Old Values, New Ideas

Type*	Plating**	ETCO Abbreviation	ASTM #	Commercial Name	Base Metal Description	Finish	UNS	Mechanical Properties @ H04 Brinell Hardness	Tensile (MPa)	Yield (MPa)	Elongation in 50mm	Density @ 20° C	Melting Temp (°C)	Thermal Properties@20C Specific Heat	Thermal Conductivi	Electrical Properties @ 20°C Conductivity (% IACS)	Resistivity	Resistivity	Finish	Base Metal Description	Commerical Name	ASTM #	ETCO Name	Plating**	Type*
BRASS	Brass	HB	B36	Cartridge Brass	70% Copper 30% Zinc	None	C26000 @ H04	82 HRB	525	435	8%	8.53 g/cm³	955	375 J/kg-K	120 W/m-K	Volumetric, 061 temper, 28%	061 temper, 62 nW - m	0.062 mW * m	None 30% Zinc	70% Copper Brass	Cartridge	B36	HB	Brass	BRASS
	Tinned	THB	B36	Cartridge Brass	70% Copper 30% Zinc	100% Tin Plated	C26000 @ H04	82 HRB	525	435	8%	8.53 g/cm³	955	375 J/kg-K	120 W/m-K	Volumetric, 061 temper, 28%	061 temper, 62 nW - m	0.062 mW * m	100% Tin Plate	70% Copper 30% Zinc	Cartridge Brass	B36	THB	Tinned	
	Nickel Plated	NPHB	B36	Cartridge Brass	70% Copper 30% Zinc	100% Nickel Plated	C26000 @ H04	82 HRB	525	435	8%	8.53 g/cm³	955	375 J/kg-K	120 W/m-K	Volumetric, 061 temper, 28%	061 temper, 62 nW - m	0.062 mW * m	100% Nickel Plated	70% Copper 30% Zinc	Cartridge Brass	B36	NPHB	Nickle Plated	
	Rich Low	RL	B36	Red Brass	85% Copper 15% Zinc	None	C23000 @ H04	77 HRB	485	395	5%	8.75 g/cm³	1025	380 J/kg-K	159 W/m-K	Volumetric, annealed, 37%	47 nW - m, annealed	0.047 mW * m	None 15% Zinc	85% Copper	Red Brass	B36	RL	Rich Low	
	Tinned Rich Low	TRL	B36	Red Brass	85% Copper 15% Zinc	100% Tin Plated	C23000 @ H04	77 HRB	485	395	5%	8.75 g/cm³	1025	380 J/kg-K	159 W/m-K	Volumetric, annealed, 37%	47 nW - m, annealed	0.047 mW * m	100% Tin Plated	85% Copper 15% Zinc	Red Brass	B36	TRL	Tinned Rich Low	
	Tinned Lead High	TLHB	B36	Cartridge Brass	70% Copper 30% Zinc	60% Tin/ 40% Lead	C26000 @ H04	82 HRB	525	435	8%	8.53 g/cm³	955	375 J/kg-K	120 W/m-K	Volumetric, 061 temper, 28%	061 temper, 62 nW - m	0.062 mW * m	60% Tin/ 40% Lead	70% Copper 30% Zinc	Cartridge Brass	B36	TLHB	Tinned Lead High	
STEEL	Steel	CRS	A108	Carbon Steel	SAE 1008	None	G10080 - Cold Drawn	95 HRB	340	290 min	20%	7.7 g/cm³	1515	481 J/Kg-K @ 50C	59.5 W/m-K	14.50%	0.142 mW * m	0.142 mW * m	None	SAE 1008	Carbon Steel	A108	CRS	Steel	STEEL
	Tinned	TS	A108	Carbon Steel	SAE 1008	100% Tin Plated	G10080 - Cold Drawn	95 HRB	340	290 min	20%	7.7 g/cm³	1515	481 J/Kg-K @ 50C	65.3 W/m-K	14.50%	0.142 mW * m	0.142 mW * m	100% Tin Plated	SAE 1008	Carbon Steel	A108	TS	Tinned	
	Nickel Plated	NPS	A108	Carbon Steel	SAE 1008	100% Nickel Plated	G10080 - Cold Drawn	95 HRB	340	290 min	20%	7.7 g/cm³	1515	481 J/Kg-K @ 50C	65.3 W/m-K	14.50%	0.142 mW * m	0.142 mW * m	100% Nickel Plated	SAE 1008	Carbon Steel	A108	NPS	Nickel Plated	
	Copper Plated	CPS	A108	Carbon Steel	SAE 1008	100% Copper Plated	G10080 - Cold Drawn	95 HRB	340	290 min	20%	7.7 g/cm³	1515	481 J/Kg-K @ 50C	65.3 W/m-K	14.50%	0.142 mW * m	0.142 mW * m	100% Copper Plated	SAE 1008	Carbon Steel	A108	CPS	Copper Plated	
	Bright Zinc Plated	BZPS	A108	Carbon Steel	SAE 1008	Electra Galvanized Zinc	G10080 - Cold Drawn	95 HRB	340	290 min	20%	7.7 g/cm³	1515	481 J/Kg-K @ 50C	65.3 W/m-K	14.50%	0.142 mW * m	0.142 mW * m	Electra Galvanized Zinc	SAE 1008	Carbon Steel	A108	BZPS	Bright Zinc Plated	
	Galvanized	GALST	A108	Carbon Steel	SAE 1008	G90-60 Bright Spangle	G10080 - Cold Drawn	95 HRB	340	290 min	20%	7.7 g/cm³	1515	481 J/Kg-K @ 50C	65.3 W/m-K	14.50%	0.142 mW * m	0.142 mW * m	G90-60 Bright Spangle	SAE 1008	Carbon Steel	A108	GALST	Galvanized	
	Stainless	SS	A240, A666	Cr-Ni-Mo SS	Stainless Steel 316	None	S31600 @ W	95 max	515	205	40%	8.0 g/cm³	1375-1400	500 J/kg-K	16.2 W/m-K	2.50%	740 nW - m	0.740 mW * m	None	Stainless Steel 316	Cr-Ni-Mo SS	A240, A666	SS	Stainless	
ALLOY	Tinned Alloy	TAL 194	B465	High Copper Alloy	High Copper (>96% Cu)	100% Tin Plated	C19500 @ H02	85-88 HRB	565-620	505-605	3-13%	8.92 g/cm³	1090		199 W/m-K	50%	34.4 nW - m	0.034 mW * m	100% Tin Plated	High Copper (>96% Cu)	High Copper Alloy	B465	TAL 194	Tinned Alloy	ALLOY
BRONZE	Phosphor	PB	B103(M)	Phosphor Bronze	Phos Bronze	None	C51000 @ H04	87 HRB	560	515	10	8.86 g/cm³	1060		84 W/m-K	20%	87 nW - m	0.087 mW * m	None	Phos Bronze	Phosphor Bronze	B103(M)	PB	Phosphor	BRONZE
	Tinned Phosphor	TPB	B103(M)	Phosphor Bronze	Phos Bronze	100% Tin Plated	C51000 @ H04	87 HRB	560	515	10	8.86 g/cm³	1060		84 W/m-K	20%	87 nW - m	0.087 mW * m	100% Tin Plated	Phos Bronze	Phosphor Bronze	B103(M)	TPB	Tinned Phosphor	
	Bearing	BB	B591	Tin Brass	90% Copper 5% Tin	None	C41500 @ H04	83 HRB	485	450	5%	8.8 g/cm³	1032	380 J/kg-K	123 W/m-K	28%	62 nW - m	0.062 mW * m	None	90% Copper 5% Tin	Tin Brass	B591	BB	Bearing	
COPPER	Beryllium	BECU	B194, B768	Berylium Copper	Be Cu	None	C17200 @ TH04 (a)	30-35 HRC	1310-1480	1140-1415	1-4 %	8.25 g/cm³	980	420 J/kg-K	105-130 W/m-K	22-25%	57 - 115 nW - m	0.057 - 0.115 mW * m	None	Be Cu	Berylium Copper	B194-B766	BECU	Beryllium	COPPER
	Zirconium	ZHC	B422	Zirconium Copper	Zirconium Copper	None	C15100 @ H04	57 HRB	400	385	3%	8.94 g/cm³	1080		360 W/m-K	90% rolled	19.2 nW - m	0.0192 mW * m	None	Zirconium Copper	Zirconium Copper	B422	ZHC	Zirconium	

(a) Cold Rolled, Aged 2hrs @ 315°C

* Note: Other material types available, please contact your ETCO customer service representative for your specific needs.

** Note: For detailed plating specifications please contact your ETCO customer service representative.

Data Sources: 2001 SAE Handbook Vol 1 Copper & Copper Alloys, ASM International, 2001 Electrical Connector Handbook, R. Mroczkowski

ETCO Incorporated Tel: 401•467•2400, Fax: 401•467•9230, Web: www.etco.com

Material Selection Matrix

Old Values, New Ideas

Product Requirements	Design Factors	Material Properties
Signal vs. Power	Current	Conductivity
Insertion Force	Contact Force	Strength
Temperature	Stable Forces	Stress Relaxation

From Electrical Connector Handbook, R. Mroczkowski

ETCO Incorporated Tel: 401•467•2400, Fax: 401•467•9230, Web: www.etco.com