

## Ángulos

Ángulos Importados  
 Angulares de lados iguales  
 Tolerancias dimensionales ASTM A6 / A6M  
 Calidades de acero  
 ASTM / A6M  
 A572 grado 50

L		Dimensiones				Área cm <sup>2</sup>	Peso kg/m	Distancia de los ejes				Momento respecto a los ejes							
		(mm)						e	w	v1	v2	x-x=y-y			E-E		n-n		
		a	s	r1	r2	lx	Sx					Rx	le	Re	In	Rn	Sn		
						cm	cm					cm	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm	cm <sup>4</sup>
120 x	8	120	8.0	13.0	4.8	18.70	14.70	3.23	8.49	456	4.22	255.00	29.10	3.69	405.00	4.65	105.00	23.60	2.37
	10		10.0			23.10	18.20	3.31		4.68	4.24	313.00	36.00	3.68	497.00	4.73	129.00	27.60	2.37
	12		12.0			27.50	21.60	3.40		4.80	4.26	368.00	42.70	3.65	584.00	4.60	152.00	31.60	2.35
150 x	12	150	12.0	16.0	8.0	34.80	27.30	4.12	10.60	5.83	5.29	737.00	67.70	4.60	1170.00	5.80	303.00	52.00	2.95

Ángulos Nacionales  
 Angulares de lados iguales  
 Tolerancias dimensionales  
 Norma Covenin perfiles 1293-85  
 Norma Covenin "L" 1036-86  
 Calidades del Acero Covenin AE-25 y AE-35

L		Dimensiones				Área cm <sup>2</sup>	Peso kg/m	Distancia de los ejes				Momento respecto a los ejes							
		(mm)						e	w	v1	v2	x-x=y-y			E-E		n-n		
		a	s	r1	r2	lx	Sx					Rx	le	Re	In	Rn	Sn		
						cm	cm					cm	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm	cm <sup>4</sup>
20 x 3	20	3.0	3.5	2.0	1.12	0.88	0.60	1.41	0.85	0.70	0.39	0.28	0.59	0.62	0.74	0.15	0.18	0.37	
25 x 3	25	3.0	3.5	2.0	1.42	1.12	0.73	1.77	1.03	0.87	0.79	0.45	0.75	1.27	0.95	0.31	0.30	0.47	
30 x 3	30	3.0	5.0	2.5	1.74	1.36	0.84	2.12	1.18	1.04	1.41	0.65	0.90	2.24	1.14	0.57	0.48	0.57	
35x	4	35	4.0	5.0	2.5	2.67	2.10	1.00	2.47	1.41	1.24	2.96	1.18	1.05	4.68	1.33	1.24	0.88	0.68
	6		6.0			3.87	3.04	1.08		1.53	1.27	4.14	1.71	1.04	6.50	1.30	1.77	1.16	0.68
40x	4	40	4.0	6.0	3.0	3.08	2.42	1.12	2.83	1.58	1.40	4.48	1.55	1.21	7.08	1.52	1.86	1.18	0.78
	6		6.0			4.48	3.52	1.20		1.70	1.43	6.33	2.26	1.19	9.98	1.49	2.67	1.57	0.77
50x	4	50	4.0	7.0	3.5	3.89	3.06	1.36	3.54	1.92	1.75	8.97	2.46	1.52	14.20	1.91	3.73	1.94	0.98
	5		5.0			4.80	3.77	1.40		1.98	1.76	11.00	3.05	1.51	17.40	1.90	4.59	2.32	0.98
	7		7.0			6.56	5.15	1.49		2.11	1.78	14.60	4.15	1.49	23.10	1.88	6.02	2.85	0.96
65x	5	65	4.5	9.0	4.5	6.35	4.98	1.75	4.60	2.49	2.28	24.96	5.27	1.98	39.91	2.53	10.00	4.00	1.27
	6		6.0			7.53	5.91	1.80		2.55	2.28	29.20	6.21	1.97	46.30	2.48	12.10	4.74	1.27
	7		7.0			8.70	6.83	1.85		2.62	2.29	33.40	7.18	1.96	53.0	2.47	13.80	5.27	1.26
75x	7	75	7.0	10.0	5.0	10.10	7.94	2.09	5.30	2.95	2.63	52.40	9.67	2.28	83.60	2.88	21.10	7.15	1.45
	8		8.0			11.50	9.03	2.13		3.01	2.65	58.90	11.00	2.26	93.30	2.85	24.40	8.11	1.46
90x 7	90	7.0	11.0	5.5	12.20	9.62	2.45	6.36	3.46	3.17	92.50	14.13	2.75	147.0	3.46	38.00	11.00	1.77	
100x	8	100	8.0	12.0	6.0	15.50	12.20	2.74	7.07	3.87	3.52	145.00	19.90	3.06	230.00	3.85	59.90	15.50	1.96
	10		10.0			19.20	15.10	2.82		3.99	3.54	177.00	24.70	3.04	280.00	3.82	73.30	18.40	1.95

## Mallas Truckson

### Mallas en Rollo

Tipo	Diámetros de los alambres	Separación de los alambres	Área de acero	Largo x Ancho del rollo	Peso del rollo
(Peso x área)	(cada sentido)	(cm)	(cm <sup>2</sup> /m)	(m)	(Kg/rollo)
		(l/t)	(l/t)		
(*)					
**1.98 x 120	4.0	10-oct	1.26/1.26	45.00/2.65	238*
**1.67 x 120	4.0	oct-15	1.26/0.84	45.00/2.65	200
**1.33 x 120	4.0	15/15	0.84/0.84	45.22/2.65	160*
**1.33 x 100	4.0	15/15	0.84/0.84	37.65/2.65	133
**1.33 x 60	4.0	15/15	0.84/0.84	22.50/2.65	80
0.97 x 100	3.43	15/15	0.62/0.62	40.00/2.51	98*
0.97 x 50	3.43	15/15	0.62/0.62	20.00/2.50	49

Rollo tipo	Diámetros de los alambres	Separación de los alambres		Área de acero	Largo x Ancho del rollo	Cantidad de alambre		Peso del rollo
		Long	Transv			Long	Transv	
	mm	mm	mm	(cm <sup>2</sup> )	(mxn)			
10x10x120	4.00	100	100	1.257	45x2.65	27	450	238.00
15x15x120	4.00	150	150	0.838	45x2.65	18	300	160.00
6x6x100	3.43	150	150	0.616	40x2.50	17	266	97.52
6x6x50	3.43	150	150	0.616	20x2.50	17	133	48.76

## Láminas

### Láminas de Hierro Negro

Norma: A-569 / A-36

Dimensiones (mm)	Kgrs. Pieza	Piezas Atado	Kgrs. Atado
2,0 x 1000 x 2000	32	75	2400
2,0 x 1200 x 2400	46,08	50	2304
2.5 x 1000 x 2000	40	65	2600
3,0 x 1000 x 2400	57,6	45	2592
3,0 x 1000 x 2000	48	55	2640
3,0 x 1200 x 2400	69,12	35	2419
4,0 x 1000 x 2000	64	40	2560
4,0 x 1200 x 2400	92,16	27	2488
4.5 x 1200 x 2400	103,68	25	2592
5,0 x 1000 x 2000	80	32	2560
5,0 x 1200 x 2400	115,2	22	2534
6,0 x 1000 x 2000	96	26	2496
6,0 x 1200 x 2400	138,24	20	2765
8,0 x 1000 x 2000	128	20	2560
8,0 x 1200 x 2400	184,32	14	2580
9,0 x 1000 x 2000	144	18	2592
9,0 x 1200 x 2400	207,36	13	2696
10 x 1000 x 2000	160	16	2560
10 x 1200 x 2400	230,4	11	2534
12 x 1000 x 2000	192	13	2496
12 x 1200x 2400	276,48	9	2488
13 x 1200 x 2400	299,52	1	300
16 x 1000 x 2000	256	1	256
16 x 1200 x 2400	638,64	1	369
19 x 1200 x 2400	437,76	1	438
25 x 1200 x 2400	576	1	576
31 x 1200 x 2400	714,24	1	714
38 x 1200 x 2400	875,52	1	876
50 x 1200 x 2400	1382,4	1	1382

## Láminas HN Estriada

Norma: A-569

Dimensiones (mm)	Kgrs. Pieza	Piezas Atado	Kgrs. Atado
2,5 x 1200 x 2400	63,19	40	2528
3,0 x 1000 x 2400	64	40	2560
3,0 x 1200 x 2400	74,48	35	2607
4,5 x 1000 x 2400	90,32	30	2710
4,5 x 1200 x 2400	108,4	25	2710
5,0 x 1200 x 2400	119,69	21	2513
6,0 x 1200 x 2400	142,9	15	2144

Acero estructural uso de construcción

Calidad del Acero Norma ASTM A 36 / A 36M-94

Tolerancias dimensionales Norma ASTM A6/A6M-94 y EN 10163/2-91

Normas americanas ASTM

Composición química

Designación ASTM	Grade	Espesor (mm)	C (máx.)	Mn	P (max)	S (max)	Si
A 36 / A 36 M - 94	-	< 20	0.25	-	0.04	0.05	0.40 (max)
	-	20-40	0.24	0.80-1.20	0.04	0.05	0.40 (max)
	-	40-65	0.26	0.80-1.20	0.04	0.05	0.15-0.40
	-	65-100	0.27	0.85-1.20	0.04	0.05	0.15-0.40
A 283 / A 283 M - 93	c	< 40	0.24	0.90 (max)	0.035	0.04	0.40 (max)
	c	> 40	0.24	0.90 (max)	0.034	0.04	0.15-0.40
A 529 / A 529M - 94	50	-	0.27	1.35 (max)	0.040	0.05	0.40 (max)
A 573 / A 573M - 93	70	< 13	0.27	0.85-1.20	0.035	0.04	0.15-0.40
	0	13-40	0.28	0.85-1.20	0.035	0.04	0.15-0.40

## Normas americanas ASTM Propiedades Mecánicas

Designación	Grade	Lim. elástico (N/mm)	Resist. a tracción (Rm)	Alargamiento (Min)		Resiliencia (Min)	
		Min. MPa.	Mpa.	%		C°	J
		8"	2"				
A36 / A36M - 94	-	250	400-550	20	23	-	-
A 283 / A283M - 93	C	205	380-515	22	25	-	-
A 529 / A529M - 94	50	345	485-690	18	21	-	-
A 573 / A573M - 93	70	290	485-620	18			

## Normas europeas EN Composición química

Designación		DESOXIDACIÓN	Tipo de acero	ANÁLISIS DE COLADA									
Simbólica	Numérica			(% en peso)									
				C Max			Mn	Si	P	S	N	CEV MAX	
(s/EN 10027-1)	(No/EN 10027-2)	e<16	16/40	e>16	MAXIMO					<40	>40		
S 235 JR	10.037	-	BS	0.17	0.20	-	1.40	-	0.045	0.045	0.009	0.35	-
S 235 JO	10.114	FN	QS	0.17	0.17	0.17	1.40	-	0.040	0.040	0.009	0.35	0.38
S 275 JR	10.044	FN	BS	0.21	0.21	0.22	1.50	-	0.045	0.045	0.09	0.40	0.42
S 275 JO	10.143	FN	QS	0.18	0.18	0.18	1.50	-	0.040	0.040	0.009	0.40	0.42
S 355 JR	10.045	FN	BS	0.24	0.24	0.24	1.60	0.55	0.045	0.045	0.009	0.45	0.47
S355 JO	10.553	FN	QS	0.20	0.20	0.22	1.60	0.55	0.040	0.040	0.009	0.45	0.47

FN = Acero no efervescente

BS = Acero de base

QS = Acero de calidad

## Normas Europeas EN Propiedades mecánicas

DESIGNACIÓN		Límite elástico superior					Resistencia	Alargamiento			Energía		
Simbólica	Numérica	(S/espesor)					(Rm / mm <sup>2</sup> )	(L=5d)			(Kv Min J)		
		< 16	16/40	40/63	63/80	80/100	<100	< 40	40/63	63/100	Temp	Media	Indiv
(s/EN 10027-1)	(No EN 10027-2)	Espesor > 10/100											
S 235 JR	10.037	235	225	-	-	-	340/470	24	-	-	20	27	19
S 235 JO	10.114	234	225	215	215	215	340/470	24	23	22	0	27	19
S 275 JR	10.044	275	265	255	245	235	410/560	20	19	18	20	27	19
S 275 JO	10.143	275	265	255	245	235	410/560	20	19	18	0	27	19
S 355 JR	10.045	355	345	335	325	315	490/630	20	19	18	20	27	19
S 355 JO	10.553	355	345	335	325	315	490/630	20	19	18	0	27	19

Peso teórico por lámina en Kg.

Ancho y largo	Espesor						
	6	8	10	13	16	19	22
2.400 x 12.000	1.382,40	1.843,20	2.304,00	2.995,20	3.686,40	4.377,61	5.068,80
2.400 x 6.000	691,2	921,61	1.152,00	1.497,60	1.843,20	2.188,80	2.534,40
2.400 x 1.200	-	-	-	299,52	368,64	437,76	

Ancho y largo	Espesor						
	25	31	38	50	65	75	100
2.400 x 12.000	5.760,00	7.142,40	8.755,20	-	-	-	-
2.400 x 6.000	2.880,00	3.571,20	4.377,60	5.760,00	-	-	-
2.400 x 1.200	576	714,24	875,52	1.152,00	-	-	-
2.500 x 5.000	-	-	-	-	6.500,00	7.500,00	10.000,00
2.500 x 1.250	-	-	-	-	162.500	1.875,00	2.500,00

Acero para Construcción Naval

Calidad de acero norma ASTM A 131 / A 131M-82

Tolerancias Dimensionales norma ASTM A 6-94 y EN 10163 / 2-91

Normas Americanas ASTM

Composición química

Designación	Grade	C	Mn	P	S	Si	Cu	Ni	Cr	Mo	V
ASTM		(max)		(max)	(max)						
A 131 / A 131M - 94	A	0.23	-	0.035	0.040	-	-	-	-	-	-

Peso teórico por lámina en Kg.

Ancho y largo	Espesor						
	6	8	10	13	16	19	22
2.400 x 12.000	1.382,40	1.843,20	2.304,00	2.995,20	3.686,40	4.377,60	5.760,00
2.400 x 6.000	691,2	921,6	1.152,00	1.497,60	1.843,23	2.188,80	2.880,00

## Tubo Estructural Cuadrado

Tubería estructural cuadrado  
 Tolerancias dimensionales ASTM A 500 grado C  
 Calidades de acero ASTM A572 grado 50

Perfiles de sección cuadrada	Dimensiones				Area	Peso	Momentos respecto a los ejes		
	(mm)								
	mm	h	b	e	r			I	S
							cm <sup>4</sup>	cm <sup>3</sup>	cm
60x60	60.00	60.00	2.25	3.38	5.02	3.98	27.40	9.13	2.34
70x70	70.00	70.00	2.25	3.38	2.92	4.65	44.60	12.74	2.75
90x90	90.00	90.00	2.50	3.75	8.54	6.70	107.46	23.88	3.55
100x100	100.00	100.00	3.00	4.50	11.33	8.89	175.10	35.02	3.94
110x110	110.00	110.00	3.40	5.10	14.10	11.07	263.04	47.82	4.33
120x120	120.00	120.00	4.00	6.00	18.01	14.14	397.30	66.22	4.74
135x135	135.00	135.00	4.30	6.45	21.85	17.15	612.27	90.71	5.28
155x155	155.00	155.00	4.50	6.75	26.39	20.72	982.43	126.77	6.10
175x175	175.00	175.00	5.50	8.25	36.25	28.46	1709.23	195.34	6.87
200x200	200.00	200.00	5.50	8.25	41.75	32.77	2597.67	259.77	7.89
200x200	200.00	200.00	7.00	10.50	52.36	41.10	3194.10	319.41	7.81
220x220	220.00	220.00	7.00	10.50	57.96	45.50	4314.30	392.21	8.63
220x220	220.00	220.00	9.00	13.50	73.18	57.45	5317.27	483.39	8.52
260x260	260.00	260.00	9.00	16.50	87.58	68.75	9.038.52	695.27	10.16
260x260	260.00	260.00	11.00	16.50	105.41	82.74	10.656.87	819.76	10.06

## Tubo Estructural Redondo

Tubería estructural redondo  
 Tolerancias dimensionales ASTM A500 grado C  
 Calidades del acero ASTM A572 grado 50

Perfiles	Dimensiones		Area	Peso	Momentos respecto a los ejes			
	(mm)							cm <sup>2</sup>
Sección redondas	pulg	d	e			I	S	R
						cm <sup>4</sup>	cm <sup>3</sup>	cm
3		76.2	2.25	5.2	4.10	35.8	9.4	2.6
3 ½		88.9	2.25	6.1	4.81	57.5	12.9	3.1
4 ½		114.3	2.50	8.8	6.89	137.3	24.0	4.0
5		127.0	3.00	11.7	9.17	224.8	35.4	4.4
5 ½		139.7	3.40	14.6	11.43	338.3	48.4	4.8
6		152.4	4.00	18.6	14.64	513.7	67.4	5.2
6 5/8		168.3	4.30	22.2	17.39	745.0	88.5	5.8
7 5/8		193.7	4.50	26.7	20.99	1197.0	123.6	6.7
8 5/8		219.1	5.50	36.9	28.97	2105.5	192.2	7.6
9 5/8		244.5	5.50	41.3	32.41	2949.2	241.3	8.5
9 5/8		244.5	7.00	52.2	41.00	3684.6	301.4	8.4
10 3/4		273.1	7.00	58.5	45.93	5180.2	379.4	9.4
10 3/4		273.1	9.00	74.7	58.61	6514.3	477.1	9.3
12 3/4		323.9	9.00	89.0	69.88	11.044.0	681.8	11.1
12 3/4		323.9	11.00	108.1	84.87	13243.3	817.9	11.1



## Tubo Estructural Rectangular

Tubería estructural rectangular

Tolerancias dimensionales ASTM A500 grado C

Calidades de acero ASTM A572 grado 50

Materia prima:

Hasta 1.90mm espesor: ASTM -A366 Laminado en frío

Mas 2mm espesor: ASTM -A569 Laminado en Caliente

Medida	Espesor	Peso		Sección	Ix	Sx	Rx	Iy	Sy	Ry
Dimensión	Thickness	Weight		Section						
pulg	mm	Kg/m	lb/ft	cm <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
2½x1	1.10	1.519	1.020	1.876	8.283	2.61	2.101	2.121	1.67	1.063
2½x1	1.20	1.652	1.100	2.039	8.844	2.79	2.083	2.286	1.80	1.059
2½x1	1.50	2.048	1.376	2.519	10.349	3.26	2.027	2.753	2.17	1.045
2½x1½	1.10	1.743	1.171	2.156	11.003	3.47	2.259	5.094	2.67	1.537
2½x1½	1.20	1.896	1.274	2.344	11.802	3.72	2.244	5.505	2.89	1.533
2½x1½	1.50	2.353	1.581	2.900	14.011	4.41	2.198	6.690	3.51	1.519
2½x1½	1.90	2.951	1.983	3.623	16.533	5.21	2.136	8.158	4.28	1.500
3x1	1.10	1.743	1.171	2.156	13.302	3.49	2.484	2.534	2.00	1.084
3x1	1.20	1.896	1.274	2.344	14.234	3.74	2.464	2.732	2.15	1.080
3x1	1.50	2.353	1.581	2.900	16.771	4.40	2.405	3.298	2.60	1.066
3x1	1.90	2.951	1.953	3.623	19.563	5.13	2.324	3.986	3.14	1.049
3x1¼	1.10	1.854	1.245	2.295	15.272	4.01	2.579	4.091	2.58	1.335
3x1¼	1.20	2.018	1.356	2.496	16.378	4.30	2.561	4.419	2.78	1.331
3x1¼	1.50	2.505	1.683	3.091	19.429	5.10	2.507	5.362	3.38	1.317
3x1½	1.10	1.966	1.321	2.435	17.242	4.53	2.661	6.051	3.18	1.576
3x1½	1.20	2.140	1.438	2.649	18.521	4.86	2.644	6.543	3.43	1.572
3x1½	1.40	2.486	1.670	3.072	20.943	5.50	2.611	7.501	3.94	1.563
3x1½	1.90	3.337	2.242	4.106	26.225	6.88	2.527	9.740	5.11	1.540
3x1½	2.00	3.505	2.355	4.240	29.744	7.81	2.649	10.114	5.31	1.544
3x1½	2.50	4.432	2.978	5.240	35.916	9.43	2.618	12.101	6.35	1.520
3x1½	2.90	4.980	3.346	6.022	40.504	10.63	2.594	13.548	7.11	1.500
3x2	1.40	2.771	1.862	3.365	26.657	7.00	2.815	14.363	5.65	2.066
3x2	2.00	3.912	2.628	4.748	36.738	9.64	2.782	19.685	7.75	2.036
3x2	2.60	5.024	3.376	6.097	46.039	12.08	2.748	24.533	9.66	2.006
4x1½	1.40	3.056	2.053	3.720	45.218	8.90	3.486	9.851	5.17	1.627
4x1½	1.50	3.268	2.196	3.979	48.192	9.49	3.480	10.473	5.50	1.622
4x1½	2.00	4.318	2.901	5.256	62.559	12.31	3.450	13.428	7.05	1.598
4x1½	2.60	5.553	3.731	6.757	78.707	15.49	3.413	16.643	8.74	1.569

Perfiles	Dimensiones				Area	Peso	Momentos respecto a los ejes		
Sección Rectángula	(mm)				cm <sup>2</sup>	Kg/m			
	h	b	e	r			I	S	R
							cm <sup>4</sup>	cm <sup>3</sup>	cm
80x40	80	40	2.25	3.38	5.02	3.94	40.61	10.15	2.84
100x40	100	40	2.25	3.38	5.92	4.65	71.37	14.27	3.47
120x60	120	60	2,5	3,75	8,54	6,7	159,29	26,55	4,32
140x60	140	60	3	4.50	11.33	8.89	274.27	39.18	4.92
160x65	160	65	3.40	5.10	14.44	11.34	449.65	56.21	5.58
180x65	180	65	4	6	18.41	14.45	697.99	77.55	6.16
200x70	200	70	4.30	6.45	21.85	17.15	1016.19	101.62	6.82
220x90	220	90	4.5	6.75	26.39	20.72	1561.83	141.98	7.69
260x90	260	90	5.5	8.25	36.25	28.46	2844.82	218.83	8.86
300x100	300	100	5.5	8.25	41.76	32.77	4366.42	291.09	10.23
300x100	300	100	7	10.50	52.36	41.10	5360.46	357.36	10.12
320x120	320	120	7	10.50	57.96	45.5	7032.23	439.51	11.02
320x120	320	120	9	13.50	73.18	57.45	8654.16	540.89	10.87
350x170	350	170	9	13.50	87.58	68.75	13546.10	774.06	12.44

## Vigas

Vigas HEA

Vigas Europeas de alas anchas ligeras

ASTM Designation A36

Tolerancias dimensionales E.N 10024, 10034, 10056

Calidades de acero norma E.N 10025 S 275JR

HEA	Dimensiones					Área	Peso	Momento respecto a los ejes					
(l)	(mm)					cm <sup>2</sup>	Kg/m	Eje x-x			Eje y-x		
IPBL	h	b	S	t	r			I <sub>x</sub>	S <sub>x</sub>	R <sub>x</sub>	I <sub>y</sub>	S <sub>y</sub>	R <sub>y</sub>
								cm <sup>4</sup>	cm	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
100	96	100	5.0	8.0	12	21.2	16.7	349	72.8	4.06	134	26.8	2.51
120	114	120	5.0	8.5	12	25.3	19.9	606	106.0	4.89	231	38.5	3.02
140	133	140	5.5	8.5	12	31.4	24.7	1030	155.0	5.73	389	55.6	3.52
160	152	160	6.0	9.0	15	38.8	30.4	1670	220.0	6.57	616	76.9	3.98
180	171	180	6.0	9.5	15	45.3	35.5	2510	294.0	7.45	925	103.0	4.52
200	190	200	6.5	10.0	18	53.8	42.3	3690	389.0	8.28	1340	134.0	4.98
220	210	220	7.0	11.0	18	64.3	50.5	5410	515.0	9.17	1950	178.0	5.51
240	230	240	7.5	12.0	21	76.8	60.3	7760	675.0	10.10	2770	231.0	6.00
260	250	260	7.5	12.5	24	86.8	68.2	10450	836.0	11.00	3670	282.0	6.50
280	270	280	8.0	13.0	24	97.3	76.4	13670	1010.0	11.90	4760	340.0	7.00
300	290	300	8.5	14.0	27	112.0	88.3	18260	1260.0	12.70	6310	421.0	7.49
320	310	300	9.0	15.5	27	124.0	97.6	22930	1480.0	13.60	6990	466.0	7.49
340	330	300	9.5	16.5	27	133.0	105.0	27690	1680.0	14.40	7440	496.0	7.46
360	350	300	10.0	17.5	27	143.0	112.0	33090	1890.0	15.20	7890	526.0	7.43
400	390	300	11.0	19.0	27	159.0	125.0	45070	2310.0	16.80	8560	571.0	7.34
450	440	300	11.5	21.0	27	178.0	140.0	63720	2900.0	18.90	9470	631.0	7.29
500	490	300	12.0	23.0	27	198.0	155.0	86970	3550.0	21.00	10370	691.0	7.24
550	540	300	12.5	24.0	27	212.0	166.0	111900	4150.0	23.00	10820	721.0	7.15
600	590	300	13.0	25.0	27	226.0	178.0	141200	4790.0	25.00	11270	751.0	7.05
650	640	300	13.5	26.0	27	242.0	190.0	175200	5470.0	26.90	11720	782.0	6.97
700	690	300	14.5	27.0	27	260.0	204.0	215300	6240.0	28.80	12180	812.0	6.84
800	790	300	15.0	28.0	30	286.0	224.0	303400	7680.0	32.60	12640	843.0	6.65
900	890	300	16.0	30.0	30	320.0	252.0	422100	9480.0	36.30	13550	903.0	6.50
1000	990	300	16.5	31.0	30	347.0	272.0	553800	11190.0	40.00	14000	934.0	6.35

## Vigas HEB

Vigas Europeas de alas anchas normales

ASTM Designation A36

Tolerancias dimensionales E.N 10024, 10034, 10056

Calidades de acero norma E.N 10025, S 275 JR

HEA	Dimensiones					Área	Peso	Momento respecto a los ejes					
(l)	(mm)					cm <sup>2</sup>	Kg/m	Eje x-x			Eje y-x		
IPB	h	b	s	t	r			lx	Sx	Rx	ly	Sy	Ry
								cm <sup>4</sup>	cm	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
100	100	100	6.0	10.0	12	26.0	20.4	450	89.9	4.15	167	33.5	2.53
120	120	120	6.5	11.0	12	34.0	26.7	864	144	5.04	318	52.9	3.05
140	140	140	7.0	12.0	12	43.0	33.7	1510	216	5.93	550	78.5	3.58
160	160	160	8.5	13.0	15	54.3	42.6	2490	311	6.78	889	111	4.05
180	180	180	8.5	14.0	15	65.3	51.2	3830	426	7.66	1360	151	4.57
200	200	200	9.0	15.0	18	78.1	61.3	5700	570	8.54	2000	200	5.07
220	220	220	9.5	16.0	18	91.0	71.5	8090	736	9.43	2840	258	5.59
240	240	240	10.0	17.0	21	106	83.2	11260	938	10.3	3920	327	6.08
260	260	260	10.0	17.5	24	118	93.0	14920	1150	11.2	5130	395	6.58
280	280	280	10.5	18.0	24	131	103	19270	1380	12.1	6590	471	7.09
300	300	300	11.0	19.0	27	149	117	25170	1680	13.0	8560	571	7.58
320	320	300	11.5	20.5	27	161	127	30820	1930	13.8	9240	616	7.57
340	340	300	12.0	21.5	27	171	134	36660	2160	14.6	9690	646	7.53
360	360	300	12.5	22.5	27	181	142	43190	2400	15.5	10140	676	7.40
400	400	300	13.5	24.0	27	198	155	57680	2880	17.1	10820	721	7.39
450	450	300	13.5	26.0	27	218	171	79890	3550	19.1	11720	781	7.33
500	500	300	14.5	28.0	27	239	187	107200	4290	21.2	12620	842	7.27
550	550	300	15.0	29.0	27	254	199	136700	4970	23.2	13080	872	7.17
600	600	300	15.5	30.0	27	270	212	171000	5700	25.2	13980	902	7.08
650	650	300	16.0	31.0	27	286	225	210600	6480	27.1	14000	932	6.99
700	700	300	17.0	32.0	27	306	241	256900	7340	29.0	14400	963	6.87
800	800	300	17.5	33.0	30	334	262	359100	8980	32.8	14900	994	6.68
900	900	300	18.5	35.0	30	371	291	494100	10980	36.5	15820	1050	6.53
1000	1000	300	19.5	36.0	30	400	314	644700	12890	40.1	16280	1090	6.38

Vigas IPE

Vigas europeas de alas paralelas

ASTM Designation A36

Tolerancias dimensionales E.N. 10024, 10034, 10056

Calidades de acero norma E.N. 10025 S 275JR

IPE (l)	Dimensiones					Área cm <sup>2</sup>	Peso Kg/m	Momento respecto a los ejes					
	(mm)							Eje x-x			Eje y-x		
	h	b	s	t	r			Ix	Sx	Rx	Iy	Sy	Ry
80	80	46	3.8	5.2	5	7.64	6.0	80.1	20.0	3.24	8.49	3.69	1.05
100	100	55	4.1	5.7	7	10.30	8.1	171	34.2	4.07	15.90	5.79	1.24
120	120	64	4.4	6.3	7	13.20	10.4	318	53.0	4.90	27.70	8.65	1.45
140	140	73	4.7	6.9	7	16.40	12.9	541	77.3	5.74	44.90	12.30	1.65
160	160	82	5.0	7.4	9	20.10	15.8	869	109.0	6.58	68.30	16.70	1.84
180	180	91	5.3	8.0	9	23.90	18.8	1320	146.0	7.42	101.00	22.20	2.05
200	200	100	5.6	8.5	12	28.50	22.4	1940	194.0	8.26	142.00	28.50	2.24
220	220	110	5.9	9.2	12	33.40	26.2	2770	252.0	9.11	205.00	37.30	2.48
240	240	120	6.2	9.8	15	39.10	30.7	3890	324.0	9.97	284.00	47.30	2.69
270	270	135	6.6	10.2	15	45.90	36.1	5790	429.0	11.20	420.00	62.20	3.02
300	300	150	7.1	10.7	15	53.80	42.2	8360	557.0	12.50	604.00	80.50	3.35
330	330	160	7.5	11.5	18	62.60	49.1	11770	713.0	13.70	788.00	98.50	3.55
360	360	170	8.0	12.7	18	72.70	57.1	16270	904.0	15.00	1040.00	123.00	3.79
400	400	180	8.6	13.5	21	84.50	66.3	23130	1160.0	16.50	1320.00	146.00	3.95
450	450	190	9.4	14.6	21	98.80	77.6	33740	1500.0	18.50	1680.00	176.00	4.12
500	500	200	10.2	16.0	21	116.00	90.7	48200	1930.0	20.40	2140.00	214.00	4.31
550	550	210	11.1	17.2	24	134.00	106.0	67120	2440.0	22.30	2670.00	254.00	4.45
600	600	220	12.0	19.0	24	156.00	122.0	22080	3070.0	24.30	3390.00	308.00	4.66

Vigas IPN  
 Vigas perfil normal europeo  
 ASTM Designation A36  
 Tolerancias dimensionales E.N. 10024, 10034, 10056  
 Calidades del acero norma E.N. 10025 S 275JR

IPN (l)	Dimensiones (mm)						Área cm <sup>2</sup>	Peso Kg/m	Momento respecto a los ejes					
	h	b	s	t	r1	r2			Eje x-x			Eje y-x		
									lx	Sx	Rx	ly	Sy	Ry
									cm <sup>4</sup>	cm	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
60	34	3.6	5.3	-	-	-	5.35	4.2	30.4	10.1	2.38	3.04	1.79	0.75
80	80	42	4.2	5.9	3.9	2.3	7.77	6.10	78.40	19.6	3.18	6.29	2.99	0.90
100	100	50	4.5	6.8	4.5	2.7	10.60	8.34	171.00	34.2	4.01	12.2	4.88	1.07
120	120	58	5.1	7.7	5.1	3.1	14.20	11.10	328.00	54.7	4.81	21.5	7.41	1.23
140	140	66	5.7	8.6	5.7	3.4	18.20	14.30	573.00	81.9	5.61	35.2	10.7	1.40
160	160	74	6.3	9.5	6.3	3.8	22.8	17.90	935.0	117.0	6.40	54.70	14.80	1.55
180	180	82	6.9	10.4	6.9	4.1	27.9	21.90	1450.0	161.0	7.20	81.30	19.80	1.71
200	200	90	7.5	11.3	7.5	4.5	33.4	26.20	2140.0	214.0	8.00	117.00	26.00	1.87
220	220	98	8.1	12.2	8.1	4.9	39.5	31.10	3060.0	278.0	8.80	162.00	33.10	2.02
240	240	106	8.7	13.1	8.7	5.2	46.1	36.20	4250.0	354.0	9.59	221.00	41.70	2.20
260	260	113	9.4	14.1	9.4	5.6	53.3	41.90	5740.0	442.0	10.40	288.00	51.00	2.32
280	280	119	10.1	15.2	10.1	6.1	61.0	47.90	7590.0	542.0	11.10	364.00	61.20	2.45
300	300	125	10.8	16.2	10.8	6.5	69.0	54.20	9800.0	653.0	11.90	451.00	72.20	2.56
320	320	131	11.5	17.3	11.5	6.9	77.7	61.00	12510.0	782.0	12.70	555.00	84.70	2.67
340	340	137	12.2	18.3	12.2	7.3	86.7	68.00	15700.0	923.0	13.50	674.00	98.40	2.80
360	360	143	13.0	19.5	13.0	7.8	97.0	76.10	19610.0	1090.0	14.20	818.00	114.00	2.90
380	380	149	13.7	20.5	13.7	8.2	107.0	84.00	24010.0	1260.0	15.00	975.00	131.00	3.02
400	400	155	14.4	21.6	14.4	8.6	118.0	92.40	29210.0	1460.0	15.70	1160.00	149.00	3.13
425	425	163	15.3	23.0	15.3	9.2	132.0	104.00	36970.0	1740.0	16.70	1440.00	176.00	3.30
450	450	170	16.2	24.3	16.2	9.7	147.0	115.00	45850.0	2040.0	17.70	1730.00	203.00	3.43
475	472	178	17.1	25.6	17.1	10.3	163.0	128.00	56480.0	2380.0	18.60	2090.00	235.00	3.60
500	500	185	18.0	27.0	18.0	10.8	179.0	141.00	68740.0	2750.0	19.60	2480.00	268.00	3.72
550	550	200	19.0	30.0	19.0	11.9	212.0	166.00	99180.0	3610.0	21.60	3490.00	349.00	4.02
600	600	215	21.6	32.4	21.6	13.0	254.0	199.00	139000.0	4630.0	23.40	4670.00	434.00	4.30

Vigas UPL  
 Vigas perfil liviano  
 Norma Covenin Perfiles 1293  
 Norma Covenin "U" 1037  
 Calidades del acero Norma Covenin AE 25 AE 35

UPL	Peso	Area	Altura	Ancho del ala	Espesor del ala	Espe sor	Eje x-x			Eje y-y			
	(Kg/m)	(cm <sup>2</sup> )	(mm)	(mm)	(mm)	(mm)	lx	Sx	rx	ly	Sy	ry	ey
			d	bf	tf	tw	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm	(cm)
80	6.08	7.75	80	35	7	4.5	74.4	18.6	3.1	7.8	3.18	1	1.1
100	8.2	10.5	100	40	8	5	155	30.9	3.92	13.5	4.8	1.15	1.22
120	9.58	12.2	120	45	8	5	266	443	4.67	19.8	6.1	1.27	1.31

Vigas UPN  
 Perfil europeo normal en "U"  
 ASTM Designation A36  
 Tolerancias dimensionales E.N. 10024, 10034, 10056  
 Calidades del acero norma E.N. 10025 S 275JR

UPN	Dimensiones (mm)						Seccion	Peso	Referido al eje x-x				Referido al eje y-y		
							A	P	Ix	Sx	Rx	c	Iy	Sy	Ry
	cm <sup>2</sup>	Kg/m	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm							
80	80	45	6.0	8.0	4.00	46	11.0	8.64	106	26.5	3.10	1.45	19.4	6.36	1.33
100	100	50	6.0	8.5	4.50	64	13.5	10.6	206	41.2	3.91	1.55	29.3	8.49	1.47
120	120	55	7.0	9.0	4.50	82	17.0	13.4	364	60.7	4.62	1.60	43.2	11.10	1.59
140	140	60	7.0	10.0	5.00	98	20.4	16.0	605	86.4	5.45	1.75	62.7	14.80	1.75
160	160	65	7.5	10.5	5.50	115	24.0	18.8	925	116.0	6.21	1.84	85.3	18.30	1.89
180	180	70	8.0	11.0	5.50	133	28.0	22.0	1350	150.0	6.95	1.92	114.0	22.40	2.02
200	200	75	8.5	11.5	6.00	151	32.2	25.3	1910	191.0	7.70	2.01	148.0	27.00	2.14
220	220	80	9.0	12.5	6.50	167	37.4	29.4	2690	245.0	8.48	2.14	197.0	33.60	2.30
240	240	85	9.5	13.0	6.50	184	42.3	33.2	3600	300.0	9.22	2.23	248.0	39.60	2.42
260	260	90	10.0	14.0	7.00	200	48.3	37.9	4820	371.0	9.99	2.36	317.0	42.70	2.56
280	280	95	10.0	15.0	7.50	216	53.3	41.8	6280	448.0	10.90	2.53	399.0	57.20	2.74
300	300	100	10.0	16.0	8.00	232	58.8	46.2	8030	535.0	11.70	2.70	495.0	67.80	2.90
320	320	100	14.0	17.5	8,75	246	75.8	59.5	10870	679.0					

## Pletinas

Pletinas de acero  
 Calidad Norma Covenin 2746-90  
 Calidad Norma Covenin 1293-85  
 Grado AE-25

Ancho		Dimensiones Nominales					
Espesor							
Pulgadas		Ancho	Espesor	Longitu	Kg / Pieza	Pieza	Kg / Atado
		mm	mm	(m)		Atado	
1/2 x	01-ago	12.7	3.18	6	1.90	480	913
	mar-16		4.76		2.84	330	940
	01-abr		6.35		3.80	270	1.026
5/8 x	01-ago	15.9	3.18	6	2.37	390	927
	mar-16		4.76		3.56	270	962
	01-abr		6.35		4.75	210	998
3/4x	01-ago	19.05	3.18	6	2.84	320	912
	mar-16		4.76		4.27	224	957
	01-abr		6.35		5.70	180	1.026
1 x	01-ago	25.4	3.18	6	3.79	250	950
	mar-16		4.76		5.70	168	958
	01-abr		6.35		7.596	128	972
1¼ x	01-ago	31.75	3.18	6	4.75	206	978
	mar-16		4.76		7.122	136	969
	01-abr		6.35		9.498	102	969
1½x	01-ago	38.1	3.18	6	5.70	172	980
	mar-16		4.76		8.544	112	958
	01-abr		6.35		11.394	84	957
2x	01-ago	50.8	3.18	6	7.50	128	972
	mar-16		4.76		11.394	84	957
	01-abr		6.35		15.192	64	972
1½	03-ago	38.1	9.53	6	17.28	60	1037



Denominación	Ancho	Espesor	Peso Pza.	Embalaje	Peso Atado
	(mm)	(mm)	(6m)	(Pzas. x Atado)	
50x9	50	9	21.60	48	1.037
50x12	50	12	28.80	36	1.037
65x6	65	6	18.35	54	991
65x9	65	9	27.55	36	992
65x12	65	12	36.70	27	991
75x6	75	6	21.17	48	1.016
75x9	75	9	31.79	32	1.017
75x12	75	12	42.42	24	1.018
100x6	100	6	28.80	36	1.037
100x9	100	9	43.20	24	1.037
100x12	100	12	57.60	18	1.037

## Cerchas

### CERCHAS ELECTROSOLDADAS ESTANDAR

Las cerchas estándar presentan características constantes exceptuando su altura, peso y ángulo de la diagonal.

Diámetro Alambre Superior (d3) 7.0 mm (superficie lisa).

Diámetro Alambre Diagonales (d2) 4.5 mm (superficie lisa).

Diámetro Alambre Inferior (d1) 5.0 mm (superficie estriada).

Paso del Zig-zag (a) 20 cm.

Separación entre alambres inferiores (v) 6 cm.

Tipo	Altura (h) cm	Angulo de la	Peso	Longitud
		diagonal	Kg/m	(m)
c-10	10	46.4	0.973	desde 2 hasta 12 mts con
c-15	15	57.7	1.077	incremento
c-20	20	64.6	1.194	de 10 cm.

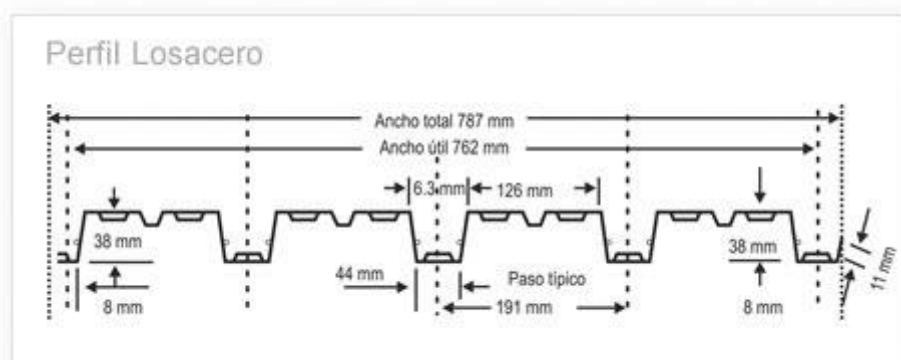
## Losacero

El Losacero 1 5" es una lámina de acero galvanizado estructural, creada para encofrar entrepisos, placas y techos.

Es producida a partir de acero laminado en frío, previamente galvanizado mediante un proceso continuo de inmersión en caliente, con un punto de rotura mínimo de 33 ksi, ASTM A525, A527, A446.

Longitudes Standard

4,10m - 4,60m - 5,10m - 6,10m - 6,60m



Tablas Sobrecargadas Admisibles (Kg/m<sup>2</sup>)

Calibre 20 (0,70mm)						
Espesor (H) de la Losa (cm)	H=8		H=10		H=12	
	Simple	Dos	Simple	Dos	Simple	Dos
Luz Libre entre apoyos	Apoyada	Tramos	Apoyada	Tramos	Apoyada	Tramos
1,50 m.	800	1250	960	2270	1050	2330
1,75 m.	400	1020	450	1240	340	1570
2,00 m.	240	680	-	-	-	-

Calibre 22 (0,90mm)						
Espesor (H) de la Losa (cm)	H=8		H=10		H=12	
	Simple	Dos	Simple	Dos	Simple	Dos
Luz Libre entre apoyos	Apoyada	Tramos	Apoyada	Tramos	Apoyada	Tramos
1,50 m.	970	1250	1200	2330	1400	2330
1,75 m.	570	1020	630	1630	610	1850
2,00 m.	320	830	270	1000	-	-
2,25 m.	180	510	-	-	-	-