NTS™

NATIONAL TUBE SUPPLY

A Member of the Bianco Group

Product Guide

The Right Supply, Right On Time.

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NATIONAL TUBE SUPPLY
A Member of the Bianco Group

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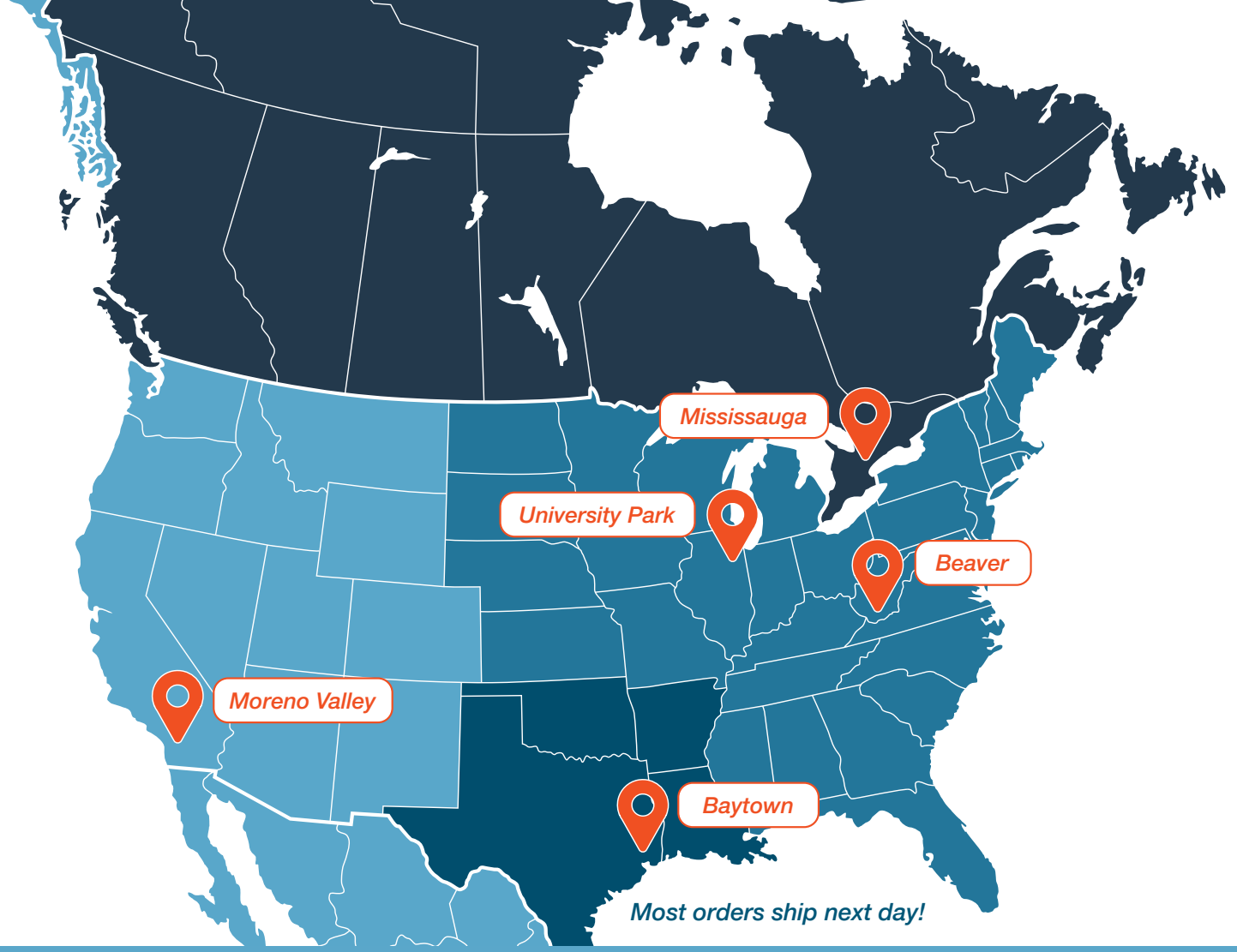

NATIONAL TUBE SUPPLY

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nationaltubesupply.com

The Right Supply, Right On Time.

National Tube Supply has been a leading supplier of carbon & alloy mechanical tubing across North America since its founding in 1990. We've spent the last three decades building our company around our customers to ensure we're providing the best products, services, and support.

As a member of the Bianco Group, National Tube Supply maintains a massive inventory and sources product from mills throughout the world. This means customers can trust that we'll have the materials they need in stock and often ready to ship next day!

Contact one of our experienced sales representatives to explore how National Tube Supply can help accelerate your supply chain with the right supply, right on time.

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DOM

Welded and Drawn Over Mandrel Carbon Steel Tubing
ASTM A-513/5
< .156 Walls C1020
≥ .156 Walls C1026
ST52.3 ≥ .156” walls

CDS

Cold Drawn Seamless Carbon Steel Tubing
ASTM A-519
Available grades 1026, ST52.3, 4130

ALY

Hot-Finish Seamless Alloy 4140/42 Alloy Steel Tubing
Annealed or Heat Treated
ASTM A-519

HFS

Hot-Finish C1026 or A106 B/C Carbon Mechanical Tubing
ASTM A-519

Seamless Carbon Steel Pipe

Variations in Outside Diameter

A106

NPS Designator	*Permissible Variations in Outside Diameter*	
	Over Inches	*Under inches*
⅛ to 1½, incl	1/64 (0.015)	1/64 (0.015)
Over 1½ to 4, incl	1/32 (0.031)	1/32 (0.031)
Over 4 to 8, incl	1/16 (0.062)	1/32 (0.031)
Over 8 to 10, incl	3/32 (0.093)	1/32 (0.031)
Over 10	1%	1%

Decimal Equivalents

B.W.G. or Fraction	Decimal	B.W.G. or Fraction	Decimal	B.W.G. or Fraction	Decimal	B.W.G. or Fraction	Decimal
36	.004	20	.035	9	.148	11/32	.344
35	.005	19	.042	5/32	.156	3/8	.375
34	.007	3/64	.047	8	.165	00	.380
33	.008	18	.049	11/64	.172	000	.425
32	.009	17	.058	7	.180	7/16	.438
31	.010	1/16	.063	3/16	.188	0000	.454
30	.012	16	.065	13/64	.203	1/2	.500
29	.013	15	.072	6	.203	17/32	.531
28	.014	5/64	.078	7/32	.219	9/16	.563
1/64	.016	14	.083	5	.220	19/32	.594
27	.016	3/32	.094	4	.238	5/8	.625
26	.018	13	.095	1/4	.250	11/16	.688
25	.020	7/64	.109	3	.259	3/4	.750
24	.022	12	.109	9/32	.281	13/16	.813
23	.025	11	.120	2	.284	7/8	.875
22	.028	1/8	.125	1	.300	15/16	.938
1/32	.031	10	.134	5/16	.313	1	1.000
21	.032	9/64	.141	0	.340	2	2.000

Common Metric Conversion Factors
10 millimeters = 1 centimeter
100 centimeters = 1 meter
1000 grams = 1 kilogram
1 centimeter = .3937 inch
1 meter = 3.281 feet
1 kilogram = 2.2046 pounds
1 inch = 2.540 centimeters
1 foot = 30.48 centimeters
1 kg/cm^2 = 14.22 psi

Seamless Mechanical Tube Tolerance

Cold Drawn Round Carbon Steel

Diameter Tolerances

OD Size Range Inches	Wall: Percent of OD	Unannealed or Stress Relief Annealed				Soft Annealed or Normalized				Oil Quenched & Tempered
		OD Inches		ID Inches		OD Inches		ID Inches		OD & ID Inches
		Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus/Minus
Up to 0.499	All	.004	.000			.005	.002			.005
0.500 - 1.699	All	.005	.000	.000	.005	.007	.002	.002	.007	.007
1.700 - 2.099	All	.006	.000	.000	.006	.006	.005	.005	.006	.008
2.100 - 2.499	All	.007	.000	.000	.007	.008	.005	.005	.008	.009
2.500 - 2.899	All	.008	.000	.000	.008	.009	.005	.005	.009	.010
2.900 - 3.299	All	.009	.000	.000	.009	.011	.005	.005	.011	.012
3.300 - 3.699	All	.010	.000	.000	.010	.013	.005	.005	.013	.013
3.700 - 4.099	All	.011	.000	.000	.011	.013	.007	.010	.010	.014
4.100 - 4.499	All	.012	.000	.000	.012	.014	.007	.011	.011	.015
4.500 - 4.899	All	.013	.000	.000	.013	.016	.007	.012	.012	.017
4.900 - 5.299	All	.014	.000	.000	.014	.018	.007	.013	.013	.018
5.300 - 5.549	All	.015	.000	.000	.015	.020	.007	.014	.014	.019
5.550 - 5.999	Under 6 6 to 7½ Over 7½	.010 .009 .018	.010 .009 .000	.010 .009 .009	.010 .009 .009	.018 .016 .017	.018 .016 .015	.018 .016 .016	.018 .016 .016	.025 .023 .023
6.000 - 6.499	Under 6 6 to 7½ Over 7½	.013 .010 .020	.013 .010 .000	.013 .010 .010	.013 .010 .010	.023 .018 .020	.023 .018 .015	.023 .018 .018	.023 .018 .018	.033 .025 .025
6.500 - 6.999	Under 6 6 to 7½ Over 7½	.015 .012 .012	.015 .012 .012	.015 .012 .012	.015 .012 .012	.027 .021 .021	.027 .021 .021	.027 .021 .021	.027 .021 .021	.038 .029 .029
7.000 - 7.499	Under 6 6 to 7½ Over 7½	.018 .013 .026	.018 .013 .000	.018 .013 .013	.018 .013 .013	.032 .023 .031	.032 .023 .015	.032 .023 .023	.032 .023 .023	.045 .033 .033
7.500 - 7.999	Under 6 6 to 7½ Over 7½	.020 .015 .029	.020 .015 .000	.020 .015 .015	.020 .015 .015	.035 .026 .036	.035 .026 .015	.035 .026 .026	.035 .026 .026	.050 .037 .037

OD Size Range Inches	Wall: Percent of OD	Unannealed or Stress Relief Annealed				Soft Annealed or Normalized				Oil Quenched & Tempered
		OD Inches		ID Inches		OD Inches		ID Inches		OD & ID Inches
		Plus	Minus	Plus	Minus	Plus	Minus	Plus	Minus	Plus/Minus
8.000 - 8.499	Under 6	.023	.023	.023	.023	.041	.041	.041	.041	.058
	6 to 7½	.016	.016	.016	.016	.028	.028	.028	.028	.040
	Over 7½	.031	.000	.015	.016	.033	.022	.028	.028	.040
8.500 - 8.999	Under 6	.025	.025	.025	.025	.044	.044	.044	.044	.063
	6 to 7½	.017	.017	.017	.017	.030	.030	.030	.030	.043
	Over 7½	.034	.000	.015	.019	.038	.022	.030	.030	.043
9.000 - 9.499	Under 6	.028	.028	.028	.028	.045	.045	.049	.049	.070
	6 to 7½	.019	.019	.019	.019	.033	.033	.033	.033	.047
	Over 7½	.037	.000	.015	.022	.043	.022	.033	.033	.047
9.500 - 9.999	Under 6	.030	.030	.030	.030	.045	.045	.053	.053	.075
	6 to 7½	.020	.020	.020	.020	.035	.035	.035	.035	.050
	Over 7½	.040	.000	.015	.025	.048	.022	.035	.035	.050
10.000 - 10.999	Under 6	.034	.034	.034	.034	.045	.045	.060	.060	.080
	6 to 7½	.022	.022	.022	.022	.039	.039	.039	.039	.055
	Over 7½	.044	.000	.015	.029	.055	.022	.039	.039	.055
11.000 - 12.000	Under 6	.035	.035	.035	.035	.050	.050	.065	.065	
	6 to 7½	.025	.025	.025	.025	.045	.045	.045	.045	
	Over 7½	.045	.000	.015	.035	.060	.022	.045	.045	

Wall Thickness Tolerances for Round Cold-Worked Tubing

Wall Thickness Range as % of Outside Diameter	Wall Thickness Tolerance Over and Under Nominal, %	
	Up to 1.499" ID	1.500" and Over
25 and Under	10.0	7.5
Over 25	12.5	10.0

Tabulated tolerances can be applied simultaneously to only two of three cross-sectional dimensions, i.e., OD x Wall, OD x ID, or ID x Wall. ID tolerances apply only to tube specified OD x ID or ID x Wall... and to dimensions. 0.625" and over when ID is at least half the OD. Wall thickness less than 3% of OD require added ovality tolerances of plus and minus ½% of mean OD. If water quench and temper is required or specified – refer to mill for applicable tolerances.

DOM Mechanical Steel Tube Tolerances

Cold Drawn Round Welded & Drawn Over Mandrel

Diameter Tolerances

OD Size Range Inches	Wall: Percent of OD	OD Inches		ID Inches	
		Plus	Minus	Plus	Minus
Up to 0.499	All	.004	.000		
0.500 - 1.699	All	.005	.000	.000	.005
1.700 - 2.099	All	.006	.000	.000	.006
2.100 - 2.499	All	.007	.000	.000	.007
2.500 - 2.899	All	.008	.000	.000	.008
2.900 - 3.299	All	.009	.000	.000	.009
3.300 - 3.699	All	.010	.000	.000	.010
3.700 - 4.099	All	.011	.000	.000	.011
4.100 - 4.499	All	.012	.000	.000	.012
4.500 - 4.899	All	.013	.000	.000	.013
4.900 - 5.299	All	.014	.000	.000	.014
5.300 - 5.549	All	.015	.000	.000	.015
5.550 - 5.999	Under 6 6 to 7½	.010 .009	.010 .009	.010 .009	.010 .009
6.000 - 6.499	Under 6 6 to 7½	.013 .010	.013 .010	.013 .010	.013 .010
6.500 - 6.999	Under 6 6 to 7½	.015 .012	.015 .012	.015 .012	.015 .012
7.000 - 7.499	Under 6 6 to 7½	.018 .013	.018 .013	.018 .013	.018 .013
7.500 - 7.999	Under 6 6 to 7½	.020 .015	.020 .015	.020 .015	.020 .015
8.000 - 8.499	Under 6 6 to 7½	.023 .016	.023 .016	.023 .016	.023 .016
8.500 - 8.999	Under 6 6 to 7½	.025 .017	.025 .017	.025 .017	.025 .017
9.000 - 9.499	Under 6 6 to 7½	.028 .019	.028 .019	.028 .019	.028 .019
9.500 - 9.999	Under 6 6 to 7½	.030 .020	.030 .020	.030 .020	.030 .020
10.000 - 10.999	Under 6 6 to 7½	.034 .022	.034 .022	.034 .022	.034 .022
11.000 - 11.999	Under 6 6 to 7½	.035 .025	.035 .025	.035 .025	.035 .025
12.000 - 12.999	Under 6 6 to 7½	.036 .027	.036 .027	.036 .027	.036 .027
13.000 - 13.999	Under 6 6 to 7½	.037 .029	.037 .029	.037 .029	.037 .029
14.000 - 15.000	Under 6 6 to 7½	.038 .030	.038 .030	.038 .030	.038 .030

Straightness Tolerance

.030” in any 3ft of length up to 7.500” OD
.060” in any 3ft of length up to 7.500” OD

Tabulated tolerances can be applied simultaneously to only two of three cross-sectional dimensions, i.e. OD x Wall, OD x ID, or ID x Wall.

ID Tolerances apply only to tube specified OD x ID or ID x Wall.

DOM Mechanical Steel Tube Tolerances

Cold Drawn Round Welded & Drawn Over Mandrel

Wall Tolerances

Wall Thickness, Inches	Including .375 to .875 OD	Over .875 to 1.875 OD	Over 1.875 to 3.750 OD	Over 3.750 to 15.000 OD
.028 & .035	+.002 -.002	+.002 -.002	+.002 -.002	
.049	+.002 -.002	+.002 -.003	+.002 -.003	
.065	+.002 -.002	+.002 -.003	+.002 -.003	+.004 -.004
.083	+.002 -.002	+.002 -.003	+.003 -.003	+.004 -.005
.095	+.002 -.002	+.002 -.003	+.003 -.003	+.004 -.005
.109	+.002 -.003	+.002 -.004	+.003 -.003	+.005 -.005
.120	+.003 -.003	+.002 -.004	+.003 -.003	+.005 -.005
.134		+.002 -.004	+.003 -.003	+.005 -.005
.148		+.002 -.004	+.003 -.003	+.005 -.005
.165		+.003 -.004	+.003 -.004	+.005 -.006
.180		+.004 -.004	+.003 -.005	+.006 -.006
.203		+.004 -.005	+.004 -.005	+.006 -.007
.220		+.004 -.006	+.004 -.006	+.007 -.007
.238		+.005 -.006	+.005 -.006	+.007 -.007
.259		+.005 -.006	+.005 -.006	+.007 -.007

Wall Thickness, Inches	Including .375 to .875 OD	Over .875 to 1.875 OD	Over 1.875 to 3.750 OD	Over 3.750 to 15.000 OD
.284		+.005 -.006	+.005 -.006	+.007 -.007
.300		+.006 -.006	+.006 -.006	+.008 -.008
.320		+.007 -.007	+.007 -.007	+.008 -.008
.344		+.008 -.008	+.008 -.008	+.009 -.009
.375			+.009 -.009	+.009 -.009
.400			+.010 -.010	+.010 -.010
.438			+.011 -.011	+.011 -.011
.480			+.012 -.012	+.012 -.012
.531			+.013 -.013	+.013 -.013
.563			+.013 -.013	+.013 -.013
.580			+.014 -.014	+.014 -.014
.600			+.015 -.015	+.015 -.015
.625			+.016 -.016	+.016 -.016
.650				+.017 -.017

Outside Diameter Tolerances for Round Hot-Finish Tubing

A519

Outside Diameter Size Range, in.	Outside Diameter Tolerance, in.	
	Over	Under
Up to 2.999	0.020	0.020
3.000 - 4.499	0.025	0.025
4.500 - 5.999	0.031	0.031
6.000 - 7.499	0.037	0.037
7.500 - 8.999	0.045	0.045
9.000 - 10.750	0.050	0.050

A Diameter tolerances are not applicable to normalized and tempered or quenched and tempered conditions.

B The common range of sizes of hot finish tubes in 1½" to 10¾" outside diameter with wall thickness at least 3% or more of outside diameter, but not less than 0.095".

C Larger sizes are available; consult manufacturer for sizes and tolerances.

Chemical Requirements

A106

Chemical	Composition, %		
	Grade B	Grade C	
Carbon, max[A]	0.30	0.35	0.35
Manganese	0.29 - 1.06	0.29 - 1.06	0.29 - 1.06
Phosphorus, max	0.035	0.035	0.035
Sulfur, max	0.035	0.035	0.035
Silicon, min	0.10	0.10	0.10
Chrome, max[B]	0.40	0.40	0.40
Copper, max[B]	0.40	0.40	0.40
Molybdenum, max[B]	0.15	0.15	0.15
Nickel, max[B]	0.40	0.40	0.40
Vanadium, max[B]	0.08	0.08	0.08

A For each reduction of 0.01% below the specified carbon maximum, an increase of 0.06% manganese above the specified maximum will be permitted up to a maximum of 1.35%.

B Unless otherwise specified by the purchaser, for each reduction of 0.01% below the specified carbon maximum, and increase of 0.06% manganese above the specified maximum will be permitted up to a maximum of 1.65%.

C These five elements combined shall not exceed 1%.

Wall Thickness Tolerances for Round Hot-Finish Tubing

A519

Wall Thickness Range as Percent of Outside Diameter	Wall Thickness Tolerance, [A] Percent Over and Under Nominal		
	Outside Diameter 2.999" and Smaller	Outside Diameter 3.000" to 5.999"	Outside Diameter 6.000" to 10.750"
Under 15	12.5	10.0	10.0
15 and over	10.0	7.5	10.0

A Wall Thickness tolerances may not be applicable to walls 0.199" and less; consult manufacturer for wall tolerances on such tube sizes.

Typical Chemistry Percentages by Grade

		Carbon	Manganese	Phosphorus, Max	Sulfur, Max	Silicon	Aluminum
1020	HF Seamless	0.18 - 0.23	0.30 - 0.60	0.040	0.050		
1020	CD Seamless	0.18 - 0.23	0.30 - 0.60	0.040	0.050		
1020	Welded SRA	0.17 - 0.23	0.30 - 0.60	0.035	0.035		
1026	HF Seamless	0.22 - 0.28	0.60 - 0.90	0.040	0.050		
1026	CD Seamless	0.22 - 0.28	0.60 - 0.90	0.040	0.050		
1026	Welded SRA	0.22 - 0.28	0.60 - 0.90	0.035	0.035		
ST52.3	Welded SRA	0.12 - 0.18	1.20 - 1.60	0.025	0.025	0.15 - 0.35	.02 min
4140/42	HF Seamless	0.38 - 0.45	0.75 - 1.00	0.040	0.040	0.15 - 0.35	

Typical Physical Properties by Grade

		Yield	Tensile	Elongation (%)	Hardness Rb	Charpy Impact (ft - lbs @ -20C)
1020	HF Seamless	28,000	48,000	30	50	
1020	CD Seamless	60,000	70,000	5	75	
1020	Welded SRA	55,000	65,000	10	75	
1026	HF Seamless	35,000	60,000	25	70	
1026	CD Seamless	75,000	90,000	10	90	
1026	Welded SRA	65,000	75,000	10	80	
ST52.3	Welded SRA	75,000	85,000	18	85	
4140/42	HF Seamless	60,000	80,000	25	85	20

Pipe Dimensions and Weights

Carbon and Alloy

■ Wall Thickness in Inches
■ Steel Weight per Foot in Pounds

Pipe Size	OD in Inches	Pipe Schedules													
		5	10	20	30	STD	40	60	E.H.	80	100	120	140	160	Double E.H.
⅛	.405	.035 .1383	.049 .1863			.068 .2447	.068 .2447		.095 .3145	.095 .3145					
¼	.540	.049 .2570	.065 .3297			.088 .4248	.088 .4248		.119 .5351	.119 .5351					
⅜	.675	.049 .3276	.065 .4235			.091 .5676	.091 .5676		.126 .7388	.126 .7388					
½	.840	.065 .5380	.083 .6710			.109 .8510	.109 .8510		.147 1.088	.147 1.088				.187 1.304	.294 1.714
¾	1.050	.065 .6838	.083 .8572			.113 1.131	.113 1.131		.154 1.474	.154 1.474				.218 1.937	.308 2.441
1	1.315	.065 .8678	.109 1.404			.133 1.679	.133 1.679		.179 2.172	.179 2.172				.250 2.844	.358 3.659
1¼	1.660	.065 1.107	.109 1.806			.140 2.273	.140 2.273		.191 2.997	.191 2.997				.250 3.765	.382 5.214
1½	1.900	.065 1.274	.109 2.085			.145 2.718	.145 2.718		.200 3.631	.200 3.631				.281 4.859	.400 6.408
2	2.375	.065 1.604	.109 2.638			.154 3.653	.154 3.653		.218 5.022	.218 5.022				.344 7.462	.436 9.029
2½	2.875	.083 2.475	.120 3.531			.203 5.793	.203 5.793		.276 7.661	.276 7.661				.375 10.01	.552 13.69
3	3.500	.083 3.029	.120 4.332			.216 7.576	.216 7.576		.300 10.25	.300 10.25				.438 14.32	.600 18.58
3½	4.000	.083 3.472	.120 4.973			.226 9.109	.226 9.109		.318 12.50	.318 12.50					.636 22.85
4	4.500	.083 3.915	.120 5.613			.237 10.79	.237 10.79		.337 14.98	.337 14.98		.438 19.00		.531 22.51	.674 27.54
4½	5.000					.247 12.54			.355 17.61						
5	5.563	.109 6.349	.134 7.770			.258 14.62	.258 14.62		.375 20.78	.375 20.78		.500 27.04		.625 32.96	.750 38.55
6	6.625	.109 7.585	.134 9.289			.280 18.97	.280 18.97		.432 28.57	.432 28.57		.562 36.39		.719 45.35	.864 53.16

Pipe Dimensions and Weights

Carbon and Alloy

■ Wall Thickness in Inches
■ Steel Weight per Foot in Pounds

Pipe Size	OD in Inches	Pipe Schedules													
		5	10	20	30	STD	40	60	E.H.	80	100	120	140	160	Double E.H.
7	7.625					.301 23.54			.500 38.04						.875 63.08
8	8.625	.109 9.914	.148 13.40	.250 22.36	.277 24.70	.322 28.55	.322 28.55	.406 35.64	.500 43.39	.500 43.39	.594 50.95	.719 60.71	.812 67.76	.906 74.69	.875 72.42
9	9.625					.342 33.91			.500 48.73						
10	10.75	.134 15.19	.165 18.70	.250 28.04	.307 34.24	.365 40.48	.365 40.48	.500 54.74	.500 54.74	.594 64.43	.719 77.03	.844 89.29	1.000 104.1	1.125 115.6	1.000 104.1
11	11.75					.375 45.56			.500 60.08						
12	12.75	.165 22.18	.180 24.16	.250 33.38	.330 43.77	.375 49.56	.406 53.52	.562 73.15	.500 65.42	.688 88.63	.844 107.3	1.000 125.5	1.125 139.67	1.312 160.3	1.000 125.5
14	14.00		.250 36.71	.312 45.61	.375 54.57	.375 54.57	.438 63.44	.594 85.05	.500 72.09	.750 106.1	.938 130.9	1.094 150.8	1.250 170.2	1.406 189.1	
16	16.00		.250 42.05	.312 52.27	.375 62.58	.375 62.58	.500 82.77	.656 107.5	.500 82.77	.844 136.6	1.031 164.8	1.219 192.4	1.438 233.6	1.594 245.3	
18	18.00		.250 47.39	.312 58.94	.438 82.15	.375 70.59	.562 104.7	.750 138.2	.500 93.45	.938 170.9	1.156 208.0	1.375 244.1	1.562 274.2	1.781 308.5	
20	20.00		.250 52.73	.375 78.60	.500 104.1	.375 78.60	.594 123.1	.812 166.4	.500 104.1	1.031 208.9	1.281 256.1	1.500 296.4	1.750 341.1	1.969 379.2	
24	24.00		.250 63.41	.375 94.62	.562 140.7	.375 94.62	.688 171.3	.969 238.4	.500 125.5	1.219 296.6	1.531 367.4	1.812 429.4	2.062 483.1	2.344 542.1	

NATIONAL TUBE SUPPLY

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