MATERION

Brush Performance Alloys - Rod and Wire Materials Properties (English Units)

	Alloy (UNS Number)	Temper		Heat Treament	Diameter	Density	Modulus of Elasticity	0.2% Offset Yield Strength	Tensile Strength	Tensile Elongation in 2"	Electrical Conductivity	Thermal Conductivity	Estimated 1000 Hour Stress Relaxation Resistance[1]			10^6 Cycle Fatigue Strength (R=-1)	Machinability Rating vs. Free-Cutting (C36000) Brass	Thermal Expansion Coefficient	Hardness	
					in	lb/in^3	Mpsi	ksi	ksi	%	% IACS	Btu/ft hr °F	100°C	150°C	200°C	ksi		in/in °F	HV/DPH[3]	Rockwell
Copper Beryllium Wire	25 (C17200)	A	TB00		0.050 - 0.500	0.300	19	20 - 30	58 - 78	30 - 60	15 - 19	60	-	-	-	-	-	9.7	-	-
		1/4 H	TD01	As Drawn	0.050 - 0.500	0.300	19	75 - 105	90 - 115	3 - 25	15 - 19	60	-	-	-	-	-	9.7	-	-
		1/2 H	TD02		0.050 - 0.500	0.300	19	90 - 125	110 - 135	2 - 15	15 - 19	60	-	-	-	-	-	9.7	-	-
		3/4 H	TD03		0.050 - 0.500	0.300	19	115 - 150	130 - 155	2 - 8	15 - 19	60	-	-	-	-	-	9.7	-	-
		H	TD04		0.050 - 0.500	0.300	19	130 - 160	140 - 165	1 - 6	15 - 19	60	-	-	-	-	-	9.7	-	-
		AT	TF00	3 hours @ 600°F	0.050 - 0.500	0.302	19	145 - 180	160 - 200	3 min.	22 - 28	60	96	88	61	-	-	9.7	-	-
		1/4 HT	TH01	2 hours @ 600°F	0.050 - 0.500	0.302	19	165 - 200	175 - 210	2 min.	22 - 28	60	96	90	62	-	-	9.7	-	-
		1/2 HT	TH02		0.050 - 0.500	0.302	19	170 - 210	185 - 215	2 min.	22 - 28	60	97	88	59	-	-	9.7	-	-
		3/4 HT	TH03		0.050 - 0.500	0.302	19	175 - 220	190 - 230	2 min.	22 - 28	60	-	-	-	-	-	9.7	-	-
		HT	TH04		0.050 - 0.500	0.302	19	180 - 220	195 - 230	1 min.	22 - 28	60	98	87	55	-	-	9.7	-	-
	M25 (C17300)	A	TB00		0.050 - 0.500	0.300	19	20 - 30	58 - 78	30 - 60	15 - 19	60	-	-	-	-	-	9.7	-	-
		1/4 H	TD01	As Drawn	0.050 - 0.500	0.300	19	75 - 105	90 - 115	3 - 25	15 - 19	60	-	-	-	-	-	9.7	-	-
		1/2 H	TD02		0.050 - 0.500	0.300	19	90 - 125	110 - 135	2 - 15	15 - 19	60	-	-	-	-	-	9.7	-	-
		3/4 H	TD03		0.050 - 0.500	0.300	19	115 - 150	130 - 155	2 - 8	15 - 19	60	-	-	-	-	-	9.7	-	-
		H	TD04		0.050 - 0.500	0.300	19	130 - 160	140 - 165	1 - 6	15 - 19	60	-	-	-	-	-	9.7	-	-
		AT	TF00	3 hours @ 600°F	0.050 - 0.500	0.302	19	145 - 180	160 - 200	3 min.	22 - 28	60	96	88	61	-	-	9.7	-	-
		1/4 HT	TH01	2 hours @ 600°F	0.050 - 0.500	0.302	19	165 - 200	175 - 210	2 min.	22 - 28	60	96	90	62	-	-	9.7	-	-
		1/2 HT	TH02		0.050 - 0.500	0.302	19	170 - 210	185 - 215	2 min.	22 - 28	60	97	88	59	-	-	9.7	-	-
		3/4 HT	TH03		0.050 - 0.500	0.302	19	175 - 220	190 - 230	2 min.	22 - 28	60	-	-	-	-	-	9.7	-	-
		HT	TH04		0.050 - 0.500	0.302	19	180 - 220	195 - 230	1 min.	22 - 28	60	98	87	55	-	-	9.7	-	-
	3 (C17510) & 10 (C17500)	A	TB00	As Drawn	0.050 - 0.500	0.319	20	10 - 30	35 - 55	20 - 60	20 - 30	140	-	-	-	-	-	9.8	-	-
		H	TD04		0.050 - 0.500	0.319	20	55 - 75	65 - 80	2 - 20	20 - 30	140	-	-	-	-	-	9.8	-	-
		AT	TF00	3 hours @ 900°F	0.050 - 0.500	0.319	20	80 - 110	100 - 130	10 min.	45 - 60	140	-	-	-	-	-	9.8	-	-
		HT	TH04	2 hours @ 900°F	0.050 - 0.500	0.319	20	95 - 125	110 - 140	10 min.	48 - 60	140	95	85	66	-	-	9.8	-	-
Copper Beryllium Rod	25 (C17200)	A	TB00		0.030 to 15.0	0.300	19	20 - 35	60 - 85	20 - 60	15 - 19	60	-	-	-	-	-	9.7	<165	B45 - 85
		H	TD04	As Drawn	0.030 to 0.375	0.300	19	75 - 105	90 - 130	8 - 30	15 - 19	60	-	-	-	-	20%	9.7	175 - 300	B88 - 103
					0.375 - 1.000	0.300	19	75 - 105	90 - 125	8 - 30	15 - 19	60	-	-	-	-	20%	9.7	175 - 290	B88 - 102
					1.000 - 3.000	0.300	19	75 - 105	85 - 120	8 - 20	15 - 19	60	-	-	-	-	20%	9.7	175 - 280	B88 - 101
		AT	TF00	3 hours @ 600°F	0.030 to 3.000	0.302	19	145 - 175	165 - 200	4 - 10	22 - 28	60	96	88	61	-	-	9.7	350 - 415	C36 - 42
					3.000 to 14.0	0.302	19	130 - 175	165 - 200	3 - 10	22 - 28	60	96	88	61	30 - 40	-	9.7	350 - 415	C36 - 42
		HT	TH04	2 hours @ 600°F	0.030 to 0.375	0.302	19	160 - 200	185 - 225	2 - 9	22 - 28	60	98	87	55	55 - 65	-	9.7	380 - 450	C39 - 45
					0.375 - 1.000	0.302	19	155 - 195	180 - 220	2 - 9	22 - 28	60	98	87	55	52 - 63	-	9.7	370 - 435	C38 - 44
					1.000 - 3.000	0.302	20	145 - 190	175 - 215	4 - 9	22 - 28	60	98	87	55	50 - 60	-	9.7	360 - 435	C37 - 44
	M25 (C17300)	A	TB00		0.030 to 15.0	0.300	19	20 - 35	60 - 85	20 - 60	15 - 19	60	-	-	-	-	-	9.7	<165	B45 - 85
		1/2 H	TD02	As Drawn	.030 to 3.00	0.300	19	60 - 90	80 - 100	15 min.	15 - 19	60	-	-	-	-	-	9.7	-	-
		H	TD04		0.030 to 0.375	0.300	19	75 - 105	90 - 130	8 - 30	15 - 19	60	-	-	-	-	70%	9.7	175 - 300	B88 - 103
					0.375 - 1.000	0.300	19	75 - 105	90 - 125	8 - 30	15 - 19	60	-	-	-	-	70%	9.7	175 - 290	B88 - 102
					1.000 - 3.000	0.300	19	75 - 105	85 - 120	8 - 20	15 - 19	60	-	-	-	-	70%	9.7	175 - 280	B88 - 101
		AT	TF00	3 hours @ 600°F	0.030 to 3.000	0.302	19	145 - 175	165 - 200	4 - 10	22 - 28	60	96	88	61	-	-	9.7	350 - 415	C36 - 42
					3.000 to 14.0	0.302	19	130 - 175	165 - 200	3 - 10	22 - 28	60	96	88	61	-	-	9.7	350 - 415	C36 - 42
		1/2 HT	TH02	2 hours @ 600°F	0.030 to 3.000	0.302	19	165 min.	169 - 209	2 min.	22 - 28	60	97	88	59	-	-	9.7	-	-
		HT	TH04	2 hours @ 600°F	0.030 to 0.375	0.302	19	160 - 200	185 - 225	2 - 9	22 - 28	60	98	87	55	-	-	9.7	380 - 450	C39 - 45
					0.375 - 1.000	0.302	19	155 - 195	180 - 220	2 - 9	22 - 28	60	98	87	55	-	-	9.7	370 - 435	C38 - 44
					1.000 - 3.000	0.302	20	145 - 190	175 - 215	4 - 9	22 - 28	60	98	87	55	-	-	9.7	360 - 435	C37 - 44
	3 (C17510) & 10 (C17500)	A	TB00	As Drawn	0.030 to 10.0	0.319	20	10 - 30	35 - 55	20 - 35	20 - 30	140	-	-	-	-	-	9.8	<100	B20 - 50
		H	TD04		0.030 to 3.000	0.319	20	50 - 75	65 - 80	10 - 15	20 - 30	140	-	-	-	-	40%	9.8	<160	B60 - 80
		AT	TF00	3 hours @ 900°F	0.030 to 10.0	0.319	20	80 - 100	100 - 130	10 - 25	45 - 60	140	93	83	63	35 - 45	-	9.8	195 - 240	B92 - 100
		HT	TH04	2 hours @ 900°F	0.030 to 3.000	0.319	20	95 - 125	110 - 140	5 - 25	48 - 60	140	95	85	66	39 - 48	-	9.8	210 - 290	B95 - 102
Leaded Copper Nickel	Brush 1915 & 1916 (C19150 & C19160) Wire	H	TD04	As Drawn	0.050 - 0.375	0.320	18	35 - 65	50 - 75	4 - 15	-	-	-	-	-	-	70% Alloy 1915 80% Alloy 1916	9.8	-	-
					0.375 - 0.500	0.320	18	25 - 55	40 - 65	5 - 25	-	-	-	-	-	-		9.8	-	-
		HT	TH04	4 hours @ 750°F	0.050 - 0.375	0.320	18	75 - 100	85 - 105	4 - 15	45%	120	-	-	-	-		9.8	-	-
					0.375 - 0.500	0.320	18	65 - 90	75 - 105	4 - 20	45%	120	85	70	55	-		9.8	-	-
	Brush 1915 & 1916 (C19150 & C19160) Rod	H	TD04	As Drawn	0.050 - 0.375	0.320	18	45 - 70	55 - 75	5 - 20	-	-	-	-	-	-	70% Alloy 1915 80% Alloy 1916	9.8	-	-
					0.375 - 0.500	0.320	18	25 - 55	40 - 65	5 - 25	-	-	-	-	-	-		9.8	-	-
		HT	TH04	4 hours @ 750°F	0.050 - 0.375	0.320	18	70 - 95	85 - 105	4 - 20	45%	120	-	-	-	-		9.8	-	-
					0.375 - 0.500	0.320	18	55 - 85	70 - 100	4 - 30	45%	120	85	70	55	-		9.8	-	-
CuNiSn	ToughMet® 3 (C72900) Rod	TS 160U	-	Mill Hardened	0.125 to 0.25	0.325	21	150 min.	160 min.	5 min.	< 7	22	-	-	-	-	-	8.9	-	C32 min.
					0.25 - 0.4	0.325	21	150 min.	160 min.	7 min.	< 7	22	-	-	-	-	-	8.9	-	C32 min.

Alloy	UNS Number	Composition
Alloy 25	C17200	98% Cu, 1.9% Be, 0.2% Co+Ni
Alloy M25	C17300	97% Cu, 1.9% Be, 0.2% Co+Ni, 1%Pb
Alloy 3	C17510	97.7% Cu, 0.5% Be,1.8% Ni

Alloy	UNS Number	Composition
Alloy 10	C17500	97% Cu, 0.5% Be, 2.5% Co
Alloy 1915	C19150	98% Cu, 1.0% Ni, 0.75% Pb, 0.25 P
Alloy 1916	C19150	98% Cu, 1.0% Ni, 1.0% Pb, 0.25 P
ToughMet 3	C72900	77% Cu, 15% Ni, 8% Sn

Notes : 1 - Estimated to be equal to the stress relaxation performance of strip material of the same temper.
2 - Machinability vs. C36000 leaded free-cutting brass as determined per ASTM E618
3 - Converted from Rockwell Hardness specification.

MATERION

Brush Performance Alloys - Rod and Wire Materials Properties (SI Units)

	Alloy (UNS Number)	Temper		Heat Treament	Diameter	Density	Modulus of Elasticity	0.2% Offset Yield Strength	Tensile Strength	Tensile Elongation in 50 mm	Electrical Conductivity	Thermal Conductivity	Estimated 1000 Hour Stress Relaxation Resistance[1]			10^8 Cycle Fatigue Strength (R=-1)	Machinability Rating vs. Free-Cutting (C36000) Brass	Thermal Expansion Coefficient	Hardness	
					mm	g/cm³	GPa	MPa	MPa	%	% IACS	W/m K	100°C	150°C	200°C	MPa	v. Brass	mm/mm C	HV/DPH[3]	Rockwell
Copper Beryllium Wire	25 (C17200)	A	TB00	As Drawn	1.27 to 12.7	8.30	131	130 - 210	410 - 565	30 - 60	15 - 19	105	-	-	-	-	-	17.5	-	-
		1/4 H	TD01		1.27 to 12.7	8.30	131	510 - 730	620 - 800	3 - 25	15 - 19	105	-	-	-	-	-	17.5	-	-
		1/2 H	TD02		1.27 to 12.7	8.30	131	620 - 870	750 - 940	2 - 15	15 - 19	105	-	-	-	-	-	17.5	-	-
		3/4 H	TD03		1.27 to 12.7	8.30	131	790 - 1040	890 - 1070	2 - 8	15 - 19	105	-	-	-	-	-	17.5	-	-
		H	TD04		1.27 to 12.7	8.30	131	890 - 1110	960 - 1140	1 - 6	15 - 19	105	-	-	-	-	-	17.5	-	-
		AT	TF00	3 hours @ 315°C	1.27 to 12.7	8.36	131	990 - 1250	1100 - 1380	3 min.	22 - 28	105	96	88	61	-	-	17.5	-	-
		1/4 HT	TH01	2 hours @ 315°C	1.27 to 12.7	8.36	131	1130 - 1380	1200 - 1450	2 min.	22 - 28	105	96	90	62	-	-	17.5	-	-
		1/2 HT	TH02		1.27 to 12.7	8.36	131	1170 - 1450	1270 - 1490	2 min.	22 - 28	105	97	88	59	-	-	17.5	-	-
		3/4 HT	TH03		1.27 to 12.7	8.36	131	1200 - 1520	1310 - 1590	2 min.	22 - 28	105	-	-	-	-	-	17.5	-	-
		HT	TH04		1.27 to 12.7	8.36	131	1240 - 1520	1340 - 1590	1 min.	22 - 28	105	98	87	55	-	-	17.5	-	-
	M25 (C17300)	A	TB00	As Drawn	1.27 to 12.7	8.30	131	130 - 210	410 - 565	30 - 60	15 - 19	105	-	-	-	-	-	17.5	-	-
		1/4 H	TD01		1.27 to 12.7	8.30	131	510 - 730	620 - 800	3 - 25	15 - 19	105	-	-	-	-	-	17.5	-	-
		1/2 H	TD02		1.27 to 12.7	8.30	131	620 - 870	750 - 940	2 - 15	15 - 19	105	-	-	-	-	-	17.5	-	-
		3/4 H	TD03		1.27 to 12.7	8.30	131	790 - 1040	890 - 1070	2 - 8	15 - 19	105	-	-	-	-	-	17.5	-	-
		H	TD04		1.27 to 12.7	8.30	131	890 - 1110	960 - 1140	1 - 6	15 - 19	105	-	-	-	-	-	17.5	-	-
		AT	TF00	3 hours @ 315°C	1.27 to 12.7	8.36	131	990 - 1250	1100 - 1380	3 min.	22 - 28	105	96	88	61	-	-	17.5	-	-
		1/4 HT	TH01	2 hours @ 315°C	1.27 to 12.7	8.36	131	1130 - 1380	1200 - 1450	2 min.	22 - 28	105	96	90	62	-	-	17.5	-	-
		1/2 HT	TH02		1.27 to 12.7	8.36	131	1170 - 1450	1270 - 1490	2 min.	22 - 28	105	97	88	59	-	-	17.5	-	-
		3/4 HT	TH03		1.27 to 12.7	8.36	131	1200 - 1520	1310 - 1590	2 min.	22 - 28	105	-	-	-	-	-	17.5	-	-
		HT	TH04		1.27 to 12.7	8.36	131	1240 - 1520	1340 - 1590	1 min.	22 - 28	105	98	87	55	-	-	17.5	-	-
	3 (C17510) & 10 (C17500)	A	TB00	As Drawn	1.27 to 12.7	8.83	138	60 - 210	240 - 380	20 - 60	20 - 30	240	-	-	-	-	-	17.6	-	-
		H	TD04		1.27 to 12.7	8.83	138	370 - 520	440 - 560	2 - 20	20 - 30	240	-	-	-	-	-	17.6	-	-
		AT	TF00	3 hours @ 480°C	1.27 to 12.7	8.83	138	550 - 760	680 - 900	10 min.	45 - 60	240	93	83	63	241 - 310	-	17.6	-	-
		HT	TH04	2 hours @ 480°C	1.27 to 12.7	8.83	138	650 - 870	750 - 970	10 min.	48 - 60	240	95	85	66	269 - 331	-	17.6	-	-
Copper Beryllium Rod	25 (C17200)	A	TB00	As Drawn	0.76 to 355.6	8.30	131	130 - 250	410 - 590	20 - 60	15 - 19	105	-	-	-	-	-	17.5	<165	B45 - 85
		H	TD04		0.76 to 9.5	8.30	131	520 - 720	620 - 900	8 - 30	15 - 19	105	-	-	-	-	20%	17.5	175 - 300	B88 - 103
					9.5 to 25.4	8.30	131	520 - 720	620 - 860	8 - 30	15 - 19	105	-	-	-	-	20%	17.5	175 - 290	B88 - 102
					25.4 to 76.2	8.30	131	520 - 720	590 - 830	8 - 20	15 - 19	105	-	-	-	-	20%	17.5	175 - 280	B88 - 101
		AT	TF00	3 hours @ 315°C	0.76 to 76.2	8.36	131	1000 - 1210	1140 - 1380	4 - 10	22 - 28	105	96	88	61	-	-	17.5	350 - 415	C36 - 42
					76.2 to 355.6	8.36	131	900 - 1210	1140 - 1380	3 - 10	22 - 28	105	96	88	61	210 - 275	-	17.5	350 - 415	C36 - 42
		HT	TH04	2 hours @ 315°C	0.76 to 9.5	8.36	131	1100 - 1380	1280 - 1550	2 - 9	22 - 28	105	98	87	55	380 - 450	-	17.5	380 - 450	C39 - 45
					9.5 to 25.4	8.36	131	1070 - 1340	1240 - 1520	2 - 9	22 - 28	105	98	87	55	360 - 435	-	17.5	370 - 435	C38 - 44
					25.4 to 76.2	8.36	138	1000 - 1310	1210 - 1480	4 - 9	22 - 28	105	98	87	55	345 - 415	-	17.5	360 - 435	C37 - 44
	M25 (C17300)	A	TB00	As Drawn	0.76 to 355.6	8.30	131	130 - 250	410 - 590	20 - 60	15 - 19	105	-	-	-	-	-	17.5	<165	B45 - 85
		1/2 H	TD02		0.76 to 76.2	8.30	131	415 - 620	550 - 690	15 min.	15 - 19	105	-	-	-	-	-	17.5	-	-
		H	TD04		0.76 to 9.5	8.30	131	520 - 720	620 - 900	8 - 30	15 - 19	105	-	-	-	-	70%	17.5	175 - 300	B88 - 103
					9.5 to 25.4	8.30	131	520 - 720	620 - 860	8 - 30	15 - 19	105	-	-	-	-	70%	17.5	175 - 290	B88 - 102
					25.4 to 76.2	8.30	131	520 - 720	590 - 830	8 - 20	15 - 19	105	-	-	-	-	70%	17.5	175 - 280	B88 - 101
		AT	TF00	3 hours @ 315°C	0.76 to 76.2	8.36	131	1000 - 1210	1140 - 1380	4 - 10	22 - 28	105	96	88	61	-	-	17.5	350 - 415	C36 - 42
					76.2 to 9.5	8.36	131	900 - 1210	1140 - 1380	3 - 10	22 - 28	105	96	88	61	-	-	17.5	350 - 415	C36 - 42
		1/2 HT	TH02	2 hours @ 315°C	0.76 to 76.2	8.39	131	1140 min	1170 - 1440	2 min.	22 - 28	105	97	88	59	-	-	17.5	-	-
		HT	TH04	2 hours @ 315°C	0.76 to 9.5	8.36	131	1100 - 1380	1280 - 1550	2 - 9	22 - 28	105	98	87	55	-	-	17.5	380 - 450	C39 - 45
					9.5 to 25.4	8.36	131	1070 - 1340	1240 - 1520	2 - 9	22 - 28	105	98	87	55	-	-	17.5	370 - 435	C38 - 44
					25.4 to 76.2	8.36	138	1000 - 1310	1210 - 1480	4 - 9	22 - 28	105	98	87	55	-	-	17.5	360 - 435	C37 - 44
	3 (C17510) & 10 (C17500)	A	TB00	As Drawn	0.76 to 254	8.83	138	70 - 210	240 - 380	20 - 35	20 - 30	240	-	-	-	-	-	17.6	<100	B20 - 50
		H	TD04		0.76 to 76	8.83	138	350 - 520	450 - 550	10 - 15	20 - 30	240	-	-	-	-	40%	17.6	<160	B60 - 80
		AT	TF00	3 hours @ 480°C	0.76 to 254	8.83	138	550 - 690	690 - 900	10 - 25	45 - 60	240	93	83	63	240 - 310	-	17.6	195 - 240	B92 - 100
		HT	TH04	2 hours @ 480°C	0.76 to 76	8.83	138	660 - 860	760 - 970	5 - 25	48 - 60	240	95	85	66	269 - 331	-	17.6	210 - 290	B95 - 102
Leaded Copper Nickel	Brush 1915 & 1916 (C19150 & C19160) Wire	H	TD04	As Drawn	1.27 to 9.5	8.86	124	240 - 450	350 - 520	4 - 15	-	-	-	-	-	-	70% Alloy 1915 80% Alloy 1916	17.6	-	-
					9.5 to 12.7	8.86	124	170 - 380	280 - 450	5 - 25	-	-	-	-	-	-		17.6	-	-
		HT	TH04	4 hours @ 400°C	1.27 to 9.5	8.86	124	480 - 690	560 - 720	4 - 15	45%	210	-	-	-	-		17.6	-	-
					9.5 to 12.7	8.86	124	450 - 620	520 - 720	4 - 20	45%	210	85	70	55	-		17.6	-	-
	Brush 1915 & 1916 (C19150 & C19160) Rod	H	TD04	As Drawn	1.27 to 9.5	8.86	124	310 - 480	380 - 520	5 - 20	-	-	-	-	-	-	70% Alloy 1915 80% Alloy 1916	17.6	-	-
					9.5 to 12.7	8.86	124	170 - 380	280 - 450	5 - 25	-	-	-	-	-	-		17.6	-	-
		HT	TH04	4 hours @ 400°C	1.27 to 9.5	8.86	124	480 - 660	590 - 720	4 - 20	45%	210	-	-	-	-		17.6	-	-
					9.5 to 12.7	8.86	124	380 - 590	480 - 690	4 - 30	45%	210	85	70	55	-		17.6	-	-
CuNiSn	ToughMet® 3 (C72900) Rod	TS 160U	-	Mill Hardened	3.175 to 6.35	9.00	144	1035 min.	1100 min.	5 min.	< 7	38	-	-	-	-	-	16.1	-	C32 min.
					6.35 to 10	9.00	144	1035 min.	1100 min.	7 min.	< 7	38	-	-	-	-	-	16.1	-	C32 min.

Alloy	UNS Number	Composition
Alloy 25	C17200	98% Cu, 1.9% Be, 0.2% Co+Ni
Alloy M25	C17300	97% Cu, 1.9% Be, 0.2% Co+Ni, 1%Pb
Alloy 3	C17510	97.7% Cu, 0.5% Be,1.8% Ni

Alloy	UNS Number	Composition
Alloy 10	C17500	97% Cu, 0.5% Be, 2.5% Co
Alloy 1915	C19150	98% Cu, 1.0% Ni, 0.75% Pb, 0.25 P
Alloy 1916	C19150	98% Cu, 1.0% Ni, 1.0% Pb, 0.25 P
ToughMet 3	C72900	77% Cu, 15% Ni, 8% Sn

Notes : 1 - Estimated to be equal to the stress relaxation performance of strip material of the same temper.
2 - Machinability vs. C36000 leaded free-cutting brass as determined per ASTM E618
3 - Converted from Rockwell Hardness specification.