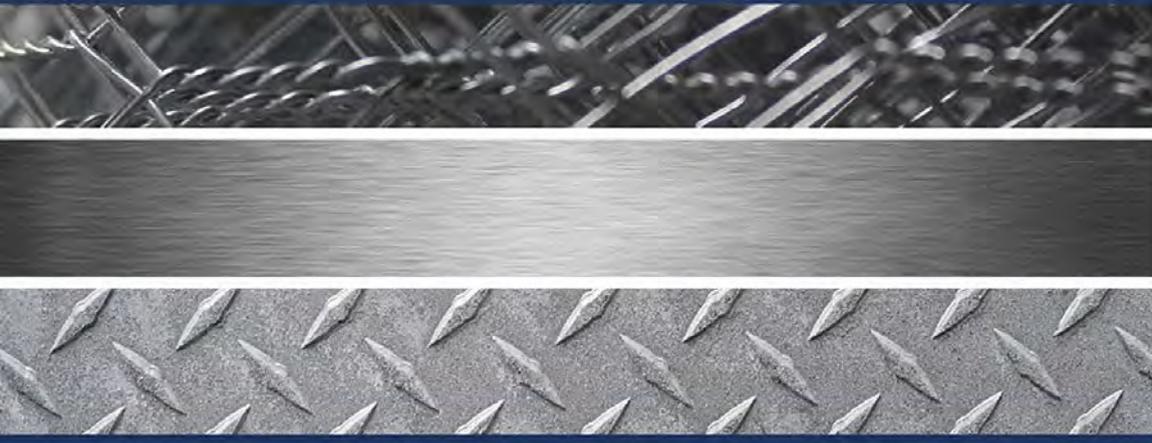




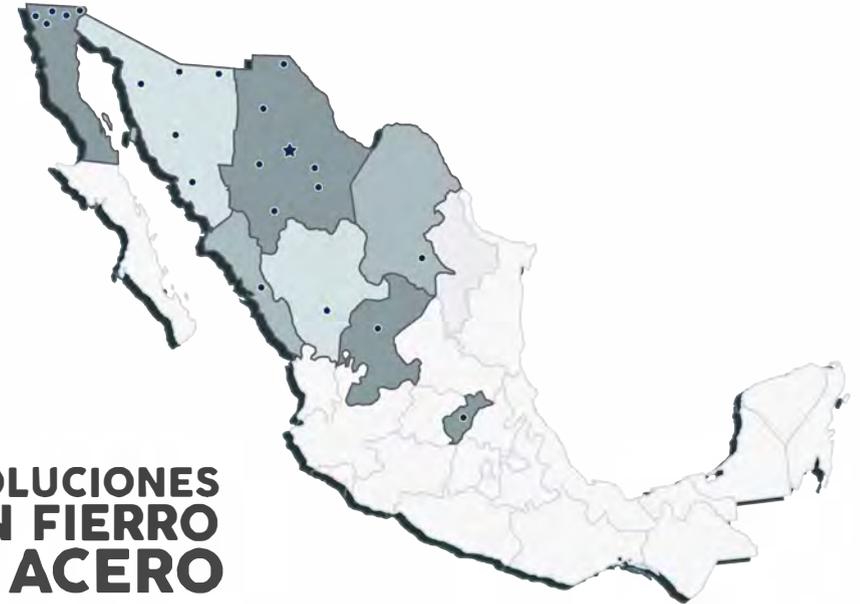
**FIERRO Y ACERO**  
**COFIASA**



# CATÁLOGO

Versión Extendida Acero: ADIAC

- CHIHUAHUA - SONORA - DURANGO - COAHUILA - SINALOA  
- QUERÉTARO - ZACATECAS - BAJA CALIFORNIA-



## SOLUCIONES EN FIERRO Y ACERO

ESTRUCTURISTA. INDUSTRIA. HOGAR. HERRERÍA.  
FERRETERÍA. AGROPECUARIO. CONSTRUCCIÓN

### -SUCURSALES-

#### **CHIHUAHUA**

Matriz (614) 442-10 40  
Norte (614) 483- 26 20  
Villa (614) 417- 74 22  
Dale (614) 492- 08 88  
Nueva España (614) 420- 80 22  
Aeropuerto (614) 446- 50 68  
Zarco (614) 411- 50 32  
Cuauhtémoc (625) 582-20 78  
Cuauh. Centro (625) 128- 07 46  
Camargo (648) 462- 39 66  
Delicias Norte (639) 472- 52 22  
Delicias Sur (639) 474- 59 19  
Parral (627) 523- 06 32  
Parral Niños Heroes (627) 525-73 60

#### **DURANGO**

Durango (618) 833- 01 02

#### **JUÁREZ**

Centro (656) 227-71 00  
Torres (656) 624-20 96  
Aztecas (656) 630-26 86  
Norte (656) 615-33 44  
Libramiento (656) 683-65 48  
Granjero (656) 693-28 46  
Casas Grandes (636) 694- 21 18

#### **SONORA**

Agua Prieta (633) 331- 0072  
Hermosillo Progreso (662) 264- 54 34  
Hermosillo Sur (662) 250- 94 12  
Caborca (637) 372- 72 30  
Obregón (644) 412- 00 82  
Nogales (631) 313- 54 50

#### **FRESNILLO**

Fresnillo (493) 935 -75 64

#### **BAJA CALIFORNIA**

Florido (664) 645-04 26  
Matamoros (664) 645-79 71  
Cinco y diez (664) 686-91 03  
Fundadores (664) 637-97 20  
Soler (664) 630 - 58 21  
Mexicali Terán (686) 561- 8460  
Mexicali Palaco (686) 577- 87 33  
Ensenada (665) 177-36 81  
Tecate (665) 654- 64 61  
Rosarito (661) 613- 41 27

#### **QUERÉTARO**

San José (442) 210- 22 39  
Carr. a Celaya (442) 195- 62 39

#### **SALTILLO**

Saltillo (844) 485- 13 05

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**COFIASA** ha participado en el desarrollo y crecimiento del país, durante 49 años; suministrando acero de la más alta calidad y con el mejor servicio.

Con presencia importante en los estados de Baja California, Chihuahua, Coahuila, Durango, Querétaro, Sinaloa, Sonora y Zacatecas, a través de 44 sucursales habiendo iniciado operaciones en Junio de 1971.

Nuestra misión es comercializar acero, materiales y artículos relacionados a la construcción y otras industrias, a través de procesos efectivos y eficientes que generen valor para nuestros clientes.

Recientemente, alineados con nuestra misión, hemos decidido incluir en nuestra oferta de valor una línea de productos de Acero Habilitado en la que aplicamos procesos de alta tecnología, lo que nos permite ofrecer a nuestros clientes grandes beneficios y continuar agregando valor a sus proyectos constructivos como lo hemos venido haciendo a lo largo de los últimos 49 años.

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FIERRO Y ACERO  
**COFIASA**



LA RED ACERA  
**MÁS GRANDE**  
DEL NOROESTE

## NOM NMX C407 VARILLA CORRUGADA ALTA RESISTENCIA

No. de Varilla	Diámetro		Área mm <sup>2</sup>	Peso kg/m	Longitud m	Peso por varilla kg	Varillas por tonelada piezas
	pulg.	mm.					
2.5	5/16"	7.94	49	0.384	12.0	4.61	217 ± 7
3	3/8"	9.53	71	0.560	12.0	6.72	149 ± 4
4	1/2"	12.70	127	0.994	12.0	11.93	84 ± 2
5	5/8"	15.88	198	1.552	12.0	18.62	54 ± 1
6	3/4"	19.05	285	2.235	12.0	26.82	37 ± 1
8	1"	25.40	507	3.973	12.0	47.68	21
10	1 1/4"	31.75	794	6.225	12.0	74.70	13
12	1 1/2"	38.10	1140	8.938	12.0	107.26	9

Resistencia a la tensión (mínimo)	6,300 kg/cm <sup>2</sup>
Resistencia a la fluencia (mínimo)	4,200 kg/cm <sup>2</sup>
Alargamiento a la ruptura en 200 mm	5/16", 3/8", 1/2", 5/8" y 3/4" 1" 1 1/4" y 1 1/2"
	9% 8% 7%



### GRADO 42

Propiedades mecánicas de doblado	
Diámetro	Diámetro de mandril
5/16"	3.5 d
3/8"	3.5 d
1/2"	3.5 d
5/8"	3.5 d
3/4"	5.0 d
1"	5.0 d
1 1/4"	7.0 d
1 1/2"	8.0 d

d = diámetro de la varilla

CARACTERÍSTICA	ESPECIFICACIÓN Y TOLERANCIA			
Distribución de las corrugaciones	Deben estar colocadas de manera que formen un ángulo no menor de 45° con respecto al eje de la varilla, y en direcciones encontradas en lados opuestos al eje de la varilla			
Espaciamento, altura y costilla de las corrugaciones	No. de varilla	Espaciamento máximo promedio en mm	Altura mínima promedio en mm	Costilla (cuerda) máxima en mm
	2.5	5,6	0,3	3,0
	3	6,7	0,4	3,6
	4	8,9	0,5	4,9
	5	11,1	0,7	6,1
	6	13,3	1,0	7,3
	8	17,8	1,3	9,7
	10	22,3	1,6	12,2
12	26,7	1,9	14,6	
Acabado	No deben ser causa de rechazo la presencia en la superficie de: escamas, irregularidades u óxido, siempre y cuando desaparezcan mediante la limpieza manual con un cepillo de alambre, y la probeta así cepillada cumpla con los requisitos dimensionales y mecánicos especificados.			

## VARILLA CORRUGADA GRADO 6000

Diámetro nominal	Área	kg/m	Peso x varilla	Longitud	COMPROBACIÓN DE IGUALDAD DE CARGAS			
pulg.	mm.	cm <sup>2</sup>	(kgs)	m	Diámetro nominal	Comprobación de resistencias		
						Resistencia a la fluencia	Área de acero	Carga
3/16"	4.76	0.178	0.149	0.84	1/4"	6,000 kg/cm <sup>2</sup>	0.317 kg/cm <sup>2</sup>	1,902 kg
1/4"	6.35	0.317	0.248	1.49	5/16"	4,200 kg/cm <sup>2</sup>	0.495 kg/cm <sup>2</sup>	2,079 kg
5/16"	7.94	0.495	0.388	2.33	5/16"	6,000 kg/cm <sup>2</sup>	0.495 kg/cm <sup>2</sup>	2,970 kg
					3/8"	4,200 kg/cm <sup>2</sup>	0.710 kg/cm <sup>2</sup>	2,982 kg

## CASTILLOS ELECTROSOLDADOS

Diseño	Varillas longitudinales corrugadas		Estribos lisos cada 15.8 cm		Sección de concreto cm	Sección de castillo doblado cm	Tramos por hoja	Peso teórico kg/pza	Fy kg/cm <sup>2</sup>	Diseño	Longitud m	Piezas por atado
	diámetro mm	grado	diámetro mm	grado								
15-15-4	6.00	60	4.1	50	15 x 15	10.5 x 10.5	5	6.91	6,000	10/36	6.0	120
15-20-4	6.00	60	4.1	50	15 x 20	10.5 x 15.5	4	7.29	6,000	12/36	2.8	120
15-25-4	6.00	60	4.1	50	15 x 25	10.5 x 20.6	3	7.66	6,000	12/36	6.0	120
15-30-4	6.00	60	4.1	50	15 x 30	10.5 x 25.7	3	8.04	6,000	12/64	2.8	120
esc-10-2	3.43	50	3.4	50	10	7.0	1	0.49	6,000	12/64	6.0	120
esc-12-2	3.43	50	3.4	50	12	9.0	1	0.51	6,000	14/36	3.9	120
esc-15-2	3.43	50	3.4	50	15	12.0	1	0.53	6,000	14/36	6.0	120
12-12-4	5.60	60	4.1	50	12 x 12	7.9 x 7.9	5	6.02	6,000	14/36	7.0	120
12-20-4	5.60	60	4.1	50	12 x 20	7.9 x 15.5	4	6.58	6,000	14/36	9.0	120
12-12-3	5.60	60	4.1	50	12 x 12	7.9 x 7.9	6	4.58	6,000	14/64	6.0	120
15-15-3	6.00	60	4.1	50	15 x 15	10.5 x 10.5	6	5.25	6,000	14/64	7.0	120
15-15-4	7.94	60	5.72	50	15 x 15	11 x 11	5	12.32	6,000	15/36	6.0	120
15-20-4	7.94	60	5.72	50	15 x 20	11 x 16	4	12.93	6,000	15/36	7.0	120
15-25-4	7.94	60	5.72	50	15 x 25	11 x 21	4	13.53	6,000	15/64	6.0	120
15-30-4	7.94	60	5.72	50	15 x 30	11 x 26	3	14.13	6,000	15/64	7.0	120
15-15-4	9.00	60	5.72	50	15 x 15	11 x 11	5	14.99	6,000	21/64	8.0	120
15-20-4	9.00	60	5.72	50	15 x 20	11 x 16	4	15.59	6,000			
15-25-4	9.00	60	5.72	50	15 x 25	11 x 21	4	16.19	6,000			
15-30-4	9.00	60	5.72	50	15 x 30	11 x 26	3	16.8	6,000			

## ARMADURA

## ALAMBRES GALVANIZADOS

INDUSTRIALES		FINOS		FERRETEROS		AGRÍCOLAS	
Calibre	Diámetros	Calibre	Diámetros	Calibre	Diámetro	Calibre	Diámetro
1/4 al 16	6.35 a 1.57	18, 20, 22	1.22, 0.84, 0.71	10.5, 12.5, 14.5, 16	3.15, 2.43, 1.6	16	1.57
Tensión	Peso/Rollo	Tensión	Peso/Rollo	Tensión	Peso/Rollo	Tensión	Peso/Rollo
3,900 - 5,200 kg/cm <sup>2</sup>	250, 300, 600 y 1,200 kg	3,900 - 5,200 kg/cm <sup>2</sup>	60 - 80 kg	14.5, 16	1.85, 1.57	18	1.22

## ALAMBRES

Calibre	Diámetro	Diámetro	Peso	Metros por kilo
Número	pulg.	mm	kg/1000 mts	
3/8	0.375	9.525	558.790	1.750
5/16	0.313	7.937	388.049	2.577
1/4	0.250	6.350	248.351	4.027
0	0.340	8.636	459.350	2.177
1	0.300	7.620	357.626	2.796
2	0.284	7.214	320.496	3.120
3	0.259	6.579	266.554	3.752
4	0.238	6.045	225.082	4.443
5	0.220	5.588	192.323	5.200
6	0.203	5.156	163.753	6.107
6 1/2	0.1915	4.864	145.725	6.862
7	0.180	4.572	128.745	7.767
7 1/2	0.1725	4.382	118.239	8.457
8	0.165	4.191	108.182	9.244
8 1/2	0.1565	3.975	97.323	10.275
9	0.148	3.759	87.038	11.489
9 1/2	0.141	3.581	79.000	12.658
10	0.134	3.404	71.350	14.015
10 1/2	0.127	3.226	64.091	15.602
11	0.120	3.048	57.220	17.476
11 1/2	0.1145	2.908	52.095	19.195
12	0.109	2.769	47.211	21.181
12 1/2	0.102	2.591	41.342	24.188
13	0.095	2.413	35.862	27.884
13 1/2	0.089	2.26	31.475	31.771
14	0.083	2.108	27.374	36.531
14 1/2	0.0775	1.969	23.867	41.898
15	0.072	1.829	20.599	48.546
15 1/2	0.0685	1.74	18.645	53.634
16	0.065	1.65	16.789	59.563
16 1/2	0.0615	1.562	15.029	66.538
17	0.058	1.473	13.367	74.811
17 1/2	0.0535	1.359	11.773	87.928
18	0.049	1.245	9.541	104.810
18 1/2	0.0455	1.156	8.226	121.566
19	0.042	1.067	7.009	142.674
19 1/2	0.0385	0.978	5.890	169.779
20	0.035	0.889	4.868	205.423
21	0.032	0.813	4.069	245.761
22	0.028	0.711	3.115	321.027

## CLAVO CONCRETO

Pulg.	mm	Pulg.	mm	Pulg.	mm
1	25	2	51	3	76
1 1/2	38	3 1/2	89	4	102
2	51	4	102	5	127
2 1/2	63	5	127	6	152
3	76	6	152	7	178
3 1/2	89	7	178	8	203

## CLAVOS

Pulg.	mm	Pulg.	mm	Pulg.	mm
2	51	2 1/2	63	3	76
3	76	3 1/2	89	4	102
4	102	4 1/2	114	5	127
5	127	5 1/2	139	6	152
6	152	6 1/2	165	7	178
7	178	7 1/2	190	8	203

## ALAMBRE RECOCIDO

Calibre	mm	metros por kilo
16	1.65	59
14	2.11	36
12	2.77	21
10	3.41	14
8	4.19	9

## MALLA ELECTROSOLDADA

TIPO	Diámetro del alambre	Área de acero	Peso por rollo	Peso por hoja	Diámetro del Rollo
	mm	cm <sup>2</sup> /m	kg	kg	cm
6x6 2/2	6.67	2.29	383	57.45	85
6x6 3/3	6.19	1.97	330	49.5	83
6x6 4/4	5.72	1.69	282	42.3	80
6x6 6/6	4.88	1.23	205	30.75	70
6x6 8/8	4.11	0.87	146	21.9	65
6x6 10/10	3.43	0.61	101	-	60
6x6 12/12	2.68	0.37	62	-	50

## ALAMBRÓN

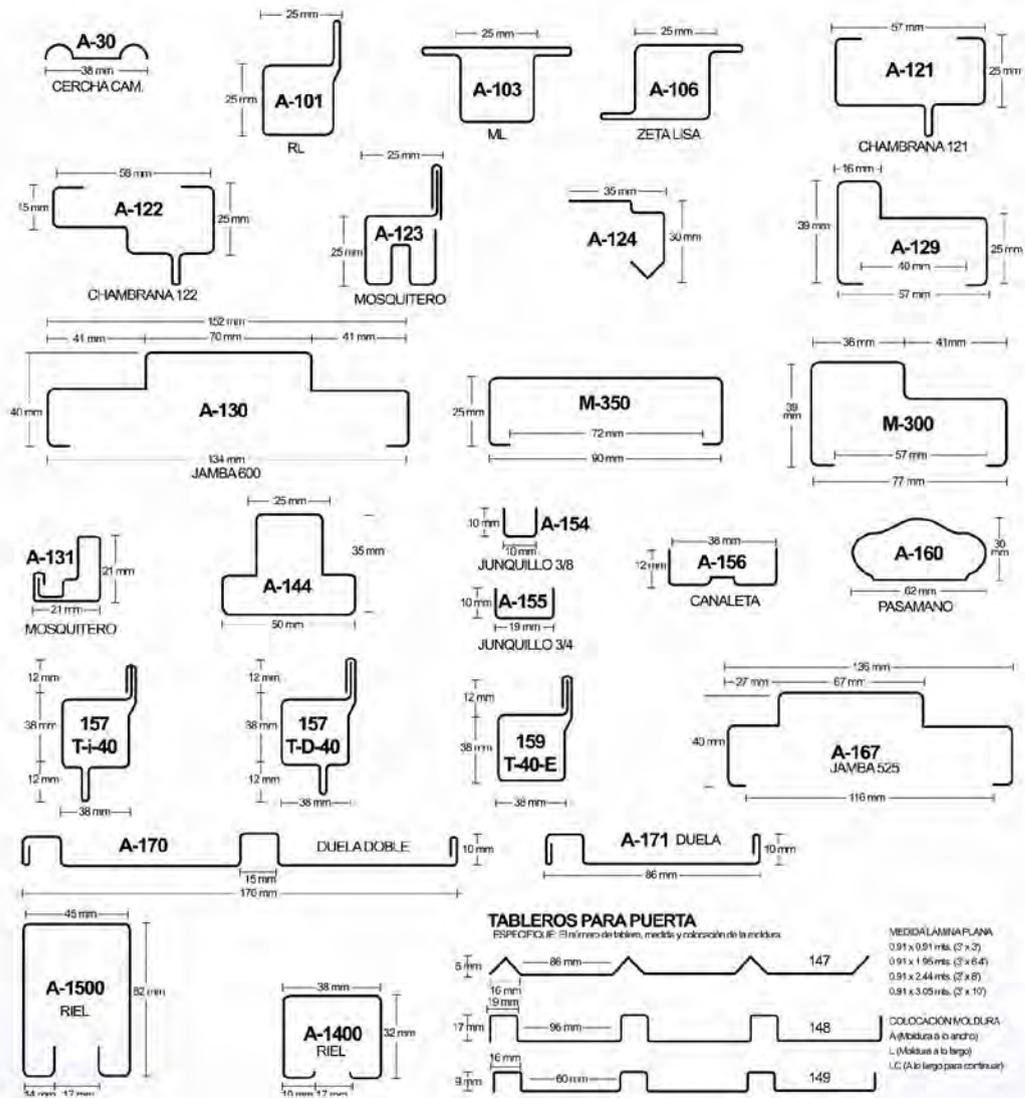
Diámetro	Peso	
pulg.	mm	kg/m
7/32"	5.50	0.186
1/4"	6.35	0.248
5/16"	7.94	0.388
3/8"	9.52	0.558

TC- Tipo Construcción  
TT- Tipo Trefilar

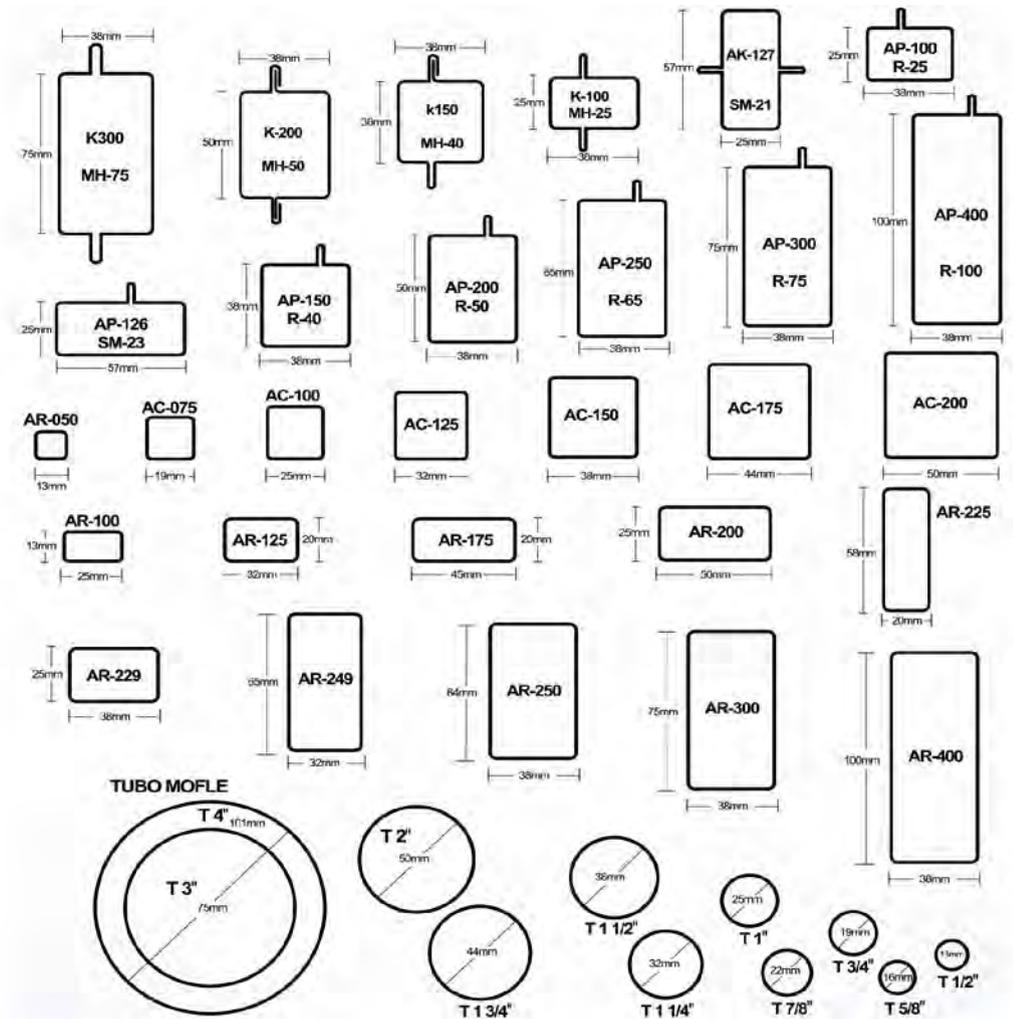
## SEMIFLECHA

Diámetro	Largo	Piezas / atado aprox.	kg/atado aprox.
pulg.	m		
3/16"	6.0	120	100
1/4"	6.0	67	100
5/16"	6.0	43	100
3/8"	6.0	30	100
1/2"	6.0	17	100

## PERFIL TUBULAR 6 mts.



## PERFIL TUBULAR 6 MTS.





FIERRO Y ACERO  
**COFIASA**

## PERFIL TUBULAR 6 mts.

### PERFILES TUBULARES 6.00 mts.

Perfil	Clave	Cal	Kg/m	Kg/pieza
Cercha	A-30	18	0.458	2.75
RL	A-101	18	1.220	7.32
RL	A-101	20	0.915	5.49
ML	A-103	18	1.435	8.61
ML	A-103	20	1.077	6.46
Zeta	A-106	18	1.357	8.14
Zeta	A-106	20	1.010	6.06
Chambrana	A-121	18	1.272	7.63
Chambrana	A-121	20	0.953	5.72
Chambrana	A-122	18	1.298	7.79
Chambrana	A-122	20	0.973	5.84
Mosquitero	A-123	18	1.387	8.32
Mosquitero	A-123	20	1.040	6.24
	A-124	18	0.673	4.04
	A-129(X)	18	1.320	7.26
	A-129(X)	20	0.989	5.44
Jamba 600	A-130(X)	20	1.693	9.31
	M-300(X)	18	1.600	8.80
	M-300(X)	20	1.170	6.44
	M-350(X)	20	1.070	5.89
Mosquitero	A-131	20	0.667	4.00
	A-144	18	1.467	8.80
	A-154	18	0.250	1.50
Junquillo	A-154	20	0.190	1.14
Junquillo	A-155	20	0.300	1.80
Canaleta	A-156	20	0.400	2.40
T-I-40	157	18	2.000	12.00
T-I-40	157	20	1.500	9.00
T-D-40	158	18	2.000	12.00
T-D-40	158	20	1.500	9.00
T-40-E	159	18	1.800	10.80
T-40-E	159	20	1.400	8.40

Perfil	Clave	Cal	Kg/m	Kg/pieza
Pasamano	A-160	18	1.488	8.93
Pasamano	A-160	20	1.117	6.70
Jamba 525	A-167(X)	18	2.133	11.73
Jamba 525	A-167(X)	20	1.600	8.80
Duela Doble	A-170	20	1.558	9.35
Duela Sencilla	A-171	20	0.878	5.27
Riel	A-1400	18	1.220	7.32
Riel	A-1500	14	3.000	18.00
Riel	A-1500	16	2.500	15.00
MH-25	AK-100	18	1.580	9.48
MH-25	AK-100	20	1.160	6.96
SM-21	AK-127	18	1.878	11.27
SM-21	AK-127	20	1.445	8.67
MH-40	AK-150	18	1.722	10.33
MH-40	AK-150	20	1.347	8.08
MH-50	*K200	18	2.300	7.02
MH-50	*K200	20	1.700	5.19
MH-75	K-300	18	2.600	15.60
MH-75	K-300	20	1.900	11.40
R-25	AP-100	18	1.330	7.98
R-25	AP-100	20	1.010	6.06
SM-23	AP-126	18	1.737	10.42
SM-23	AP-126	20	1.313	7.88
R-40	AP-150	18	1.615	9.69
R-40	AP-150	20	1.233	7.40
R-50	AP-200	18	1.855	11.13
R-50	AP-200	20	1.405	8.43
R-65	AP-250	18	2.080	12.48
R-65	AP-250	20	1.560	9.48
R-75	AP-300	18	2.352	14.11
R-75	AP-300	20	1.735	10.41
R-100	AP-400	18	2.800	16.80
R-100	AP-400	20	2.100	12.60

### CUADRADOS

Perfil	Calibre	Kg/m	Kg/pieza
AC-050	18	0.468	2.81
AC-050	20	0.352	2.11
AC-075	18	0.667	4.00
AC-075	20	0.525	3.15
AC-100	16	1.170	7.02
AC-100	18	0.933	5.60
AC-100	20	0.717	4.30
AC-125	16	1.480	8.88
AC-125	18	1.210	7.26
AC-125	20	0.910	5.46
AC-150	16	1.790	10.74
AC-150	18	1.467	8.80
AC-150	20	1.098	6.59
AC-175	16	1.708	10.25
AC-175	20	1.282	7.69
AC-200	16	2.387	14.32
AC-200	18	1.952	11.71
AC-200	20	1.463	8.76

### RECTANGULARES

Perfil	Calibre	Kg/m	Kg/pieza
AR-100	18	0.667	4.00
AR-100	20	0.525	3.15
AR-125	18	0.957	5.74
AR-125	20	0.717	4.30
AR-175	18	1.220	7.32
AR-175	20	0.915	5.46
AR-200	18	1.467	8.80
AR-200	20	1.105	6.63
AR-225	18	1.488	8.93
AR-225	20	1.097	6.58
AR-229	18	1.185	7.11
AR-229	20	0.888	5.33
AR-249	18	1.855	11.13
AR-249	20	1.390	8.34
AR-250	18	1.952	11.71
AR-250	20	1.463	8.76
AR-300	18	2.118	12.71
AR-300	20	1.603	9.62
AR-400	18	2.700	16.20
AR-400	20	2.000	12.00

### TUBO MOFLE

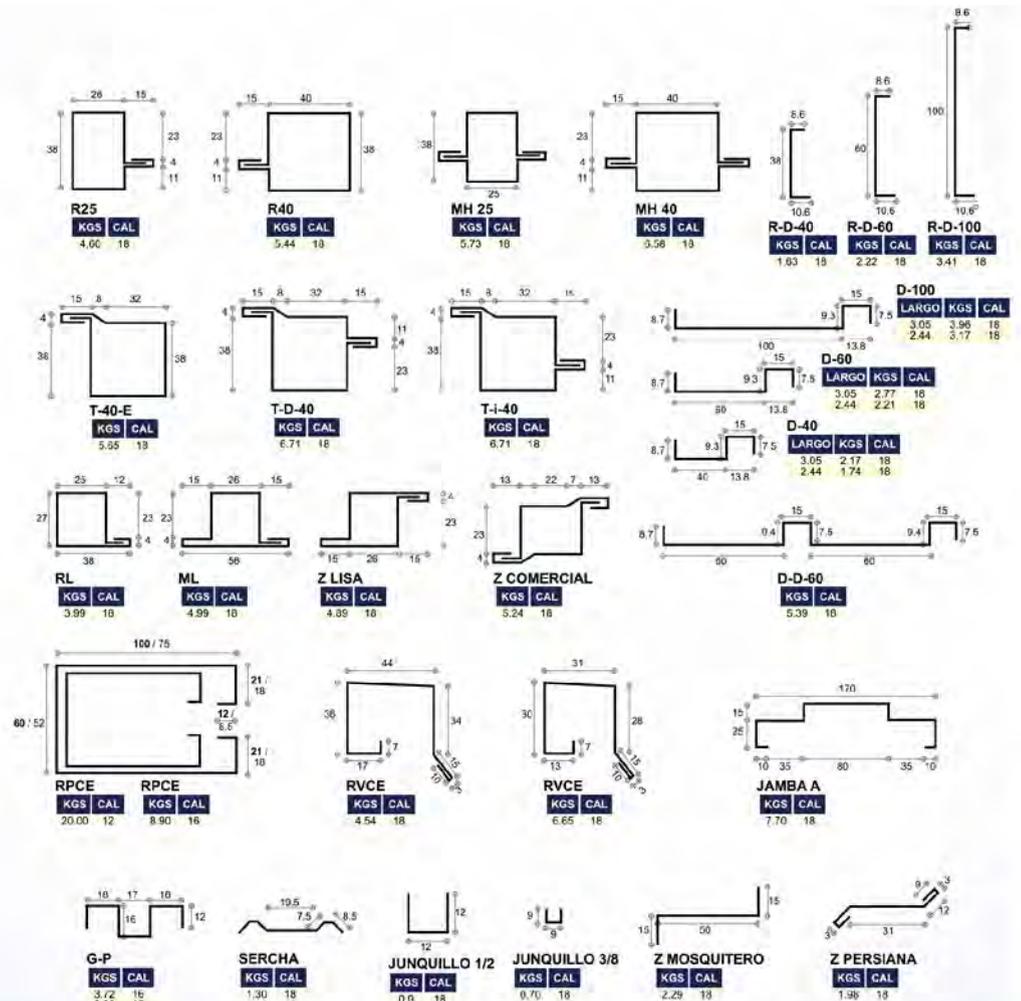
Perfil	Calibre	Kg/m	Kg/pieza
T-1/2	18	0.390	2.34
T-1/2	20	0.293	1.76
T-5/8	16	0.592	3.55
T-5/8	18	0.488	2.93
T-5/8	20	0.358	2.15
T-3/4	16	0.712	4.27
T-3/4	18	0.585	3.51
T-3/4	20	0.417	2.50
T-7/8	16	0.832	4.99
T-7/8	18	0.667	4.00
T-7/8	20	0.483	2.90
T-1	16	0.950	5.70
T-1	18	0.717	4.30
T-1	20	0.585	3.51
T-1 1/4	16	1.165	6.99
T-1 1/4	18	0.947	5.68
T-1 1/4	20	0.710	4.26
T-1 1/2	16	1.428	8.57
T-1 1/2	18	1.172	7.03
T-1 1/2	20	0.878	5.27
T-1 3/4	16	1.673	10.04
T-1 3/4	18	1.372	8.23
T-1 3/4	20	1.028	6.17
T-2	16	1.895	11.37
T-2	18	1.552	9.31
T-2	20	1.163	6.98
T-3	16	2.917	17.50
T-3	18	2.333	14.00
T-4	16	3.700	22.60
T-4	18	3.000	18.00

### TABLEROS

Medida		Calibre	Peso/pieza
Ancho	Largo		
3 (0.91)	3 (0.91)	20	6.06
3 (0.91)	6 (1.83)	20	12.12
3 (0.91)	8 (2.44)	20	16.18
3 (0.91)	10 (3.05)	20	20.21
4 (1.22)	3 (0.91)	20	8.08
4 (1.22)	4 (1.22)	20	10.78
4 (1.22)	6 (1.83)	20	16.17
4 (1.22)	8 (2.44)	20	21.58
4 (1.22)	10 (3.05)	20	26.95

Longitud estandar: 6.00 mts.  
Pesos teóricos con variación de +5%  
(x) Perfiles a 5.5 mts.  
\* Perfiles a 3.05 mts.

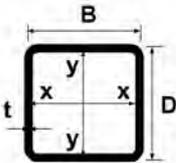
## PERFIL TUBULAR 3.05 MTS.





# PTR PERFIL TUBULAR CUADRADO (OR) (HSS)

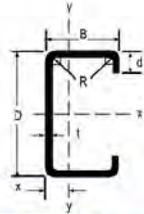
MEDIDA D x B	ESPESOR		CALIBRE	PESO		ÁREA	MOMENTO DE INERCIA	MÓDULO DE SECCIÓN	RADIO DE GIRO	COLOR
	pulg.	mm		kg/m	lb/pie					
1" x 1"	0.075	1.905	14	1.33	0.89	1.7	1.52	1.19	0.95	Verde
	0.095	2.413	13	1.62	1.09	2.07	1.75	1.58	0.92	Verde
	0.133	3.376	10	2.1	1.41	2.68	2.04	1.5	0.87	Rojo
1 1/4" x 1 1/4"	0.075	1.910	14	1.71	1.15	2.18	3.17	1.99	1.2	Azul
	0.090	2.300	13	2.2	1.48	2.82	3.52	2.34	1.18	Verde
	0.075	1.905	14	2.09	1.40	2.66	5.71	3	1.46	Azul
1 1/2" x 1 1/2"	0.110	2.794	12	2.94	1.98	3.74	7.56	3.97	1.4	Blanco
	0.125	3.175	11	3.27	2.20	4.18	8.21	4.31	1.4	Verde
	0.154	3.912	9	3.89	2.61	4.96	9.24	4.85	1.37	Rojo
2" x 2"	0.075	1.905	14	2.85	1.92	3.63	14.28	5.62	1.98	Blanco
	0.110	2.794	12	4.05	2.72	5.16	19.48	7.65	1.94	Azul
	0.125	3.175	11	4.54	3.05	5.79	21.37	8.41	1.92	Verde
2 1/2" x 2 1/2"	0.156	3.962	9	5.5	3.70	7.02	24.88	9.5	1.88	Rojo
	0.188	4.775	8	6.43	4.32	7.74	26.64	10.49	1.85	Azul
	0.250	6.350	6	8.05	5.41	9.68	30.8	12.13	1.78	Verde
3" x 3"	0.125	3.175	11	5.3	3.90	7.4	44.08	13.88	2.44	Blanco
	0.141	3.581	9	6.47	4.35	8.25	48.36	15.23	2.42	Verde
	0.188	4.775	8	8.34	5.60	10.63	59.32	18.88	2.36	Azul
3 1/2" x 3 1/2"	0.250	6.350	2	10.58	7.11	12.71	67.42	21.3	2.31	Verde
	0.125	3.175	11	7.07	4.75	9.01	78.93	20.72	2.96	Blanco
	0.156	3.962	9	8.66	5.82	11.05	94.24	22.73	2.92	Verde
4" x 4"	0.188	4.775	8	10.24	6.88	13.08	108.4	27.45	2.88	Rojo
	0.250	6.350	2	13.11	8.81	15.68	125.29	32.94	2.82	Azul
	0.125	3.175	11	8.33	5.60	10.63	128.54	28.32	3.44	Verde
4 1/2" x 4 1/2"	0.156	3.962	9	10.24	6.88	13.08	154.51	34.76	3.44	Blanco
	0.188	4.775	8	12.14	8.16	15.48	179.01	40.27	3.4	Verde
	0.250	6.350	2	15.53	10.50	19.93	220.16	49.53	3.32	Rojo
5" x 5"	0.125	3.175	11	9.6	6.45	12.24	195.49	38.48	4	Verde
	0.156	3.962	9	11.82	7.94	15.07	236.16	46.49	3.96	Blanco
	0.188	4.775	8	14.04	9.43	17.91	275.07	54.15	3.92	Verde
6" x 6"	0.250	6.350	2	18.16	12.20	23.16	341.94	67.31	3.84	Rojo
	0.125	3.175	11	12.13	8.15	15.47	391.86	81.71	5.03	Verde
	0.156	3.962	9	14.98	10.07	19.1	476.61	75.06	5	Blanco
7" x 7"	0.188	4.775	8	17.85	11.99	22.76	559.16	88.06	4.96	Verde
	0.250	6.350	2	23.22	15.60	29.61	705.26	111.08	4.88	Rojo
	0.125	3.175	11	12.13	8.15	15.47	391.86	81.71	5.03	Verde
8" x 8"	0.156	3.962	9	17.85	11.99	22.76	559.16	88.06	4.96	Blanco
	0.188	4.775	8	20.69	14.13	26.38	673.8	106.5	4.88	Verde
	0.250	6.350	2	26.69	18.33	34.19	843.8	133.3	4.8	Rojo
10" x 10"	0.125	3.175	11	10.86	7.30	13.85	282.4	49.41	4.51	Verde
	0.156	3.962	9	13.4	9.00	17.08	342.44	59.32	4.48	Blanco
	0.188	4.775	8	15.94	10.71	20.33	400.48	70.37	4.44	Verde
12" x 12"	0.250	6.350	2	20.69	14.13	26.38	501.9	87.82	4.36	Rojo
	0.125	3.175	11	12.13	8.15	15.47	391.86	81.71	5.03	Verde
	0.156	3.962	9	14.98	10.07	19.1	476.61	75.06	5	Blanco
14" x 14"	0.188	4.775	8	17.85	11.99	22.76	559.16	88.06	4.96	Verde
	0.250	6.350	2	23.22	15.60	29.61	705.26	111.08	4.88	Rojo
	0.125	3.175	11	10.86	7.30	13.85	282.4	49.41	4.51	Verde
16" x 16"	0.156	3.962	9	17.85	11.99	22.76	559.16	88.06	4.96	Blanco
	0.188	4.775	8	20.69	14.13	26.38	673.8	106.5	4.88	Verde
	0.250	6.350	2	26.69	18.33	34.19	843.8	133.3	4.8	Rojo



# PTR PERFIL TUBULAR RECTANGULAR (OR) (HSS)

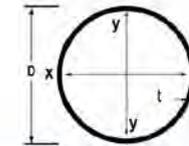
MEDIDA D x B	ESPESOR		CALIBRE	PESO		ÁREA	MOMENTO DE INERCIA		MÓDULO DE SECCIÓN		RADIO DE GIRO		COLOR
	pulg.	mm		kg/m	lb/pie		I <sub>xx</sub>	I <sub>yy</sub>	S <sub>xx</sub>	S <sub>yy</sub>	r <sub>xx</sub>	r <sub>yy</sub>	
3" x 2"	0.125	3.175	11	5.80	3.90	7.4	57.42	30.53	15.07	12.02	2.79	2.03	Blanco
	0.141	3.581	9	6.47	4.35	8.25	63.03	33.43	16.54	13.16	2.76	2.01	Verde
	0.188	4.775	8	8.34	5.60	10.63	77.42	40.75	20.32	16.04	2.7	1.96	Rojo
4" x 2"	0.125	3.175	11	7.07	4.75	9.01	117.34	36.69	23.1	15.63	3.61	2.10	Blanco
	0.156	3.962	9	8.66	5.82	11.05	140.19	47.02	27.59	18.51	3.56	2.06	Verde
	0.188	4.775	8	10.24	6.88	13.06	161.26	53.64	31.74	21.12	3.51	2.03	Rojo
4" x 3"	0.125	3.175	11	8.33	5.60	10.63	155.42	100.45	30.79	26.36	3.84	3.07	Blanco
	0.156	3.962	9	10.24	6.88	13.06	188.16	120.53	37.04	31.63	3.8	3.04	Verde
	0.188	4.775	8	12.14	8.16	15.48	218.17	139.38	42.95	36.58	3.75	3.00	Rojo
5" x 3"	0.25	6.350	2	15.63	10.50	19.93	269.87	170.61	52.89	44.63	3.67	2.83	Azul
	0.125	3.175	11	9.60	6.45	12.24	208.19	121.57	42.23	32.01	4.68	3.16	Blanco
	0.156	3.962	9	11.82	7.94	15.07	324.2	146.81	51.05	38.63	4.64	3.12	Verde
6" x 2"	0.188	4.775	8	14.04	9.43	17.91	377.87	170.37	59.51	44.72	4.59	3.08	Rojo
	0.25	6.350	2	18.16	12.20	23.16	470.26	210.27	74.08	55.19	4.51	3.01	Azul
	0.125	3.175	11	9.61	6.46	11.42	309.3	54.53	40.64	21.47	5.21	2.18	Blanco
6" x 2"	0.156	3.962	9	10.35	6.95	12.2	329	57.86	43.01	22.78	5.19	2.20	Verde
	0.188	4.775	8	14.02	9.42	16.71	457	75.34	57.19	28.66	5.11	2.11	Rojo
	0.25	6.350	2	18.16	12.20	21.88	545.3	91.57	71.45	36.05	5	2.06	Azul
6" x 3"	0.125	3.175	11	10.66	7.30	13.85	419.43	143.48	55.04	37.66	5.5	3.22	Blanco
	0.156	3.962	9	13.40	9.00	17.08	508.85	173.1	66.78	45.43	5.46	3.18	Verde
	0.188	4.775	8	15.94	10.71	20.33	595.34	201.35	75.13	52.85	5.41	3.15	Rojo
6" x 4"	0.25	6.350	2	20.69	14.13	26.38	748.55	249.72	97.97	66.64	5.32	3.08	Azul
	0.125	3.175	11	12.13	8.15	15.47	509.23	213.64	66.83	53.67	5.74	4.21	Blanco
	0.156	3.962	9	14.98	10.07	19.1	619.76	332.62	81.93	65.39	5.7	4.17	Verde
6" x 4"	0.188	4.775	8	17.85	11.99	22.76	727.55	388.87	95.48	76.55	5.65	4.13	Rojo
	0.25	6.350	2	23.22	15.60	29.61	918.68	488.49	120.66	96.16	5.57	4.06	Azul
	0.125	3.175	11	10.86	7.30	13.85	282.4	49.41	4.51	4.51	116.4	5.18	Blanco
7" x 5"	0.156	3.962	9	12.13	8.15	15.47	391.86	81.71	5.03	5.03	148.1	5.11	Verde
	0.188	4.775	8	14.98	10.07	19.1	476.61	75.06	5	5	177.0	5.03	Rojo
	0.250	6.350	2	18.16	12.20	23.16	589.89	212.72	84.45	128.0	4.95	4.95	Azul
7" x 5"	0.125	3.175	11	9.6	6.45	12.24	195.49	38.48	4	4	244.2	4.83	Blanco
	0.156	3.962	9	11.82	7.94	15.07	236.16	46.49	3.96	3.96	282.4	4.72	Verde
	0.188	4.775	8	14.04	9.43	17.91	275.07	54.15	3.92	3.92	329.4	4.61	Rojo
8" x 4"	0.250	6.350	2	18.16	12.20	23.16	341.94	67.31	3.84	3.84	418.3	4.19	Verde
	0.125	3.175	11	10.86	7.30	13.85	282.4	49.41	4.51	4.51	488.4	4.06	Blanco
	0.156	3.962	9	12.13	8.15	15.47	391.86	81.71	5.03	5.03	589.8	3.92	Verde
8" x 4"	0.188	4.775	8	14.98	10.07	19.1	476.61	75.06	5	5	700.0	3.84	Rojo
	0.250	6.350	2	20.69	14.13	26.38	501.9	87.82	4.36	4.36	843.8	4.06	Azul
	0.125	3.175	11	10.86	7.30	13.85	282.4	49.41	4.51	4.51	1068.0	3.92	Blanco
8" x 6"	0.156	3.962	9	12.13	8.15	15.47	391.86	81.71	5.03	5.03	1280.0	3.84	Verde
	0.188	4.775	8	14.98	10.07	19.1	476.61	75.06	5				

## POLÍN MONTÉN PERFIL C LAMINADO EN FRÍO (CF)



Designación	Calibre	Peso	Dimensiones			Área	Eje X - X			Eje Y - Y				Factor columna
			d	t	R		Ix	Sx	rx	Iy	Sy	r	x	
D x B		kg/m	mm	pulg.	mm	cm <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm	mm	
3" x 1 1/2"	14	2.40	19	0.0747	6.4	3.23	28	7.22	2.92	7	2.99	1.46	14.99	0.98
4" x 2"	10	5.85	19	0.1345	6.4	7.30	113	22.15	3.93	25	7.66	1.84	18.35	1.00
4" x 2"	12	4.55	19	0.1046	6.4	5.78	91	17.86	3.96	20	6.30	1.88	18.36	0.97
4" x 2"	14	3.29	19	0.0747	6.4	4.19	67	13.22	4.00	15	4.76	1.92	18.37	0.91
5" x 2"	10	6.56	19	0.1345	6.4	8.17	192	30.25	4.85	27	7.89	1.82	16.58	0.97
5" x 2"	12	5.08	19	0.1046	6.4	6.45	154	24.29	4.89	22	6.49	1.86	16.58	0.92
5" x 2"	14	3.68	19	0.0747	6.4	4.68	114	17.90	4.93	17	4.89	1.89	16.57	0.84
6" x 2"	10	7.38	19	0.1345	6.4	9.04	298	39.12	5.74	29	8.06	1.78	15.15	0.92
6" x 2"	12	5.82	19	0.1046	6.4	7.13	239	31.31	5.79	24	6.82	1.82	15.13	0.85
6" x 2"	14	4.21	19	0.0747	6.4	5.16	175	23.00	5.83	18	4.99	1.86	15.11	0.77
6" x 2 1/2"	10	7.95	19	0.1345	6.4	9.90	346	45.44	5.91	50	11.54	2.25	19.89	0.93
6" x 2 1/2"	12	6.18	19	0.1046	6.4	7.80	276	36.27	5.95	41	9.39	2.29	19.90	0.87
6" x 2 1/2"	14	4.46	19	0.0747	6.4	5.64	203	26.54	5.99	31	7.02	2.33	19.90	0.79
7" x 2 3/4"	10	9.00	22	0.1345	6.4	11.41	542	60.94	6.89	72	14.89	2.51	21.62	0.88
7" x 2 3/4"	12	6.99	19	0.1046	6.4	8.81	424	47.64	6.93	55	11.12	2.49	20.76	0.82
7" x 2 3/4"	14	5.04	19	0.0747	6.4	6.36	309	34.37	6.97	41	8.27	2.53	20.76	0.74
8" x 2 3/4"	10	9.82	22	0.1345	6.4	12.28	744	73.19	7.78	75	15.11	2.47	20.21	0.83
8" x 2 3/4"	12	7.72	19	0.1046	6.4	9.49	580	57.10	7.82	57	11.28	2.45	19.38	0.77
8" x 2 3/4"	14	5.57	19	0.0747	6.4	6.85	423	41.16	7.86	42	8.39	2.49	19.37	0.69
8" x 3"	10	10.14	22	0.1345	6.4	12.71	787	77.45	7.87	93	17.34	2.71	22.53	0.84
8" x 3"	12	7.89	22	0.1046	6.4	9.98	625	61.47	7.91	75	14.00	2.74	22.52	0.78
8" x 3"	14	5.63	19	0.0747	6.4	7.09	448	42.80	7.95	52	9.62	2.72	21.67	0.69
9" x 2 3/4"	10	10.52	22	0.1345	6.4	13.15	985	86.18	8.66	78	15.29	2.43	18.99	0.79
9" x 2 3/4"	12	8.26	19	0.1046	6.4	10.16	767	67.14	8.69	59	11.42	2.41	18.18	0.72
9" x 2 3/4"	14	5.96	19	0.0747	6.4	7.33	559	48.36	8.73	44	8.49	2.45	18.16	0.65
9" x 3 1/2"	10	11.78	25	0.1345	6.4	14.65	1167	102.10	8.92	150	24.02	3.19	26.65	0.81
9" x 3 1/2"	12	9.12	22	0.1046	6.4	11.33	911	79.09	8.96	114	18.07	3.17	25.79	0.75
9" x 3 1/2"	14	6.56	19	0.0747	6.4	8.05	652	53.19	9.00	80	12.45	3.15	24.91	0.63
10" x 2 3/4"	10	11.22	22	0.1345	6.4	14.01	1269	99.92	9.52	80	15.44	2.39	17.92	0.75
10" x 2 3/4"	12	8.80	19	0.1046	6.4	10.84	987	77.75	9.55	61	11.53	2.37	17.13	0.68
10" x 2 3/4"	14	6.34	19	0.0747	6.4	7.81	719	55.97	9.59	45	8.58	2.41	17.09	0.61
10" x 3 1/2"	10	12.37	25	0.1345	6.4	15.52	1495	117.74	9.82	155	24.29	3.16	25.26	0.77
10" x 3 1/2"	12	9.62	22	0.1046	6.4	12.01	1165	91.12	9.85	118	18.28	3.13	24.42	0.71
10" x 3 1/2"	14	6.87	19	0.0747	6.4	8.53	833	61.37	9.88	82	12.59	3.11	23.55	0.60
12" x 3 1/2"	10	13.74	25	0.1345	6.4	17.26	2308	151.37	11.56	163	24.73	3.08	22.88	0.71
12" x 3 1/2"	12	10.64	22	0.1046	6.4	13.36	1796	117.02	11.59	124	18.61	3.05	22.07	0.64
12" x 3 1/2"	14	7.57	19	0.0747	6.4	9.50	1282	79.06	11.62	87	12.82	3.02	21.25	0.54

## TUBERÍA PARA USO MECÁNICO ASTM A-500



### DIÁMETROS MENORES (OC)

CED No.	DIÁMETRO NOMINAL		DIÁMETRO EXTERIOR (D)		ESPESOR (T)		CALIBRE	PESO		ÁREA	I	S	R
	pulg.	mm	pulg.	mm	pulg.	mm		kg/m	kg/pieza				
30	1/2"	13	0.840	21.34	0.075	1.905	14	0.91	5.46	1.163	0.55	0.519	0.69
	3/4"	19	1.050	26.67	0.075	1.905	14	1.16	6.96	1.482	1.14	0.857	0.878
	1"	25	1.315	33.40	0.075	1.905	14	1.56	9.36	1.885	2.35	1.405	1.116
	1 1/4"	32	1.660	42.16	0.090	2.286	13	2.35	14.10	2.864	5.71	2.709	1.412
	1 1/2"	38	1.900	48.26	0.090	2.286	13	2.71	16.26	3.302	8.75	3.624	1.627
	2"	51	2.375	60.33	0.105	2.667	12	3.96	23.76	4.831	20.12	6.670	2.041
	2 1/2"	64	2.875	73.03	0.105	2.667	12	4.84	29.04	6.967	42.58	11.662	2.472
	3"	76	3.500	88.90	0.120	3.048	11	6.75	40.50	8.551	78.65	17.695	3.033
	4"	102	4.500	114.30	0.120	3.048	11	8.74	52.44	11.084	171.24	29.962	3.93
	5"	127	5.000	127.00	0.125	3.175	1/8"	9.69	58.14	12.351	236.87	37.303	4.379
6 5/8"	168	6.625	168.30	0.188	4.780	3/16"	19.23	115.38	24.528	820.30	97.495	5.783	
40	1/2"	13	0.840	21.34	0.109	2.769	12	1.27	7.62	1.615	0.71	0.667	0.664
	3/4"	19	1.050	26.67	0.113	2.870	12	1.68	10.08	2.146	1.54	1.156	0.848
	1"	25	1.315	33.40	0.133	3.378	10	2.65	15.90	3.186	3.64	2.177	1.068
	1 1/4"	32	1.660	42.16	0.135	3.429	10	3.49	20.94	4.313	8.10	3.844	1.371
	1 1/2"	38	1.900	48.26	0.145	3.683	9	4.37	26.22	5.158	12.90	5.346	1.581
	2"	51	2.375	60.33	0.154	3.912	9	5.55	33.30	6.932	27.71	9.187	1.999
	2 1/2"	64	2.875	73.03	0.188	4.775	3/16"	8.43	50.58	10.994	63.67	17.436	2.406
	3"	76	3.500	88.90	0.220	5.588	5	12.25	73.50	14.377	125.58	28.253	2.955
	4"	102	4.500	114.30	0.220	5.588	5	15.98	95.88	20.478	301.04	52.676	3.834
	6 5/8"	168	6.625	168.28	0.280	7.112		29.65	177.90	36.009	1171.37	139.220	5.704
PG*	1/2"	13	0.840	21.34	0.090	2.286	13	1.07	6.42	1.368	0.63	0.590	0.678
	3/4"	19	1.050	26.67	0.095	2.413	13	1.44	8.64	1.839	1.37	1.024	0.862
	1"	25	1.315	33.40	0.104	2.642	12	2.00	12.00	2.553	3.04	1.821	1.092
	1 1/4"	32	1.660	42.16	0.110	2.794	12	2.71	16.26	3.456	6.73	3.192	1.395
	1 1/2"	38	1.900	48.26	0.114	2.896	11	3.24	19.44	4.127	10.66	4.417	1.607
	2"	51	2.375	60.33	0.120	3.048	11	4.30	25.80	5.485	22.56	7.478	2.028
	2 1/2"	64	2.875	73.03	0.145	3.683	9	6.29	37.74	8.023	48.36	13.244	2.455
	3"	76	3.500	88.90	0.150	3.810	9	7.99	47.94	10.185	92.36	20.779	3.011
	4"	102	4.500	114.30	0.156	3.962	8	10.77	64.62	13.735	209.29	36.621	3.904
	5"	127	5.000	127.00	0.156	3.962	8	12.01	72.06	15.316	290.12	45.689	4.325
6 1/4"	159	6.250	158.75	0.156	3.962	8	15.11	90.66	19.268	577.45	72.749	5.474	
6 5/8"	168	6.625	168.28	0.250	6.350	1/4"	25.33	151.98	32.303	1060.33	126.024	5.729	

PROPIEDADES MECÁNICAS ASTM A-500	GRADO A		GRADO B		GRADO C	
	lbs/pulg <sup>2</sup>	kg/cm <sup>2</sup>	lbs/pulg <sup>2</sup>	kg/cm <sup>2</sup>	lbs/pulg <sup>2</sup>	kg/cm <sup>2</sup>
Esfuerzo de ruptura mín.	45,000	3,164	58,000	4,078	62,000	4,359
Esfuerzo de fluencia mín.	33,000	2,320	42,000	2,953	46,000	3,234

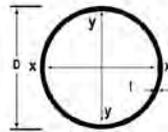
PG\*: Tubo de pared gruesa.  
Nota: La tubería para uso mecánico se surte como estándar en tramos de 5.00 mts.

# TUBERÍA PARA USO MECÁNICO ASTM A-500

# LÁMINA

## DIÁMETROS MAYORES (OC)

DENOMINACIÓN		DIÁMETRO EXTERIOR	ESPESOR DE PARED	PESO EXTREMO LISO	DIÁMETRO INTERIOR	ÁREA		I	S	R	
Tamaño Nominal	Pared	D (pulg/a)	t (pulg/a)	Wpe (lb/ft)	d (pulg)	pulg <sup>2</sup>	cm <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	cm	
6 5/8		6.625	0.312	21.04	31.31	6.001	6.19	39.92	1283.93	152.60	5.68
6 5/8		6.625	0.375	25.03	37.25	5.875	7.36	47.50	1499.18	178.18	5.62
6 5/8	80 XE	6.625	0.432	28.57	42.52	5.761	8.40	54.23	1682.35	199.95	5.57
6 5/8		6.625	0.500	32.71	48.68	5.625	9.62	62.07	1887.09	224.29	5.52
8 5/8		8.625	0.188	16.94	25.21	8.249	4.98	32.15	1043.14	168.27	7.58
8 5/8	20	8.625	0.250	22.36	33.28	8.125	6.58	42.44	2398.29	218.95	7.52
8 5/8	30	8.625	0.277	24.70	36.76	8.071	7.26	46.87	2632.24	240.31	7.50
8 5/8	40 E	8.625	0.322	28.65	42.49	7.981	8.40	54.19	3011.86	274.96	7.46
8 5/8		8.625	0.375	33.04	49.17	7.875	9.72	62.71	3442.79	314.30	7.42
8 5/8	80 XE	8.625	0.500	43.39	64.57	7.625	12.76	82.34	4392.41	401.00	7.31
10 3/4		10.750	0.188	21.21	31.56	10.374	6.24	36.86	1616.36	240.31	9.43
10 3/4	20	10.750	0.250	28.04	41.73	10.250	8.25	53.20	4724.71	346.07	9.38
10 3/4	30	10.750	0.307	34.24	50.96	10.136	10.07	64.98	5709.66	418.21	9.38
10 3/4	40 E	10.750	0.365	40.48	60.24	10.020	11.91	76.93	6678.35	489.17	9.33
10 3/4	80 XE	10.750	0.500	54.74	81.46	9.750	16.10	103.68	8606.33	645.03	9.22
12 3/4		12.750	0.188	25.22	37.53	12.374	7.42	47.87	6082.08	375.61	11.28
12 3/4	20	12.750	0.250	33.38	49.68	12.250	9.82	63.34	7970.12	492.21	11.23
12 3/4	30	12.750	0.330	43.77	65.14	12.090	12.88	83.07	10323.01	637.52	11.18
12 3/4		12.750	0.344	45.58	67.83	12.062	13.41	86.50	10725.28	662.36	11.15
12 3/4	E	12.750	0.375	49.56	73.75	12.000	14.58	94.06	11606.10	716.76	11.12
12 3/4	40	12.750	0.406	53.52	79.65	11.938	15.74	101.58	12473.38	770.32	11.09
12 3/4	XE	12.750	0.500	65.42	97.36	11.750	19.24	124.14	15021.81	927.70	11.01
14		14.000	0.188	27.73	41.27	13.624	8.16	52.53	8084.05	454.67	12.40
14	10	14.000	0.250	36.71	54.63	13.500	10.80	69.57	10607.49	596.60	12.35
14	20	14.000	0.312	45.61	67.88	13.376	13.42	86.56	13062.34	734.66	12.30
14	30 E	14.000	0.375	54.57	81.21	13.250	16.05	103.56	15487.83	871.08	12.24
14	40	14.000	0.438	63.44	94.41	13.124	18.66	120.40	17845.10	1003.66	12.19
14	XE	14.000	0.500	72.09	107.28	13.000	21.21	136.81	20099.81	1130.46	12.13
16		16.000	0.188	31.75	47.25	15.624	9.34	60.25	12128.32	596.87	14.20
16	10	16.000	0.250	42.05	62.58	15.500	12.37	79.81	15940.87	784.49	14.15
16	20	16.000	0.312	52.27	77.79	15.376	15.38	99.21	19663.01	967.67	14.09
16	30 E	16.000	0.375	62.58	93.13	15.250	18.41	118.76	23354.06	1149.31	14.04
16	40 XE	16.000	0.500	82.77	123.18	15.000	24.35	157.08	30411.49	1496.63	13.93
18		18.000	0.188	35.76	53.22	17.624	10.52	67.87	17336.55	758.38	16.00
18	10	18.000	0.250	47.39	70.52	17.500	13.94	89.94	22816.14	998.08	15.94
18	20	18.000	0.312	58.94	87.71	17.376	17.34	111.85	28180.38	1232.74	15.89
18	E	18.000	0.375	70.59	105.05	17.250	20.76	133.96	33514.76	1466.09	15.83
18	30	18.000	0.438	82.15	122.25	17.124	24.17	155.91	38733.52	1694.38	15.78
18	XE	18.000	0.500	93.45	139.07	17.000	27.49	177.35	43758.20	1914.18	15.72
20		20.000	0.250	52.73	78.47	19.500	15.51	100.07	31429.09	1237.37	17.74
20	10	20.000	0.312	65.60	97.62	19.376	19.30	124.50	38858.80	1529.87	17.68
20	20 E	20.000	0.375	78.60	116.97	19.250	23.12	149.16	46263.53	1821.40	17.63
20	XE	20.000	0.500	104.13	154.96	19.000	30.63	197.62	60531.33	2383.12	17.52
22		22.000	0.250	58.07	86.42	21.500	17.08	110.21	41975.52	1502.35	19.53
22	E	22.000	0.375	86.61	128.89	21.250	25.48	164.36	61894.37	2215.26	19.42
22	XE	22.000	0.500	114.81	170.86	21.000	33.77	217.88	81122.46	2903.45	19.31
22		22.000	0.562	128.67	191.48	20.876	37.85	244.20	90408.32	3235.80	19.26
22		22.000	0.625	142.68	212.33	20.750	41.97	270.77	99875.97	3567.50	19.20
24		24.000	0.250	63.41	94.37	23.500	18.65	120.34	54651.23	1793.02	21.33
24	10	24.000	0.312	78.93	117.46	23.376	23.22	149.80	67876.21	2220.35	21.27
24	20 E	24.000	0.375	94.62	140.81	23.250	27.83	179.56	80700.66	2647.66	21.22
24	XE	24.000	0.500	125.49	186.75	23.000	36.91	238.15	105923.20	3475.17	21.11
24	30	24.000	0.562	140.68	209.36	22.876	41.38	266.98	118132.26	3875.73	21.05
24		24.000	0.625	156.03	232.20	22.750	45.90	298.11	130336.54	4276.13	21.00
24	40	24.000	0.688	171.29	254.91	22.624	50.39	325.08	142339.71	4669.94	20.94



## LÁMINA LISA ROLADA EN CALIENTE Y FRÍO PROCEDENTE DE ROLLO

ESPESOR			PESO TEÓRICO		PESO APROXIMADO POR HOJA			
Calibre	Pulg	mm	kg/m <sup>2</sup>	kg/pie <sup>2</sup>	3' x 8'	3' x 10'	4' x 8'	3' x 10'
1/4"	0.2500	6.35	49.83	4.63	111.12	138.89	148.15	185.19
3	0.2390	6.07	48.82	4.54	108.85	136.07	145.14	181.42
4	0.2242	5.69	45.77	4.25	102.05	127.57	136.07	170.09
5	0.2090	5.31	42.72	3.97	95.25	119.56	127.00	158.75
6	0.1940	4.93	39.67	3.69	88.45	110.56	117.93	147.42
3/16"	0.1870	4.75	37.28	3.46	83.11	103.89	110.82	138.52
7	0.1790	4.55	36.62	3.40	81.65	102.06	108.87	136.08
8	0.1640	4.17	33.57	3.12	74.85	93.56	99.80	124.75
9	0.1495	3.80	30.52	2.84	68.05	85.06	90.73	113.42
10	0.1345	3.42	27.46	2.55	61.23	76.53	81.64	102.04
1/8"	0.1250	3.18	24.92	2.31	55.56	69.45	74.08	92.60
11	0.1196	3.04	24.41	2.27	54.43	68.03	72.57	90.71
12	0.1046	2.66	21.36	1.98	47.63	59.53	63.50	79.38
13	0.0897	2.28	18.30	1.70	40.80	51.00	54.40	68.00
14	0.0747	1.90	15.26	1.42	34.02	42.53	45.37	56.71
15	0.0673	1.71	13.42	1.25	29.91	37.39	39.88	49.85
16	0.0598	1.52	12.20	1.13	27.20	34.00	36.27	45.34
17	0.0538	1.37	10.72	1.00	23.91	29.89	31.88	39.85
18	0.0478	1.21	9.76	0.91	21.76	27.20	29.02	36.27
19	0.0418	1.06	8.33	0.77	18.58	23.22	24.77	30.96
20	0.0359	0.91	7.32	0.68	16.32	20.40	21.76	27.20
21	0.0329	0.84	6.56	0.61	14.62	18.28	19.50	24.37
22	0.0299	0.76	6.10	0.57	13.60	17.00	18.13	22.67
23	0.0269	0.68	5.36	0.50	11.96	14.95	15.94	19.93
24	0.0239	0.61	4.88	0.45	10.88	13.60	14.51	18.13
25	0.0209	0.53	4.17	0.39	9.29	11.61	12.39	15.48
26	0.0179	0.45	3.66	0.34	8.16	10.20	10.88	13.60
27	0.0164	0.42	3.27	0.30	7.29	9.11	9.72	12.15
28	0.0149	0.38	3.05	0.28	6.80	8.50	9.07	11.33
29	0.0135	0.34	2.69	0.25	6.00	7.50	8.00	10.00
30	0.0120	0.30	2.44	0.23	5.44	6.80	7.25	9.07

## PLACA

### PLACA ANCHA CON ORILLA RECORTADA

ESPESOR		PESO TEÓRICO		PESO APROXIMADO POR HOJA				
pulgadas	mm	kg/m <sup>2</sup>	kg/pie <sup>2</sup>	5' x 20'	6' x 20'	7' x 20'	8' x 20'	10' x 20'
3/16"	0.188	4.78	37.84	352	422	492	562	703
1/4"	0.250	6.35	50.38	468	562	655	749	936
5/16"	0.313	7.95	62.93	585	702	818	935	1,169
3/8"	0.375	9.53	75.57	702	842	983	1,123	1,404
7/16"	0.438	11.13	88.10	818	982	1,146	1,310	1,637
1/2"	0.500	12.70	100.77	936	1,123	1,311	1,498	1,872
9/16"	0.563	14.30	113.27	1,052	1,263	1,473	1,684	2,105
5/8"	0.625	15.88	125.96	1,170	1,404	1,638	1,872	2,340
11/16"	0.688	17.48	138.44	1,286	1,543	1,801	2,058	2,572
3/4"	0.750	19.05	151.15	1,404	1,685	1,966	2,247	2,808
7/8"	0.875	22.23	176.34	1,638	1,966	2,294	2,621	3,276
1"	1.000	25.40	201.53	1,872	2,247	2,621	2,996	3,745
1 1/8"	1.125	28.58	226.72	2,106	2,528	2,949	3,370	4,213
1 1/4"	1.250	31.75	251.92	2,340	2,808	3,277	3,745	4,681
1 3/8"	1.375	34.93	277.11	2,574	3,089	3,604	4,119	5,149
1 1/2"	1.500	38.10	302.30	2,808	3,370	3,932	4,493	5,617
1 5/8"	1.625	41.28	327.49	3,042	3,651	4,259	4,868	6,085
1 3/4"	1.750	44.45	352.68	3,276	3,932	4,587	5,242	6,553
2"	2.000	50.80	403.07	3,745	4,494	5,242	5,991	7,489
2 1/4"	2.250	57.15	453.45	4,213	5,055	5,898	6,740	8,425
2 1/2"	2.500	63.50	503.83	4,681	5,617	6,553	7,489	9,361
3"	3.000	76.20	604.60	5,617	6,740	7,864	8,987	11,234

### FÓRMULAS PARA CALCULAR EL PESO APROXIMADO DE UNA PLANCHILLA EN CUALQUIER DIMENSIÓN

$$P = e \times a \times l \times Fe$$

P = peso en kgs.  
e = espesor en pulgadas  
a = ancho en pulgadas  
l = largo en pulgadas  
Fe = peso específico en kg/pulg<sup>3</sup> = 0.130

EJEMPLO:

espesor 0.500 ancho 72" largo 240"  
sustituyendo en la fórmula:  
 $P = 0.500 \times 72 \times 240 \times 0.130 = 1,123 \text{ kgs.}$

$$P = e \times a \times l \times Fe$$

P = peso en kgs.  
e = espesor en pulgadas  
a = ancho en metros  
l = largo en metros  
Fe = factor de conversión = 201.2

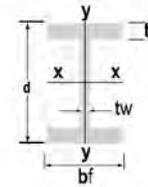
EJEMPLO:

espesor 0.500 ancho 1.83 largo 6.10  
sustituyendo en la fórmula:  
 $P = 0.500 \times 1.83 \times 6.10 \times 201.2 = 1,123 \text{ kgs.}$

### ANTIDERRAPANTES

ESPESOR		PESO TEÓRICO		PESO APROXIMADO POR HOJA				
Calibre	Pulg	mm	kg/m <sup>2</sup>	kg/pie <sup>2</sup>	3' x 8'	3' x 10'	4' x 8'	4' x 10'
1/4"	0.250	6.3	54.96	5.11	122.54	153.18	163.39	204.24
3/16"	0.188	4.7	42.52	3.95	94.81	118.51	126.41	158.01
10	0.135	3.4	33.24	3.09	74.11	92.64	98.82	123.52
1/8"	0.125	3.2	30.07	2.79	67.05	83.81	89.39	111.74
11	0.120	3.0	29.08	2.70	64.84	81.05	86.45	108.06
12	0.105	2.6	25.62	2.38	57.12	71.41	76.17	95.21
14	0.075	1.9	18.30	1.70	40.80	51.00	54.40	68.00

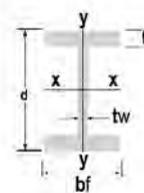
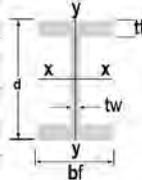
## IPR PERFIL I RECTANGULAR (IR)



Designación	lb/ple	kg/m	Área	Peralte (d)	Espesor del alma (tw)	Patín		Eje X - X			Eje Y - Y		
						ancho (bf)	espesor (t)	I	S	r	I	S	r
			cm <sup>2</sup>	mm	mm	mm	mm	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm
6' x 4'	9	13.4	17.29	150	4.32	100	5.5	683	91	6.3	91	18	2.3
	12	17.9	22.90	153	5.84	102	7.1	920	120	6.3	124	25	2.3
	16	23.8	30.58	160	6.60	102	10.3	1336	167	6.6	184	36	2.5
6' x 6'	15	22.3	28.58	152	5.84	152	6.6	1220	160	6.6	388	51	3.7
	20	29.8	37.87	157	6.60	153	9.3	1727	220	6.8	554	72	3.8
	25	37.2	47.35	162	8.13	154	11.6	2231	275	6.9	712	92	3.9
8' x 4'	10	14.9	19.10	200	4.32	24	5.2	1282	128	8.2	503	17	2.1
	13	19.3	24.77	203	5.84	102	8.5	1648	162	8.2	114	22	2.1
	15	22.3	28.65	206	6.22	102	8.0	1998	193	8.4	142	28	2.2
8' x 5 1/4'	18	26.8	33.94	207	5.84	133	8.4	2576	249	8.7	332	50	3.1
	21	31.3	39.74	210	6.35	134	10.2	3134	298	8.9	407	61	3.2
8' x 6 1/2'	24	35.7	45.68	201	6.22	165	10.2	3442	342	8.7	762	92	4.1
	28	41.7	53.23	205	7.24	166	11.8	4079	398	8.8	903	109	4.1
	31	46.1	58.90	203	7.24	203	11.0	4579	451	8.8	1544	152	5.1
8' x 8'	35	52.1	66.45	206	7.87	204	12.6	5286	511	8.9	1773	174	5.2
	40	59.5	75.48	210	9.14	205	14.2	6077	582	9.0	2044	200	5.2
	48	71.4	90.97	216	10.16	206	17.4	7859	708	9.2	2535	246	5.3
	58	86.3	110.32	222	12.95	209	20.6	9490	852	9.3	3126	300	5.3
	67	99.7	127.10	229	14.48	210	23.7	11321	980	9.4	3688	351	5.4
10' x 4'	12	17.9	22.84	251	4.83	101	5.3	2239	179	9.9	91	18	2.0
	15	22.3	28.45	254	5.84	102	6.9	2868	226	10.0	120	24	2.1
	17	25.3	32.19	257	6.10	102	8.4	3409	265	10.3	148	29	2.1
10' x 5 3/4'	19	28.3	36.26	260	6.35	102	10.0	4008	308	10.5	179	35	2.2
	22	32.7	41.87	258	6.10	146	9.1	4912	380	10.8	475	65	3.4
	26	38.7	49.10	262	6.60	147	11.2	5994	457	11.0	587	80	3.5
10' x 8'	30	44.6	57.03	266	7.62	148	13.0	7076	531	11.1	895	94	3.5
	33	49.1	62.65	247	7.37	202	11.0	7118	574	10.6	1523	151	4.9
	39	58.0	74.19	252	8.00	203	13.5	8899	690	10.8	1873	185	5.0
10' x 10'	45	67.0	85.81	257	8.89	204	15.7	10323	805	11.0	2223	218	5.1
	49	72.9	92.90	253	8.64	254	14.2	11321	895	11.0	3888	306	6.5
	54	80.4	97.29	256	9.40	255	15.6	12612	983	11.1	4287	338	6.5
	60	89.3	113.55	260	10.67	256	17.3	14193	1093	11.2	4828	377	6.5
	68	101.2	129.03	264	11.94	257	19.6	16400	1241	11.3	5578	433	6.6
	77	114.6	145.81	269	13.46	259	22.1	18939	1408	11.4	6410	493	6.6
	88	131.0	167.10	275	15.37	261	25.1	22227	1614	11.5	7451	570	6.7
	100	148.8	189.68	282	17.27	263	28.4	25931	1835	11.7	8616	655	6.7
	112	166.7	212.26	289	19.13	265	31.8	29802	2065	11.8	9823	742	6.8
	14	20.8	26.84	303	5.08	101	5.7	3688	818	11.7	98	20	1.9
12' x 4'	16	23.8	30.39	305	5.59	101	6.7	4287	280	11.9	117	23	2.0
	19	28.3	35.94	309	5.97	102	8.9	5411	349	12.2	157	31	2.1
	22	32.7	41.81	313	6.60	102	10.8	6493	416	12.5	194	38	2.2
12' x 6 1/2'	26	38.7	49.35	310	5.84	165	9.7	8491	547	13.1	720	88	3.8
	30	44.6	56.71	313	6.60	166	11.2	9906	633	13.2	945	102	3.9
	35	52.1	66.45	318	7.62	167	13.2	11863	747	13.3	1020	122	3.9
12' x 8'	40	59.5	76.13	303	7.49	203	13.1	12778	844	13.0	1836	180	4.9
	45	67.0	85.16	306	8.51	204	14.6	14485	946	13.1	2081	203	5.0
	50	74.4	94.84	310	9.40	205	16.3	16275	1052	13.2	2343	228	5.0
12' x 10'	53	78.9	100.64	306	8.76	254	14.6	17690	1157	13.3	3987	315	6.3
	58	86.3	109.68	310	9.14	254	16.3	19771	1278	13.4	4454	351	6.4

## IPR PERFIL I RECTANGULAR (IR)

Designación	lb/pie	kg/m	Área cm <sup>2</sup>	Peralto (d) mm	Espesor del alma (tw) mm	Patin		Eje X - X			Eje Y - Y		
						ancho (bf) mm	espesor (t) mm	I cm <sup>4</sup>	S cm <sup>3</sup>	r cm	I cm <sup>4</sup>	S cm <sup>3</sup>	r cm
12" x 12"	65	96.7	123.3	308	9.91	305	15.4	22185	1440	13.4	7242	477	7.7
	72	107.1	136.13	311	10.92	306	17.0	24849	1596	13.5	8117	531	7.7
	79	117.6	149.68	314	11.94	307	18.7	27555	1753	13.6	8991	587	7.7
	87	129.5	165.16	318	13.08	308	20.6	30801	1934	13.7	10031	651	7.8
	96	142.9	181.94	323	13.97	309	22.9	34672	2147	13.8	11238	728	7.8
	106	157.7	201.29	327	15.49	310	25.1	38834	2376	13.9	12529	808	7.9
	120	178.6	227.74	333	18.03	313	28.1	44537	2671	14.0	14360	918	8.0
	136	202.4	257.42	341	20.07	315	31.8	51613	3048	14.2	16566	1052	8.0
	152	226.2	288.39	348	22.10	317	35.6	59521	3425	14.4	18897	1193	8.1
	170	253.0	322.58	356	24.38	319	39.6	68678	3851	14.6	21519	1349	8.2
	190	282.8	360.00	365	26.92	322	44.1	78668	4310	14.8	24516	1524	8.3
	210	312.5	398.71	374	29.97	325	48.3	89074	4785	15.0	27638	1704	8.3
	230	342.3	436.77	382	32.64	328	52.6	100728	5280	15.2	30884	1885	8.4
	252	375.0	478.06	391	35.43	330	57.2	113215	5785	15.4	34464	2081	8.5
	279	415.2	528.39	403	38.86	334	62.7	129448	6440	15.6	39001	2343	8.6
	305	453.9	578.06	415	41.28	336	68.7	147762	7128	16.0	43704	2606	8.7
	336	500.0	637.42	427	45.09	340	75.1	168990	7915	16.3	49532	2901	8.8
14" x 5"	22	32.7	41.87	349	5.84	127	8.5	8283	475	14.1	291	46	2.6
	26	38.7	49.51	353	6.48	128	10.7	10198	578	14.4	371	58	2.7
14" x 6 3/4"	30	44.6	57.10	352	6.86	171	9.8	12112	688	14.6	816	95	3.8
	34	50.6	64.52	355	7.24	171	11.6	14152	796	14.8	970	113	3.9
	38	56.6	72.26	358	7.87	172	13.1	16025	895	14.9	1111	129	3.9
	43	64.0	81.29	347	7.75	203	13.5	17815	1026	14.8	1881	185	4.8
14" x 8"	48	71.4	90.97	350	8.84	204	15.1	20146	1150	14.9	2139	210	4.9
	53	78.9	100.64	354	9.40	205	16.8	22518	1275	15.0	2402	234	4.9
	61	90.8	115.40	353	9.53	254	16.4	26639	1509	15.2	4454	352	6.2
	68	101.2	129.03	357	10.54	255	18.3	30052	1688	15.3	5036	397	6.2
14" x 10"	82	122.0	155.48	363	12.95	257	21.7	33090	1835	15.3	5578	436	6.3
	90	133.9	170.97	356	11.18	360	18.0	41582	2343	15.6	10068	818	9.4
	99	147.3	187.74	360	12.32	370	19.8	46202	2573	15.7	10733	905	9.4
14" x 14 1/2"	109	162.2	206.45	364	13.34	371	21.8	51613	2835	15.8	11806	1003	9.5
	120	178.6	227.74	368	14.90	373	23.9	57440	3114	15.8	12903	1106	9.5
	132	196.4	250.32	372	16.38	374	26.2	63683	3425	16.0	14209	1221	9.6
	145	215.8	275.48	375	17.27	394	27.7	71176	3802	16.1	15719	1431	10.1
	159	236.6	301.29	380	18.92	395	30.2	79084	4162	16.2	17314	1576	10.2
	176	261.9	334.19	387	21.08	398	33.3	89074	4605	16.3	19180	1753	10.2
	193	287.2	366.45	393	22.61	399	36.6	99896	5080	16.5	21251	1950	10.3
	211	314.0	400.00	399	24.89	401	39.6	110718	5539	16.6	23522	2130	10.3
	233	346.7	441.93	407	27.16	404	43.7	125286	6145	16.8	26067	2376	10.4
	257	382.5	487.74	416	29.85	406	48.0	141519	6801	17.0	28944	2638	10.5
	283	421.1	537.42	425	32.77	409	52.6	159833	7522	17.2	32137	2933	10.6
	311	462.8	589.68	435	35.81	412	57.4	180228	8292	17.5	35713	3261	10.7
	342	509.0	651.61	446	39.12	416	62.7	203953	9144	17.7	39738	3622	10.8
	370	550.6	703.22	455	42.04	418	67.6	226430	9947	18.0	44330	3949	10.8
	398	592.3	754.84	465	44.96	421	72.3	249739	10750	18.2	49322	4293	10.9
	426	634.0	806.45	474	47.63	424	77.1	274713	11569	18.4	54831	4638	11.0
16" x 5 1/2"	26	38.7	49.55	399	6.35	140	8.8	12529	629	15.9	399	57	2.8
	31	46.1	58.84	403	6.99	140	11.2	15609	773	16.3	516	74	3.0
	36	53.6	68.39	403	7.49	177	10.9	18647	926	16.5	1020	115	3.9
	40	59.5	76.13	407	7.75	178	12.8	21561	1060	16.8	1203	135	4.0
	45	67.0	85.81	410	8.76	179	14.4	24391	1191	16.9	1365	153	4.0
	50	74.4	94.84	413	9.65	180	16.0	27430	1327	17.0	1548	172	4.0
	57	84.8	108.39	417	10.92	181	18.2	31550	1511	17.1	1794	198	4.1



## IPR PERFIL I RECTANGULAR (IR)

Designación	lb/pie	kg/m	Área cm <sup>2</sup>	Peralto (d) mm	Espesor del alma (tw) mm	Patin		Eje X - X			Eje Y - Y		
						ancho (bf) mm	espesor (t) mm	I cm <sup>4</sup>	S cm <sup>3</sup>	r cm	I cm <sup>4</sup>	S cm <sup>3</sup>	r cm
16" x 10 1/4"	67	99.7	127.10	415	10.03	260	15.9	40374	1950	17.7	4953	380	6.2
	77	114.6	145.81	420	11.56	261	19.3	46618	2229	17.8	5744	441	6.2
	89	132.4	169.03	425	13.34	263	22.2	54526	2573	17.9	6785	515	6.3
	100	148.8	189.68	431	14.86	265	25.0	62435	2901	18.0	7742	585	6.4
18" x 6"	35	52.1	66.45	450	7.62	152	10.8	21228	944	17.9	637	84	3.1
	40	59.5	76.13	455	8.00	153	13.3	25473	1121	18.3	795	104	3.2
	46	68.5	87.10	459	9.14	154	15.4	29536	1291	18.4	937	122	3.3
18" x 7 1/2"	50	74.4	94.84	457	9.02	190	14.5	33299	1457	18.7	1669	175	4.2
	55	81.8	104.52	460	9.91	191	16.0	37045	1611	18.8	1869	195	4.2
	60	89.3	113.55	463	10.54	192	17.7	40957	1770	19.0	2085	218	4.3
	65	96.7	123.23	466	11.43	193	19.1	44537	1917	19.0	2281	236	4.3
	71	105.7	134.19	469	12.57	194	20.6	48699	2081	19.1	2510	259	4.3
	76	113.1	143.87	463	10.80	280	17.3	55359	2393	19.6	6327	452	6.6
	86	128.0	163.23	467	12.19	282	19.6	63883	2720	19.7	7284	518	6.7
	97	144.4	183.87	472	13.59	283	22.1	72840	3081	19.9	8366	592	6.7
	106	157.7	200.64	476	14.99	284	23.9	79500	3343	19.9	9157	646	6.8
	119	177.1	226.45	482	16.64	286	25.9	87155	3785	20.1	10531	736	6.8
	130	193.5	246.45	489	17.02	283	30.5	102393	4195	20.4	11571	818	6.9
	143	212.8	271.61	495	18.54	285	33.5	114464	4621	20.5	12945	909	6.9
18" x 11"	158	235.1	298.71	501	20.57	287	36.6	127367	5080	20.6	14443	1006	7.0
	175	260.4	330.97	509	22.61	289	40.4	143600	5637	20.8	16275	1127	7.0
	192	285.7	363.87	517	24.38	291	44.5	161914	6260	21.1	18314	1259	7.1
	211	314.0	400.64	525	26.92	293	48.5	181061	6899	21.3	20520	1398	7.2
	234	348.2	443.87	535	29.46	296	53.6	204786	7669	21.5	23228	1572	7.2
	258	383.0	489.68	545	32.51	299	58.4	230176	8456	21.7	26139	1753	7.3
	283	421.1	536.77	555	35.56	302	63.5	257231	9275	21.9	29344	1950	7.4
	311	462.8	590.32	567	38.61	305	69.6	290530	10258	22.2	33090	2179	7.5
21" x 6 1/2"	44	65.5	83.87	526	8.89	165	11.4	35088	1337	20.5	862	104	3.2
	50	74.4	94.84	529	9.65	166	13.6	40957	1549	20.8	1036	125	3.3
	57	84.8	107.74	535	10.29	166	15.5	48599	1819	21.2	1274	153	3.4
	62	92.3	118.05	533	10.16	209	15.6	55359	2081	21.7	2393	229	4.5
	68	101.2	129.03	537	10.92	210	17.4	61802	2294	21.8	2693	257	4.6
21" x 8 1/4"	73	108.6	138.71	539	11.56	211	18.8	66597	2474	21.9	2939	279	4.6
	83	123.5	156.77	544	13.08	212	21.2	76170	2802	22.0	3388	320	4.8
	93	138.4	176.13	549	14.73	214	23.6	86160	3146	22.1	3867	362	4.7
	101	150.3	192.26	543	12.70	312	20.3	100728	3720	22.9	10323	680	7.3
	111	165.2	210.97	546	13.97	313	22.2	111134	4080	23.0	11405	729	7.4

# PLACA

## PLACA ANCHA CON ORILLA RECORTADA

ESPESOR		PESO TEÓRICO		PESO APROXIMADO POR HOJA				
pulgadas	mm	kg/m2	kg/pie2	5' x 20'	6' x 20'	7' x 20'	8' x 20'	10' x 20'
3/16"	0.188	4.78	37.84	352	422	492	562	703
1/4"	0.250	6.35	50.38	468	562	655	749	936
5/16"	0.313	7.95	62.93	585	702	818	935	1,169
3/8"	0.375	9.53	75.57	702	842	983	1,123	1,404
7/16"	0.438	11.13	88.10	818	982	1,146	1,310	1,637
1/2"	0.500	12.70	100.77	936	1,123	1,311	1,498	1,872
9/16"	0.563	14.30	113.27	1,052	1,263	1,473	1,684	2,105
5/8"	0.625	15.88	125.96	1,170	1,404	1,638	1,872	2,340
11/16"	0.688	17.48	138.44	1,286	1,543	1,801	2,058	2,572
3/4"	0.750	19.05	151.15	1,404	1,685	1,966	2,247	2,808
7/8"	0.875	22.23	176.34	1,638	1,966	2,294	2,621	3,276
1"	1.000	25.40	201.53	1,872	2,247	2,621	2,996	3,745
1 1/8"	1.125	28.58	226.72	2,106	2,528	2,949	3,370	4,213
1 1/4"	1.250	31.75	251.92	2,340	2,808	3,277	3,745	4,681
1 3/8"	1.375	34.93	277.11	2,574	3,089	3,604	4,119	5,149
1 1/2"	1.500	38.10	302.30	2,808	3,370	3,932	4,493	5,617
1 5/8"	1.625	41.28	327.49	3,042	3,651	4,259	4,868	6,085
1 3/4"	1.750	44.45	352.68	3,276	3,932	4,587	5,242	6,553
2"	2.000	50.80	403.07	3,745	4,494	5,242	5,991	7,489
2 1/4"	2.250	57.15	453.45	4,213	5,055	5,898	6,740	8,425
2 1/2"	2.500	63.50	503.83	4,681	5,617	6,553	7,489	9,361
3"	3.000	76.20	604.60	5,617	6,740	7,864	8,987	11,234

## FÓRMULAS PARA CALCULAR EL PESO APROXIMADO DE UNA PLANCHA EN CUALQUIER DIMENSIÓN

$$P = e \times a \times l \times Pe$$

P = peso en kgs.  
e = espesor en pulgadas  
a = ancho en pulgadas  
l = largo en pulgadas  
Pe = peso específico en kg/pulg3 = 0.130

### EJEMPLO:

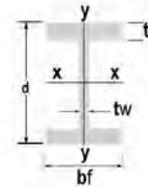
espesor 0.500 ancho 72" largo 240"  
sustituyendo en la fórmula:  
 $P = 0.500 \times 72 \times 240 \times 0.130 = 1,123 \text{ kgs.}$

$$P = e \times a \times l \times Fc$$

P = peso en kgs.  
e = espesor en pulgadas  
a = ancho en metros  
l = largo en metros  
Fc = factor de conversión = 201.2

### EJEMPLO:

espesor 0.500 ancho 1.83 largo 6.10  
sustituyendo en la fórmula:  
 $P = 0.500 \times 1.83 \times 6.10 \times 201.2 = 1,123 \text{ kgs.}$



# IPR

## PERFIL I RECTANGULAR (IR)

Designación	lb/pie	kg/m	Área cm2	Peralte (d) mm	Espesor del alma (tw) mm	Patin		Eje X - X			Eje Y - Y		
						ancho (bf) mm	espesor (t) mm	I cm4	S cm3	r cm	I cm4	S cm3	r cm
6" x 4"	9	13.4	17.29	150	4.32	100	5.5	683	91	6.3	91	18	2.3
	12	17.9	22.90	153	5.84	102	7.1	920	120	6.3	124	25	2.3
	16	23.8	30.58	160	6.60	102	10.3	1336	167	6.6	184	36	2.5
6" x 6"	15	22.3	28.58	152	5.84	152	6.6	1220	160	6.6	388	51	3.7
	20	29.8	37.87	157	6.60	153	9.3	1727	220	6.8	554	72	3.8
	25	37.2	47.35	162	8.13	154	11.6	2231	275	6.9	712	92	3.9
8" x 4"	10	14.9	19.10	200	4.32	24	5.2	1282	128	8.2	503	17	2.1
	13	19.3	24.77	203	5.84	102	6.5	1648	162	8.2	114	22	2.1
	15	22.3	28.55	206	6.22	102	8.0	1998	193	8.4	142	26	2.2
8" x 5 1/4"	18	26.8	33.94	207	5.84	133	8.4	2576	249	8.7	332	50	3.1
	21	31.3	39.74	210	6.35	134	10.2	3134	298	8.9	407	61	3.2
	24	35.7	45.68	210	6.22	165	10.2	3442	342	8.7	762	92	4.1
8" x 6 1/2"	28	41.7	53.23	205	7.24	166	11.8	4079	398	8.8	903	109	4.1
	31	46.1	58.90	203	7.24	203	11.0	4579	451	8.8	1544	152	5.1
	35	52.1	66.45	206	7.87	204	12.6	5286	511	8.9	1773	174	5.2
8" x 8"	40	59.5	75.48	210	9.14	205	14.2	6077	582	9.0	2044	200	5.2
	48	71.4	90.97	216	10.16	206	17.4	7659	708	9.2	2535	246	5.3
	58	86.3	110.32	222	12.95	209	20.6	9490	852	9.3	3126	300	5.3
10" x 4"	67	99.7	127.10	229	14.48	210	23.7	11321	990	9.4	3688	351	5.4
	12	17.9	22.84	251	4.83	101	5.3	2239	179	9.9	91	16	2.0
	15	22.3	28.45	254	5.84	102	6.9	2868	226	10.0	120	24	2.1
10" x 5 3/4"	17	25.3	32.19	257	6.10	102	8.4	3409	255	10.3	148	29	2.1
	19	28.3	36.26	260	6.35	102	10.0	4008	308	10.5	179	35	2.2
	22	32.7	41.87	258	6.10	146	9.1	4912	380	10.8	475	65	3.4
10" x 8"	26	38.7	49.10	262	6.60	147	11.2	5994	457	11.0	587	80	3.5
	30	44.6	57.03	266	7.62	148	13.0	7076	531	11.1	695	94	3.5
	33	49.1	62.65	247	7.37	202	11.0	7118	574	10.6	1523	151	4.9
10" x 10"	39	58.0	74.19	252	8.00	203	13.5	8699	690	10.8	1873	185	5.0
	45	67.0	85.81	257	8.89	204	15.7	10323	805	11.0	2223	218	5.1
	49	72.9	92.90	253	8.64	254	14.2	11321	895	11.0	3888	306	6.5
12" x 4"	54	80.4	97.29	256	9.40	255	15.6	12612	983	11.1	4287	338	6.5
	60	89.3	113.55	260	10.67	256	17.3	14193	1093	11.2	4828	377	6.5
	68	101.2	129.03	264	11.94	257	19.6	16400	1241	11.3	5578	433	6.6
12" x 6 1/2"	77	114.6	145.81	269	13.46	259	22.1	18939	1408	11.4	6410	493	6.6
	88	131.0	167.10	275	15.37	261	25.1	22227	1614	11.5	7451	570	6.7
	100	148.8	189.68	282	17.27	263	28.4	25931	1835	11.7	8616	655	6.7
12" x 8"	112	166.7	212.25	289	19.18	265	31.8	29802	2065	11.8	9823	742	6.8
	14	20.8	26.84	303	5.08	101	5.7	3688	818	11.7	98	20	1.9
	16	23.8	30.39	305	5.59	101	6.7	4287	280	11.9	117	23	2.0
12" x 10"	19	28.3	35.94	309	5.97	102	8.9	5411	349	12.2	157	31	2.1
	22	32.7	41.81	313	6.60	102	10.8	6493	416	12.5	194	36	2.2
	26	38.7	49.35	310	5.84	165	9.7	8491	547	13.1	720	86	3.8
12" x 6 1/2"	30	44.6	56.71	313	6.60	166	11.2	9906	633	13.2	845	102	3.9
	35	52.1	66.45	318	7.62	167	13.2	11863	747	13.3	1020	122	3.9
	40	59.5	76.13	303	7.49	203	13.1	12778	844	13.0	1836	180	4.9
12" x 8"	45	67.0	85.16	306	8.51	204	14.6	14485	946	13.1	2081	203	5.0
	50	74.4	94.84	310	9.40	205	16.3	16275	1052	13.2	2343	228	5.0
	53	78.9	100.64	306	8.76	254	14.6	17690	1157	13.3	3987	315	6.3
12" x 10"	58	86.3	109.68	310	9.14	254	16.3	19771	1278	13.4	4454	351	6.4

## ANTIDERRAPANTES

ESPESOR			PESO TEÓRICO		PESO APROXIMADO POR HOJA			
Calibre	Pulg	mm	kg/m2	kg/pie2	3' x 8'	3' x 10'	4' x 8'	4' x 10'
1/4"	0.250	6.3	54.96	5.11	122.54	153.18	163.39	204.24
3/16"	0.188	4.7	42.52	3.95	94.81	118.51	126.41	158.01
10	0.135	3.4	33.24	3.09	74.11	92.64	98.82	123.52
1/8"	0.125	3.2	30.07	2.79	67.05	83.81	89.39	111.74
11	0.120	3.0	29.08	2.70	64.84	81.05	86.45	108.06
12	0.105	2.6	25.62	2.38	57.12	71.41	76.17	95.21
14	0.075	1.9	18.30	1.70	40.80	51.00	54.40	68.00

## CANAL (CPS) Y VIGA (IPS)

## ÁNGULO (APS) ÁNGULO LADOS IGUALES (LI)

### CANALES CPS PROPIEDADES DE DISEÑO Y DIMENSIONES

PERALTE	PATÍN	PESO	ÁREA	ESPORES			EJE X - X			EJE Y - Y			DISTANCIA
				ALMA	PATÍN	S	I	r	S	I	r		
Pulg.	mm	mm	kg/m	mm	mm	cm <sup>3</sup>	cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>4</sup>	cm	X	
3" L	76.20	35.81	<b>5.21</b>	6.68	3.17	6.45	16.31	62.27	3.06	2.87	7.03	1.03	1.04
3"	76.20	35.81	<b>6.10</b>	7.68	4.32	6.93	17.90	68.10	2.97	3.40	8.30	1.04	1.12
4" L	101.60	40.23	<b>6.70</b>	8.54	4.42	5.59	25.20	128.12	3.89	2.98	9.53	1.06	0.92
4"	101.60	40.23	<b>8.04</b>	10.00	4.67	7.52	31.10	157.90	3.97	4.70	13.30	1.15	1.17
6" L	152.20	48.77	<b>12.20</b>	15.35	5.08	8.71	71.00	541.00	5.94	8.20	29.10	1.38	1.32
6" SP	152.20	51.66	<b>15.62</b>	19.81	7.98	8.71	82.50	628.50	5.64	9.34	36.21	1.35	1.27
6" P	152.20	54.79	<b>19.34</b>	24.71	11.10	8.71	95.00	724.20	5.41	10.52	43.70	1.33	1.31
8" L	203.20	57.40	<b>17.11</b>	21.81	5.60	9.91	133.40	1356.90	7.90	12.80	54.94	1.59	1.45
8" SP	203.20	59.51	<b>20.46</b>	26.06	7.70	9.91	148.00	1502.60	7.59	13.99	63.68	1.56	1.40
8" P	203.20	64.19	<b>27.90</b>	35.55	12.37	9.91	180.30	1831.40	7.16	16.55	82.41	1.52	1.44
10"	254.00	66.04	<b>22.80</b>	28.97	6.10	11.07	221.20	2805.40	9.83	19.01	94.90	1.81	1.61
10"	254.00	69.57	<b>29.80</b>	37.94	9.63	11.07	258.90	3284.10	9.30	21.63	116.96	1.76	1.54
10"	254.00	73.30	<b>37.20</b>	47.42	13.36	11.07	298.20	3796.00	8.94	24.25	139.85	1.72	1.57
10"	254.00	77.04	<b>44.70</b>	56.90	17.09	11.07	339.20	4387.20	8.69	27.04	164.00	1.70	1.65
12"	304.80	74.73	<b>30.80</b>	39.29	7.16	12.72	352.30	5389.40	11.71	28.35	161.50	2.03	1.77
12"	304.80	77.39	<b>37.20</b>	47.42	9.83	12.72	394.90	5993.70	11.25	30.81	186.05	1.98	1.71
12"	304.80	80.52	<b>44.70</b>	56.90	12.95	12.72	442.50	6742.90	10.90	33.76	213.94	1.94	1.70

### PROPIEDADES Y MEDIDAS VIGA IPS

PERALTE	PESO	ÁREA	PATÍN			ALMA			EJE X - X			EJE Y - Y		
			Ancho	Espeor	Espeor	mm	mm	mm	I	S	r	I	S	r
Pulg.	mm	kg/m	mm	mm	mm	mm	mm	cm <sup>3</sup>	cm <sup>4</sup>	cm	cm <sup>3</sup>	cm <sup>4</sup>	cm	
3	76.20	<b>8.48</b>	10.52	59.00	6.60	4.30	103.3	27.10	3.12	19.10	8.50	1.35		
4	101.60	<b>11.46</b>	14.26	67.64	7.44	4.90	248.3	48.90	4.17	32.10	9.50	1.50		
5	127.00	<b>14.88</b>	18.52	76.30	8.28	5.44	503.3	79.30	5.21	51.20	13.40	1.65		
6	152.40	<b>18.60</b>	23.29	84.63	9.12	5.89	906.8	119.00	6.25	77.00	18.20	1.83		
8	203.20	<b>27.38</b>	34.90	101.62	10.82	6.88	2,397.5	235.97	8.28	155.25	30.48	2.11		

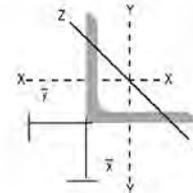
### TABLA DE ESPECIFICACIÓN DE VIGAS PARA CLAROS DETERMINADOS

CLARO mts.	USO ETREPISO				USO AZOTEA			
	0.90	1.00	1.10	1.10	0.90	1.00	1.10	1.10
2.50	4"	4"	4"	4"	4"	4"	4"	4"
3.00	4"	4"	4"	4"	4"	4"	4"	4"
3.20	4"	4"	5"	4"	4"	4"	4"	4"
3.40	4"	5"	5"	4"	4"	4"	4"	4"
3.50	5"	5"	5"	4"	4"	4"	5"	5"
3.60	5"	5"	5"	4"	4"	4"	5"	5"
3.80	5"	5"	5"	4"	5"	5"	5"	5"
4.00	5"	5"	5"	5"	5"	5"	5"	5"
4.20	5"	5"	5"	5"	5"	5"	5"	5"
4.40	5"	6"	6"	5"	5"	5"	5"	5"
4.50	6"	6"	6"	5"	5"	5"	6"	6"
4.60	6"	6"	6"	5"	5"	5"	6"	6"
4.80	6"	6"	6"	6"	6"	6"	6"	6"
5.00	6"	6"	8" L	6"	6"	6"	6"	6"
5.20	6"	8" L	8" L	6"	8" L	8" L	8" L	8" L
5.40	8" SP	8" SP	8"	8"	8" L	8" L	8" SP	8" SP
5.60	8" SP	8"	8"	8" L	8" SP	8" SP	8" SP	8" SP
5.80	8"	8"	8"	8"	8"	8"	8"	8"
6.00	8"	8"	8"	8"	8"	8"	8"	8"

Las vigas se consideran simplemente apoyadas y lateralmente soportadas.

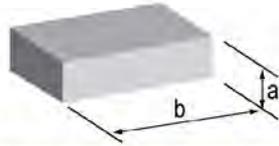
### DATOS PARA EL CÁLCULO DE VIGUERÍA PARA BÓVEDA DE LADRILLO

USO	CARGA MUERTA	CARGA VIVA	Fy
	kg/m <sup>2</sup>	kg/m <sup>2</sup>	kg/cm <sup>2</sup>
Entrepiso	300	250	2,530
Azotea	300	150	



MEDIDA ESTANDAR	PESO	ÁREA	EJES X-X y Y-Y				EJE Z-Z			
			I	S	r	k+y				
Pulg.	mm	kg/m	pza 6.1 m	cm <sup>2</sup>	cm <sup>4</sup>	cm <sup>3</sup>	cm	cm	cm	
1/8"	3.18	19.1	<b>0.88</b>	5.368	1.11	0.37	0.28	0.58	0.58	0.38
1"	25.4	<b>1.19</b>	7.259	1.52	0.92	0.51	0.79	0.76	0.48	0.48
1 1/4"	31.8	<b>1.50</b>	9.15	1.93	1.83	0.80	0.97	0.89	0.60	0.60
1 1/2"	38.1	<b>1.83</b>	11.163	2.34	3.25	1.18	1.17	1.07	0.73	0.73
1 3/4"	44.5	<b>2.14</b>	13.054	2.74	5.41	1.64	1.40	1.22	0.86	0.86
2"	50.8	<b>2.46</b>	15.006	3.10	7.91	2.13	1.60	1.40	0.99	0.99
5/32"	4.06	38.1	<b>2.28</b>	13.908	2.91	3.95	1.47	1.16	1.09	0.80
2"	50.8	<b>3.09</b>	18.849	3.95	9.73	2.71	1.57	1.40	1.05	1.05
2 1/2"	63.5	<b>3.92</b>	23.912	5.01	19.48	4.34	1.97	1.70	1.24	1.24
1"	25.4	<b>1.73</b>	10.553	2.21	1.25	0.72	0.76	0.81	0.48	0.48
1 1/4"	31.8	<b>2.20</b>	13.42	2.79	2.54	1.16	0.97	0.97	0.60	0.60
1 1/2"	38.1	<b>2.68</b>	16.348	3.43	4.58	1.64	1.17	1.12	0.73	0.73
1 3/4"	44.5	<b>3.15</b>	19.215	4.03	7.49	2.29	1.37	1.30	0.86	0.86
2"	50.8	<b>3.63</b>	22.143	4.61	11.45	3.11	1.57	1.45	0.99	0.99
2 1/2"	63.5	<b>4.61</b>	28.121	5.81	22.89	4.92	1.98	1.75	1.24	1.24
3"	76.2	<b>5.52</b>	33.672	7.03	40.01	7.22	2.39	2.08	1.51	1.51
3 1/2"	88.9	<b>6.55</b>	39.955	8.36	64.36	9.92	2.78	2.40	1.76	1.76
1"	25.4	<b>2.22</b>	13.542	2.80	1.54	0.92	0.74	0.86	0.48	0.48
1 1/4"	31.8	<b>2.86</b>	17.446	3.72	3.21	1.49	0.94	1.02	0.60	0.60
1 1/2"	38.1	<b>3.48</b>	21.228	4.40	5.83	2.20	1.14	1.19	0.73	0.73
1 3/4"	44.5	<b>4.12</b>	25.132	5.20	9.57	3.11	1.35	1.35	0.86	0.86
2"	50.8	<b>4.75</b>	28.975	6.06	14.57	4.10	1.55	1.50	0.99	0.99
2 1/2"	63.5	<b>6.10</b>	37.21	7.68	29.14	6.39	1.96	1.83	1.24	1.24
3"	76.2	<b>7.29</b>	44.469	9.29	51.60	9.50	2.36	2.13	1.49	1.49
3 1/2"	88.9	<b>8.63</b>	52.643	10.90	83.66	13.01	2.77	2.46	1.76	1.76
4"	101.6	<b>9.82</b>	59.902	12.52	124.90	17.20	3.18	2.77	2.00	2.00
2"	50.8	<b>5.83</b>	35.563	7.42	17.46	4.92	1.52	1.55	0.99	0.99
2 1/2"	63.5	<b>7.44</b>	45.384	9.48	35.38	7.87	1.93	1.88	1.24	1.24
3"	76.2	<b>9.08</b>	55.388	11.48	62.90	11.60	2.34	2.21	1.47	1.47
3 1/2"	88.9	<b>10.71</b>	65.331	13.48	101.95	16.00	2.74	2.51	1.75	1.75
4"	101.6	<b>12.20</b>	74.42	15.48	154.40	21.10	3.15	2.84	2.00	2.00
5"	127.0	<b>15.47</b>	94.367	19.72	310.91	34.62	3.97	3.44	2.62	2.62
2"	50.8	<b>6.99</b>	42.639	8.77	19.98	5.74	1.50	1.63	0.99	0.99
2 1/2"	63.5	<b>8.78</b>	53.558	11.16	40.79	9.34	1.91	1.93	1.24	1.24
3"	76.2	<b>10.72</b>	65.392	13.61	73.30	13.60	2.31	2.26	1.47	1.47
3 1/2"	88.9	<b>12.65</b>	77.165	16.00	119.46	18.84	2.72	2.57	1.74	1.74
4"	101.6	<b>14.58</b>	88.938	18.45	181.50	24.90	3.12	2.89	1.98	1.98
5"	127.0	<b>18.30</b>	111.63	23.29	363.80	39.70	3.96	3.53	2.52	2.52
6"	152.4	<b>22.17</b>	135.237	28.13	640.60	57.80	4.78	4.16	3.05	3.05
4"	101.6	<b>16.82</b>	102.602	21.35	206.90	28.70	3.12	2.94	1.98	1.98
5"	127.0	<b>21.28</b>	129.808	26.97	417.10	45.70	3.94	3.58	2.52	2.52
6"	152.4	<b>25.60</b>	156.16	32.65	735.90	66.70	4.75	4.22	3.02	3.02
3"	76.2	<b>13.99</b>	85.339	17.74	92.40	17.50	2.29	2.36	1.47	1.47
3 1/2"	88.9	<b>16.52</b>	100.772	20.97	151.51	24.41	2.89	2.69	1.73	1.73
4"	101.6	<b>19.05</b>	116.205	24.19	231.40	32.30	3.10	2.99	1.98	1.98</

## SOLERA PLANA



MEDIDA ESTANDAR axb	PESO TEÓRICO		ÁREA		MEDIDA ESTANDAR axb	PESO TEÓRICO		ÁREA					
	Pulg.	mm	kg/m	kg/pza.*		Pulg.	mm	kg/m	kg/pza.*	pulg2	mm2		
1/8"	1/2"	12.7	0.317	1.93	0.063	40.3	3/8"	1 1/2"	38.1	2.849	17.38	0.563	362.90
	3/4"	19.1	0.476	2.90	0.094	60.6		2"	50.8	3.798	23.17	0.750	483.87
	1"	25.4	0.633	3.86	0.125	80.6		2 1/2"	63.5	4.748	28.96	0.938	604.84
	1 1/4"	31.7	0.790	4.82	0.156	100.6		3"	76.2	5.698	34.76	1.125	725.81
	1 1/2"	38.1	0.950	5.79	0.188	121.0		4"	101.6	7.597	46.34	1.500	967.74
	2"	50.8	1.266	7.72	0.250	161.3		5"	127	9.496	57.93	1.875	1,209.68
3/16"	2 1/2"	63.5	1.583	9.65	0.313	201.6	6"	152.4	11.395	69.51	2.250	1,451.61	
	3"	76.2	1.899	11.59	0.375	241.9	1 1/2"	38.1	3.798	23.17	0.750	483.87	
	1/2"	12.7	0.476	2.90	0.094	60.6	2"	50.8	5.065	30.90	1.000	645.16	
	3/4"	19.1	0.716	4.37	0.141	91.2	2 1/2"	63.5	6.331	38.62	1.250	806.45	
	1"	25.4	0.952	5.81	0.188	121.3	3"	76.2	7.597	46.34	1.500	967.74	
	1 1/4"	31.7	1.188	7.25	0.235	151.4	4"	101.6	10.129	61.79	2.000	1,290.32	
1/4"	1 1/2"	38.1	1.428	8.71	0.282	181.9	5"	127	12.661	77.23	2.500	1,612.90	
	2"	50.8	1.904	11.61	0.376	242.6	6"	152.4	15.194	92.68	3.000	1,935.48	
	2 1/2"	63.5	2.380	14.52	0.470	303.2	8"	203.2	20.258	123.57	4.000	2,580.64	
	3"	76.2	2.856	17.42	0.564	363.9	10"	254.0	25.322	154.46	5.000	3,225.80	
	4"	101.6	3.808	23.23	0.752	485.1	1 1/2"	38.1	4.748	28.96	0.938	604.84	
	5"	127.0	4.760	29.04	0.940	606.4	2"	50.8	6.331	38.62	1.250	806.45	
5/16"	6"	152.4	5.712	34.84	1.128	727.7	2 1/2"	63.5	7.913	48.27	1.563	1,008.06	
	1/2"	12.7	0.633	3.86	0.125	80.6	3"	76.2	9.496	57.93	1.875	1,209.68	
	3/4"	19.1	0.952	5.81	0.188	121.3	4"	101.6	12.661	77.23	2.500	1,612.90	
	1"	25.4	1.266	7.72	0.250	161.3	5"	127	15.827	96.54	3.125	2,016.13	
	1 1/4"	31.7	1.580	9.64	0.312	201.3	6"	152.4	18.992	115.85	3.750	2,419.35	
	1 1/2"	38.1	1.899	11.58	0.375	241.9	8"	203.2	25.322	154.46	5.000	3,225.80	
3/8"	2"	50.8	2.532	15.45	0.500	322.6	10"	254.0	31.654	193.09	6.250	4,032.25	
	2 1/2"	63.5	3.165	19.31	0.625	403.2	1 1/2"	38.1	5.698	34.76	1.125	725.81	
	3"	76.2	3.798	23.17	0.750	483.9	2"	50.8	7.597	46.34	1.500	967.74	
	4"	101.6	5.065	30.90	1.000	645.2	2 1/2"	63.5	9.496	57.93	1.875	1,209.68	
	5"	127	6.331	38.62	1.250	806.5	3"	76.2	11.395	69.51	2.250	1,451.61	
	6"	152.4	7.597	46.34	1.500	967.7	4"	101.6	15.194	92.68	3.000	1,935.48	
1/2"	8"	203.2	10.130	61.79	2.000	1,290.3	5"	127	18.992	115.85	3.750	2,419.35	
	10"	254	12.662	77.24	2.500	1,612.9	6"	152.4	22.790	139.02	4.500	2,903.22	
	1 1/2"	38.1	2.378	14.51	0.469	302.9	8"	203.2	30.388	185.37	6.000	3,870.96	
	2"	50.8	3.170	19.34	0.626	403.9	10"	254.0	37.984	231.70	7.500	4,838.70	
	2 1/2"	63.5	3.963	24.17	0.782	504.8	2"	50.8	10.129	61.79	2.000	1,290.32	
	3"	76.2	4.756	29.01	0.939	605.8	3"	76.2	15.194	92.68	3.000	1,935.48	
5/8"	4"	101.6	6.341	38.68	1.252	807.7	4"	101.6	20.258	123.57	4.000	2,580.64	
	5"	127	7.926	48.35	1.565	1,009.7	5"	127	25.323	154.47	5.000	3,225.80	
	6"	152.4	9.511	58.02	1.878	1,211.6	6"	152.4	30.387	185.36	6.000	3,870.96	
	8"	203.2	12.682	77.36	2.504	1,615.4	8"	203.2	40.516	247.15	8.000	5,161.28	
	10"	254	15.852	96.70	3.130	2,019.3	10"	254.0	50.646	308.94	10.000	6,451.60	

\* El peso por pieza corresponde a un tramo de 6.10 mts. de longitud.

## REDONDOS Y CUADRADOS

### REDONDOS (OS)



MEDIDA ESTANDAR	DIMENSIONES (d)		PESO TEÓRICO		ÁREA DE LA SECCION	
	Pulg.	mm	kg/m	kg/pieza*	pulg2	mm2
3/8"	0.375	9.5	0.559	3.410	0.11	71.26
7/16"	0.438	11.1	0.761	4.640	0.15	97.21
1/2"	0.500	12.7	0.994	6.063	0.20	126.68
9/16"	0.562	14.3	1.257	7.668	0.25	160.05
5/8"	0.625	15.9	1.552	9.467	0.31	197.93
11/16"	0.688	17.5	1.878	11.456	0.37	239.84
3/4"	0.750	19.1	2.235	13.634	0.44	285.02
13/16"	0.812	20.6	2.624	16.006	0.52	334.10
7/8"	0.875	22.2	3.042	18.556	0.60	387.95
15/16"	0.938	23.8	3.493	21.307	0.69	445.82
1"	1.000	25.4	3.974	24.241	0.79	506.71
1 1/16"	1.062	27.0	4.486	27.365	0.89	571.50
1 1/8"	1.125	28.6	5.029	30.677	0.99	641.30
1 3/16"	1.188	30.2	5.605	34.191	1.11	715.13
1 1/4"	1.250	31.8	6.211	37.887	1.23	791.73
1 5/16"	1.312	33.3	6.846	41.761	1.35	872.23
1 3/8"	1.375	34.9	7.470	45.567	1.48	958.00
1 1/2"	1.500	38.1	8.942	54.546	1.77	1,140.09
1 9/16"	1.562	39.7	9.704	59.194	1.92	1,236.30
1 3/4"	1.750	44.5	12.170	74.237	2.41	1,551.80
1 3/16"	1.812	46.0	13.060	79.666	2.58	1,663.71
2"	2.000	50.8	15.900	96.990	3.14	2,026.83
2 1/8"	2.125	54.0	17.950	109.495	3.55	2,288.11
2 1/4"	2.250	57.2	20.120	122.732	3.98	2,565.21
2 1/2"	2.500	63.5	24.840	151.524	4.91	3,166.93

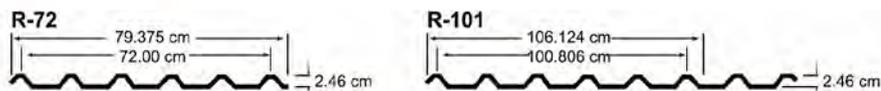
### CUADRADOS



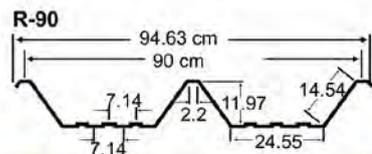
MEDIDA ESTANDAR	DIMENSIONES (a)		PESO TEÓRICO		ÁREA DE LA SECCION	
	Pulg.	mm	kg/m	kg/pieza*	pulg2	mm2
3/8"	0.375	9.5	0.712	4.3	0.14	90.73
1/2"	0.500	12.7	1.266	7.7	0.25	161.29
5/8"	0.625	15.9	1.978	12.1	0.39	252.02
3/4"	0.750	19.1	2.848	17.4	0.56	362.90
1"	1.000	25.4	5.060	30.9	1.00	645.16
1 1/4"	1.250	31.8	7.906	48.2	1.56	1,008.06
1 1/2"	1.500	38.1	11.395	69.5	2.25	1,451.61
2"	2.000	50.8	20.240	123.5	4.00	2,580.64
2 1/2"	2.500	63.5	31.620	192.9	6.25	4,032.25
3"	3.000	76.2	45.530	277.7	9.00	5,806.44

\* El peso por pieza corresponde a un tramo de 6.10 mts. de longitud.

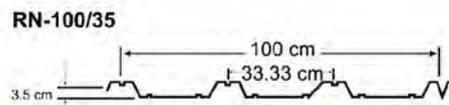
## LÁMINA GALVANIZADA



CALIBRE	PROPIEDADES DE LA SECCIÓN							ACCIONES PERMISIBLES			
	PESO		COMPRESIÓN SUPERIOR (MOMENTO POSITIVO)			COMPRESIÓN INFERIOR (MOMENTO NEGATIVO)			VA MAX (kg/m)	REACCIÓN MÁXIMA	
	R-72 (kg/m <sup>2</sup> )	R-101	J+ (cm <sup>2</sup> /m)	S+ (cm <sup>3</sup> /m)	M MAX+ (kg-m)	I- (cm <sup>4</sup> /m)	S- (cm <sup>3</sup> /m)	M MAX- (kg-m)		APOYO EXTERIOR (kg/m)	APOYO INTERIOR (kg/m)
30	3.39		2.90	1.73	26.98	2.02	1.56	24.34	742	147	181
28	4.12	3.92	3.93	2.41	37.60	2.66	2.11	32.92	1279	208	330
26	4.89	4.64	4.93	3.07	47.89	3.38	2.73	42.59	1846	279	515
24	5.64	5.36	5.81	3.65	56.94	4.14	3.25	50.70	2372	359	731
22	7.91	7.52	8.33	5.34	83.30	6.78	4.90	76.44	3393	680	1557



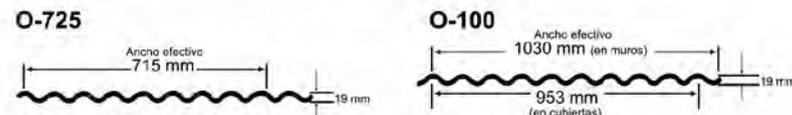
CALIBRE	PROPIEDADES DE LA SECCIÓN			
	PESO (kg/m)	PESO (kg/m <sup>2</sup> )	INERCIÁ (cm <sup>4</sup> /m)	MÓDULO DE SECCIÓN (cm <sup>3</sup> /m)
26	4.69	5.21	81.48	8.92
24	5.42	6.02	100.7	11.26
22	7.6	8.44	155.93	18.39



CALIBRE	PROPIEDADES DE LA SECCIÓN							
	PESO APROX.		COMPRESIÓN SUPERIOR M+			COMPRESIÓN INFERIOR M-		
	kg/m	kg/m	I <sub>xx</sub> + (cm <sup>4</sup> /m)	S <sub>xx</sub> + (cm <sup>3</sup> /m)	M <sub>max</sub> + (kg-m)	I <sub>xx</sub> - (cm <sup>4</sup> /m)	S <sub>xx</sub> - (cm <sup>3</sup> /m)	M <sub>max</sub> - (kg-m)
26	4.68	4.68	10.57	4.42	68.95	6.86	3.68	57.41
24	5.41	5.41	12.76	5.38	83.93	8.21	4.47	69.73
22*	7.60*	7.60*	18.53	8.05	125.58	12.53	7.11	110.92

\* Estos calibres se fabricarán sólo bajo consulta técnica.

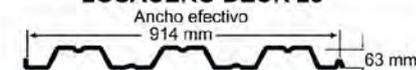
## LÁMINA GALVANIZADA



CALIBRE	PROPIEDADES DE LA SECCIÓN							
	PESO APROX. (kg/m)		PESO APROX. (kg/m <sup>2</sup> )			COMPRESIÓN SUPERIOR O INFERIOR		
	O-725	O-100	O-725	O-100 Muros	O-100 Techos	I <sub>xx</sub> (cm <sup>4</sup> /m)	S <sub>xx</sub> (cm <sup>3</sup> /m)	M <sub>max</sub> (kg-m)
30	2.44*		3.41*			1.84	1.90	29.64
28	2.97	3.96	4.16	3.83	4.15	2.28	2.35	39.66
26	3.52*	4.69	4.93*	4.54	4.92	2.74	2.82	44.00
24		5.42		5.25	5.68	3.20	3.30	51.50

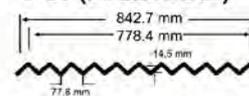
\* Estos calibres se fabricarán sólo bajo consulta técnica.

## LOSACERO DECK 25



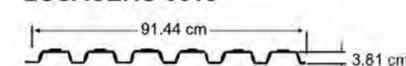
CAL	PROPIEDADES DE LA SECCIÓN DE ACERO: FY=37000 LBS PLG 2 (2603 kg/cm <sup>2</sup> )									
	ESP. ACERO BASE		PROPIEDADES EFECTIVAS			PROPIEDADES SIN REDUCIR				
	pulg.	mm	I <sub>xx</sub> + (cm <sup>4</sup> /m)	S <sub>xx</sub> + (cm <sup>3</sup> /m)	S <sub>xx</sub> - (cm <sup>3</sup> /m)	I <sub>xx</sub> (cm <sup>4</sup> /m)	S <sub>xx</sub> SUP. (cm <sup>3</sup> /m)	S <sub>xx</sub> INF. (cm <sup>3</sup> /m)	ÁREA (cm <sup>2</sup> /m)	Y INF (cms)
24	0.0209	0.531	45.11	11.93	13.11	50.54	15.61	16.24	7.07	3.11
22	0.0299	0.759	69.54	19.22	20.66	72.31	22.33	23.23	10.12	3.11
20	0.0359	0.912	86.34	24.54	26.04	86.81	26.82	27.89	12.15	3.11
18	0.0478	1.214	114.63	35.25	36.61	114.63	35.4	36.83	15.47	3.11

## O-30 (FULL HARD)



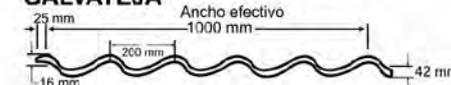
CAL	PROPIEDADES DE LA SECCIÓN				
	PESO APROX.		COMPRESIÓN SUPERIOR O INFERIOR		
	kg/m	kg/m <sup>2</sup>	I <sub>xx</sub> (cm <sup>4</sup> /m)	S <sub>xx</sub> (cm <sup>3</sup> /m)	M <sub>max</sub> (kg-m)
32	1.89	2.42	0.53	0.72	11.23
28	2.97	3.81	0.78	1.05	44

## LOSACERO 3615



CALIBRE	PROPIEDADES DE LA SECCIÓN				
	ESPESOR (mm)	PESO (kg/m <sup>2</sup> )	I <sub>p</sub> (cm <sup>4</sup> /cm)	I <sub>n</sub> (cm <sup>4</sup> /cm)	S <sub>p</sub> (cm <sup>3</sup> /cm)
24	0.0209	6.02	13.71	16.76	5.95
22	0.0295	8.33	21.54	25.39	9.86
20	0.0358	10.02	27.67	31.09	13.16
18	0.0474	13.14	39.38	41.43	19.98

## GALVATEJA



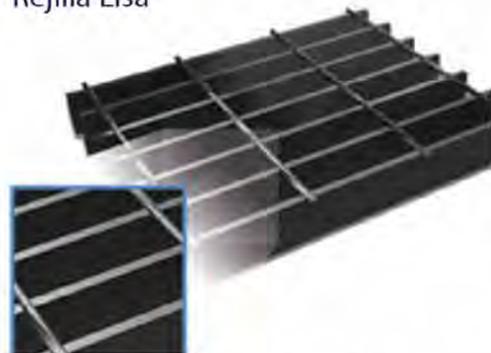
## REJILLA IRVING LISA Y DENTADA

TIPO	PULGADAS	TIPO	PULGADAS
IS-05	1/8 x 3/4"	IS-05	3/16 x 1-1/4"
IS-05	1/8 x 1"	IS-05	3/16 x 1-1/2"
IS-05	1/8 x 1-1/4"	IS-05	3/16 x 1-3/4"
IS-05	1/8 x 1-1/2"	IS-05	3/16 x 2"
IS-05	3/16 x 3/4"	IS-05	3/16 x 2-1/4"
IS-05	3/16 x 1"	IS-05	3/16 x 2-1/2"

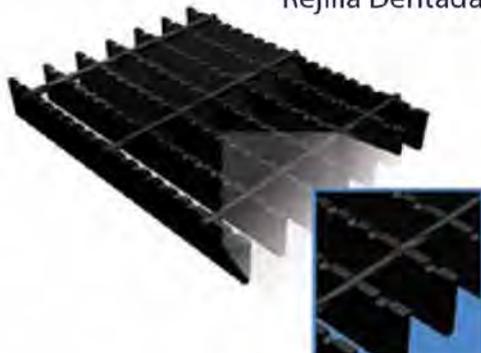
### PESO NOMINAL DE LA REJILLA TIPO IS-05 DE ACERO ELECTROFORJADA SOLERAS DE CARGA

milímetros	pulgadas	kg/cm <sup>2</sup>
3.2 x 19.1	1/8 x 3/4"	19.1
3.2 x 25.4	1/8 x 1"	24.4
3.2 x 31.8	1/8 x 1-1/4"	29.8
3.2 x 38.1	1/8 x 1-1/2"	35.2
4.8 x 19.1	3/16 x 3/4"	27.1
4.8 x 25.4	3/16 x 1"	35.2
4.8 x 31.8	3/16 x 1-1/4"	43.3
4.8 x 38.1	3/16 x 1-1/2"	51.3
4.8 x 44.4	3/16 x 1-3/4"	59.7
4.8 x 50.8	3/16 x 2"	67.7
4.8 x 57.1	3/16 x 2-1/4"	75.8
4.8 x 63.5	3/16 x 2-1/2"	83.9

Rejilla Lisa



Rejilla Dentada



Tamaño de tablero: 1.00 x 6.00 m.

Superficie: Lisa y dentada.

Acabados: Acero al natural, pintura negra base agua y galvanizado por inmersión caliente según la norma ASTM-A123.

## MALLA CICLÓNICA GALVANIZADA

CALIBRE 9			
Terminación	Diseño (mm)	Alto (m)	Largo (m)
púa - púa	55	2.00	10
púa - púa	55	2.50	10
púa - púa	55	3.00	10

CALIBRE 10.5			
Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20
púa - púa	55	2.50	20
púa - púa	55	3.00	20
nudo - púa	63	1.00	20
nudo - púa	63	1.25	20
púa - púa	63	1.50	20
púa - púa	63	1.75	20
nudo - púa	63	2.00	20
nudo - púa	69	1.00	20
nudo - púa	69	1.25	20
nudo - púa	69	1.50	20
nudo - púa	69	1.75	20
nudo - púa	69	2.00	20
púa - púa	69	2.50	10
púa - púa	69	3.00	10

CALIBRE 11			
Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20
púa - púa	55	2.25	20
púa - púa	55	2.50	20
púa - púa	55	3.00	20
nudo - púa	63	1.00	20
nudo - púa	63	1.25	20
púa - púa	63	1.50	20
púa - púa	63	1.75	20
púa - púa	63	2.00	20
púa - púa	63	2.50	20
púa - púa	63	3.00	20
púa - púa	69	1.00	20
nudo - nudo	69	1.00	20
púa - púa	69	1.25	20
nudo - nudo	69	1.25	20
púa - púa	69	1.50	20
nudo - nudo	69	1.50	20
púa - púa	69	1.75	20
nudo - nudo	69	1.75	20
púa - púa	69	2.00	20
nudo - nudo	69	2.00	20

CALIBRE 12.5			
Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20
púa - púa	55	2.50	20
púa - púa	55	3.00	20
nudo - púa	63	1.00	20
nudo - púa	63	1.25	20
púa - púa	63	1.50	20
púa - púa	63	1.75	20
púa - púa	63	2.00	20
nudo - nudo	69	1.00	20
nudo - nudo	69	1.25	20
púa - púa	69	1.50	20
nudo - nudo	69	1.50	20
púa - púa	69	1.75	20
nudo - nudo	69	1.75	20
púa - púa	69	2.00	20
nudo - nudo	69	2.00	20

CALIBRE 13			
Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20
nudo - púa	63	1.00	20
nudo - púa	63	1.25	20
nudo - púa	63	1.50	20
nudo - púa	63	1.75	20
púa - púa	63	2.00	20
púa - púa	69	1.00	20
púa - púa	69	1.25	20
púa - púa	69	1.50	20
púa - púa	69	1.75	20
púa - púa	69	2.00	20

## MAJLA CICALÓNICA PVC

### CALIBRE 10.5

Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20

### CALIBRE 11

Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20
púa - púa	55	2.50	20
púa - púa	55	3.00	20
púa - púa	55	4.00	20
nudo - púa	63	1.00	20
nudo - púa	63	1.25	20
púa - púa	63	1.50	20
púa - púa	63	1.75	20
púa - púa	63	2.00	20

### CALIBRE 12.5

Terminación	Diseño (mm)	Alto (m)	Largo (m)
nudo - púa	55	1.00	20
nudo - púa	55	1.25	20
púa - púa	55	1.50	20
púa - púa	55	1.75	20
púa - púa	55	2.00	20

## CABALLETES Y CUMBRERAS

DESCRIPCIÓN	CALIBRE 22		CALIBRE 24		CALIBRE 26		CALIBRE 28		CALIBRE 30		CALIBRE 32	
	Ancho (mm)	Largo (m)	Galvanizado (kg)	Pintado (kg)	Pintado (kg)	Galvanizado (kg)	Pintado (kg)	Galvanizado (kg)	Galvanizado (kg)	Pintado (kg)	Pintado (kg)	
caballete liso	18	3.05				5.3	5.49	4.5	3.7			2.8
caballete rect	18	3.05				5.3	5.49	4.5	3.7			2.8
tr 90	24	2.44				5.72						
cumbrera rect	36	1.2			4.98	4.24	4.32					
cumbrera rect	48	1.2	9.12	6.94	6.63	5.6	5.76					

## ESPECIFICACIONES ACEROS MÁS COMÚNES

### CARACTERÍSTICAS DE LOS ACEROS MÁS UTILIZADOS EN LA INDUSTRIA Y EN LA CONSTRUCCIÓN

ESPECIFICACIÓN	USOS PRINCIPALES									
<b>ACERO ESTRUCTURAL DE MEDIA Y ALTA RESISTENCIA</b>										
ASTM A-36	Uso estructural									
ASTM A-283-C	Uso estructural alta soldabilidad									
ASTM A-572-50	Uso estructural alta resistencia									
ASTM A-572-85	Alta resistencia, baja aleación, bases de postes y luminarias									
LC PAILAS	Fabricación de pailas para galvanizado									
ASTM A-709-36	Acero estructural para puentes adicionado con Cu y prueba de impacto									
ASTM A-709-50										
<b>ACERO PARA RECIPIENTES A PRESIÓN</b>										
ASTM A-285-C	Baja y mediana resistencia para recipientes a presión									
ASTM A-516-70	Recipientes a presión a mediana y baja temperatura									
ASTM A-515-70	Recipientes a presión a media y alta temperatura									
<b>ACERO PARA FABRICACIÓN DE PERFILES</b>										
ASTM A-500-A	Norma especificada para fabricación de tubos con costura, cuadrados y redondos, para uso estructural del tipo mecánico.									
ASTM A-500-B										
ASTM A-500-C										
ASTM A-570-36	Media resistencia para fabricación de estructuras, perfil tubular y polinos.									
ASTM A-570-40										
ASTM A-570-50	Alta resistencia para fabricación de tuberías y polin.									
<b>ACERO PARA FABRICACIÓN DE TUBERÍA DE CONDUCCIÓN</b>										
ASTM A-53-A	Tubería de baja resistencia									
ASTM A-53-B	Tubería de mediana resistencia									
API 5L-B	Tubería de conducción, media resistencias.									
API 5L-X 42										
<b>ACERO BAJO, MEDIO Y ALTO CARBON (ACERO SAE)</b>										
SAE 1006	Bajo carbono para piezas de troquelado moderado									
SAE 1008										
SAE 1010										
SAE 1012										
SAE 1045										
SAE 1060	Herramientas, cuchillas, corcha de carretillas, palas, implementos agrícolas.									
<b>ACERO BAJO CARBONO PARA FABRICACIÓN DE PERFILES COMERCIALES, TUBULAR Y POLINOS.</b>										
<b>COMPOSICIÓN QUÍMICA % EN PESO MÁXIMO</b>										
ESPECIFICACIÓN	COMPOSICIÓN QUÍMICA % EN PESO MÁXIMO							LÍMITE ELÁSTICO	ÚLTIMA TENSIÓN	% ELONG.
	C	Mn	P	S	Si	Cb	V			
<b>ACERO ESTRUCTURAL DE MEDIA Y ALTA RESISTENCIA</b>										
ASTM A-36	0.29	1.20	0.040	0.050	0.4	-	-	36	58 - 80	20
ASTM A-283-C	0.24	0.90	0.035	0.040	0.4	-	-	30	55 - 75	22
ASTM A-572-50	0.23	1.35	0.035	0.035	0.4	0.050	0.06	50	65	18
ASTM A-572-85	0.23	1.65	0.035	0.040	0.4	0.050	0.15	65	80	15
LC PAILAS	0.06	0.35	0.030	0.030	0.4	-	-	-	-	-
ASTM A-709-36	0.29	1.20	0.040	0.050	0.4	-	-	36	58 - 80	20
ASTM A-709-50	0.23	1.35	0.035	0.035	0.4	0.050	0.06	50	65	18
<b>ACERO PARA RECIPIENTES A PRESIÓN</b>										
ASTM A-285-C	0.28	0.90	0.035	0.035	-	-	-	33	55-75	23
ASTM A-516-70	0.31	1.20	0.035	0.035	-	-	-	38	70 - 90	17
ASTM A-515-70	0.31	1.20	0.035	0.035	-	-	-	38	70 - 90	17
<b>ACERO PARA FABRICACIÓN DE PERFILES</b>										
ASTM A-500-A	0.28	-	0.035	0.035	-	-	-	39	45	25
ASTM A-500-B	0.28	-	0.035	0.035	-	-	-	46	58	23
ASTM A-500-C	0.23	1.35	0.035	0.035	-	-	-	50	62	21
ASTM A-570-36	0.25	0.90	0.035	0.040	-	-	-	36	53	22
ASTM A-570-40	0.25	0.90	0.035	0.040	-	-	-	40	55	21
ASTM A-570-50	0.25	1.35	0.035	0.040	-	0.050	-	50	65	17
<b>ACERO PARA FABRICACIÓN DE TUBERÍA DE CONDUCCIÓN</b>										
ASTM A-53-A	0.25	0.95	0.050	0.045	-	0.08	0.30	48	31	
ASTM A-53-B	0.30	1.20	0.050	0.045	-	0.08	0.35	60	33	
API 5L-B	0.26	1.15	0.030	0.030	-	-	-	35	60	*
API 5L-X 42	0.28	1.25	0.030	0.030	-	-	-	42	60	*
SAE 1006	0.08	0.45	0.030	0.035	-	-	-	-	-	-
SAE 1008	0.10	0.50	0.030	0.035	-	-	-	-	-	-
SAE 1010	0.13	0.60	0.030	0.035	-	-	-	-	-	-
SAE 1012	0.15	0.60	0.030	0.035	-	-	-	-	-	-
SAE 1045	0.50	0.90	0.030	0.035	0.35	-	-	-	-	-
SAE 1060	0.66	0.90	0.030	0.035	0.35	-	-	-	-	-

## TABLA DE EQUIVALENCIAS Y CONVERSIÓN DE UNIDADES

Fracción	milésimas	mm	Fracción	milésimas	mm	Calibre No.	milésimas	mm	Calibre No.	milésimas	mm
1/64"	0.016"	0.40	7/8"	0.875"	22.23	3	0.2391"	6.07	19	0.0418"	1.06
1/32"	0.031"	0.79	15/16"	0.938"	23.81	4	0.2242"	5.69	20	0.0359"	0.91
1/16"	0.063"	1.59	1"	1.000"	25.40	5	0.2092"	5.31	21	0.0329"	0.84
1/8"	0.125"	3.18	1 1/8"	1.125"	28.58	6	0.1943"	4.94	22	0.0299"	0.76
5/32"	0.156"	3.97	1 1/4"	1.250"	31.75	7	0.1793"	4.55	23	0.0269"	0.68
3/16"	0.188"	4.76	1 3/8"	1.375"	34.93	8	0.1644"	4.18	24	0.0239"	0.61
1/4"	0.250"	6.35	1 1/2"	1.500"	38.10	9	0.1495"	3.80	25	0.0209"	0.53
5/16"	0.313"	7.94	1 5/8"	1.625"	41.28	10	0.1345"	3.42	26	0.0179"	0.45
3/8"	0.375"	9.53	1 3/4"	1.750"	44.45	11	0.1196"	3.04	27	0.0149"	0.38
7/16"	0.438"	11.11	2"	2.000"	50.80	12	0.1046"	2.66	28	0.0119"	0.30
1/2"	0.500"	12.70	2 1/4"	2.250"	57.15	13	0.0897"	2.28	29	0.0089"	0.23
9/16"	0.563"	14.29	2 1/2"	2.500"	63.50	14	0.0747"	1.90	30	0.0059"	0.15
5/8"	0.625"	15.88	2 3/4"	2.750"	69.85	15	0.0633"	1.61	31	0.0044"	0.11
11/16"	0.688"	17.46	3"	3.000"	76.20	16	0.0596"	1.52	32	0.0039"	0.10
3/4"	0.750"	19.05	3 1/2"	3.500"	88.90	17	0.0538"	1.37	33	0.0034"	0.09
13/16"	0.813"	20.64	4"	4.000"	101.60	18	0.0478"	1.21	34	0.0029"	0.07

### UNIDADES DE LONGITUD

ES IGUAL	mm	cm	m	km	pulg	pie	yarda	milla
1 milímetro a	1	0.1	0.001	0.000001	0.03937	0.00328083	0.0010936	0.0000062137
1 centímetro a	10	1	0.01	0.00001	0.3937	0.0328083	0.010936	0.000062137
1 metro a	1,000	100	1	0.001	39.37	3.28083	1.0936	0.00062137
1 kilómetro a	1,000,000	100,000	1,000	1	39,370	3,280.83	1,093.60	0.62137
1 pulgada a	25.4	2.54	0.0254	0.0000254	1	0.08333	0.027778	0.000016
1 pie a	304.8	30.48	0.3048	0.0003048	12	1	0.3333	0.0001894
1 yarda a	914.4	91.44	0.9144	0.0009144	36	3	1	0.0005682
1 milla a	1,609,350	160,935	1,609.35	1.60935	63,360	5,280	1,760	1

### UNIDADES DE PESO

ES IGUAL	gr	kg	tm	oz	lb	tl
1 gramo a	1	0.001	0.000001	0.03527	0.003937	0.00328083
1 kilogramo a	1,000	1	0.001	35.27	0.9937	0.0328083
1 tonelada métrica a	1,000,000	1,000	1	35,270	39.37	3.28083
1 onza a	28.35	0.02835	0.00002835	1	0.0625	0.0037037
1 libra a	453.6	0.4536	0.0004536	16	1	0.08333
1 tonelada larga a	1,016,050	1,016.05	1.01605	35,836	2,240	1

### UNIDADES DE AREA

ES IGUAL	mm2	cm2	m2	pulg2	pie2	yd2
1 milímetro cuadrado a	1	0.01	0.000001	0.00155	0.0000108	0.0000012
1 centímetro cuadrado a	100	1	0.0001	0.155	0.00108	0.00012
1 metro cuadrado a	1,000,000	10,000	1	1,550	10.76	1.196
1 pulgada cuadrada a	645.16	6.45160	0.0006452	1	0.066944	0.000772
1 pie cuadrado a	92,903.04	929.0304	0.0929	144	1	0.11111
1 yarda cuadrada a	836,131.02	8,361.31	0.8361	1,296	9	1

### UNIDADES DE VOLUMEN

ES IGUAL	cm3	dm3	m3	pulg3	pie3	galón
1 centímetro cúbico a	1	0.001	0.000001	0.06102	0.00003531	0.00026417
1 decímetro cúbico a	1,000	1	0.001	61.02	0.03531	0.26417
1 metro cúbico a	1,000,000	1,000	1	61,020	35.31	264.17
1 pulgada cúbica a	16.39	0.01639	0.00001639	1	0.0005787	0.004329
1 pie cúbico a	28,316.85	28.31685	0.02831685	1,728	1	7.48055
1 galón E.U. (líquido) a	3,785.43	3.78543	0.00378543	231	0.133663	1

### PESO POR UNIDAD DE LONGITUD

ES IGUAL	kg/m	lb/pie
1 kilogramo por metro a	1	0.67197
1 libra por pie a	1.48816	1

### PESO POR UNIDAD DE SUPERFICIE (ESFUERZOS)

ES IGUAL	kg/cm2	Mpa	lb/pulg2
1 kilogramo x cm2 a	1	0.0981	14.2234
1 mega pascal a	10.1937	1	144.99
1 libra x pulg2 (ksi)	0.07031	0.0068971	1

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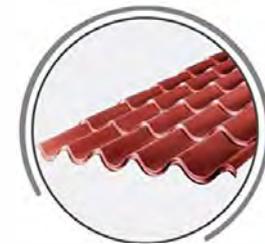




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