89 x 9.5	1.20	19.0	27.4	25.8	34.1	9.0	17.4	1.000
L 89 x 89 x 7.9	1.02	16.0	27.5	25.2	28.8	7.6	17.5	1.000
L 89 x 89 x 6.4	0.840	13.0	27.8	24.6	23.4	6.1	17.6	1.000
L 89 x 76 x 12.7	0.962	17.8	22.3	22.1	32.4	10.9	15.8	0.714
L 89 x 76 x 9.5	0.763	13.9	22.7	21.0	25.1	8.3	15.9	0.721
L 89 x 76 x 7.9	0.654	11.8	22.9	20.4	21.3	7.0	15.9	0.724
L 89 x 76 x 6.4	0.539	9.59	23.1	19.9	17.2	5.7	16.0	0.727
L 89 x 64 x 12.7	0.581	12.7	18.1	18.1	22.9	10.0	13.6	0.486
L 89 x 64 x 9.5	0.464	9.87	18.5	16.9	17.5	7.7	13.6	0.496
L 89 x 64 x 6.4	0.331	6.87	18.9	15.8	12.0	5.2	13.8	0.506
L 76 x 76 x 12.7	0.915	17.5	22.7	23.6	31.6	11.6	14.8	1.000
L 76 x 76 x 11.1	0.823	15.5	22.9	23.1	28.2	10.3	14.9	1.000
L 76 x 76 x 9.5	0.726	13.6	23.1	22.5	24.6	8.9	14.9	1.000
L 76 x 76 x 7.9	0.623	11.5	23.3	21.9	20.8	7.5	15.0	1.000
L 76 x 76 x 6.4	0.514	9.39	23.5	21.3	17.0	6.1	15.0	1.000
L 76 x 76 x 4.8	0.397	7.18	23.8	20.8	13.0	4.6	15.1	1.000





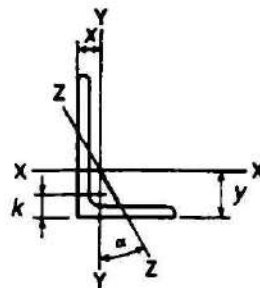
Angulos Americanos de Alas Iguales y Desiguales

Dimensiones de Acuerdo al ASTM - A6

Size and Thickness				k	Mass per Meter	Area	Axis X-X					
							I	S	r	y	Z	y _p
mm		in.		mm	kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	mm	10 ³ mm ³	mm
L 76 x 64 x 12.7	L 3 x 2½ x ½	22	12.6	1610	0.863	17.0	23.2	25.2	30.8	12.6		
L 76 x 64 x 9.5	L 3 x 2½ x ¾	19	9.8	1240	0.686	13.2	23.5	24.1	24.1	10.8		
L 76 x 64 x 7.9	L 3 x 2½ x ⅝	17	8.3	1050	0.589	11.2	23.7	23.6	20.5	10.0		
L 76 x 64 x 6.4	L 3 x 2½ x ¼	16	6.7	847	0.486	9.17	24.0	23.0	16.7	9.2		
L 76 x 64 x 4.8	L 3 x 2½ x ⅜	14	5.0	643	0.376	7.02	24.2	22.4	12.8	8.4		
L 76 x 51 x 12.7	L 3 x 2 x ½	21	11.5	1450	0.795	16.4	23.4	27.4	29.2	18.8		
L 76 x 51 x 9.5	L 3 x 2 x ¾	17	8.8	1120	0.634	12.7	23.8	26.3	22.9	17.3		
L 76 x 51 x 7.9	L 3 x 2 x ⅝	16	7.4	945	0.545	10.8	24.0	25.7	19.5	16.5		
L 76 x 51 x 6.4	L 3 x 2 x ¼	14	6.1	766	0.450	8.84	24.2	25.1	15.9	15.7		
L 76 x 51 x 4.8	L 3 x 2 x ⅜	13	4.6	582	0.348	6.77	24.5	24.5	12.2	14.9		
L 64 x 64 x 12.7	L 2½ x 2½ x ½	21	11.5	1450	0.524	12.1	19.0	20.6	21.5	11.4		
L 64 x 64 x 9.5	L 2½ x 2½ x ¾	17	8.8	1120	0.420	9.46	19.4	19.5	16.7	8.8		
L 64 x 64 x 7.9	L 2½ x 2½ x ⅝	16	7.4	945	0.362	8.06	19.6	18.9	14.2	7.5		
L 64 x 64 x 6.4	L 2½ x 2½ x ¼	14	6.1	766	0.300	6.59	19.8	18.3	11.7	6.0		
L 64 x 64 x 4.8	L 2½ x 2½ x ⅜	13	4.6	582	0.233	5.06	20.0	17.8	8.93	4.6		
L 64 x 51 x 9.5	L 2½ x 2 x ¾	17	7.9	998	0.389	9.14	19.7	21.3	16.2	11.3		
L 64 x 51 x 7.9	L 2½ x 2 x ⅝	16	6.7	844	0.336	7.78	19.9	20.7	13.8	10.5		
L 64 x 51 x 6.4	L 2½ x 2 x ¼	14	5.4	685	0.278	6.37	20.2	20.2	11.3	9.7		
L 64 x 51 x 4.8	L 2½ x 2 x ⅜	13	4.1	522	0.217	4.89	20.4	19.6	8.72	8.9		
L 51 x 51 x 9.5	L 2 x 2 x ¾	16	7.0	877	0.202	5.82	15.2	16.2	10.4	8.6		
L 51 x 51 x 7.9	L 2 x 2 x ⅝	14	5.8	743	0.175	4.97	15.4	15.6	8.87	7.3		
L 51 x 51 x 6.4	L 2 x 2 x ¼	13	4.7	605	0.146	4.09	15.6	15.1	7.29	6.0		
L 51 x 51 x 4.8	L 2 x 2 x ⅜	11	3.6	461	0.115	3.15	15.8	14.5	5.62	4.5		
L 51 x 51 x 3.2	L 2 x 2 x ¼	10	2.5	312	0.080	2.16	16.0	13.9	3.85	3.1		



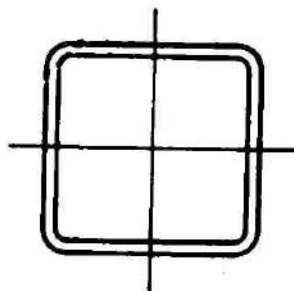
Angulos Americanos de Alas Iguales y Desiguales



Dimensiones de Acuerdo al ASTM - A6

Size and Thickness	Axis Y-Y						Axis Z-Z	
	<i>I</i>	<i>S</i>	<i>r</i>	<i>x</i>	<i>Z</i>	<i>x_p</i>	<i>r</i>	Tan α
mm	10^6 mm^4	10^3 mm^3	mm	mm	10^3 mm^3	mm	mm	
L 76 x 64 x 12.7	0.554	12.4	18.5	19.2	22.1	10.6	13.2	0.667
L 76 x 64 x 9.5	0.443	9.66	18.9	18.1	17.2	8.2	13.3	0.676
L 76 x 64 x 7.9	0.382	8.22	19.1	17.6	14.6	6.9	13.3	0.680
L 76 x 64 x 6.4	0.316	6.73	19.3	17.0	11.9	5.6	13.4	0.684
L 76 x 64 x 4.8	0.246	5.17	19.6	16.4	9.06	4.2	13.5	0.688
L 76 x 51 x 12.7	0.283	7.84	14.0	14.9	14.6	9.6	10.9	0.414
L 76 x 51 x 9.5	0.228	6.12	14.3	13.8	11.2	7.4	10.9	0.428
L 76 x 51 x 7.9	0.198	5.24	14.5	13.2	9.46	6.2	11.0	0.435
L 76 x 51 x 6.4	0.165	4.30	14.7	12.6	7.67	5.0	11.0	0.440
L 76 x 51 x 4.8	0.129	3.31	14.9	12.0	5.85	3.8	11.2	0.446
L 64 x 64 x 12.7	0.524	12.1	19.0	20.6	21.5	11.4	12.4	1.000
L 64 x 64 x 9.5	0.420	9.46	19.4	19.5	16.7	8.8	12.4	1.000
L 64 x 64 x 7.9	0.362	8.06	19.6	18.9	14.2	7.5	12.4	1.000
L 64 x 64 x 6.4	0.300	6.59	19.8	18.3	11.7	6.0	12.5	1.000
L 64 x 64 x 4.8	0.233	5.06	20.0	17.8	8.93	4.6	12.6	1.000
L 64 x 51 x 9.5	0.217	6.01	14.7	14.8	10.8	7.9	10.7	0.614
L 64 x 51 x 7.9	0.188	5.13	14.9	14.2	9.19	6.6	10.7	0.620
L 64 x 51 x 6.4	0.157	4.21	15.1	13.7	7.49	5.4	10.8	0.626
L 64 x 51 x 4.8	0.123	3.25	15.4	13.1	5.74	4.1	10.8	0.631
L 51 x 51 x 9.5	0.202	5.82	15.2	16.2	10.4	8.6	9.88	1.000
L 51 x 51 x 7.9	0.175	4.96	15.3	15.6	8.87	7.3	9.91	1.000
L 51 x 51 x 6.4	0.146	4.07	15.5	15.1	7.29	6.0	9.93	1.000
L 51 x 51 x 4.8	0.115	3.16	15.8	14.5	5.62	4.5	10.0	1.000
L 51 x 51 x 3.2	0.080	2.16	16.0	13.9	3.85	3.1	10.1	1.000





Tuberías Estructurales Cuadradas y Rectangulares

Dimensiones y Propiedades

Dimensiones de Acuerdo al ASTM - A6

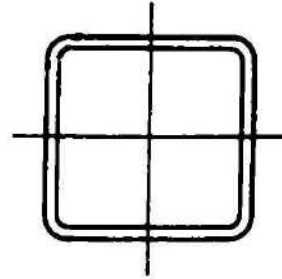
Dimensions				Mass per Meter	Properties**					
Nominal Size*					Area	I	S	r	J	Z
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	10 ³ mm ⁴	10 ³ mm ³
406 x 406 x 15.9	16 x 16 x 5/8	189.5	24 100	604	2 980	158	963 000	3 500		
406 x 406 x 12.7	16 x 16 x 1/2	153.7	19 600	499	2 460	160	786 000	2 860		
406 x 406 x 9.5	16 x 16 x 3/8	116.9	14 900	387	1 910	161	602 000	2 200		
406 x 406 x 7.9	16 x 16 x 5/16	98.0	12 500	327	1 610	162	506 000	1 850		
356 x 356 x 15.9	14 x 14 x 5/8	164.2	20 900	398	2 240	138	639 000	2 650		
356 x 356 x 12.7	14 x 14 x 1/2	133.5	17 000	330	1 850	139	524 000	2 170		
356 x 356 x 9.5	14 x 14 x 3/8	101.7	13 000	257	1 440	141	402 000	1 670		
356 x 356 x 7.9	14 x 14 x 5/16	85.4	10 900	218	1 220	141	339 000	1 410		
305 x 305 x 15.9	12 x 12 x 5/8	138.9	17 700	242	1 590	117	394 000	1 900		
305 x 305 x 12.7	12 x 12 x 1/2	113.2	14 400	202	1 320	118	324 000	1 570		
305 x 305 x 9.5	12 x 12 x 3/8	86.5	11 000	159	1 040	120	250 000	1 210		
305 x 305 x 7.9	12 x 12 x 5/16	72.7	9 260	135	885	121	211 000	1 030		
305 x 305 x 6.4	12 x 12 x 1/4	58.7	7 480	110	721	121	171 000	834		
254 x 254 x 15.9	10 x 10 x 5/8	113.6	14 500	134	1 060	96.1	220 000	1 270		
254 x 254 x 12.7	10 x 10 x 1/2	93.0	11 800	113	890	97.9	183 000	1 060		
254 x 254 x 9.5	10 x 10 x 3/8	71.3	9 080	89.3	703	99.2	142 000	825		
254 x 254 x 7.9	10 x 10 x 5/16	60.0	7 650	76.4	602	99.9	120 000	701		
254 x 254 x 6.4	10 x 10 x 1/4	48.6	6 190	62.7	494	101	97 800	571		
254 x 254 x 4.8	10 x 10 x 3/16	36.8	4 690	48.2	380	101	74 500	436		

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.



Tuberías Estructurales **Cuadradas y Rectangulares** Dimensiones y Propiedades



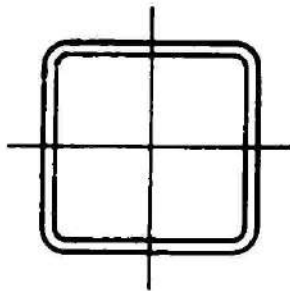
Dimensiones de Acuerdo al ASTM -A6

Dimensions				Mass per Meter	Properties**					
Nominal Size*					Area	I	S	r	J	Z
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	10 ³ mm ⁴	10 ³ mm ³
203 x 203 x 15.9	8 x 8 x 5/8	88.3	11200	63.6	627	75.4	107000	773		
203 x 203 x 12.7	8 x 8 x 1/2	72.7	9260	54.5	537	76.7	89900	650		
203 x 203 x 9.5	8 x 8 x 3/8	56.1	7150	43.8	432	78.3	70600	512		
203 x 203 x 7.9	8 x 8 x 5/16	47.4	6040	37.7	371	79.0	60100	437		
203 x 203 x 6.4	8 x 8 x 1/4	38.4	4900	31.2	307	79.8	49100	358		
203 x 203 x 4.8	8 x 8 x 3/16	29.2	3720	24.2	238	80.7	37600	275		
178 x 178 x 12.7	7 x 7 x 1/2	62.6	7970	35.4	398	66.6	59000	486		
178 x 178 x 9.5	7 x 7 x 3/8	48.5	6180	28.7	322	68.1	46700	386		
178 x 178 x 7.9	7 x 7 x 5/16	41.1	5230	24.8	279	68.9	39900	330		
178 x 178 x 6.4	7 x 7 x 1/4	33.4	4250	20.6	231	69.6	32700	272		
178 x 178 x 4.8	7 x 7 x 3/16	25.4	3240	16.1	181	70.5	25100	209		
152 x 152 x 12.7	6 x 6 x 1/2	52.4	6680	20.8	274	55.8	35300	340		
152 x 152 x 9.5	6 x 6 x 3/8	40.9	5210	17.2	226	57.5	28300	273		
152 x 152 x 7.9	6 x 6 x 5/16	34.7	4420	15.0	197	58.3	24300	235		
152 x 152 x 6.4	6 x 6 x 1/4	28.3	3610	12.5	164	58.8	20000	194		
152 x 152 x 4.8	6 x 6 x 3/16	21.6	2750	9.82	129	59.8	15500	151		
127 x 127 x 12.7	5 x 5 x 1/2	42.3	5390	11.3	178	45.8	19500	225		
127 x 127 x 9.5	5 x 5 x 3/8	33.3	4240	9.47	149	47.3	15900	183		
127 x 127 x 7.9	5 x 5 x 5/16	28.4	3620	8.35	131	48.0	13800	159		
127 x 127 x 6.4	5 x 5 x 1/4	23.2	2960	7.05	111	48.8	11400	132		
127 x 127 x 4.8	5 x 5 x 3/16	17.8	2270	5.58	87.9	49.6	8870	103		

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.





Tuberías Estructurales Cuadradas y Rectangulares

Dimensiones y Propiedades

Dimensiones de Acuerdo al ASTM - A6

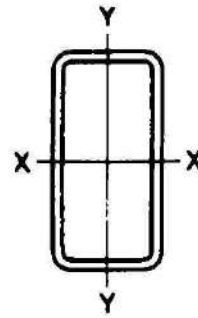
Dimensions				Mass per Meter	Properties**					
Nominal Size*					Area	<i>I</i>	<i>S</i>	<i>r</i>	<i>J</i>	<i>Z</i>
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	mm	10 ³ mm ⁴	10 ³ mm ³
114 x 114 x 6.4	4.5 x 4.5 x 1/4	20.7	2640	4.98	87.4	43.4	8120	105		
114 x 114 x 4.8	4.5 x 4.5 x 3/16	15.9	2030	3.96	69.5	44.2	6340	82		
102 x 102 x 12.7	4 x 4 x 1/2	32.2	4100	5.18	102	35.5	9190	133		
102 x 102 x 9.5	4 x 4 x 3/8	25.7	3270	4.51	88.4	37.1	7740	111		
102 x 102 x 7.9	4 x 4 x 5/16	22.1	2810	4.04	79.2	37.9	6790	97.6		
102 x 102 x 6.4	4 x 4 x 1/4	18.2	2320	3.46	67.8	38.6	5710	82.1		
102 x 102 x 4.8	4 x 4 x 3/16	14.0	1790	2.78	54.5	39.4	4480	64.7		
89 x 89 x 7.9	3.5 x 3.5 x 5/16	18.9	2410	2.55	57.3	32.5	4350	71.5		
89 x 89 x 6.4	3.5 x 3.5 x 1/4	15.6	1990	2.21	49.7	33.3	3690	60.7		
89 x 89 x 4.8	3.5 x 3.5 x 3/16	12.1	1540	1.79	40.2	34.1	2920	48.2		
76 x 76 x 7.9	3 x 3 x 5/16	15.7	2010	1.48	38.9	27.1	2570	49.5		
76 x 76 x 6.4	3 x 3 x 1/4	13.1	1670	1.30	34.2	27.9	2210	42.5		
76 x 76 x 4.8	3 x 3 x 3/16	10.2	1300	1.07	28.2	28.7	1770	34.1		
64 x 64 x 7.9	2.5 x 2.5 x 5/16	15.7	1600	0.801	25.0	22.4	1420	32.7		
64 x 64 x 6.4	2.5 x 2.5 x 1/4	10.6	1350	0.723	22.6	23.1	1250	28.6		
64 x 64 x 4.8	2.5 x 2.5 x 3/16	8.3	1060	0.608	19.0	23.9	1020	23.3		
51 x 51 x 7.9	2 x 2 x 5/16	9.4	1200	0.344	13.5	16.9	628	18.4		
51 x 51 x 6.4	2 x 2 x 1/4	8.1	1030	0.323	12.7	17.7	575	16.6		
51 x 51 x 4.8	2 x 2 x 3/16	6.4	819	0.282	11.1	18.6	484	13.9		

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.



Tuberías Estructurales **Cuadradas y Rectangulares** Dimensiones y Propiedades



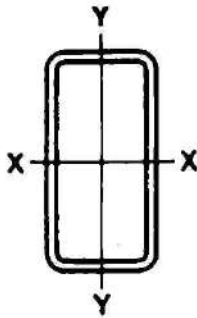
Dimensiones de Acuerdo al ASTM - A6

Dimensions				Mass per Meter	Properties**										
Nominal Size*					Area	X-X Axis				Y-Y Axis				J	
						I_x	S_x	Z_x	r_x	I_y	S_y	Z_y	r_y		
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴	
508 x 305 x 12.7	20 x 12 x 1/2	153.7	19600	687	2700	3290	187	313	2050	2320	126	687000			
508 x 305 x 9.5	20 x 12 x 3/8	116.9	14900	532	2090	2530	189	243	1590	1780	128	527000			
508 x 305 x 7.9	20 x 12 x 5/16	98.0	12500	450	1770	2130	190	206	1350	1510	128	444000			
508 x 203 x 12.7	20 x 8 x 1/2	133.5	17000	528	2080	2650	176	125	1230	1390	85.7	335000			
508 x 203 x 9.5	20 x 8 x 3/8	101.7	13000	411	1620	2040	178	98.2	967	1070	86.9	260000			
508 x 203 x 7.9	20 x 8 x 5/16	85.4	10900	349	1370	1730	179	83.8	826	909	87.7	220000			
508 x 102 x 12.7	20 x 4 x 1/2	113.2	14400	371	1460	2020	161	25.9	508	593	42.4	86200			
508 x 102 x 9.5	20 x 4 x 3/8	86.5	11000	291	1150	1560	163	21.1	414	469	43.8	69400			
508 x 102 x 7.9	20 x 4 x 5/16	72.7	9260	249	980	1330	164	18.3	359	401	44.5	59800			
457 x 152 x 12.7	18 x 6 x 1/2	113.2	14400	340	1490	1950	154	58.5	770	880	63.7	170000			
457 x 152 x 9.5	18 x 6 x 3/8	86.5	11000	266	1160	1510	156	46.7	614	687	65.2	133000			
457 x 152 x 7.9	18 x 6 x 5/16	72.7	9260	227	993	1280	157	40.1	528	584	65.8	114000			
406 x 305 x 12.7	16 x 12 x 1/2	133.5	17000	400	1970	2360	153	257	1690	1940	123	499000			
406 x 305 x 9.5	16 x 12 x 3/8	101.7	13000	311	1530	1820	155	201	1320	1500	124	383000			
406 x 305 x 7.9	16 x 12 x 5/16	85.4	10900	264	1300	1540	156	171	1120	1260	125	323000			
406 x 203 x 12.7	16 x 8 x 1/2	113.2	14400	299	1470	1850	144	101	995	1140	83.7	249000			
406 x 203 x 9.5	16 x 8 x 3/8	86.5	11000	235	1160	1430	146	80.0	788	886	85.3	193000			
406 x 203 x 7.9	16 x 8 x 5/16	72.7	9260	200	985	1210	147	68.4	674	751	85.9	164000			
406 x 102 x 12.7	16 x 4 x 1/2	93.0	11800	200	985	1350	130	20.7	406	478	41.9	66000			
406 x 102 x 9.5	16 x 4 x 3/8	71.3	9080	159	783	1050	132	16.9	331	379	43.1	53200			
406 x 102 x 7.9	16 x 4 x 5/16	60.0	7650	136	670	894	133	14.7	288	325	43.8	45900			
356 x 254 x 12.7	14 x 10 x 1/2	113.2	14400	254	1430	1730	133	151	1190	1370	102	304000			
356 x 254 x 9.5	14 x 10 x 3/8	86.5	11000	199	1120	1340	135	118	929	1060	104	235000			
356 x 254 x 7.9	14 x 10 x 5/16	72.7	9260	169	949	1130	135	101	795	900	104	199000			

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.





Tuberías Estructurales Cuadradas y Rectangulares Dimensiones y Propiedades

Dimensiones de Acuerdo al ASTM - A6

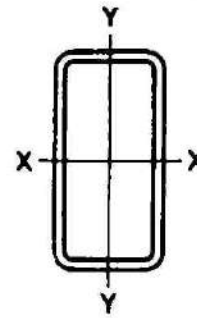
Dimensions			Mass per Meter	Properties**									
Nominal Size*				Area	X-X Axis				Y-Y Axis				J
					I_x	S_x	Z_x	r_x	I_y	S_y	Z_y	r_y	
mm	in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴
356 x 152 x 12.7	14 x 6 x 1/2		93.0	11800	177	994	1280	122	46.0	605	701	62.4	123000
356 x 152 x 9.5	14 x 6 x 3/8		71.3	9080	140	787	1000	124	36.9	486	550	63.7	96700
356 x 152 x 7.9	14 x 6 x 5/16		60.0	7650	120	674	850	125	31.8	418	469	64.5	82400
356 x 152 x 6.4	14 x 6 x 1/4		48.6	6190	98.6	554	693	126	26.3	346	383	65.2	67400
356 x 102 x 12.7	14 x 4 x 1/2		82.8	10600	140	787	1070	115	18.1	355	421	41.3	56200
356 x 102 x 9.5	14 x 4 x 3/8		63.7	8110	112	629	836	118	14.9	292	335	42.9	45300
356 x 102 x 7.9	14 x 4 x 5/16		53.7	6840	96.0	539	712	118	13.0	255	287	43.6	39100
356 x 102 x 6.4	14 x 4 x 1/4		43.5	5540	79.2	445	582	120	10.9	214	236	44.4	32300
305 x 203 x 15.9	12 x 8 x 5/8		113.6	14500	175	1150	1430	110	92.1	907	1080	79.7	200000
305 x 203 x 12.7	12 x 8 x 1/2		93.0	11800	147	964	1190	112	78.0	768	896	81.3	167000
305 x 203 x 9.5	12 x 8 x 3/8		71.3	9080	116	761	926	113	62.0	611	700	82.6	130000
305 x 203 x 7.9	12 x 8 x 5/16		60.0	7650	99.4	652	786	114	53.1	523	595	83.3	110000
305 x 203 x 6.4	12 x 8 x 1/4		48.6	6190	81.5	534	641	115	43.7	431	485	84.0	89700
305 x 203 x 4.8	12 x 8 x 3/16		36.8	4690	62.7	411	489	116	33.7	332	371	84.8	68400
305 x 152 x 15.9	12 x 6 x 5/8		100.9	12900	141	925	1190	105	46.3	609	727	59.9	119000
305 x 152 x 12.7	12 x 6 x 1/2		82.8	10600	119	780	998	106	39.7	522	611	61.2	99900
305 x 152 x 9.5	12 x 6 x 3/8		63.7	8110	95.0	623	782	108	32.0	421	481	62.8	78700
305 x 152 x 7.9	12 x 6 x 5/16		53.7	6840	81.5	534	666	109	27.6	363	410	63.5	67100
305 x 152 x 6.4	12 x 6 x 1/4		43.5	5540	67.1	440	544	110	22.8	300	336	64.2	54900
305 x 152 x 4.8	12 x 6 x 3/16		33.0	4210	51.8	340	416	111	17.7	233	258	64.8	42100
305 x 102 x 15.9	12 x 4 x 5/8		88.3	11200	107	702	965	97.7	17.6	345	425	39.6	53400
305 x 102 x 12.7	12 x 4 x 1/2		72.7	9260	92.3	605	813	99.8	15.5	304	363	40.9	46300
305 x 102 x 9.5	12 x 4 x 3/8		56.1	7150	74.2	487	641	102	12.8	251	290	42.3	37400
305 x 102 x 7.9	12 x 4 x 5/16		47.4	6040	64.0	420	548	103	11.2	220	249	43.1	32300
305 x 102 x 6.4	12 x 4 x 1/4		38.4	4900	52.9	347	449	104	9.37	184	205	43.7	26700
305 x 102 x 4.8	12 x 4 x 3/16		29.2	3720	41.0	269	345	105	7.35	144	159	44.5	20700

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.



Tuberías Estructurales **Cuadradas y Rectangulares** **Dimensiones y Propiedades**



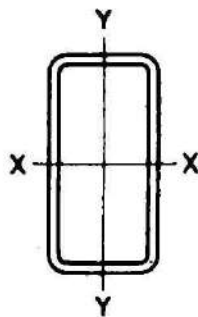
Dimensiones de Acuerdo al ASTM - A6

Dimensions				Mass per Meter	Properties**										J
Nominal Size*					Area	X-X Axis				Y-Y Axis					
						I _x	S _x	Z _x	r _x	I _y	S _y	Z _y	r _y		
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴	
305 x 51 x 6.4	12 x 2 x 1/4	33.4	4250	38.5	252	352	95.2	1.94	76.1	88.6	21.4	6660			
305 x 51 x 4.8	12 x 2 x 3/16	25.4	3240	30.1	197	272	96.4	1.58	62.0	69.8	22.1	5360			
254 x 203 x 12.7	10 x 8 x 1/2	82.8	10600	94.0	740	902	94.2	66.3	653	773	79.1	127000			
254 x 203 x 9.5	10 x 8 x 3/8	63.7	8110	74.7	588	706	96.0	52.9	521	606	80.8	99400			
254 x 203 x 7.9	10 x 8 x 5/16	53.7	6840	64.1	505	601	96.8	45.4	447	516	81.5	84400			
254 x 203 x 6.4	10 x 8 x 1/4	43.5	5540	52.8	416	491	97.6	37.4	368	422	82.2	68800			
254 x 203 x 4.8	10 x 8 x 3/16	33.0	4210	40.7	320	376	98.3	28.9	285	323	82.9	52600			
254 x 152 x 12.7	10 x 6 x 1/2	72.7	9260	75.1	591	746	90.1	33.4	439	521	60.1	77300			
254 x 152 x 9.5	10 x 6 x 3/8	56.1	7150	60.2	474	588	91.8	27.0	355	412	61.5	61100			
254 x 152 x 7.9	10 x 6 x 5/16	47.4	6040	51.8	408	502	92.6	23.4	308	352	62.2	52100			
254 x 152 x 6.4	10 x 6 x 1/4	38.4	4900	42.8	337	411	93.5	19.4	255	289	62.9	42700			
254 x 152 x 4.8	10 x 6 x 3/16	29.2	3720	33.2	261	315	94.5	15.1	199	222	63.7	32800			
254 x 127 x 9.5	10 x 5 x 3/8	52.3	6660	53.1	418	529	89.3	17.8	280	325	51.7	44400			
254 x 127 x 7.9	10 x 5 x 5/16	44.2	5630	45.8	361	453	90.2	15.5	244	279	52.5	38100			
254 x 127 x 6.4	10 x 5 x 1/4	35.9	4570	38.0	299	372	91.2	12.9	203	230	53.1	31300			
254 x 127 x 4.8	10 x 5 x 3/16	27.3	3480	29.5	232	286	92.1	10.1	159	177	53.9	24100			
254 x 102 x 12.7	10 x 4 x 1/2	62.6	7970	56.6	446	593	84.3	12.9	253	305	40.2	36500			
254 x 102 x 9.5	10 x 4 x 3/8	48.5	6180	46.0	362	471	86.3	10.7	210	245	41.6	29500			
254 x 102 x 7.9	10 x 4 x 5/16	41.1	5230	39.8	313	404	87.2	9.39	184	211	42.4	25500			
254 x 102 x 6.4	10 x 4 x 1/4	33.4	4250	33.1	261	332	88.3	7.89	155	174	43.1	21100			
254 x 102 x 4.8	10 x 4 x 3/16	25.4	3240	25.8	203	256	89.2	6.20	122	135	43.7	16400			
254 x 51 x 7.9	10 x 2 x 5/16	34.7	4420	27.6	217	304	79.0	1.86	72.9	87.8	20.5	6240			
254 x 51 x 6.4	10 x 2 x 1/4	28.3	3610	23.2	183	252	80.2	1.62	63.5	74.1	21.2	5390			
254 x 51 x 4.8	10 x 2 x 3/16	21.6	2750	18.2	143	195	81.4	1.32	51.8	58.6	21.9	4340			

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.





Tuberías Estructurales Cuadradas y Rectangulares Dimensiones y Propiedades

Dimensiones de Acuerdo al ASTM - A6

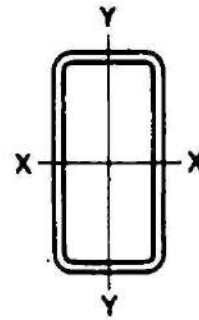
Dimensions			Mass per Meter	Properties**									
Nominal Size*				Area	X-X Axis				Y-Y Axis				J
					I_x	S_x	Z_x	r_x	I_y	S_y	Z_y	r_y	
mm	in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴
203 x 152 x 12.7	8	x 6 x 1/2	62.6	7970	42.8	422	526	73.3	27.1	357	430	58.3	55600
203 x 152 x 9.5	8	x 6 x 3/8	48.5	6180	34.7	342	418	74.9	22.1	291	342	59.8	44200
203 x 152 x 7.9	8	x 6 x 5/16	41.1	5230	30.0	296	358	75.7	19.2	253	294	60.6	37800
203 x 152 x 6.4	8	x 6 x 1/4	33.4	4250	24.9	245	294	76.5	16.0	211	242	61.4	31000
203 x 152 x 4.8	8	x 6 x 3/16	25.4	3240	19.4	191	227	77.4	12.4	163	186	61.9	23800
203 x 102 x 12.7	8	x 4 x 1/2	52.4	6680	31.3	308	406	68.5	10.3	202	247	39.3	26900
203 x 102 x 9.5	8	x 4 x 3/8	40.9	5210	25.8	254	326	70.4	8.64	169	200	40.7	21800
203 x 102 x 7.9	8	x 4 x 5/16	34.7	4420	22.5	222	281	71.3	7.59	149	173	41.4	18900
203 x 102 x 6.4	8	x 4 x 1/4	28.3	3610	18.8	185	232	72.2	6.40	125	143	42.1	15700
203 x 102 x 4.8	8	x 4 x 3/16	21.6	2750	14.7	145	180	73.1	5.06	99.2	111	42.9	12200
203 x 76 x 12.7	8	x 3 x 1/2	47.4	6040	25.3	249	343	64.7	4.99	131	165	28.7	14700
203 x 76 x 9.5	8	x 3 x 3/8	37.1	4730	21.1	208	278	66.8	4.29	113	136	30.1	12400
203 x 76 x 7.9	8	x 3 x 5/16	31.6	4020	18.5	182	240	67.8	3.82	101	118	30.8	10900
203 x 76 x 6.4	8	x 3 x 1/4	25.8	3280	15.6	154	199	69.0	3.26	85.8	98.7	31.5	9130
203 x 76 x 4.8	8	x 3 x 3/16	19.7	2510	12.3	121	155	70.0	2.61	68.7	77.2	32.2	7170
203 x 51 x 9.5	8	x 2 x 3/8	33.3	4240	16.7	165	232	62.8	1.61	63.1	79.5	19.5	5270
203 x 51 x 7.9	8	x 2 x 5/16	28.4	3620	14.8	146	202	63.9	1.48	58.0	70.4	20.2	4770
203 x 51 x 6.4	8	x 2 x 1/4	23.2	2960	12.5	123	168	65.0	1.29	50.6	59.7	20.9	4130
203 x 51 x 4.8	8	x 2 x 3/16	17.8	2270	9.93	97.8	131	66.1	1.06	41.6	47.4	21.6	3330
178 x 127 x 12.7	7	x 5 x 1/2	52.4	6680	26.5	298	379	63.0	15.5	244	299	48.2	33300
178 x 127 x 9.5	7	x 5 x 3/8	40.9	5210	21.8	245	304	64.7	12.8	202	240	49.6	26800
178 x 127 x 7.9	7	x 5 x 5/16	34.7	4420	19.0	213	262	65.6	11.2	176	207	50.3	23100
178 x 127 x 6.4	7	x 5 x 1/4	28.3	3610	15.9	179	216	66.4	9.41	148	171	51.1	19000
178 x 127 x 4.8	7	x 5 x 3/16	21.6	2750	12.4	139	167	67.1	7.39	116	133	51.8	14700

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.



Tuberías Estructurales **Cuadradas y Rectangulares** **Dimensiones y Propiedades**



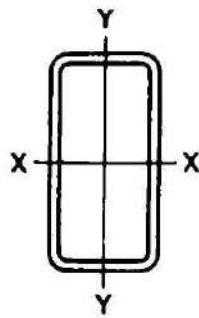
Dimensiones de Acuerdo al ASTM - A6

Dimensions				Mass per Meter	Properties**									
Nominal Size*					Area	X-X Axis				Y-Y Axis				J
						I_x	S_x	Z_x	r_x	I_y	S_y	Z_y	r_y	
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴
178 x 102 x 9.5	7 x 4 x 3/8	37.1	4730	18.4	207	264	62.4	7.62	149	178	40.1	18200		
178 x 102 x 7.9	7 x 4 x 5/16	31.6	4020	16.1	181	228	63.3	6.71	132	154	40.9	15800		
178 x 102 x 6.4	7 x 4 x 1/4	25.8	3280	13.5	152	189	64.2	5.67	111	128	41.6	13100		
178 x 102 x 4.8	7 x 4 x 3/16	19.7	2510	10.6	119	147	65.0	4.49	88.0	99.9	42.3	10200		
178 x 76 x 9.5	7 x 3 x 3/8	33.3	4240	14.9	167	222	59.3	3.76	98.9	120	29.8	10400		
178 x 76 x 7.9	7 x 3 x 5/16	28.4	3620	13.1	147	193	60.2	3.36	88.4	105	30.5	9140		
178 x 76 x 6.4	7 x 3 x 1/4	23.2	2960	11.1	125	160	61.2	2.88	75.8	87.6	31.2	7690		
178 x 76 x 4.8	7 x 3 x 3/16	17.8	2270	8.78	98.7	125	62.2	2.31	60.8	68.7	31.9	6040		
152 x 102 x 12.7	6 x 4 x 1/2	42.3	5390	14.7	193	252	52.2	7.72	151	189	37.8	17600		
152 x 102 x 9.5	6 x 4 x 3/8	33.3	4240	12.3	162	205	53.9	6.55	128	155	39.3	14500		
152 x 102 x 7.9	6 x 4 x 5/16	28.4	3620	10.8	142	178	54.6	5.80	114	135	40.0	12600		
152 x 102 x 6.4	6 x 4 x 1/4	23.2	2960	9.15	120	148	55.6	4.92	96.5	112	40.8	10500		
152 x 102 x 4.8	6 x 4 x 3/16	17.8	2270	7.23	95.1	115	56.4	3.91	76.7	87.8	41.5	8140		
152 x 76 x 9.5	6 x 3 x 3/8	29.5	3760	9.80	129	170	51.1	3.21	84.5	103	29.2	8370		
152 x 76 x 7.9	6 x 3 x 5/16	25.2	3210	8.70	114	148	52.1	2.88	75.8	90.5	30.0	7370		
152 x 76 x 6.4	6 x 3 x 1/4	20.7	2640	7.40	97.4	124	52.9	2.48	65.3	76.1	30.6	6210		
152 x 76 x 4.8	6 x 3 x 3/16	15.9	2030	5.89	77.5	97.2	53.9	1.99	52.4	59.9	31.3	4890		
152 x 51 x 9.5	6 x 2 x 3/8	25.7	3270	7.38	97.1	136	47.5	1.19	46.7	59.4	19.1	3650		
152 x 51 x 7.9	6 x 2 x 5/16	22.1	2810	6.64	87.4	120	48.6	1.10	43.1	53.0	19.8	3320		
152 x 51 x 6.4	6 x 2 x 1/4	18.2	2320	5.72	75.3	101	49.7	0.967	37.9	45.2	20.4	2880		
152 x 51 x 4.8	6 x 2 x 3/16	14.0	1790	4.60	60.5	79.7	50.7	0.798	31.3	36.1	21.1	2330		

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.





Tuberías Estructurales **Cuadradas y Rectangulares** **Dimensiones y Propiedades**

Dimensiones de Acuerdo al ASTM - A6

Dimensions						Mass per Meter	Properties**									
Nominal Size*							Area	X-X Axis				Y-Y Axis				J
								I_x	S_x	Z_x	r_x	I_y	S_y	Z_y	r_y	
mm		in.		kg	mm ²	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ⁶ mm ⁴	10 ³ mm ³	10 ³ mm ³	mm	10 ³ mm ⁴		
127 x 102 x 9.5	5 x 4 x 3/8	29.5	3760	7.83	123	155	45.6	5.53	108	133	38.4	11 000				
127 x 102 x 7.9	5 x 4 x 5/16	25.2	3210	6.94	109	135	46.5	4.92	96.5	116	39.1	9 600				
127 x 102 x 6.4	5 x 4 x 1/4	20.7	2640	5.90	92.9	113	47.3	4.19	82.2	97.3	39.8	8 020				
127 x 102 x 4.8	5 x 4 x 3/16	15.9	2030	4.69	73.9	88.6	48.1	3.34	65.5	76.2	40.6	6 260				
127 x 76 x 12.7	5 x 3 x 1/2	32.2	4 100	7.01	110	150	41.3	3.03	79.7	104	27.2	7 550				
127 x 76 x 9.5	5 x 3 x 3/8	25.7	3 270	6.12	96.4	126	43.3	2.68	70.5	87.4	28.6	6 470				
127 x 76 x 7.9	5 x 3 x 5/16	22.1	2 810	5.47	86.1	111	44.1	2.42	63.7	77.0	29.3	5 720				
127 x 76 x 6.4	5 x 3 x 1/4	18.2	2 320	4.69	73.9	93.2	45.0	2.09	55.0	65.1	30.0	4 830				
127 x 76 x 4.8	5 x 3 x 3/16	14.0	1 790	3.76	59.2	73.4	45.8	1.69	44.5	51.4	30.7	3 820				
127 x 51 x 7.9	5 x 2 x 5/16	18.9	2 410	4.07	64.1	87.1	41.1	0.910	35.7	44.4	19.4	2 620				
127 x 51 x 6.4	5 x 2 x 1/4	15.6	1 990	3.54	55.7	74.1	42.2	0.808	31.7	38.1	20.2	2 280				
127 x 51 x 4.8	5 x 2 x 3/16	12.1	1 540	2.87	45.2	58.9	43.2	0.670	26.3	30.6	20.9	1 850				
102 x 76 x 7.9	4 x 3 x 5/16	18.9	2 410	3.12	61.2	78.1	36.0	1.96	51.6	63.5	28.5	4 120				
102 x 76 x 6.4	4 x 3 x 1/4	15.6	1 990	2.71	53.1	66.3	36.9	1.70	44.7	54.0	29.2	3 500				
102 x 76 x 4.8	4 x 3 x 3/16	12.1	1 540	2.19	42.9	52.6	37.7	1.39	36.6	43.0	30.0	2 780				
102 x 51 x 7.9	4 x 2 x 5/16	15.7	2 010	2.24	43.9	59.5	33.4	0.724	28.4	35.9	19.0	1 930				
102 x 51 x 6.4	4 x 2 x 1/4	13.1	1 670	1.98	38.8	51.1	34.4	0.648	25.4	31.1	19.7	1 690				
102 x 51 x 4.8	4 x 2 x 3/16	10.2	1 300	1.63	32.0	41.1	35.4	0.542	21.3	25.1	20.4	1 370				
76 x 51 x 6.4	3 x 2 x 1/4	10.6	1 350	0.916	24.1	31.5	26.0	0.483	18.9	23.7	18.9	1 100				
76 x 51 x 4.8	3 x 2 x 3/16	8.3	1 060	0.770	20.3	25.7	27.0	0.410	16.1	19.4	19.7	904				

*Outside dimensions across flat sides.

**Properties are based upon a nominal outside corner radius equal to two times the wall thickness.

TOLERANCIAS LAMINA EN FRIO NORMA JAPONESA

4. (JIS G 3141)

The cold-rolled sheets and strip produced under Kawasaki and JIS specifications are subject to dimensional and shape tolerances as prescribed below.

Thickness Tolerances A, mm

Specified Thickness, mm	Specified Width, mm				
	Under 630	630 to 1,000, excl.	1,000 to 1,250, excl.	1,250 to 1,600, excl.	1,600 and over
Under 0.25	±0.03	±0.03	±0.03	—	—
0.25 to 0.60, excl.	±0.04	±0.04	±0.04	—	—
0.40 to 0.60, excl.	±0.05	±0.05	±0.05	±0.06	—
0.60 to 0.80, excl.	±0.06	±0.06	±0.06	±0.07	±0.08
0.80 to 1.00, excl.	±0.07	±0.07	±0.08	±0.09	±0.10
1.00 to 1.25, excl.	±0.08	±0.08	±0.09	±0.10	±0.12
1.25 to 1.60, excl.	±0.09	±0.10	±0.11	±0.12	±0.14
1.60 to 2.00, excl.	±0.10	±0.11	±0.12	±0.14	±0.16
2.00 to 2.50, excl.	±0.12	±0.13	±0.14	±0.16	±0.18
2.50 to 3.15, excl.	±0.14	±0.15	±0.16	±0.18	±0.20
3.15 and over	±0.16	±0.17	±0.19	±0.20	—

TOLERANCIAS LAMINAS EN FRIO NORMA D.I.N. 1541

Table 2. Preferred nominal thicknesses and permissible variations on thickness

Preferred nominal thickness 1)	Permissible thickness variations 1), 2), 3)					
	Normal variations on a nominal width			Close variations (F) on a nominal width		
	< 1200	≥ 1200 < 1500	≥ 1500 ≤ 2000	< 1200	≥ 1200 < 1500	≥ 1500 ≤ 2000
0,35	+ 0.04	--	--	+ 0.03	--	--
0,40	+ 0.04	--	--	+ 0.03	--	--
0,50	+ 0.05	+ 0.06	--	+ 0.04	+ 0.05	--
0,60	+ 0.05	+ 0.06	--	+ 0.04	+ 0.05	--
0,70	+ 0.06	+ 0.07	+ 0.07	+ 0.05	+ 0.06	+ 0.06
0,80	+ 0.06	+ 0.07	+ 0.08	+ 0.05	+ 0.06	+ 0.06
0,90	+ 0.07	+ 0.08	+ 0.08	+ 0.06	+ 0.07	+ 0.07
1,00	+ 0.07	+ 0.08	+ 0.09	+ 0.06	+ 0.07	+ 0.07
1,20	+ 0.08	+ 0.09	+ 0.10	+ 0.07	+ 0.08	+ 0.08
1,50	+ 0.10	+ 0.11	+ 0.11	+ 0.08	+ 0.09	+ 0.09
2,00	+ 0.12	+ 0.13	+ 0.13	+ 0.09	+ 0.10	+ 0.10
2,50	+ 0.14	+ 0.15	+ 0.15	+ 0.11	+ 0.12	+ 0.12
3,00	+ 0.16	+ 0.17	+ 0.17	+ 0.13	+ 0.14	+ 0.14

- 1) For intermediate thicknesses, the permissible variations given in the Table for the next higher value of nominal thickness apply (see Section 6.1.1).
- 2) For flat products of general structural steels, higher values are permitted for variations on thickness (see Section 6.1.2).
- 3) Special provisions apply to the ends of strip and in the range of welds (see Sections 6.1.2.1 and 6.1.2.2).



**Tabla Comparativa de las Normas Japonesas (JIS),
Americanas (ASTM), Británica (BS), Alemanas (DIN)
para Láminas en Frío**

1. Chemical Composition and Mechanical Properties

Specification			Kawasaki Designation (JIS G 3141**)				ASTM		
Classification			SPCC Commercial Quality	SPCD Drawing Quality	SPCE Deep Drawing Quality	SPCEN Non-aging, Deep Drawing Quality	A 366*1 Commercial Quality	A 619 Drawing Quality	A 620 Drawing Quality, Special Killed
Chemical Compo- sition, %	C, max.		(0.12)	(0.10)	(0.08)	(0.08)	0.15	0.10	0.10
	Si		—	—	—	—	—	—	—
	Mn		(0.5 max.)	(0.45 max.)	(0.40 max.)	(0.40 max.)	0.25~0.60	0.50 max.	0.50 max.
	P, max.		(0.040)	(0.035)	(0.030)	(0.030)	0.035	0.025	0.025
	S, max.		(0.045)	(0.035)	(0.030)	(0.030)	0.040	0.035	0.035
Tensile Test	Tensile Strenth	kg/mm ² psi	(28 min.) (40,000 min.)	28 min. 40,000 min.	28 min. 40,000 min.	28 min. 40,000 min.	—	—	—
	Yield Point,max.	kg/mm ² psi	—	—	—	—	—	—	—
	Elongation, %, min. GL=50mm (2 in.) (JIS No. 5 specimens)	Over 0.25 to 0.40, incl.*12	(32)	34	36	36	—	—	—
		Over 0.40 to 0.60, incl.*12	(34)	36	38	38	—	—	—
		Over 0.60 to 1.0, incl.*12	(36)	38	40	40	—	—	—
		Over 1.0 to 1.6, incl.*12	(37)	39	41	41	—	—	—
		Over 1.6 to 2.5, incl.*12	(38)	40	42	42	—	—	—
		Over 2.5*12	(39)	41	43	43	—	—	—
Cupping Test		See Table on page 7-10.				—			
Bond Test	Mandrel diameter for bending test	Flat on itself				Flat on itself			

*1 0.2 % minimum copper, when copper steel is specified.

*2 Tensile tests will only be carried out if specially agreed.

*3 No tensile properties are specified but for design purposes the tensile strength may be taken as 19.0 ton/in.² (30 kg/mm²) minimum.

*4 For material thinner than 0.024 in. (0.61 mm) elongation values are not applicable.

*5 GL means gauge length.

*6 Values in parentheses are for reference only.



**Tabla Comparativa de las Normas Japonesas (JIS),
Americanas (ASTM), Británica (BS), Alemanas (DIN)
para Láminas en Frío**

BS 1449 Part 1 B				DIN 1623 Sheet 1			
CR 1 Extra Deep Drawing Quality (Non-aging)	CR 2 Extra Deep Drawing Quality	CR 3 * ⁷ Deep Drawing Quality	CR 4 * ⁸ Drawing Quality	St 10 Ordinary Quality	St 12 Drawing Quality	St 13 Deep Drawing Quality	St 14 Extra Deep Drawing Quality
0.075	0.08	0.10	0.12	0.15	0.10	0.10	0.10
—	—	—	—	—	trace	trace* ⁹	trace* ⁹
0.45 max.	0.45 max.	0.50 max.	0.50 max.	0.25~0.50	0.20~0.45	0.20~0.45	0.20~0.45
0.025	0.030	0.040	0.040	0.080	0.050	0.040	0.030
0.030	0.035	0.040	0.050	0.060	0.050* ⁷	0.040	0.035
28.3~34.6 40,300~49,200	28.3~34.6 40,300~49,200	28.3~34.6 40,300~49,200	— —	28~50	28~42	28~40	28~38
—	—	—	—	—	—	27	24
* ⁴	* ⁴	—	—	—	—	—	—
29	26	—	—	—	24	27	30
(GL=8 in. (200 mm))* ¹⁰	(GL=8 in. (200 mm))* ¹⁰	—	—	—	(GL=80 mm)* ¹⁰	(GL=80 mm)* ¹⁰	(GL=80 mm)* ¹⁰
38	35	—	—	—	—	—	—
(GL=2 in. (50 mm))* ¹⁰	(GL=2 in. (50 mm))* ¹⁰	—	—	—	—	—	—
—	—	—	—	—	—	—	—
See Figure on page C-10.				See Figure on page C-10.			
Flat on itself				t* ¹¹	—	—	—

*⁷ Plus a maximum of 0.008 % N for air-refined special analysis steel.

*⁸ The killed steel shall be produced with a silicon range of 0.03 to 0.15 %. But the lower limit applies when other deoxidizing elements are used in addition to silicon.

*⁹ The special killed steel shall be produced with a silicon content up to and including 0.10 %, but plus at least 0.02 % metallic aluminium unless other deoxidizing agents agreed to at the time of ordering are used.

*¹⁰ GL means gauge length.

*¹¹ t is thickness of material.

*¹² Thicknesses in mm.



ACEROS

II

Tabla de Características Técnicas del Acero Inoxidable		SERIE 300-AUSTENITICO						Cromo
		Acero al Cromo Níquel					Acero al	
DESIGNACION	TIPO A.I.S.I.	301	302	304	304 L	321	316	316 S
	COMPOSICION QUIMICA	C% 0,15 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 16,00-18,00 Ni% 8,00-10,00	C% 0,15 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 17,00-19,00 Ni% 8,00-10,00	C% 0,08 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 18,00-20,00 Ni% 8,00-10,50	C% 0,030 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 18,00-20,00 Ni% 8,00-12,00	C% 0,08 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 17,00-19,00 Ni% 9,00-12,00 Ti% 5x C% ≤ 0,7	C% 0,08 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 16,00-18,00 Ni% 10,00-14,00 Mo% 2,00-2,50	C% 0,08 Máx. Mn% 2,00 Máx. Si% 1,00 Máx. Cr% 16,00-18,00 Ni% 12,00-14,00 Mo% 2,50-3,00
PRIORIDADES FISICAS	PESO ESPECIFICO (g/cm ³)	7,9	7,9	7,9	7,9	7,9	7,95	7,95
	MODULO DE ELASTICIDAD (N/mm ²)	193.000	193.000	193.000	193.000	193.000	193.000	193.000
	ESTRUCTURA	AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO
	COLOR ESPECIFICO A 20°C (ΔK/g%)	500	500	500	500	500	500	500
	CONDUCTIBILIDAD TERMICA (W/m°C)	a 100°C: 16 a 500°C: 21	16 21	16 21	16 21	16 21,5	16 21	16 21
	COEFICIENTE DE DILATACION TERMICO MEDIO (x10 ⁻⁶ °C ⁻¹)	0-100°C: 16,92 0-300°C: 17,10 0-500°C: 18,18 0-700°C: 18,72	17,28 17,82 18,36 18,72	17,30 17,80 18,40 18,80	17,30 17,80 18,40 18,80	16,74 17,10 18,54 19,26	16,02 16,20 17,46 18,54	16,02 16,20 17,46 18,54
	INTERVALO DE FUSION (°C)	1398-1420	1398-1420	1398-1454	1398-1454	1398-1427	1371-1398	1371-1398
PRIORIDADES ELECTRICAS	PERMEABILIDAD TERMICA EN ESTADO SOLUBLE RECOCIDO	AMAGNETICO 1,02	AMAGNETICO 1,008	AMAGNETICO 1,008	AMAGNETICO 1,008	AMAGNETICO 1,008	AMAGNETICO 1,008	AMAGNETICO 1,008
	CAPACIDAD DE RESISTENCIA ELECTRICA A 20°C (μΩ/m)	0,72	0,72	0,72	0,72	0,72	0,74	0,74
PRIORIDADES MECANICAS A 20° C	DUREZA BRINELL RECOCIDO HB CON DEFORMACION EN FRIJO HB	135-185 210-330	135-185 180-330	130-150 180-330	125-145 -	130-185 -	130-185 -	130-185 -
	DUREZA ROCKWELL RECOCIDO HRB CON DEFORMACION EN FRIJO HRC	75-92 25-41 1/4 DURO-DURO	70-90 10-35 -	70-88 10-35 -	70-85 -	70-88 -	70-85 -	70-85 -
	RESISTENCIA A LA TRACCION CON DEFORMACION EN FRIJO Rm (N/mm ²)	590-750 870-1200 1/4 DURO-DURO	560-720 680-1180 -	500-700 700-1180 -	500-680 -	520-700 -	540-690 -	540-690 -
	ELASTICIDAD CON DEFORMACION EN FRIJO Rp (σ 2) (N/mm ²)	215-340 500-900 1/4 DURO-DURO	205-340 340-900 -	195-340 340-900 -	175-300 -	205-340 -	205-410 -	205-410 -
	RECOCIDO Rp (1) (N/mm ²) Mínimo	225	245	235	215	245	245	245
	ALARGAMIENTO 50 mm A(%)	65-55 25-8 1/4 DURO-DURO	60-50 50-10 -	65-50 50-10 -	65-50 -	60-40 -	60-40 -	60-40 -
	ESTRICCION REDUCIDO Z(%)	70-60	75-55	75-60	75-60	65-50	75-60	75-60
	RESILIENCIA KGUL (J/cm ²) KVL (J/cm ²)	130 140	160 180	160 180	160 180	120 130	160 180	160 180
PRIORIDADES MECANICAS EN CALIENTE	ELASTICIDAD DIFERENTES TEMPERATURAS	Rp (0,2) (N/mm ²)	-	-	125	115	150	140
		a 300°C	-	-	97	98	135	125
		a 400°C	-	-	93	98	120	105
		a 500°C	-	-	-	-	-	-
TRATAMIENTOS TERMICOS	TEMPLE	Rp (1) (N/mm ²)	-	-	147	137	186	166
		a 300°C	-	-	127	117	161	147
		a 400°C	-	-	107	106	152	127
		a 500°C	-	-	-	-	-	-
OTRAS PROPIEDADES	LIMITE DE FLUENCIA	a 500°C	-	-	68	58,5	102	82
		a 600°C	-	-	42	36	64	62
		a 700°C	-	-	14,5	10,5	16,5	20
		a 800°C	-	-	4,9	3,9	5,8	6,5
OTRAS PROPIEDADES	RECOCIDO COMPLETO RECOCIDO INDUSTRIAL (°C) (°)	ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 953-1120	ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 1008-1120
		NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE
		INTERVALO DE FORJA TEMPER. INICIAL TEMPER. FINAL	1200 925	1200 925	1200 925	1175 925	1200 925	1200 925
		TEMPERATURA FORMA CON CASCARILLA SERVICIO CONTINUO SERVICIO INTERMITENTE	900 810	900 810	925 840	925 840	900 810	925 840
OTRAS PROPIEDADES	SOLDABILIDAD	MUY BUENA	MUY BUENA	MUY BUENA	MUY BUENA	BUENA	MUY BUENA	MUY BUEN
		MAQUINABILIDAD COMPARADO CON UN ACERO BESSEMER PARA A B 1112	45%	45%	45%	45%	36%	45%
		EMBUCCION	BUENA	BUENA	MUY BUENA	MUY BUENA	BUENA	BUENA



S

INOXIDABLES

Cero al

316

C% 0,08 Máx.
Mn% 2,00 Máx.
P% 1,00 Máx.
S% 16,00-18,00
Si% 12,00-14,00
Ti% 2,00-2,50

7,95

193.000

AUSTENITICO

500

16

21

16,02
16,20
17,46
18,54

371-1398

AMAGNETICO
1,008

0,74

130-185

70-85

540-690

205-410

245

60-40

75-60

160

180

140
125
105

166

147

127

82

62

20

6,5

R. RAPIDO

1008-1120

COGE TEMPLE

1200

925

925

840

Y BUENA

45%

BUENA

SERIE 300-AUSTENITICO

Cromo - Niquel - Molibdeno

316 S

316 L

316 Ti

C% 0,08 Máx.
Mn% 2,00 Máx.
P% 1,00 Máx.
S% 16,00-18,00
Si% 12,00-14,00
Ti% 2,50-3,00

7,95

193.000

AUSTENITICO

500

16

21

16,02
16,20
17,46
18,54

1371-1398

AMAGNETICO
1,008

0,74

130-185

70-85

540-690

205-410

245

60-40

75-60

160

180

140
125
105

166

147

127

82

62

20

6,5

ENFR. RAPIDO

1008-1120

NO COGE TEMPLE

1200

925

925

840

MUY BUENA

45%

BUENA

Acero refractario

309

310

310 S

C% 0,20 Máx.
Mn% 2,00 Máx.
P% 1,00 Máx.
S% 22,00-24,00
Si% 12,00-15,00

7,9

200.000

AUSTENITICO

500

12,5

17,5

14,9
16,7
17,3
18,-

1398-1454

AMAGNETICO
1,008

0,78

140-185

70-85

540-690

215-370

265

65-40

70-50

160

180

160
150
145

-

-

-

-

49

13,6

4,9

ENFR. RAPIDO

1036-1120

NO COGE TEMPLE

1175

960

1090

1000

BUENA

45%

BUENA

C% 0,25 Máx.
Mn% 2,00 Máx.
P% 1,50 Máx.
S% 24,00-26,00
Si% 19,00-22,00

7,9

200.000

AUSTENITICO

500

12,5

17,5

15,9
16,2
16,9
17,5

1398-1454

AMAGNETICO
1,008

0,79

145-210

70-85

540-690

215-370

265

55-40

70-50

160

180

156
147
137

-

-

181

171

137

70,8

30

15,5

ENFR. RAPIDO

1036-1149

NO COGE TEMPLE

1175

980

1120

1035

BUENA

45%

BUENA

C% 0,08 Máx.
Mn% 2,00 Máx.
P% 1,50 Máx.
S% 24,00-26,00
Si% 19,00-22,00

7,9

200.000

AUSTENITICO

500

12,5

17,5

15,2
16,6
17,0
18,5

1398-1454

AMAGNETICO
1,008

0,79

145-210

70-85

520-670

205-370

255

60-40

70-55

160

180

165
156
147

-

-

-

-

58,5

19,5

5

ENFR. RAPIDO

1036-1149

NO COGE TEMPLE

1175

980

1120

1030

BUENA

45%

BUENA

SERIE 400 FERRITICO

Acero al Cromo

409

420

430

434

C% 0,08 Máx.
Mn% 1,00 Máx.
P% 1,00 Máx.
S% 10,5-11,75
Ti% 0,75

7,7

200.000

FERRITICO

460

-

-

11,7
-
-
13

1427-1510

FERROMAGNETICO

0,59

120-150

65-80

360-420

205-330

235

30-25

-

95

95

-
-
-

-

-

-

-

-

-

-

ENFR. AL AIRE

885

NO COGE TEMPLE

1150

750

800

850

BUENA UNION FRAGIL

50%

BASTANTE BUENA

C% 0,15 Máx.
Mn% 1,00 Máx.
P% 1,00 Máx.
S% 10,5-11,75
Ti% 0,75

7,75

200.000

MARTENSITICO

480

28

-

10,2
10,8
11,7
12,2

1454-1510

FERROMAGNETICO

0,55

120-150

23

360-420

205-330

235

30-25

60-55

80-70

60-10

-
-
-

-

-

-

-

-

-

-

ENFR. LENTO

843-899

NO COGE TEMPLE

1150

750

648

809

BUENA UNION FRAGIL

45%

MEDIOCRE

C% 0,10 Máx.
Mn% 1,00 Máx.
P% 1,00 Máx.
S% 16,00-18,00

7,7

200.000

FERRITICO

460

26

27

10,4
11,-
11,4
11,9

1427-1510

FERROMAGNETICO

0,60

135-180

75-88

440-580

250-400

275

30-22

70-60

50

65

245
215
155

-

-

-

-

-

-

-

ENFR. AL AIRE

750-815

NO COGE TEMPLE

1060

850

840

890

BUENA UNION FRAGIL

55%

BASTANTE BUENA

C% 0,12 Máx.
Mn% 1,00 Máx.
P% 1,00 Máx.
S% 16,00-18,00
Mo% 0,75-1,25

7,7

200.000

FERRITICO

460

28

-

10,-
10,5
11,-
11,9

1427-1510

FERROMAGNETICO

INOXIDABLES

SERIE 300-AUSTENITICO						SERIE 400 FERRITICO			
Cromo - Niquel - Molibdeno			Acero refractario			Acero al Cromo			
316 S	316 L	316 Ti	309	310	310 S	409	420	430	434
C% 0,08 Máx. Mn% 2,00 Máx. S% 1,00 Máx. P% 16,00-18,00 N% 12,00-14,00 Mo% 2,50-3,00	C% 0,08 Máx. Mn% 2,00 Máx. S% 1,00 Máx. Cr% 16,00-18,00 Ni% 10,00-14,00 Mo% 2,00-2,50	C% 0,08 Máx. Mn% 2,00 Máx. S% 1,00 Máx. Cr% 16,00-18,50 Ni% 10,00-14,00 Mo% 2,00-2,50 Ti% 5xCr%≤0,80	C% 0,20 Máx. Mn% 2,00 Máx. S% 1,00 Máx. Cr% 22,00-24,00 Ni% 12,00-15,00	C% 0,25 Máx. Mn% 2,00 Máx. S% 1,50 Máx. Cr% 24,00-26,00 Ni% 19,00-22,00	C% 0,08 Máx. Mn% 2,00 Máx. S% 1,50 Máx. Cr% 24,00-26,00 Ni% 19,00-22,00	C% 0,08 Máx. Mn% 1,00 Máx. S% 1,00 Máx. Cr% 10,5-11,75 Ti% 6xCr%≤0,75	C% 0,15 Máx. Mn% 1,00 Máx. S% 1,00 Máx. Cr% 12-14	C% 0,10 Máx. Mn% 1,00 Máx. S% 1,00 Máx. Cr% 16,00-18,00	C% 0,12 Máx. Mn% 1,00 Máx. S% 1,00 Máx. Cr% 16,00-18,00 Mo% 0,75-1,25
7,95	7,95	7,95	7,9	7,9	7,9	7,7	7,75	7,7	7,7
193.000	193.000	193.000	200.000	200.000	200.000	200.000	200.000	200.000	200.000
AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO	AUSTENITICO	FERRITICO	MARTENSITICO	FERRITICO	FERRITICO
500	500	500	500	500	500	460	460	460	460
16 21	16 21	16 21	12,5 17,5	12,5 17,5	12,5 17,5	-	28	28	28
16,02 16,20 17,46 18,54	16,02 16,20 17,46 18,54	16,50 18,00 19,00	14,9 16,7 17,3 18,-	15,9 16,2 16,9 17,5	15,2 16,6 17,0 18,5	11,7 - - 13	10,2 10,8 11,7 12,2	10,4 11,- 11,4 11,9	10,- 10,5 11,- 11,9
1371-1398	1371-1398	1370	1398-1454	1398-1454	1398-1454	1427-1510	1454-1510	1427-1510	1427-1510
AMAGNETICO 1,008	AMAGNETICO 1,008	AMAGNETICO 1,02	AMAGNETICO 1,008	AMAGNETICO 1,008	AMAGNETICO 1,008	FERROMAGNETICO	FERROMAGNETICO	FERROMAGNETICO	FERROMAGNETICO
0,74	0,74	0,75	0,78	0,79	0,79	0,59	0,55	0,60	0,60
130-185	120-170	130-190	140-185	145-210	145-210	120-150	180-190 520-225 CON TRATAMIENTO TERMICO	135-180 180-230	130-180
70-85	70-85	70-85	70-85	70-85	70-85	65-80	23	75-88	75-80
540-690	520-670	540-690	540-690	540-690	520-670	360-420	67 84-154 CON TRATAMIENTO TERMICO	440-590 610-900	490-685
205-410	195-370	215-380	215-370	215-370	205-370	205-330	205-330	250-400 400-860	275-420
245	235	255	265	265	255	235	235	275	290
60-40	60-40	60-40	65-40	55-40	60-40	30-25	30-25	30-22 20-2	30-20
75-60	75-65	75-60	70-50	70-50	70-55	-	60-55	70-60	70-60
160 180	150 180	120 130	160 180	160 180	160 180	95 95	80-70 60-10	50 65	50 65
140 125 105	138 115 95	145 135 125	160 150 145	156 147 137	165 156 147	- - -	- - -	245 215 155	280 228 164
166 147 127	161 137 117	176 166 156	- - -	- - -	181 171 137	- - -	- - -	- - -	- - -
82 62 20 6,5	71 53 15,5 5	82 62 20 6,5	- 49 13,6 4,9	70,6 30 15,5	58,5 19,5 5	- - -	- - -	29,42 16,67 5,88	- - -
ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 1008-1120	ENFR. RAPIDO 1020-1070	ENFR. RAPIDO 1036-1120	ENFR. RAPIDO 1036-1149	ENFR. RAPIDO 1036-1149	ENFR. AL AIRE 885	ENFR. LENTO 843-899	ENFR. AL AIRE 750-815	ENFR. AL AIRE 795-840
NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	NO COGE TEMPLE	962°-1030°C Rev. 149-371°C	NO COGE TEMPLE	NO COGE TEMPLE
1200 925 925 840	1200 925 925 840	1150 750 925 890	1175 960 1090 1000	1175 980 1120 1035	1175 980 1120 1030	1150 750 800 850	1093-1149°C RETARDAR ENFRIAMIENTO	1060 850 840 880	1050 840 840 890
MUY BUENA	MUY BUENA	BUENA	BUENA	BUENA	BUENA	BUENA UNION FRAGIL	BUENA UNION FRAGIL	BASTANTE BUENA UNION FRAGIL	BUENA UNION FRAGIL
45%	45%		46%	45%	45%	50%	45%	55%	55%
BUENA	BUENA	BUENA	BUENA	BUENA	BUENA	BASTANTE BUENA	MEDIOCRE	BASTANTE BUENA	SUFICIENTE



PESOS LAMINA INOXIDABLE

COLD ROLLED

LAMINAS EN FRIO

430 304

Thickness (mm)	Ancho x Largo						
	914 x 3,048 (3' x 10')	1,000 x 2,000	1,000 x 3,000	1,219 x 2,438 (4' x 8')	1,219 x 3,048 (4' x 10')	1,524 x 3,048 (5' x 10')	1,524 x 6,096 (5' x 20')
0.3	6.5	4.62	6.93				
	6.6	4.76	7.14				
0.4	8.6	6.16	9.24				
	8.9	6.34	9.52				
0.5	10.8	7.70	11.6	11.4	14.3		
	11.1	7.93	11.9	11.8	14.7		
0.6	13.9	9.24	13.9	13.7	17.2		
	13.3	9.52	14.3	14.1	17.7		
0.7	15.0	10.8	16.2	16.0	20.0		
	15.5	11.1	16.7	16.5	20.6		
0.8	17.2	12.3	18.5	18.3	22.9	28.6	57.2
	17.7	12.7	19.0	18.9	23.6	29.5	58.9
0.9	19.3	13.9	20.8	20.6	25.7	32.2	64.4
	19.9	14.3	21.4	21.2	26.5	33.2	66.3
1.0	21.5	15.4	23.1	22.9	28.6	35.8	71.5
	22.1	15.9	23.8	23.6	29.5	36.8	73.7
1.2	25.7	18.5	27.7	27.5	34.3	42.9	85.8
	26.5	19.0	28.5	28.3	35.4	44.2	88.4
1.5	32.2	23.1	34.6	34.3	42.9	53.7	107
	33.1	23.8	35.7	35.4	44.2	55.3	110
2.0	42.9	30.8	46.2	45.8	57.2	71.5	143
	44.2	31.7	47.6	47.1	58.9	73.7	147
2.5	53.6	38.5	57.8	57.2	71.5	89.4	179
	55.2	39.6	59.5	58.9	73.7	92.1	184
3.0	64.4	46.2	69.3	68.7	85.8	107	215
	66.3	47.6	71.4	70.7	88.4	110	221
3.5	75.1	53.9	80.8	80.1	100	125	250
	77.3	55.5	83.3	82.5	103	129	258

HOT ROLLED

LAMINAS EN CALIENTE

430 304

Thickness (mm)	Ancho x Largo						
	914 x 3,048 (3' x 10')	1,000 x 2,000	1,000 x 3,000	1,219 x 2,438 (4' x 8')	1,219 x 3,048 (4' x 10')	1,524 x 3,048 (5' x 10')	1,524 x 6,096 (5' x 20')
3.0	64.4	46.2	69.3	68.7	85.8	107	215
	66.3	47.6	71.4	70.7	88.4	110	221
4.5	96.5	69.30	103.95	102.94	128.25	160.88	321.75
	99.5	71.33	107.1	106.09	132.75	165.38	331.88
5.0	107.3	77.0	116	114	143	179	358
	110.5	79.3	119	118	147	184	368
6.0	128.7	92.4	139	137	172	215	429
	132.6	95.2	143	141	177	221	442
7.0	150.2	108	162	160	200	250	501
	154.7	111	167	165	206	258	516
8.0	171.6	123	185	183	229	286	572
	176.8	127	190	189	236	295	589
9.0	193.1	139	208	206	257	322	644
	198.8	143	214	212	265	332	663
10.	214.5	154	231	229	286	368	715
	220.9	159	238	236	295	368	737
12.	257.4	185	277	275	343	429	858
	265.1	190	285	283	354	442	884
15.	321.8	231	347	343	429	537	1,073
	331.4	238	357	354	442	553	1,105
20.	429.0	308	462	458	572	715	1,431
	441.8	317	476	471	589	737	1,473
30.	643.5	462	693	687	858	1,073	2,146
	662.7	476	714	707	884	1,105	2,210
40.	858.1	616	924	915	1,144	1,431	2,861
	883.7	634	952	943	1,179	1,473	2,947
50.	1,072.6	770	1,155	1,144	1,430	1,788	3,577
	1,104.6	793	1,190	1,178	1,473	1,842	3,684
60.	1,287.1	924	1,386	1,373	1,717	2,146	4,292
	1,325.5		1,427	1,414	1,768	2,210	4,420

Note: Pesos indicados arriba por lámina en kgs.
 Peso específico AISI 430 7.70 Kgs/Dm³
 AISI 304 7.93 Kgs/Dm³



PESO TEORICO DE LAMINA DE ACERO AL CARBONO EN CALIENTE
PESO ESPECIFICO 7.85 Kgs/Dm³

ESPEJOR Pulg.	m.m.	KG/M2	KG/PIE2	----- 1000 x 2000	4x8' 1219 x 2438	6x20' 1829 x 6096	8x20' 2438 x 6096	----- 2000 x 6000
-----	3.00	23.55	2.188	47.10	70.01	262.55	350.06	282.60
1/8	3.18	24.96	2.319	49.93	74.21	278.30	371.07	299.56
-----	4.50	35.33	3.282	70.66	105.02	393.82	525.10	423.96
3/16	4.76	37.39	3.473	74.77	111.15	416.79	555.73	448.63
-----	6.00	47.10	4.376	94.20	140.03	525.10	700.13	565.20
1/4	6.35	49.85	4.631	99.69	148.19	555.73	740.97	598.17
5/16	7.94	62.33	5.791	124.66	185.30	694.88	926.50	747.95
-----	8.00	62.80	5.834	125.60	186.70	700.13	933.50	753.60
-----	9.00	70.65	6.564	141.30	210.04	787.64	1,050.19	847.80
3/8	9.52	74.73	6.943	149.46	222.17	833.15	1,110.87	896.78
-----	12.00	94.20	8.752	188.40	280.05	1,050.19	1,400.26	1,130.40
1/2	12.70	99.69	9.262	199.39	296.39	1,111.45	1,481.94	1,196.34
-----	15.00	117.75	10.939	235.50	350.06	1,312.74	1,750.32	1,413.00
5/8	15.87	124.58	11.574	249.16	370.37	1,388.88	1,851.84	1,494.95
-----	19.00	149.15	13.857	298.30	443.41	1,662.80	2,217.07	1,789.80
3/4	19.05	149.54	13.893	299.08	444.58	1,667.18	2,222.91	1,794.51
-----	22.00	172.70	16.045	345.40	513.43	1,925.35	2,567.14	2,072.40
7/8	22.22	174.43	16.205	348.85	518.56	1,944.61	2,592.81	2,093.12
-----	25.00	196.25	18.232	392.50	583.44	2,187.90	2,917.20	2,355.00
1	25.40	199.39	18.524	398.78	592.78	2,222.91	2,963.88	2,392.68
1.1/4	31.75	249.24	23.155	498.47	740.97	2,778.63	3,704.84	2,990.85
-----	32.00	251.20	23.338	502.40	746.80	2,800.51	3,734.02	3,014.40
-----	38.00	298.30	27.713	596.60	886.83	3,325.61	4,434.14	3,579.60
1.1/2	38.10	299.08	27.786	598.17	889.16	3,334.36	4,445.81	3,589.02
1.3/4	44.45	348.93	32.417	697.87	1,037.36	3,890.09	5,186.78	4,187.19
-----	50.00	392.50	36.465	785.00	1,166.88	4,375.80	5,834.40	4,710.00
2	50.80	398.78	37.048	797.56	1,185.55	4,445.81	5,927.75	4,785.36
2.1/2	63.50	498.47	46.311	996.95	1,481.94	5,557.27	7,409.69	5,981.70
-----	65.00	510.25	47.404	1,020.50	1,516.94	5,688.54	7,584.72	6,123.00
2.3/4	69.85	548.32	50.942	1,096.64	1,630.13	6,112.99	8,150.66	6,579.87
-----	75.00	588.75	54.697	1,177.50	1,750.32	6,563.70	8,751.60	7,065.00
3	76.20	598.17	55.573	1,196.34	1,778.33	6,668.72	8,891.63	7,178.04
-----	100.00	785.00	72.930	1,570.00	2,333.76	8,751.60	11,668.80	9,420.00
4	101.60	797.56	74.097	1,595.12	2,371.10	8,891.63	11,855.50	9,570.72



PROPIEDADES QUIMICAS Y MECANICAS PARA LAS NORMAS MAS USUALES EN COLOMBIA

CUALIDADES	COMPOSICION QUIMICA									
	C	Mn	P	S	Si	Cu	N	Ni	Cr	V
	MAX	MIN - MAX	MAX	MAX	MIN - MAX	MIN - MAX	MAX	MAX	MIN - MAX	MIN - MAX
ASTM A-36	0.29	0.85 - 1.20	0.040	0.050	0.15 - 0.40	0.20**	-----	-----	-----	-----
ASTM A-131 GR A	0.23	-----	0.035	0.040	-----	-----	-----	-----	-----	-----
ASTM A-283 GR C	0.24	0.90	0.035	0.040	0.15 - 0.40	0.20**	-----	-----	-----	-----
ASTM A-285 GR C	0.28	0.98	0.035	0.035	-----	-----	-----	-----	-----	-----
ASTM A-515 GR 70	0.35	1.30	0.035	0.035	0.15 - 0.40	-----	-----	-----	-----	-----
ASTM A-516 GR 70	0.31	0.85 - 1.20	0.035	0.035	0.15 - 0.40	-----	-----	-----	-----	-----
ASTM A-572 GR 50	0.23	1.35	0.040	0.050	0.15 - 0.40	-----	-----	-----	-----	-----
ASTM A-588 GR B	0.20	0.75 - 1.35	0.040	0.050	0.15 - 0.40	0.20 - 0.40	-----	0.50	0.40-0.70	0.01-0.1
ASTM A-706	0.30	1.50	0.035	0.045	- 0.50	-----	-----	-----	-----	-----
ST 37-2 G	0.21	-----	0.055	0.050	-----	-----	0.01	-----	-----	-----
ST 44 G	0.23	-----	0.050	0.045	-----	-----	-----	-----	-----	-----
ST 52 G	0.22	-----	0.050	0.045	-----	-----	-----	-----	-----	-----

*1 Cuando se especifica acero con cobre al momento de colocar el pedido a la acería

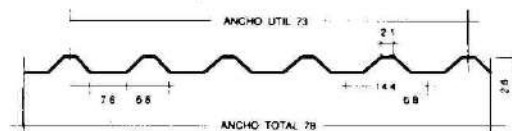
PROPIEDADES QUIMICAS Y MECANICAS PARA LAS NORMAS MAS USUALES EN COLOMBIA

CARACTERISTICAS MECANICAS

	LIMITE ELASTICO		RESISTENCIA A LA TRACCION		% DE ALARGAMIENTO
	(KSI)	(MPA)	(KSI) MIN - MAX	(MPA) MIN - MAX	
ASTM A-36	36	250	58 - 80	400 - 550	20
ASTM A-131 GR A	34	235	58 - 71	400 - 490	21
ASTM A-283 GR C	30	205	55 - 75	380 - 515	22
ASTM A-285 GR C	30	205	55 - 75	380 - 515	23
ASTM A-515 GR 70	38	260	70 - 90	485 - 620	17
ASTM A-516 GR 70	38	260	70 - 90	485 - 620	17
ASTM A-572 GR 50	50	345	65	450	20
ASTM A-588 GR B	50	345	70	485	18
ASTM A-706	58	400	80	550	14
ST 37-2 G	31	215	52 - 74	360 - 510	20
ST 44 G	35	245	62 - 84	430 - 580	18
ST 52 G	47	325	74 - 98	510 - 680	16



LA TRADICIONAL CUBIERTA ARQUITECTONICA DE ARQUITECTURA METALICA ADQUIERE CON EL COLOR UNA NUEVA DIMENSION. PERMITE,ADICIONALMENTE A LAS VENTAJAS TECNICAS CONOCIDAS, AMPLIAR LAS POSIBILIDADES ARQUITECTONICAS DE SUS PROYECTOS.



(Dimensiones en cm.)
MAXIMA DISTANCIA ENTRE APOYOS: 1.70 mts.
MAXIMA CARGA TOTAL ADMISIBLE: 60 Kg./m²

FICHA TECNICA

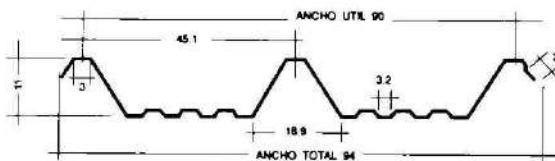
PESO	ANCHO UTIL	ANCHO TOTAL	ALTURA	TRASLAPLO LONGITUD MINIMO	PENDIENTE MINIMA	VOLADIZO MAXIMO
Kg /m ²	cms.	cms.	cms.	cms.	Con / Sin Traslado	cms.
3.22	73	78	2.6	15	15% 6%	50

DESCRIPCION

REFERENCIA	DIMENSION LARGO (mts.)	PESO Kg/u
TZA -0.73 x 1.83-30	1.83	4.30
TZA -0.73 x 2.44-30	2.44	5.73
TZA -0.73 x 3.05-30	3.05	7.16
TZA -0.73 x 3.66-30	3.66	8.60

BAJO PEDIDOS ESPECIALES, SE FABRICA LA CUBIERTA ARQUITECTONICA EN CALIBRES Y LONGITUDES DIFERENTES, CON LAS MISMAS CARACTERISTICAS DE SECCION.

INVOLUCRAMOS EL COLOR COMO COMPLEMENTO DE LAS VENTAJAS DE LA CANALETA ARQUITECTURA METALICA. EL RESULTADO ES UN PRODUCTO PARA SOLUCIONES DE CUBIERTA QUE EXIJAN UN AVANZADO DISEÑO Y UNA GRAN CALIDAD ARQUITECTONICA.



(Dimensiones en cm.)
MAXIMA DISTANCIA ENTRE APOYOS: 5 mts.
MAXIMA CARGA TOTAL ADMISIBLE: 60 Kg./m²

FICHA TECNICA

CANAleta ARQ. METALICA	PESO	ANCHO UTIL	ANCHO TOTAL	ALTURA	TRASLAPLO LONGITUD MINIMO	PENDIENTE MINIMA	VOLADIZO MAXIMO
CALIBRE	Kg /m ²	cms.	cms.	cms.	cms.	Con / Sin Traslado	cms.
26	5.08	90	94	11	15	15% 5%	60
24	6.65	90	94	11	15	15% 5%	80

DESCRIPCION

REFERENCIA	DIMENSION LARGO (mts.)	PESO Kg/un
TZC -0.90 x 3.00-26	3.00	13.71
TZC -0.90 x 4.50-24	4.50	26.92
TZC -0.90 x 5.00-24	5.00	29.91
TZC -0.90 x 6.00-24	6.00	35.89
TZC -0.90 x 7.00-24	7.00	41.87
TZC -0.90 x 8.00-24	8.00	47.85

*Para pendientes menores consultar con la División Técnica de ventas.

BAJO PEDIDOS ESPECIALES, SE FABRICA LA CANALETA EN CALIBRES Y LONGITUDES DIFERENTES, CON LAS MISMAS CARACTERISTICAS DE SECCION.

LOS PERFILES DE ACERO GALVANIZADO HAN DEMOSTRADO SU VERSATILIDAD EN UN SINNUMERO DE APLICACIONES TANTO CONSTRUCTIVAS COMO ESTRUCTURALES. SON IDEALES PARA LA FABRICACION DE ESTRUCTURAS A LA VISTA, DADA SU EXCELENTE PRESENTACION. OFRECE VENTAJAS TALES COMO: BAJO PESO PARA SECCIONES OPTIMAS, ALTA RESISTENCIA Y RIGIDEZ, RAPIDA FABRICACION Y MONTAJE Y ESTRUCTURAS MAS LIVIANAS.



DESCRIPCION

REFERENCIA	CALIBRE		DIMENSIONES (mm)			PESO (Kgs)
	No.	ESPESOR e(mm)	h	b	c	
PAG-230-14	14	1.90	100	50	15	3.24
PAG-230-16	16	1.50	100	50	15	2.57
PAG-230-18	18	1.20	100	50	15	2.06
PAG-290-14	14	1.90	160	50	15	4.15
PAG-290-16	16	1.50	160	50	15	3.29
PAG-290-18	18	1.20	160	50	15	2.65
PAG-330-14	14	1.90	200	50	15	4.75
PAG-330-16	16	1.50	200	50	15	3.77
PAG-330-18	18	1.20	200	50	15	3.03

DESCRIPCION

REFERENCIA	SECCION	LONGITUD(m)	PESO (Kgs)
PAG-250-14	(4X8)	6.00	22.8
PAG-250-16	(4X8)	6.00	18.06
PAG-250-18	(4X8)	6.00	14.58
PAG-400-14	(9X10)	6.00	36.42
PAG-400-16	(9X10)	6.00	28.92

NOTACIONES	DESCRIPCION	NOTACIONES	DESCRIPCION
Atot	AREA DE SECCION	b	ANCHO DE ALETAS
Cm	CONSTANTE DE DEFORMACION	c	DISTANCIA ENTRE ALETAS
F	AREA SECCIONAL	d	TRAMO RECTO DEL ALMA
Fa	AREA DEL ALMA	e	ESPESOR DE ALETAS
G	PESO POR METRO	gy	DISTANCIA ENTRE EL EJE "Y" A LA PARTE MAS EXTERNA DE LAS ALETAS.
I	MOMENTO DE INERCIA	h	PROFUNDIDAD DE SECCION
Jt	CONSTANTE DE TORSION	i	RADIO DE GIRO
Po	PERIMETRO EXTERIOR	iT	RADIO DE GIRO A LO LARGO DEL EJE "Y"
U	AREA SUPERFICIAL POR METRO	r	RADIO DE CORTE
W	MODULO ELASTICO DE SECCION	v	DISTANCIA ENTRE EL EJE PRINCIPAL Y LA FIBRA MAS EXTERNA DE LAS ALETAS
Wpl	MODULO PLASTICO DE SECCION	xm	DISTANCIA DESDE EL CENTRO DEL CORTE AL EJE PRINCIPAL "Y".
a	ESPESOR DEL ALMA		

FORMULAS

$$Atot = h.b.$$

$$Cm = \frac{eb^3}{24} (h - e)^2$$

$$Fa = c.a = (d + 2r)a$$

$$Jt = \frac{2}{3} (b - 0.63 e) e^3 + \frac{1}{3} (h - 2e) a^3 + 2 \frac{a}{e} \left(0.145 + 0.1 \frac{r}{e} \right) \left[\frac{\left(r + \frac{a}{2} \right)^2 + (r + e)^2 - r^2}{2r + e} \right]^4$$

$$P_0 = 2 (h + b)$$



ACERO FIGURADO

El acero figurado es acero de refuerzo para concreto armado que ha sido cortado y figurado en una planta especializada, identificado y transportado a la obra, listo para armar. Se realiza siguiendo las cartillas de despiece y se figura con criterio técnico y máquinas especializadas en cortes y dobleces.

Este método presenta todas las ventajas ante el convencional, pues ahorra tiempo y dinero porque brinda un producto preparado, totalmente controlable en la obra y con cero desperdicio.

La única empresa tecnificada en Barranquilla que ofrece tan excelente producto es **ALFREDO STECKERL E HIJOS S.A.**, que ha instalado una moderna y especializada planta con equipo humano y técnico calificado y con toda la experiencia en hierros y aceros que representa.

Esta planta está capacitada para suplir las exigencias de la construcción actual, ya que toda la información es procesada por computador y el producto se realiza en serie, con medidas exactas y cumpliendo con los diámetros de doblamientos del Código Colombiano de Construcciones Sismo Resistentes (C.C.C.S.R.).

La construcción, un sector en donde cada adelanto representa una gran economía y bienestar, está cada día más tecnificada y ahora la Costa Atlántica está a la par del interior del país, produciendo técnicamente **ACERO FIGURADO DE ALFREDO STECKERL E HIJOS S.A.**

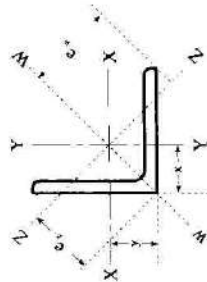


- Menor costo de elaboración
- No le ocasiona desperdicios
- Facilita el control de su acero
- Reduce faltantes y pérdidas
- Disminuye costos en la mano de obra y accidentes
- Acelera el ritmo de su construcción
- Se produce acorde a la normas del Código de Colombiano de Construcciones Sismo Resistentes.
- Disminuye el consumo total de acero

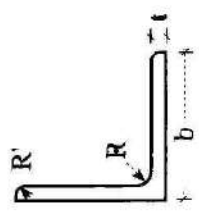
Además, suministro oportuno en todos sus diámetros bajo el más estricto cumplimiento

Haga cuentas. Llámenos para demostrarle todas las ventajas de esta innovación.

Gane tiempo y dinero utilizando en sus obras ACERO FIGURADO

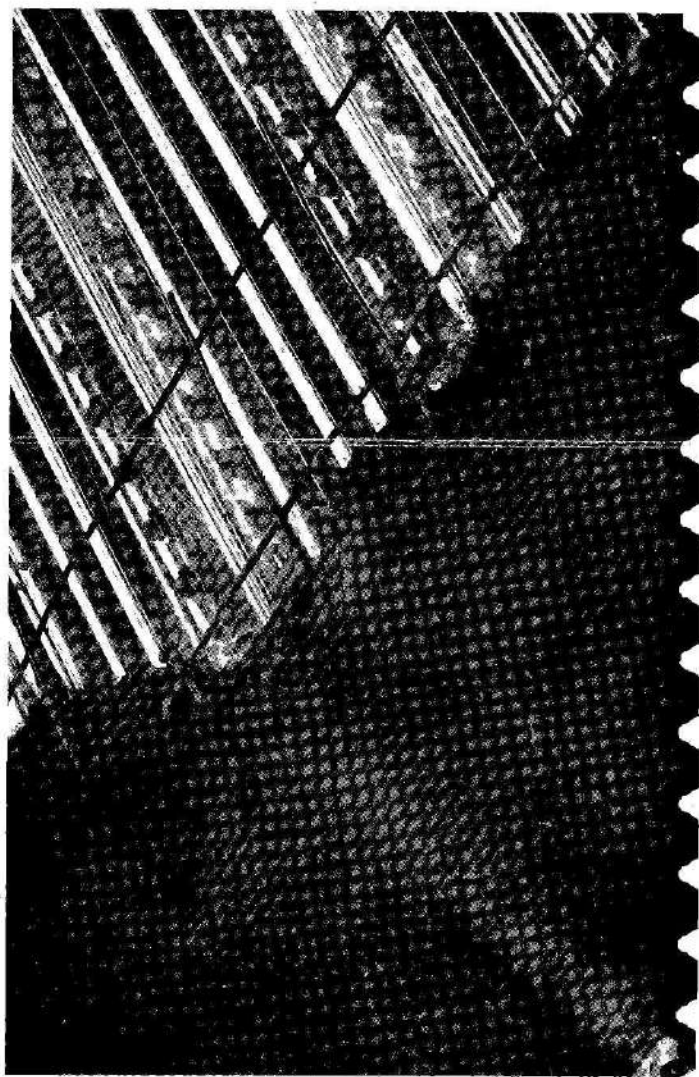


ANGULOS MILIMETRICOS DIACO PROPIEDADES PARA DISEÑO



Designación b x t mm x mm	Peso W kg/m	Area A mm ²	R mm	R'	EJE X-X, Y-Y			EJE W-W			EJE Z-Z		
					I x 10 ³ mm ⁴	S mm ³	r mm	x = y mm	I x 10 ³ mm ⁴	S mm ³	r max mm	e _x mm	I x 10 ³ mm ⁴
19 x 2,5	0,71	90	4,0	2,0	2,8	210	5,6	5,5	4,5	340	7,1	13,2	1,1
19 x 3,0	0,83	106	4,0	2,0	3,3	250	5,6	5,7	5,3	390	7,0	13,4	1,3
25 x 2,5	0,95	120	4,0	2,0	6,8	380	7,5	7,0	11,0	620	9,5	17,7	2,6
25 x 3,0	1,11	142	4,0	2,0	8,0	450	7,5	7,2	12,8	730	9,5	17,7	3,2
25 x 4,5	1,62	206	4,0	2,0	11,1	650	7,4	7,8	17,6	1000	9,3	17,7	4,7
30 x 3,0	1,36	173	5,0	2,5	14,1	650	9,0	8,4	22,8	1070	11,5	21,2	5,5
30 x 4,5	1,98	252	5,0	2,5	19,9	950	8,9	9,0	31,8	1500	11,2	21,2	8,1
35 x 3,0	1,59	203	5,0	2,5	23,0	910	10,6	9,7	37,1	1500	13,5	24,7	9,0
35 x 4,5	2,33	297	5,0	2,5	32,8	1330	10,5	10,3	52,3	2110	13,3	24,7	13,2
35 x 6,0	3,04	387	6,0	3,0	41,1	1700	10,3	10,8	65,2	2640	13,0	24,7	16,9
38 x 2,5	1,47	188	6,0	3,0	24,7	880	11,5	10,0	40,2	1500	14,6	26,9	9,2
38 x 3,0	1,74	222	6,0	3,0	29,5	1070	11,5	10,3	47,7	1770	14,7	26,9	11,3
38 x 4,5	2,55	325	6,0	3,0	42,3	1560	11,4	11,0	67,8	2520	14,4	26,9	16,8
38 x 6,0	3,32	423	6,0	3,0	53,7	2030	11,3	11,6	85,3	3180	14,2	26,9	22,0
50 x 3,0	2,32	295	7,0	3,5	69,1	1880	15,3	13,2	111,8	3160	19,5	35,4	26,4
50 x 4,5	3,41	434	7,0	3,5	100,3	2780	15,2	13,9	161,3	4560	19,3	35,4	39,4
50 x 6,0	4,46	568	7,0	3,5	128,9	3630	15,1	14,5	206,0	5830	19,0	35,4	51,7
63 x 4,5	4,35	554	9,0	4,5	204,7	4450	19,2	17,0	330,5	7420	24,4	44,5	79,0
63 x 6,0	5,71	727	9,0	4,5	265,7	5860	19,1	17,6	426,9	9580	24,2	44,5	104,5
63 x 9,0	8,32	1060	9,0	4,5	375,5	8500	18,8	18,8	589,1	13420	23,8	44,5	152,9
75 x 6,0	6,85	872	10,0	5,0	458,0	8410	22,9	20,5	736,9	13890	29,1	53,0	179,0
75 x 9,0	10,02	1277	10,0	5,0	653,8	12280	22,6	21,8	1044,8	19700	28,6	53,0	262,8
75 x 12,0	13,06	1664	10,0	5,0	828,1	15900	22,3	22,9	1313,4	24770	28,1	53,0	341,8
88 x 6,0	8,11	1033	11,0	5,5	748,6	11620	26,9	23,6	1208,0	19410	34,2	62,2	289,1
88 x 8,0	10,65	1357	11,0	5,5	972,4	15310	26,8	24,5	1562,4	25110	33,9	62,2	382,4
88 x 9,0	11,90	1516	11,0	5,5	1078,8	17090	26,7	24,9	1729,9	27800	33,8	62,2	427,6
88 x 10,0	13,13	1673	11,0	5,5	1181,6	18850	26,6	25,3	1891,2	30390	33,6	62,2	472,1
88 x 12,0	15,55	1981	11,0	5,5	1377,4	22250	26,4	26,1	2195,6	35290	33,3	62,2	559,2
100 x 6,0	9,26	1179	12,0	6,0	1110,5	15090	30,7	26,4	1793,7	25370	39,0	70,7	427,3
100 x 8,0	12,18	1551	12,0	6,0	1448,4	19940	30,6	27,4	2330,1	32950	38,8	70,7	566,8
100 x 9,0	13,62	1734	12,0	6,0	1610,0	22300	30,5	27,8	2585,5	36560	38,6	70,7	634,4
100 x 10,0	15,04	1915	12,0	6,0	1766,8	24620	30,4	28,2	2832,6	40060	38,5	70,7	701,0
100 x 12,0	17,83	2271	12,0	6,0	2066,9	29120	30,2	29,0	3302,6	46710	38,1	70,7	831,1
100 x 14,0	20,65	2643	12,0	6,0	2418,1	34410	29,9	29,0	3848,1	54410	37,8	70,7	981,1
100 x 16,0	23,57	3015	12,0	6,0	2774,3	39700	29,6	28,8	4304,3	61110	37,5	70,7	1111,1
100 x 18,0	26,49	3387	12,0	6,0	3130,5	44990	29,3	28,5	4760,5	66810	37,2	70,7	1241,1
100 x 20,0	29,41	3759	12,0	6,0	3486,7	50280	29,0	28,2	5216,7	72510	36,9	70,7	1371,1
100 x 22,0	32,33	4131	12,0	6,0	3842,9	55570	28,7	27,9	5672,9	78210	36,6	70,7	1501,1
100 x 24,0	35,25	4503	12,0	6,0	4199,1	60860	28,4	27,6	6129,1	83910	36,3	70,7	1631,1
100 x 26,0	38,17	4875	12,0	6,0	4555,3	66150	28,1	27,3	6585,3	89610	36,0	70,7	1761,1
100 x 28,0	41,09	5247	12,0	6,0	4911,5	71440	27,8	27,0	7041,5	95310	35,7	70,7	1891,1
100 x 30,0	44,01	5619	12,0	6,0	5267,7	76730	27,5	26,7	7497,7	101010	35,4	70,7	2021,1
100 x 32,0	46,93	5991	12,0	6,0	5623,9	82020	27,2	26,4	7953,9	106710	35,1	70,7	2151,1
100 x 34,0	49,85	6363	12,0	6,0	5980,1	87310	26,9	26,1	8410,1	112410	34,8	70,7	2281,1
100 x 36,0	52,77	6735	12,0	6,0	6336,3	92600	26,6	25,8	8866,3	118110	34,5	70,7	2411,1
100 x 38,0	55,69	7107	12,0	6,0	6692,5	97890	26,3	25,5	9322,5	123810	34,2	70,7	2541,1
100 x 40,0	58,61	7479	12,0	6,0	7048,7	103180	26,0	25,2	9778,7	129510	33,9	70,7	2671,1
100 x 42,0	61,53	7851	12,0	6,0	7404,9	108470	25,7	24,9	10234,9	135210	33,6	70,7	2801,1
100 x 44,0	64,45	8223	12,0	6,0	7761,1	113760	25,4	24,6	10691,1	140910	33,3	70,7	2931,1
100 x 46,0	67,37	8595	12,0	6,0	8117,3	119050	25,1	24,3	11147,3	146610	33,0	70,7	3061,1
100 x 48,0	70,29	8967	12,0	6,0	8473,5	124340	24,8	24,0	11603,5	152310	32,7	70,7	3191,1
100 x 50,0	73,21	9339	12,0	6,0	8829,7	129630	24,5	23,7	12059,7	158010	32,4	70,7	3321,1
100 x 52,0	76,13	9711	12,0	6,0	9185,9	134920	24,2	23,4	12515,9	163710	32,1	70,7	3451,1
100 x 54,0	79,05	10083	12,0	6,0	9542,1	140210	23,9	23,1	12972,1	169410	31,8	70,7	3581,1
100 x 56,0	81,97	10455	12,0	6,0	9898,3	145500	23,6	22,8	13428,3	175110	31,5	70,7	3711,1
100 x 58,0	84,89	10827	12,0	6,0	10254,5	150790	23,3	22,5	13884,5	180810	31,2	70,7	3841,1
100 x 60,0	87,81	11199	12,0	6,0	10610,7	156080	23,0	22,2	14340,7	186510	30,9	70,7	3971,1
100 x 62,0	90,73	11571	12,0	6,0	10966,9	161370	22,7	21,9	14796,9	192210	30,6	70,7	4101,1
100 x 64,0	93,65	11943	12,0	6,0	11323,1	166660	22,4	21,6	15253,1	197910	30,3	70,7	4231,1
100 x 66,0	96,57	12315	12,0	6,0	11679,3	171950	22,1	21,3	15709,3	203610	30,0	70,7	4361,1
100 x 68,0	99,49	12687	12,0	6,0	12035,5	177240	21,8	21,0	16165,5	209310	29,7	70,7	4491,1
100 x 70,0	102,41	13059	12,0	6,0	12391,7	182530	21,5	20,7	16621,7	215010	29,4	70,7	4621,1
100 x 72,0	105,33	13431	12,0	6,0	12747,9	187820	21,2	20,4	17077,9	220710	29,1	70,7	4751,1
100 x 74,0	108,25	13803	12,0	6,0	13104,1	193110	20,9	20,1	17534,1	226410	28,8	70,7	4881,1
100 x 76,0	111,17	14175	12,0	6,0	13460,3	198400	20,6	19,8	17990,3	232110	28,5	70,7	5011,1
100 x 78,0	114,09	14547	12,0	6,0	13816,5	203690	20,3	19,5	18446,5	237810	28,2	70,7	5141,1
100 x 80,0	117,01	14919	12,0	6,0	14172,7	208980	20,0	19,2	18902,7	243510	27,9	70,7	5271,1
100 x 82,0	119,93	15291	12,0	6,0	14528,9	214270	19,7	18,9	19358,9	249210	27,6	70,7	5401,1
100 x 84,0	122,85	15663	12,0	6,0	14885,1	219560	19,4	18,6	19815,1	254910	27,3	70,7	5531,1
100 x 86,0	125,77	16035	12,0	6,0	15241,3	224850	19,1	18,3	20271,3	260610	27,0	70,7	5661,1
100 x 88,0	128,69	16407	12,0	6,0	15597,5	230140	18,8	18,0	20727,5	266310	26,7	70,7	5791,1
100 x 90,0	131,61	16779	12,0	6,0	15953,7	235430	18,5	17,7	21183,7	272010	26,4	70,7	5921,1
100 x 92,0	134,53	17151	12,0	6,0	16309,9	240720	18,2	17,4	21639,9	277710	26,1	70,7	6051,1
100 x 94,0	137,45	17523	12,0	6,0	16666,1	246010	17,9	17,1	22096,1	283410	25,8	70,7	6181,1
100 x 96,0	140,37	17895	12,0	6,0	17022,3	251300	17,6	16,8	22552,3	289110	25,5	70,7	6311,1
100 x 98,0	143,29	18267	12,0	6,0	17378,5	256590	17,3	16,5	23008,5	294810	25,2	70,7	6441,1
100 x 100,0	146,21	18639	12,0	6,0	17734,7	261880	17,0	16,2	23464,7	300510	24,9	70,7	6571,1
100 x 102,0	149,13	19011	12,0	6,0	18090,9	267170	16,7	15,9	23920,9	306210	24,6	70,7	6701,1
100 x 104,0	152,05	19383	12,0	6,0	18447,1	272460	16,4	15,6	24377,1	311910	24,3	70,7	6831,1
100 x 106,0	154,97	19755	12,0	6,0	18803,3	277750	16,1	15,3	24833,3	317610	24,0	70,7	6961,1
100 x 108,0	157,89	20127	12,0	6,0	19159,5	283040	15,8	15,0	25289,5	323310	23,7	70,7	7091,1
100 x 110,0	160,81	20499	12,0	6,0	19515,7	288330	15,5	14,7	25745,7	329010	23,4	70,7	7221,1

FORMALETA Y REFUERZO POSITIVO DE LA PLACA AL MISMO TIEMPO



METALDECK es un panel de lámina colaborante que se utiliza para la construcción de losas en sección compuesta (concreto + acero).

La lámina funciona, en principio, como formaleta de trabajo para fundir la placa; luego, al fraguar el concreto, actúa como refuerzo positivo prin-

cipal de la misma.

En los sistemas convencionales el refuerzo principal lo constituyen varillas de acero armadas de acuerdo al diseño estructural; la formaleta es un elemento temporal, independiente de la losa.

GRANDES VENTAJAS EN LA CONSTRUCCION

- ◆ Mejora los rendimientos de la obra.
- ◆ Reduce desperdicios de concreto.
- ◆ Reduce volumen de escombros.
- ◆ Es de fácil manipulación y almacenamiento.
- ◆ Facilita la ejecución de redes de instalación.
- ◆ Se adapta fácilmente a cualquier geometría.
- ◆ Incide directamente en el peso de la estructura y por ende en las especificaciones de la cimentación.
- ◆ No es biodegradable.
- ◆ Es ideal para placas de cubierta, pues mejora las condiciones impermeables de la losa.
- ◆ Se adapta a cualquier tipo de estructura (concreto armado o acero).

METAL

ACQUEDUCTORA
METAL S.A.

DECK