COPPER, BRASS, AND STAINLESS TUBE
TECHNICAL ALLOY GUIDE

The Leaders in Precision
Semi-Finished Metal Products

		COPPER					BRASS						ADDITIONAL COPPER ALLOYS				STAINLESS STEEL
UNS NO.		**C10100**	**C10200**	**C11000**	**C12000**	**C12200**	**C23000**	**C26000**	**C27200**	**C33000**	**C33200**	**C33500**	**C17200**	**C51000**	**C70600**	**C75200**	**S30200 / S30400**
AVINS ALLOY DESCRIPTION		OFE COPPER (Certified)	OF COPPER (Certified)	ETP COPPER	DLP COPPER	DHP COPPER	RED BRASS	CARTRIDGE BRASS	YELLOW BRASS	LOW LEADED BRASS	HIGH LEADED BRASS	LOW LEADED BRASS	BERYLLIUM COPPER	PHOSPHOR BRONZE	COPPER NICKEL	NICKEL SILVER	302 / 304
COPPER (%)		99.99	99.95	99.90	99.90	99.9	85.0	70.0	63.0	66.0	66.0	63.5	98.1	94.8	88.6	65.0	-
NICKEL (%)		-	-	-	-	-	-	-	-	-	-	-	-	-	10.0	18.0	9.0 - 9.5
ZINC (%)		-	-	-	-	-	15.0	30.0	37.0	33.5	32.0	36.0	-	-	-	17.0	-
LEAD (%)		-	-	-	-	-	-	-	-	0.5	2.0	0.5	-	-	-	-	-
OTHER ELEMENTS (%)		O 0.0005 max	O 0.0010 max	O 0.04	P 0.008	P 0.02	Fe 0.05 max Pb 0.05 max	Fe 0.05 max Pb 0.07 max	Fe 0.07 max Pb 0.07 max	Fe 0.07 max	Fe 0.07 max	Fe 0.15 max	Be 1.9 Co 0.20 min	Sn 5.0	Fe 1.4	Mn 0.5 max	Fe 69.5 - 71.0 Cr 18.0 - 19.0 Mn 2.00 max Si 1.00 max
ASTM Designation		B 75 / B 447	B 75 / B 447	B 447	B 75 / B 447	B75 / B447	B 135 / B 587	B 135 / B 587	B 135 / B 587	B 135	B 135	-	B 643	-	B 466 / B 543	-	A213 / A249 / A269 / A511 / A632
Physical Properties																	
Density (lb/in^3) @ 68 F (Annealed)		0.323	0.323	0.322	0.323	0.323	0.316	0.308	0.305	0.307	0.308	0.306	0.298	0.320	0.323	0.316	0.285
Modulus of Elasticity (1000 KSI)		17	17	17.0	17	17	17	16	15	15	15	15	19	16	18	18	29
Electrical Conductivity (% IACS) @ 68 F (Annealed)		101	101	101	98	85	37	28	27	26	26	26	22	15	9	6	3
Thermal Conductivity (Btu*ft per hr*ft^2*°F) @ 68 F		226	226	226	223	196	92	70	67	67	67	67	62	40	26	19	9
Thermal Expansion (in/in per °F*10^-6) from 68 F		9.8	9.8	9.8	9.8	9.8	10.4	11.1	11.4	11.2	11.3	11.3	9.9	9.9	9.5	9.0	9.6
Mechanical Properties																	
LIGHT-DRAWN (H55)	Tensile (1000 PSI)	36-48		-	36-48		44-58	-		-		-	-	-	45 min	-	-
	Yield (1000 PSI 0.5% Offset)	30 min		-	30 min		-	-		-		-	-	-	35 min	-	-
	Rockwell (Scale, Hardness)	30T, 30-60		-	30T, 30-60		30T, 43-75	-		-		-	-	-	30T, 45-70 (=0.020" wall)	-	-
DRAWN (H58)	Tensile	37 min		-	37 min		44 min	54 min		54 min		-	TD04: 85-115	-	-	-	304 HT: 75 min
	Yield	30 min		-	30 min		-	-		-		-	-	-	-	-	30 min (=0.015" wall)
	Rockwell	30T, 30 min		-	30T, 30 min		30T, 43 min	30T, 53 min		30T, 53 min		-	B, 88-103	-	-	-	B, 90 max (=0.015" wall)
HARD-DRAWN (H80)	Tensile	46 min		-	46 min		57 min	66 min		66 min		-	TH04: 180-215	-	50 min	-	-
	Yield	40 min		-	40 min		-	-		-		-	155 min	-	40 min	-	-
	Rockwell	30T, 55 min		-	30T, 55 min		30T, 65 min	30T, 70 min		30T, 70 min		-	C, 38 min	-	30T, 63 min (=0.020" wall)	-	-
SOFT ANNEAL (O60)	Tensile	31 min		-	31 min		-	-		-		-	TB00: 60-85	-	38 min	-	302: 75 min
	Yield	9 min		-	9 min		-	-		-		-	-	-	13 min	-	30 min
	Rockwell	15T, 60 max (=0.035" wall) F, 50 max (>0.035" wall)		-	15T, 60 max (=0.035" wall) F, 50 max (>0.035" wall)		30T, 36 max (=0.045" wall) F, 75 max (>0.045" wall)	30T, 40 max (=0.030" wall) F, 80 max (>0.030" wall)		-		-	B, 45-85	-	30T, 45 max (=0.020" wall)	-	B, 90 max (=0.015" wall)
LIGHT ANNEAL (O50)	Tensile	31 min		-	31 min		-	-		-		-	TF00: 165-190	-	-	-	-
	Yield	9 min		-	9 min		-	-		-		-	130 min	-	-	-	-
	Rockwell	15T, 65 max (=0.035" wall) F, 55 max (>0.035" wall)		-	15T, 65 max (=0.035" wall) F, 55 max (>0.035" wall)		30T, 39 max (=0.045" wall) F, 85 max (>0.045" wall)	30T, 60 max (=0.030" wall) F, 90 max (>0.030" wall)		-		-	C, 36 min	-	-	-	-
WELDED AND LIGHT-DRAWN (WH00)	Tensile	36-48					44-58	-		-		-	-	-	WC55: 45 min	-	-
	Yield	-					-	-		-		-	-	-	35 min	-	-
	Rockwell	30T, 30-60					30T, 43-75	-		-		-	-	-	-	-	-
WELDED AND DRAWN (WH02)	Tensile	37 min					44 min	54 min		-		-	-	-	-	-	304 HT: 75 min
	Yield	-					-	-		-		-	-	-	-	-	30 min (=0.015" wall)
	Rockwell	30T, 30 min					30T, 43 min	30T, 53 min		-		-	-	-	-	-	B, 90 max (=0.015" wall)
WELDED AND HARD-DRAWN (WH04)	Tensile	46 min					57 min	66 min		-		-	-	-	-	-	-
	Yield	-					-	-		-		-	-	-	-	-	-
	Rockwell	30T, 55 min					30T, 65 min	30T, 70 min		-		-	-	-	-	-	-
WELDED AND SOFT ANNEAL (W060)	Tensile	-					-	-		-		-	-	-	W061: 40 min	-	-
	Yield	-					-	-		-		-	-	-	15 min	-	-
	Rockwell	15T, 60 max (=0.035" wall) F, 50 max (>0.035" wall)					30T, 36 max (=0.045" wall) F, 75 max (>0.045" wall)	30T, 40 max (=0.030" wall) F, 80 max (>0.030" wall)		-		-	-	-	-	-	-
WELDED AND LIGHT ANNEAL (W050)	Tensile	-					-	-		-		-	-	-	-	-	-
	Yield	-					-	-		-		-	-	-	-	-	-
	Rockwell	15T, 65 max (=0.035" wall) F, 55 max (>0.035" wall)					30T, 39 max (=0.045" wall) F, 85 max (>0.045" wall)	30T, 60 max (=0.030" wall) F, 90 max (>0.030" wall)		-		-	-	-	-	-	-

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