

# DRAWN-OVER-MANDREL TUBING

# ASTM A 513

Drawn Over Mandrel Welded Mechanical Tubing is produced in carbon grades 1010 and 1020 by Plymouth Tube Co. to ASTM A 513 Type 5. The current DOM size range is .250" OD thru 1.750" OD by .028" wall thru .134" wall (additional sizes may be produced upon inquiry). Testing capabilities include non-destructive testing (eddy-current) and destructive (flattening and flaring) methods that exceed the stated requirements of ASTM A 513. Special testing is available upon request.

## Hardness Limits and Tensile Properties for Round Tubing<sup>1</sup>

Thermal Condition	Grade	Yield Strength ksi (MPa), min	Ult. Strength ksi (MPa), min	Elongation in 2 in. or 50 mm, %, min	RB min	RB max
Normalized Tubing	1010	25 (172)	40 (276)	30	---	65
	1020	35 (241)	50 (345)	25	---	75
	1026	40 (276)	60 (414)	25	---	85
Mandrel-Drawn Tubing	1010	50 (345)	60 (414)	5	73	---
	1020	60 (414)	70 (483)	5	80	---
	1026	70 (483)	80 (552)	5	85	---
Mandrel-Drawn Stress Relieved Tubing	1010	45 (310)	55 (379)	12	68	---
	1020	55 (379)	65 (448)	10	75	---
	1026	65 (448)	75 (517)	10	80	---

## Chemical Requirements for Carbon Steels<sup>1</sup>

Grade Designation	Chemical Composition Limits, %							
	Carbon	Manganese	Phosphorus max	Sulfur max	Silicon	Nickel	Chromium	Molybdenum
1010	0.08-0.13	0.30-0.60	0.035	0.035	---	---	---	---
1020	0.17-0.23	0.30-0.60	0.035	0.035	---	---	---	---
1026	0.22-0.28	0.60-0.90	0.035	0.035	---	---	---	---

## Diameter Tolerances for Type 5<sup>1</sup>

OD Size Range	Wall % of OD	Type 5, OD, in. (Mandrel Drawn)		Type 5, ID, in. (Mandrel Drawn)	
		Over	Under	Over	Under
Up to 0.499	all	0.004	0.000	---	---
0.500 to 1.699	all	0.005	0.000	0.000	0.005
1.700 to 2.099	All	0.006	0.000	0.000	0.006

## Wall Thickness Tolerances of Type 5<sup>1</sup>

Wall Thickness		Outside Diameter, in.			
		3/8 to 7/8, incl		Over 7/8 to 1 7/8, incl	
in.	Bwg <sup>A</sup>	Wall Thickness Tolerances, in.			
		+	-	+	-
0.035	20	0.002	0.002	0.002	0.002
0.049	18	0.002	0.002	0.002	0.003
0.065	16	0.002	0.002	0.002	0.003
0.083	14	0.002	0.002	0.002	0.003
0.095	13	0.002	0.002	0.002	0.003
0.109	12	0.002	0.003	0.002	0.004
0.120	11	0.003	0.003	0.002	0.004
0.134	10	---	---	0.002	0.004

<sup>A</sup>Birmingham Wire Gauge

Additional ovality shall be as follows but the mean OD shall be within the specified tolerance:

- Outer Diameter:  
Up to 2" (50.8mm), incl.
- Additional Ovality Tolerance:  
0.010" (0.25 mm)



<sup>1</sup>Extracted, with permission, from the Annual Book of ASTM Standards © American Society for Testing and Materials, 100 Bar Harbor Drive, West Conshohocken, PA 19428-2959