
carbon


steel

Carbon Steel (Ferrous)

Carbon steel can vary in terms of the content of this element, which directly implies its functions as a raw material. It is subdivided as below for different applications. Check it out:

Low carbon: Up to 0.30% carbon in composition.

It has low strength and hardness, high toughness and ductility, and its is machinable and weldable with low production cost.

Applications: automotive metal sheets, structural profiles, plates for pipe production, construction, bridges and tinplate sheets.

Medium carbon: From 0.30% to 0.60% carbon in composition

Higher strength and hardness, lower toughness and ductility than low carbon.
They present a quantity of carbon that allows them to receive tempering and annealing heat treatment.

Applications: wheels and railway equipment, gears, crankshafts, and other machinery parts that require high mechanical and wear resistance and toughness.

High carbon: From 0.60% to 1% carbon in composition

It has higher strength and hardness and lower ductility among carbon steels. They are most often tempered or annealed.

Applications: chisels, saw blades, hammers and knives.

ALLOYS AND SHAPES

parte 1/2

Shape	Alloys	Finishing
Coil	SAE-1006 a 1045, EM, EP, EEP, LN28, LNE26, LNE38, entre otros	Cold rolling
Coil	SAE-1006 a 1045, EM, EP, EEP, LN28, LNE26, LNE38, entre otros	Hot rolling
Sheets	A36, A283C, A285C, A516G 60/70, CO-AR-COR 500, COSAR 50/60, SAC-50, SAR-60, RST-37.2, RTS-52-3, COMERCIAL, entre otros	Cold rolling
Sheets	A36, A283C, A285C, A516G 60/70, CO-AR-COR 500, COSAR 50/60, SAC-50, SAR-60, RST-37.2, RTS-52-3, COMERCIAL, entre otros	Hot rolling
Checkered coil	A36, A283C, A285C, A516G 60/70, CO-AR-COR 500, COSAR 50/60 SAC-50, SAR-60, RST-37.2, RTS-52-3, COMERCIAL, entre otros	
Checkered coil	A36, A283C, A285C, A516G 60/70, CO-AR-COR 500, COSAR 50/60, SAC-50, SAR-60, RST-37.2, RTS-52-3, COMERCIAL, entre otros	
Thick sheet	A36, A283C, A285C, A516G 60/70, CO-AR-COR 500, COSAR 50/60, SAC-50, SAR-60, RST-37.2, RTS-52-3, COMERCIAL, entre otros	
Angle plate	A36 e ASTM A572 G50 ou G60	
Profile w	ASTM A572 GRAU 50	
Profile i / u	A36 / ASTM A572	
Round bar	SAE 5160	Rolled/drawn
Round bar	SAE 1020 / SAE 1045 / SAE 1060 / SAE 4140 / SAE 4340 / SAE 8620	Rolled/drawn

ALLOYS AND SHAPES

parte 2/2

Shape	Alloys	Finishing
Square bar	SAE 1020 / SAE 1045 / SAE 1060 / SAE 4140 / SAE 4340 / SAE 8620	Laminada/Trefilada
Hex bar	SAE 1020 / SAE 1045 / SAE 1060 / SAE 4140 / SAE 4340 / SAE 8620	Laminada/Trefilada
Flat bar	ASTM A36 / SAE 1020 / SAE 1045	
Tube	API 5L / NBR 5580 (DIN2440) / NBR 5590/ NBR 6591 / ASTM A-53 / ASTM A-106 / ASTM A-333 / ASTM A 178 Grau A / ASTM A 135 / ASTM A 214 (NBR 5585)	Con soldadura
Tube	API 5L / NBR 5580 (DIN2440) / NBR 5590/ NBR 6591 / ASTM A-53 / ASTM A-106 / ASTM A-333 / ASTM A 178 Grau A / ASTM A 135 / ASTM A 214 (NBR 5585)	Sin soldadura

CHEMICAL PROPERTIES

parte 1/6

Standard	Steel	Chemical Composition %								
		C	Mn	P. máx	S. Máx	Si	Ni	Cr	Mo	Cu
5590 (ASTM A53)	GrA	Máx 0,25	Máx 0,95	0.05	0.045	-	Máx 0,40	Máx 0,40	0.15	Máx 0,40
	GrB	Máx 0,30	Máx 1,20	0.05	0.045	-	Máx 0,40	Máx 0,40	0.15	Máx 0,40
A 106	GrA	Máx 0,25	0,27/0,93	0.035	0.035	-	Máx 0,40	Máx 0,40	0.15	Máx 0,40
	GrB	Máx 0,30	0,29/1,06	0.035	0.035	Mín 0,10	Máx 0,40	Máx 0,40	0.15	Máx 0,40
	GrC	Máx 0,35	0,29/1,06	0.035	0.035	Mín 0,10	Máx 0,40	Máx 0,40	0.15	Máx 0,40
A 161	GrLC	0,10/0,20	0,30/0,80	0.035	0.035	Mín 0,10	-	-	-	-
	GrT1	0,10/0,20	0,30/0,80	0.025	0.025	Máx 0,25	-	-	0,44/0,65	-
A 178	GrA	0,06/0,18	0,27/0,63	0.035	0.035	0,10/0,50	-	-	-	-
	GrC	Máx 0,35	Máx 0,80	0.035	0.035	-	-	-	-	-
	SAC 50	Máx 0,18	Máx 1,40	0.03	0.015	-	-	-	-	-
A 179	A 179	0,06/0,18	0,27/0,63	0.035	0.035	Mín 0,10	-	-	-	-
A 192	A 192	0,06/0,18	0,27/0,63	0.035	0.035	-	-	-	-	-
A 199/200	GrT5	Máx 0,15	0,30/0,60	0.025	0.025	Máx 0,25	-	4,00/6,00	0,45/0,65	-
	GrT11	0,05/0,15	0,30/0,60	0.025	0.025	Máx 0,50	-	1,00/1,50	0,44/0,65	-
	GrT22	0,05/0,15	0,30/0,60	0.025	0.025	0,50/1,00	-	1,90/2,60	0,87/1,13	-

CHEMICAL PROPERTIES

parte 2/6

Standard	Steel	Chemical Composition %								
		C	Mn	P. máx	S. Máx	Si	Ni	Cr	Mo	Cu
A 209	GrT1	0,10/0,20	0,30/0,80	0.025	0.025	Máx 0,50	-	-	0,44/0,65	-
	GrT1a	0,15/0,25	0,30/0,80	0.025	0.025	0,10/0,50	-	-	0,44/0,65	-
	GrT1b	Máx 0,14	0,30/0,80	0.025	0.025	0,10/0,50	-	-	0,44/0,65	-
A 210	GrA1	Máx 0,27	Máx 0,93	0.035	0.035	0,10/0,50	-	-	-	-
	GrC	Máx 0,35	0,29/1,06	0.035	0.035	Mín 0,10	-	-	-	-
A 213	GrT2	0,10/0,20	0,30/0,61	0.025	0.025	Mín 0,10	-	0,50/0,81	0,44/0,65	-
	GrT5	Máx 0,15	0,30/0,60	0.025	0.025	0,10/0,30	-	4,00/6,00	0,45/0,65	-
	GrT11	0,05/0,15	0,30/0,60	0.025	0.025	Máx 0,50	-	1,00/1,50	0,44/0,65	-
	GrT12	0,05/0,15	0,30/0,60	0.025	0.025	0,50/1,00	-	0,80/1,25	0,44/0,65	-
	GrT22	0,05/0,15	0,30/0,60	0.025	0.025	Máx 0,50	-	1,90/2,60	0,87/1,13	-
A 214	A 214	Máx 0,18	0,27/0,63	0.035	0.035	Máx 0,50	-	-	-	-
A 226	A 226	0,06/0,18	0,27/0,63	0.035	0.035	-	-	-	-	-
A 333/334	Gr1	Máx 0,30	0,40/1,06	0.025	0.025	Máx 0,25	-	-	-	-
	Gr3	Máx 0,19	0,31/0,64	0.025	0.025	-	3,18/3,82	-	-	-
	Gr6	Máx 0,30	0,29/1,06	0.025	0.025	0,18/0,37	-	-	-	-
	Gr7	Máx 0,19	Máx 0,90	0.025	0.025	Mín 0,10	2,03/2,57	-	-	-

CHEMICAL PROPERTIES

parte 3/6

Standard	Steel	Chemical Composition %								
		C	Mn	P. máx	S. Máx	Si	Ni	Cr	Mo	Cu
A 335	GrP1	0,10/0,20	0,30/0,80	0.025	0.025	0,13/0,32	-	-	0,44/0,65	-
	GrP2	0,10/0,20	0,30/0,61	0.025	0.025	0,10/0,50	-	0,50/0,81	0,44/0,65	-
	GrP5	Máx 0,15	0,30/0,60	0.025	0.025	0,10/0,30	-	4,00/6,00	0,45/0,65	-
	GrP11	0,05/0,15	0,30/0,60	0.025	0.025	Máx 0,50	-	1,00/1,50	0,44/0,65	-
	GrP12	0,05/0,15	0,30/0,61	0.025	0.025	0,50/1,00	-	0,80/1,25	0,44/0,65	-
	GrP22	0,05/0,15	0,30/0,60	0.025	0.025	Máx 0,50	-	1,90/2,60	0,87/1,13	-
A 423	Gr1	Máx 0,15	Máx 0,55	0,06/0,16	0.06	Máx 0,50	0,20/0,70	0,24/1,31	-	0,20/0,60
	Gr2	Máx 0,15	0,50/1,00	0.04	0.05	Mín 0,10	0,40/1,10	-	Mín 0,10	0,30/1,00
A 500	GrA	Máx 0,30	-	0.05	0.063	-	-	-	-	Mín 0,18
	GrB	Máx 0,30	-	0.05	0.063	-	-	-	-	Mín 0,18
	GrC	Máx 0,27	Máx 1,40	0.05	0.063	-	-	-	-	Mín 0,18
A 501	A 501	Máx 0,30	-	0.05	0.063	-	-	-	-	-
DIN 1626	St 37.0	Máx 0,17	-	0.04	0.04	-	-	-	-	-

CHEMICAL PROPERTIES

parte 4/6

Standard	Steel	Chemical Composition %								
		C	Mn	P. máx	S. Máx	Si	Ni	Cr	Mo	Cu
DIN 1629	St 44.0	Máx 0,21	-	0.04	0.04	-	-	-	-	-
	St 52.0	Máx 0,22	Máx 1,60	0.04	0.035	-	-	-	-	-
DIN 2391	St 35.0	Máx 0,17	Mín 0,40	0.05	0.05	Máx 0,80	-	-	-	-
	St 45.0	Máx 0,21	Mín 0,40	0.05	0.05	Máx 0,35	-	-	-	-
	St 52.0	Máx 0,22	Máx 1,60	0.05	0.05	Máx 0,35	-	-	-	-
	VMec 134AP	Máx 0,22	Máx 1,60	0.04	0,010/0,030	Máx 0,55	-	-	-	-
DIN 2393	St 34.2	Máx 0,15	-	0.05	0.05	Máx 0,55	-	-	-	-
	St 37.2	Máx 0,18	-	0.05	0.05	-	-	-	-	-
	St 42.0	Máx 0,25	-	0.05	0.05	Máx 0,55	-	-	-	-
	St 52.3	Máx 0,22	Máx 1,60	0.05	0.05	-	-	-	-	-
DIN 17175	VMec 134AP	Máx 0,22	Máx 1,60	0.025	0.025	-	-	-	-	-
	St 35.8	Máx 0,17	0,40/0,80	0.04	0.04	Máx 0,55	-	-	-	-
	St 45.8	Máx 0,21	0,40/1,20	0.04	0.04	0,10/0,35	-	-	-	-

CHEMICAL PROPERTIES

parte 5/5

Standard	Steel	Chemical Composition %								
		C	Mn	P. máx	S. Máx	Si	Ni	Cr	Mo	Cu
DIN 17175	15Mo3	0,12/0,20	0,40/0,80	0.035	0.035	0,10/0,35	-	-	-	-
	13CrMo44	0,10/0,18	0,40/0,70	0.035	0.035	0,10/0,35	-	-	-	-
	10CrMo910	0,08/0,15	0,40/0,70	0.035	0.035	0,10/0,35	-	0,70/1,10	-	-
API 5L	GrA	Máx 0,22	Máx 0,90	0.04	0.05	Máx 0,50	-	2,00/2,50	-	-
	GrB	Máx 0,27	Máx 1,15	0.04	0.05	-	-	-	-	-
SAE 4140	-	Máx 0,38	Máx 0,75	0.03	0.04	Máx 0,15	-	Máx 0,80	Máx 0,15	-
	-	Máx 0,43	Máx 1,00			Mín 0,35	-	Mín 1,10	Mín 0,25	-
SAE 4340	-	Máx 0,38	Máx 0,60	0.03	0.04	Máx 0,15	Máx 1,65	Máx 0,70	Máx 0,20	-
	-	Máx 0,43	Máx 0,80			Mín 0,35	Mín 2,00	Mín 0,90	Mín 0,90	-
SAE 8620	-	Máx 0,18	Máx 0,70	0.03	0.04	Máx 0,15	Máx 0,40	Máx 0,40	Máx 0,15	-
	-	Máx 0,23	Máx 0,90			Mín 0,35	Mín 0,70	Mín 0,60	Mín 0,25	-
SAE 5160	-	Máx 0,56	Máx 0,75	0.03	0.04	Máx 0,15	-	Máx 0,70	-	-
	-	Máx 0,64	Máx 1,00			Mín 0,35	-	Mín 0,90	-	-

CHEMICAL PROPERTIES

parte 5/6

Standard	Steel	Chemical Composition %								
		C	Mn	P. máx	S. Máx	Si	Ni	Cr	Mo	Cu
SAE 1020	-	Máx 0,18	Máx 0,30	0.03	0.05	-	-	-	-	-
	-	Máx 0,23	Máx 0,60			-	-	-	-	-
SAE 1045	-	Máx 0,43	Máx 0,60	0.03	0.05	-	-	-	-	-
	-	Máx 0,50	Máx 0,90			-	-	-	-	-
SAE 1060	-	Máx 0,55	Máx 0,60	0.03	0.05	-	-	-	-	-
	-	Máx 0,65	Máx 0,90			-	-	-	-	-

MECHANICAL PROPERTIES

parte 1/5

Standard	Steel	Mechanical Properties		
		RT Mpa Mín.	Le Mpa Mín.	Hardness Max.
5590 (ASTM A53)	GrA	330	205	-
	GrB	415	240	-
A 106	GrA	330	205	-
	GrB	415	240	-
	GrC	485	275	-
A 161	GrLC	324	179	-
	GrT1	379	207	-
A 178	GrA	325	180	-
	GrC	415	255	-
	SAC 50	490/602	373	-
A 179	A 179	415	170	72HB
A 192	A 192	-	-	137HB
A 199/200	GrT5	415	170	163HB
	GrT11	415	170	163HB
	GrT22	415	170	163HB

MECHANICAL PROPERTIES

Standard	Steel	Mechanical Properties		
		RT Mpa Mín.	Le Mpa Mín.	Hardness Max.
A 209	GrT1	380	225	146HB
	GrT1a	415	220	153HB
	GrT1b	365	195	137HB
A 210	GrA1	415	255	143HB
	GrC	485	275	179HB
A 213	GrT2	415	205	163HB
	GrT5	415	205	179HB
	GrT11	415	205	163HB
	GrT12	415	205	163HB
	GrT22	415	205	163HB
A 214	A 214	-	-	72HB
A 226	A 226	325	180	125HB
A 333/334	Gr1	380	205	-
	Gr3	450	240	-

MECHANICAL PROPERTIES

Standard	Steel	Mechanical Properties		
		RT Mpa Mín.	Le Mpa Mín.	Hardness Max.
A 333/334	Gr6	415	240	-
	Gr7	450	240	-
A 335	GrP1	380	205	-
	GrP2	380	205	-
	GrP5	415	205	-
	GrP11	415	205	-
	GrP12	415	205	-
	GrP22	415	205	-
A 423	Gr1	415	255	170HB
	Gr2	415	255	170HB
A 500	GrA	310	228	-
	GrB	400	290	-
	GrC	427	317	-
A 501	A 501	400	250	-

MECHANICAL PROPERTIES

Standard	Steel	Mechanical Properties		
		RT Mpa Mín.	Le Mpa Mín.	Hardness Max.
DIN 1626	St 37.0	350/480	253	-
DIN 1629	St 44.0	420/550	275	-
	St 52.0	500/650	355	-
DIN 2391	St 35.0	340/470	235	-
	St 45.0	440/570	255	-
	St 52.0	490/630	355	-
	VMec 134AP	510	345	-
DIN 2393	St 34.2	310/410	205	145
	St 37.2	340/470	235	-
	St 42.0	-	-	-
	St 52.3	490/630	355	-
DIN 17175	VMec 134AP	510	343	-
	St 35.8	360/480	235	145

MECHANICAL PROPERTIES

Standard	Steel	Mechanical Properties		
		RT Mpa Mín.	Le Mpa Mín.	Hardness Max.
DIN 17175	St 45.8	410/530	255	-
	15Mo3	450/600	270	-
	13CrMo44	440/590	290	-
	10CrMo910	450/600	280	-
API 5L	GrA	331	207	-
	GrB	413	241	-
SAE 4140	-	655	415	197HB
SAE 4340	-	745	470	217HB
SAE 8620	-	1157	833	341HB
SAE 5160	-	724	275	219HB
SAE 1020	-	420	350	121 HB
SAE 1045	-	585	450	163HB
SAE 1060	-	620	485	183HB

BEAMS I AND H

parte 1/5

Gauge	"Linear Mass [kg/m]"	"Area A [cm²]"	Thickness						AXIS X - X			
			d [mm]	d [mm]	t_w [mm]	t_f [mm]	h mm	d' [mm]	I_x [cm⁴]	W_x [cm³]	r_x [cm]	Z_x [cm⁴]
W 150 x 13,0	13,0	16,6	148	100	4,3	4,9	138,2	118,20	635	86	6,18	96
W 150 x 18,4	18,4	23,4	153	102	5,8	7,1	138,8	118,80	939	123	6,34	139
W 150 x 22,5	22,5	29,0	152	152	5,8	6,6	139,0	119,00	1229	162	6,51	180
W 150 x 29,8	29,8	38,5	157	153	6,6	9,3	138,0	118,00	1739	222	6,72	248
W 150 x 37,1	37,1	47,8	162	154	8,1	11,6	139,0	119,00	2224	277	6,85	314
W 200 x 15,0	15,2	19,4	200	100	4,3	5,2	189,6	169,60	1305	130	8,20	148
W 200 x 19,3	19,7	25,1	203	102	5,8	6,5	190,0	170,00	1686	166	8,19	191
W 200 x 22,5	22,7	29,0	206	102	6,2	8,0	190,0	170,00	2029	197	8,37	226
W 200 x 26,6	26,9	34,2	207	133	5,8	8,4	190,2	170,20	2611	252	8,73	282
W 200 x 31,3	31,7	40,3	210	134	6,4	10,2	189,6	169,60	3168	302	8,86	339
W 200 x 35,9	35,9	45,7	201	165	6,2	10,2	181,0	161,00	3437	342	8,67	380

BEAMS I AND H

parte 2/5

Gauge	"Linear Mass [kg/m]"	"Area A [cm²]"	Thickness						AXIS X - X			
			d [mm]	d [mm]	t_w [mm]	t_f [mm]	h mm	d' [mm]	I_x [cm⁴]	W_x [cm³]	r_x [cm]	Z_x [cm⁴]
W 200 x 46,1	46,0	58,6	203	203	7,2	11,0	181,0	161,00	4543	448	8,81	495
W 250 x 17,9	18,1	23,1	251	101	4,8	5,3	240,4	220,40	2291	183	9,96	211
W 250 x 22,3	22,7	28,9	254	102	5,8	6,9	240,2	220,20	2939	231	10,09	268
W 250 x 25,3	25,6	32,6	257	102	6,1	8,4	240,2	220,20	3473	270	10,31	311
W 250 x 28,4	28,7	36,6	260	102	6,4	10,0	240,0	220,00	4046	311	10,51	357
W 250 x 32,7	33,0	42,1	258	146	6,1	9,1	239,8	219,80	4937	383	10,83	429
W 250 x 38,5	38,9	49,6	262	147	6,6	11,2	239,6	219,60	6057	462	11,05	518
W 250 x 44,8	45,2	57,6	266	148	7,6	13,0	240,0	220,00	7158	538	11,15	606
W 250 x 73,0	72,8	92,7	253	254	8,6	14,2	224,6	200,60	11257	890	11,02	983
W 250 x 80,0	80,0	101,9	256	255	9,4	15,6	224,8	200,80	12550	980	11,10	1089
W 250 x 89,0	89,4	113,9	260	256	10,7	17,3	225,4	201,40	14237	1095	11,18	1224
W 310 x 21,0	21,4	27,2	303	101	5,1	5,7	291,6	271,60	3776	249	11,77	292
W 310 x 23,8	24,1	30,7	305	101	5,6	6,7	291,6	271,60	4346	285	11,89	333

BEAMS I AND H

parte 3/5

Gauge	"Linear Mass [kg/m]"	"Area A [cm²]"	Thickness						AXIS X - X			
			d [mm]	d [mm]	t_w [mm]	t_f [mm]	h mm	d' [mm]	I_x [cm⁴]	W_x [cm³]	r_x [cm]	Z_x [cm⁴]
W 310 x 28,3	28,6	36,5	309	102	6,0	8,9	291,2	271,20	5500	356	12,28	412
W 310 x 32,7	33,1	42,1	313	102	6,6	10,8	291,4	271,40	6570	420	12,49	485
W 310 x 38,7	39,0	49,7	310	165	5,8	9,7	290,6	270,60	8581	554	13,14	615
W 310 x 44,5	44,9	57,2	313	166	6,6	11,2	290,6	270,60	9997	639	13,22	713
W 310 x 52,0	52,6	67,0	317	167	7,6	13,2	290,6	270,60	11909	751	13,33	842
W 310 x 97,0	97,0	123,6	308	305	9,9	15,4	277,2	245,20	22284	1447	13,43	1594
W 310 x 107,0	107,1	136,4	311	306	10,9	17,0	277,0	245,00	24839	1597	13,49	1768
W 310 x 117,0	117,7	149,9	314	307	11,9	18,7	276,6	244,60	27563	1756	13,56	1953
W 360 x 32,9	33,0	42,1	349	127	5,8	8,5	332,0	308,00	8358	479	14,09	548
W 360 x 39,0	39,4	50,2	353	128	6,5	10,7	331,6	307,60	10331	585	14,35	668
W 360 x 44,0	45,3	57,7	352	171	6,9	9,8	332,4	308,40	12258	696	14,58	784
W 360 x 51,0	50,9	64,8	355	171	7,2	11,6	331,8	307,80	14222	801	14,81	900
W 360 x 57,8	56,9	72,5	358	172	7,9	13,1	331,8	307,80	16143	902	14,92	1015

BEAMS I AND H

parte 4/5

Gauge	"Linear Mass [kg/m]"	"Area A [cm²]"	Thickness						AXIS X - X			
			d [mm]	d [mm]	t_w [mm]	t_f [mm]	h mm	d' [mm]	I_x [cm⁴]	W_x [cm³]	r_x [cm]	Z_x [cm⁴]
W 360 x 64,0	64,1	81,7	347	203	7,7	13,5	320,0	288,00	17890	1031	14,80	1146
W 360 x 72,0	71,7	91,3	350	204	8,6	15,1	319,8	287,80	20169	1152	14,86	1286
W 360 x 79,0	79,4	101,2	354	205	9,4	16,8	320,4	288,40	22713	1283	14,98	1437
W 410 x 38,8	39,5	50,3	399	140	6,4	8,8	381,4	357,40	12777	640	15,94	737
W 410 x 46,1	46,5	59,2	403	140	7,0	11,2	380,6	356,60	15690	779	16,27	891
W 410 x 53,0	53,7	68,4	403	177	7,5	10,9	381,2	357,20	18734	930	16,55	1052
W 410 x 60,0	59,8	76,2	407	178	7,7	12,8	381,4	357,40	21707	1067	16,88	1201
W 410 x 67,0	67,8	86,3	410	179	8,8	14,4	381,2	357,20	24678	1204	16,91	1363
W 410 x 75,0	75,2	95,8	413	180	9,7	16,0	381,0	357,00	27616	1337	16,98	1519
W 460 x 52,0	52,3	66,6	450	152	7,6	10,8	428,4	404,40	21370	950	17,91	1096
W 460 x 60,0	59,8	76,2	455	153	8,0	13,3	428,4	404,40	25652	1128	18,35	1292
W 460 x 68,0	68,8	87,6	459	154	9,1	15,4	428,2	404,20	29851	1301	18,46	1495

BEAMS I AND H

parte 5/5

Gauge	"Linear Mass [kg/m]"	"Area A [cm²]"	Thickness						AXIS X - X			
			d [mm]	d [mm]	t_w [mm]	t_f [mm]	h mm	d' [mm]	I_x [cm⁴]	W_x [cm³]	r_x [cm]	Z_x [cm⁴]
W 460 x 74,0	74,5	94,9	457	190	9,0	14,5	428,0	404,00	33415	1462	18,77	1657
W 460 x 82,0	82,2	104,7	460	191	9,9	16,0	428,0	404,00	37157	1616	18,84	1836
W 460 x 89,0	89,6	114,1	463	192	10,5	17,7	427,6	403,60	41105	1776	18,98	2019
W 530 x 66,0	65,6	83,6	525	165	8,9	11,4	502,2	478,20	34971	1332	20,46	1558
W 530 x 72,0	71,9	91,6	524	207	9,0	10,9	502,2	478,20	39969	1526	20,89	1756
W 530 x 74,0	74,6	95,1	529	166	9,7	13,6	501,8	477,80	40969	1549	20,76	1805
W 530 x 82,0	82,0	104,5	528	209	9,5	13,3	501,4	477,40	47569	1802	21,34	2059
W 530 x 85,0	84,6	107,7	535	166	10,3	16,5	502,0	478,00	48453	1811	21,21	2100
W 530 x 92,0	92,3	117,6	533	209	10,2	15,6	501,8	477,80	55157	2070	21,65	2360
W 610 x 101,0	102,3	130,3	603	228	10,5	14,9	573,2	541,20	77003	2554	24,31	2923
W 610 x 113,0	114,1	145,3	608	228	11,2	17,3	573,4	541,40	88196	2901	24,64	3313
W 610 x 155,0	155,5	198,1	611	324	12,7	19,0	573,0	541,00	129583	4242	25,58	4749
W 610 x 174,0	174,9	222,8	616	325	14,0	21,6	572,8	540,80	147754	4797	25,75	5383

RECTANGULAR BARS FLAT IRON

parte 1/2

Dimensions in inches		Kg/m
Thickness	Width	
1/8”	5/8"	0,4
	3/4"	0,48
	7/8"	56
	1"	0,63
	1.1/4"	0,79
	1.1/2"	0,95
	1.3/4"	1,11
	2"	1,27
3/16”	3/4"	0,71
	7/8"	0,83
	1"	0,95
	1.1/4"	1,19
	1.1/2"	1,42
	2"	1,66

Dimensions in inches		Kg/m
Thickness	Width	
3/8”	1"	1,9
	1.1/4"	2,38
	1.1/2"	2,85
	2"	3,8
	2.1/2"	4,74
	3"	5,7
	4"	7,6
1/2”	1"	2,53
	1.1/4"	3,17
	1.1/2"	3,8
	2"	5,06
	2.1/2"	6,33
	3"	7,6
	4"	10,13

Dimensions in inches		Kg/m
Thickness	Width	
1/4”	3/4"	0,95
	7/8"	1,11
	1"	1,27
	1.1/4"	1,58
	1.1/2"	1,9
	2"	2,53
	2.1/2"	3,17
	3"	3,8
	4"	5,06

Dimensions in inches		Kg/m
Thickness	Width	
5/8”	1"	3,16
	1.1/4"	3,95
	1.1/2"	4,75
	2"	6,33
	2.1/2"	7,91
	3"	9,5
	3.1/2"	11,08
	4"	12,66

RECTANGULAR BARS FLAT IRON

parte 2/2

Dimensions in inches		Kg/m	Dimensions in inches		Kg/m
Thickness	Width		Thickness	Width	
5/16”	3/4"	1,19	3/4”	1"	3,8
	7/8"	1,4		1.1/4"	4,74
	1"	1,58		1.1/2"	5,7
	1.1/4"	1,98		2"	7,6
	1.1/2"	2,38		2.1/2"	9,5
	2"	3,17		3"	11,4
	2.1/2"	3,96		3.1/2"	13,29
	3"	4,75		4"	15,19
	4"	6,33	1”	2"	10,12
3/8”	3/4"	1,42		2.1/2"	12,66
	7/8"	1,68		3"	15,19
				4"	20,26

ROUND, RECTANGULAR AND HEXAGONAL BARS

parte 1/2

Gauge		Kg/m			Gauge		Kg/m			Gauge		Kg/m			Gauge		Kg/m		
In.	mm	●	■	⬢	In.	mm	●	■	⬢	In.	mm	●	■	⬢	In.	mm	●	■	⬢
1/8	3,17	0,062	-	-	1	25,40	3,97	5,06	4,38	1.15/16	49,21	14,92	18,99	16,45	2.7/8	73,02	32,85	41,82	36,22
5/32	3,97	0,097	-	-	1.1/16	26,99	4,49	5,71	4,95	2	50,8	15,9	20,24	17,53	2.15/16	74,61	34,29	43,66	37,81
3/16	4,76	0,140	0,18	0,15	1.1/8	28,57	5,03	6,4	5,55	2.1/16	53,39	16,91	21,52	18,64	3	76,20	35,77	45,54	39,43
1/4	6,35	0,25	0,32	0,27	1.3/16	30,16	5,60	7,14	6,18	2.1/8	53,97	17,95	22,85	19,79	3.1/8	79,38	38,81	49,41	42,79
5/196	7,94	0,39	0,49	0,43	1.1/4	31,75	6,21	7,91	6,85	2.3/16	55,56	19,02	24,21	20,97	3.1/4	82,55	41,88	53,44	46,34
3/8	9,53	0,56	0,71	0,62	1.5/16	33,34	6,85	8,72	7,55	2.1/4	57,15	20,12	25,62	22,19	3.3/8	85,73	42,27	57,63	49,98
7/16	11,11	0,76	0,97	0,84	1.3/16	34,92	7,51	9,57	8,29	2.6/16	58,74	21,25	27,06	23,44	3.1/2	88,90	48,68	61,98	53,74
1/2	12,7	0,99	1,22	1,10	1.7/16	36,51	8,21	10,46	9,06	2.3/8	60,32	22,42	28,54	24,72	3.5/8	92,08	52,22	66,49	-
9/16	14,29	1,26	1,60	1,39	1.1/2	38,10	8,94	11,39	9,86	2.7/16	61,91	23,61	30,06	26,03	3.3/4	95,25	55,88	71,15	-
5/8	15,87	1,55	1,98	1,71	1.9/16	39,69	9,70	12,35	10,7	2.1/2	63,50	24,84	31,62	27,38	3.7/8	94,43	60,67	75,98	-
11/16	17,46	1,88	2,36	2,07	1.5/8	41,27	10,49	13,36	11,57	2.9/16	65,09	26,10	33,22	28,78	4	101,6	63,58	80,96	-
3/4	19,05	2,24	2,85	2,46	1.11/16	42,86	11,32	14,41	12,48	2.5/8	66,67	27,38	34,87	30,79	4.1/8	104,78	67,62	86,10	-
13/16	20,64	2,62	3,34	2,89	1.3/4	44,45	12,17	15,5	13,42	2.11/16	68,26	28,70	36,55	31,67					
7/8	22,22	3,04	3,87	3,35	1.13/16	46,04	13,06	16,62	14,4	2.3/4	69,85	30,05	38,27	33,14					
15/16	23,81	3,49	4,45	3,85	1.7/8	47,62	13,97	17,79	15,41	2.13/16	71,44	31,44	40,02	34,22					

ROUND, RECTANGULAR AND HEXAGONAL BARS

parte 2/2

Gauge		Kg/m			Gauge		Kg/m			Gauge		Kg/m			Gauge		Kg/m		
In.	mm	●	▬	⬢	In.	mm	●	▬	⬢	In.	mm	●	▬	⬢	In.	mm	●	▬	⬢
4.1/4	107,95	71,78	91,39	-	7.1/4	184,15	209,70	266,20	-	11	279,40	481,20	612,80	-	19	482,60	1434,60	1826,60	-
4.3/8	111,13	76,06	96,85	-	7.1/2	190,50	223,80	285,00	-	11.1/4	285,75	503,40	641,00	-	20	508,00	1589,50	2023,90	-
4.1/2	114,30	80,47	102,46	-	7.3/4	196,85	238,90	304,00	-	11.1/2	292,70	526,00	669,80	-	21	533,40	1752,61	2230,60	-
4.5/8	117,48	85,01	108,23	-	8	203,20	254,60	324,00	-	11.3/4	298,45	549,00	699,20	-	22	558,80	1932,50	2448,09	-
4.3/4	120,65	89,66	114,16	-	8.1/4	209,55	270,70	345,00	-	12	304,80	572,70	729,30	-	23	584,20	2102,34	2675,71	-
4.7/8	123,83	94,44	120,25	-	8.1/2	215,90	287,40	365,90	-	12.1/2	317,50	620,90	790,60	-	24	609,60	2289,13	2913,43	-
5	127,00	99,80	126,50	-	8.3/4	222,25	304,60	388,50	-	13	330,20	672,60	355,80	-	25	635,00	2483,86	3161,28	-
5.1/4	133,35	109,50	139,50	-	9	228,60	322,10	410,20	-	13.1/2	342,90	724,30	922,20	-	26	660,40	2686,54	3419,24	-
5.1/2	139,70	120,20	153,10	-	9.1/4	234,95	340,30	433,50	-	14	355,60	779,70	992,60	-	27	685,80	2897,18	3687,32	-
5.3/4	146,05	131,40	167,20	-	9.1/2	241,30	359,00	457,10	-	14.1/2	368,30	835,50	1063,80	-	28	711,20	3115,76	3965,51	-
6	152,40	143,10	182,50	-	9.3/4	247,65	378,10	481,40	-	15	381,00	894,90	1139,50	-	29	736,60	3342,29	4253,82	-
6.1/4	158,75	155,20	197,80	-	10	254,00	397,80	506,50	-	15.1/2	393,70	954,70	1215,60	-	30	762,00	3576,76	4552,24	-
6.1/2	165,10	167,90	213,50	-	10.1/4	260,35	417,90	532,00	-	16	406,50	1017,30	1295,30	-					
6.3/4	171,45	181,10	231,00	-	10.1/2	266,70	438,50	558,40	-	17	431,80	1148,60	1462,30	-					
7	177,80	194,70	284,10	-	10.3/4	273,05	459,70	585,30	-	18	457,20	1287,60	1639,40	-					

SCHEDULE STANDARD PIPES

part 1/5

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
1/4"	13,72	STD	40	2,24	0,63
		XS	80	3,02	0,80
			160	3,30	0,82
3/8"	17,15	STD	40	2,31	0,85
		XS	80	3,20	1,10
			160	4,75	1,56
1/2"	21,34	STD	40	2,77	1,25
		XS	80	3,73	1,62
			160	4,78	1,95
		XXS		7,47	2,54
3/4"	26,67	STD	40	2,87	1,68
		XS	80	3,91	2,19
			160	5,56	2,89
		XXS		7,82	3,63
1"	33,40	STD	40	3,38	2,50
		XS	80	4,55	3,23
			160	6,36	4,23
		XXS		9,09	5,45
1.1/4"	42,16	STD	40	3,56	3,38
		XS	80	4,85	4,46
			160	6,35	5,60
		XXS		9,70	7,75
1.1/2"	48,26	STD	40	3,68	4,05
		XS	80	5,08	5,40
			160	7,14	7,23
		XXS		10,16	9,54
2"	60,33	STD	40	3,91	5,43
		XS	80	5,54	7,47
			160	8,74	11,10
		XXS		11,07	13,41

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
2.1/2"	73,03	STD	40	5,16	8,62
		XS	80	7,01	11,40
			160	9,52	14,90
		XXS		14,02	20,37
2.1/2"	73,03	STD	40	5,16	8,62
		XS	80	7,01	11,40
			160	9,52	14,90
		XXS		14,02	20,37
3"	88,90	STD	40	5,49	11,28
		XS	80	7,62	15,25
			160	11,13	21,31
		XXS		15,25	27,65
3.1/2"	101,60	STD	40	5,74	13,56
		XS	80	8,08	18,60
4"	114,30	STD	40	6,02	16,06
		XS	80	8,56	22,29
			120	11,13	28,27
			160	13,49	33,49
		XXS		17,12	40,98

SCHEDULE STANDARD PIPES

part 2/5

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
5"	141,30	STD	40	6,55	21,75
		XS	80	9,52	30,92
			120	12,70	40,25
			160	15,88	49,01
		XXS		19,05	57,36
6"	168,28	STD		6,35	25,33
			40	7,11	28,23
		XS	80	10,97	42,51
			120	14,27	54,15
			160	18,26	67,48
		XXS		21,95	79,10
8"	219,08		20	6,35	33,27
			30	7,04	36,75
		STD	40	8,18	42,48
			60	10,31	53,03
		XS	80	12,70	64,56
			100	15,09	75,81
			120	18,26	90,47
			140	20,62	100,83
		XXS		22,22	107,76
			160	23,01	111,14

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
10"	273,05		20	6,35	41,74
			30	7,80	50,95
		STD	40	9,27	60,23
		XS	60	12,70	81,45
			80	15,09	95,87
			100	18,26	114,62
			120	21,44	132,86
		XXS	140	25,40	154,95
			160	28,57	172,07
12"	323,85		20	6,35	49,67
			30	8,38	65,13
		STD		9,52	73,75
			40	10,31	79,64
		XS		12,70	97,34
			60	14,27	108,85
			80	17,47	131,88
			100	21,44	159,69
		XXS	120	25,40	186,73
			140	28,57	207,83
			160	33,32	238,49

SCHEDULE STANDARD PIPES

part 3/5

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
14"	355,60		10	6,35	54,68
			20	7,92	67,87
		STD	30	9,52	81,20
			40	11,13	94,40
		XS		12,70	107,27
			60	15,19	126,56
			80	19,05	157,92
			100	23,82	194,70
			120	27,79	224,38
			140	31,75	253,27
			160	35,71	281,40
16"	406,40		10	6,35	62,57
			20	7,92	77,78
		STD	30	9,52	93,16
		XS	40	12,70	123,16
			60	16,66	159,96
			80	21,44	203,28
			100	26,19	245,25
			120	30,96	286,34
			140	36,53	332,78
			160	40,49	364,93

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
18"	457,20		10	6,35	70,52
			20	7,92	87,70
		STD		9,52	105,04
			30	11,13	122,24
		XS		12,70	139,05
			40	14,27	155,75
			60	19,05	205,60
			80	23,83	254,33
			100	29,36	309,44
			120	34,92	363,28
			140	39,67	408,04
			160	45,25	459,05
20"	508,00		10	6,35	78,47
		STD	20	9,53	116,97
		XS	30	12,70	154,97
			40	15,09	183,14
			60	20,62	247,78
			80	26,19	310,91
			100	32,54	381,20
			120	38,10	441,06
			140	44,45	507,63
			160	50,01	564,24

SCHEDULE STANDARD PIPES

part 4/5

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
22"	558,80		10	6,35	86,41
			20	9,52	128,88
		XS	30	12,70	182,32
			40	15,88	212,31
			60	22,22	293,75
			80	28,57	373,21
			100	34,92	450,69
			120	41,27	526,17
			140	47,62	599,66
			160	53,97	671,15
24"	609,60		10	6,35	94,35
		STD	20	9,52	140,80
		XS		12,70	186,73
			30	14,27	209,33
			40	17,48	254,88
			60	24,61	354,66
			80	30,96	441,31
			100	38,89	546,68
			120	46,02	638,93
			140	52,37	718,88
			160	59,53	807,50

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
26"	660,40			6,35	102,30
		STD		9,52	152,71
		XS	20	12,70	202,62
				15,88	252,04
				17,48	276,75
				19,05	300,95
28"	711,20			6,35	110,25
		STD		9,53	164,63
		XS	20	12,70	218,51
			30	15,88	271,90
				17,48	298,61
				19,05	324,79
30"	762,00			6,35	118,19
		STD		9,53	176,55
		XS	20	12,70	234,40
				15,88	291,77
			30	17,48	320,49
				19,05	350,62
32"	812,80			6,35	126,14
		STD		9,53	188,47
		XS	20	12,70	250,30
			30	15,88	311,63
			40	17,48	342,36
				19,05	372,46

SCHEDULE STANDARD PIPES

Ø Nominal	Ø External (mm)	Denomination	Schedule	Wall thickness (mm)	Weight per meter
34"	863,60			6,35	134,08
		STD	20	9,53	200,39
		XS	30	12,70	266,16
			40	15,88	331,50
				17,48	364,22
				19,05	396,74
36"	914,40			6,35	142,03
		STD		9,53	212,31
		XS	20	12,70	282,08
			30	15,88	351,36
				17,48	386,09
				19,05	420,14
38"	965,20			6,35	151,29
		STD		9,53	224,23
		XS		12,70	297,97
				15,88	371,23
				17,48	407,95
				19,05	443,97
40"	1016,00			6,35	159,34
		STD		9,53	236,15
		XS		12,70	313,86
				15,88	391,09
				17,48	429,82
				19,05	467,81