BRASS & BRONZE ALLOY DATA

Usual Form Available

	385	360	352	486	353	377	380	270	464	954	C22000	C26000	C35600	C51000	C75700	63/37	65/35	70/30	LG2
Sheet											●	●	●	●	●				
Plates												●	●	●					
Strips												●		●	●				
Bars/rods	●	●	●	●	●	●	●	●	●	●					●				●
Wire								●											
Tubes												●				●	●	●	

● - Available in normal stock

Nearest Relevant Specifications

British BS	CZ121	CZ124			CZ119		CZ121	CZ108	CZ112	C95400	CZ101	CZ106	CZ123	CZ102	NS104	CZ108	CZ107	CZ106	LG2
Australian AS	385	360	352	486	353	377	380	274	464		220	260	370	518	757	272	270	260	1565
American ASTM	C38500	C36000	C35200		C35300	C37700	380	274	C46400	C9500	C22000	C26000	C37000	C51000	C75700	272	270	C26000	C83600

Chemical Composition

Copper	58.0	61.0	62.5	60.75	62.5	58.5	58.0.	65	62.0	84.5	90.0	70.0	59.5	94.97	64.0	63.0	65.0	70.0	85.0
Zinc	38.0	36.0	34.6	36.10	35.75	39.75	39.5	35	36.8		10.0	30.0	39.3		24.0	37.0	35.0	30.0	5.0
Lead	4.0	3.25	2.75	2	1.75	1.75	2.5						1.2	5.0					5.0
Tin				1.0					1.2										5.0
Arsenic			0.15	Trace															
Aluminium							Trace			10.5									
Iron										4.0									
Nickel										0.5					12.0				
Manganese										0.5									
Phosphate														0.03					0.05

MECHANICAL PROPERTIES

Fabrication Properties

Not Rec. = Not Recommended

Machinability rating %	100	100	100	85	80	80	80	35	30	60	20	30	80	20	20	40	35	30	90
Riveting, peening	Not Rec.	Good	Excellent	Fair	Excellent	Fair	Not Rec.	Excellent	Fair/Good	Not Rec.	Excellent	Excellent	Fair	Good	Excellent	Excellent	Excellent	Excellent	Poor
Thread rolling	Fair	Good	Excellent	Fair	Excellent	Fair/Good	Not Rec.	Excellent	Good	Not Rec.	Excellent	Excellent	Fair	Good	Excellent	Excellent	Excellent	Excellent	Excellent
Bending (cold)	Fair	Good	Excellent	Good	Excellent	Good	Good	Excellent	Good	Not Rec.	Excellent	Excellent	Fair	Excellent	Excellent	Excellent	Excellent	Excellent	Fair
Hot forging	Fair	Fair	Poor	Excellent	Fair	Excellent	Fair	Fair	Good	Not Rec.	Not Rec.	Not Rec.	Good	Poor	Poor	Fair/Good	Fair	Not Rec.	Not Rec.

Heat Treatment

Measured in Degrees Celsius * = Water Quench immediately after forging to attain DR quality without further heat treatment

Annealing temp	450 - 600	450 - 600	570	*380 - 700	570	550	425 - 600	570	570	590	590	570	425-600	450-650	600-750	350	570	570	550
Stress relieving temp	250 - 300	250 - 300	275	250 - 300	275	275	250 -300	275	275	316	250	275	250-300	280-320	300-530	275	275	275	400

Joining

* = Flux Coated Rod Essential

Welding oxy acetylene	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Good	Good	Not Rec.	Fair	Good	Good	Good	Good	
Welding coated metal arc	Not Rec.	Poor	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Not Rec.	Fair	Not Rec.	Not Rec.	Not Rec.	Not Rec.	
Welding gas shielded arc	Not Rec.	Poor	Fair	Fair	Not Rec.	Not Rec.	Fair	Fair	Fair	Not Rec.	Good	Fair	Not Rec.	Good	Fair	Fair	Fair	Fair	Not Rec.
Soldering Soft	Excellent	Excellent	Good	Excellent	Excellent	Excellent	Good	Excellent	Good/Ex	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Soldering Silver	Good	Good	Good	Good	Good	Good	Fair/Good	Good	Good	Good	Excellent	Good	Excellent	Excellent	Excellent	Good/Excel	Good/Excel	Good	Good

Properties listed above are approximate only, and may vary in practice.

MECHANICAL PROPERTIES

385

	Up to 13mm	Drawn 13 to 50mm	Over 50mm
Ultimate tensile MPa	495	430	400
0.2% proof stress MPa	310	230	155
Elongation %	20	27	35
Hardness VPN	160	135	110
Shear Strength MPa	310	280	250

360

	Up to 13mm	Drawn 13 to 50mm	Over 50mm
Ultimate tensile MPa	470	385	360
0.2% proof stress MPa	300	215	190
Elongation %	25	30	38
Hardness VPN	145	115	110
Shear Strength MPa	260	215	200

352

	Up to 13mm	Drawn 13 to 50mm	Over 50mm
Ultimate tensile MPa	400	355	319
0.2% proof stress MPa	260	215	155
Elongation %	25	35	45
Hardness VPN	135	120	105
Shear Strength MPa	295	260	230

486

	Up to 13mm	Drawn 13 to 50mm	Over 50mm
Ultimate tensile MPa	465	415	370
0.2% proof stress MPa	305	250	195
Elongation %	15	25	35
Hardness VPN	160	145	130
Shear Strength MPa	340	310	280

353

	Up to 13mm	Drawn 13 to 50mm	Over 50mm
Ultimate tensile MPa	450	400	355
0.2% proof stress MPa	260	215	155
Elongation %	30	40	45
Hardness VPN	140	120	100
Shear Strength MPa	280	250	215

377

	As Extruded
Ultimate tensile MPa	385
0.2% proof stress MPa	185
Elongation %	40
Hardness VPN	100
Shear Strength MPa	230

380

	As Extruded
Ultimate tensile MPa	450
0.2% proof stress MPa	220
Elongation %	25
Hardness VPN	120
Shear Strength MPa	280

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270

Mechanical properties for Alloy 270 can vary, and is therefore available on request.

464

	Up to 13mm	Drawn 13 to 50mm	Over 50mm
Ultimate tensile MPa	465	420	370
0.2% proof stress MPa	250	200	155
Elongation %	25	35	45
Hardness VPN	150	125	100
Shear Strength MPa	300	280	250

954

	Cast
Ultimate tensile MPa	650
0.2% proof stress MPa	300
Elongation %	14
Hardness VPN	190

Alpha Brasses

	C26000		63/37	65/35	70/30
	Hard	Soft	% Hard	% Hard	% Hard
Ultimate tensile MPa	393	324	430	420	410
0.2% proof stress MPa	310	95	370	235	200
Elongation %	30	50	50	45	50
Hardness VPN	110-135	65-75	95-130	95-130	95-130

Other Brasses

	C22000 Drawn	C35600 Hard	C51000 Spring Hard	C75700 Soft
Ultimate tensile MPa	310	48	675	400
0.2% proof stress MPa	262	310		
Elongation %	15	18	2	40
Hardness VPN	95-115	140-165	200-220	85-100

LG2

	Cast
Ultimate tensile MPa	220
0.2% proof stress MPa	110
Elongation %	25
Hardness VPN	80

BRASS DENSITY TABLE

Rolled Product Brass

Plate/Sheet/Coil	Multiply length (m) x width (m) x thickness (mm) by	8.55

Extrusion

Round	Multiply d^2 (mm) by	0.00665
Hexagon	Multiply AF^2 (mm) by	0.00734
Octagon	Multiply AF^2 (mm) by	0.00702
Square	Multiply AF^2 (mm) by	0.00847
Flat	Multiply width x thickness (mm) by	0.00847

Tube

Tube	Outside diameter - wall thickness x wall thickness (mm) by	0.0267

All weights are theoretical and may vary in practice.

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BRASS & BRONZE DATA

385 Free Machining Brass	Free Machining Alloy 385 is used for mass production of brass components on high speed automatic lathes where maximum outputs and long tool life is required, and where no further cold forming operations after machining are necessary.
360 Riveting and Machining Brass	Free Cutting Brass is used for mass production of brass components on automatic lathes where, after machining, a limited amount of cold work is carried out. The increase in copper content over that of Alloy 385 improves the alloy's cold working properties so that rivetting, staking, bending, thread rolling and similar operations may be carried out after machining.
352 Dezincification Resistant Brass	Chlorinated water supplies can cause dezincification of brasses containing more than 15% zinc. The careful formulation of this alloy produces a dezincification resistant brass suitable for machined applications. Typical applications are plumbing hardware, spindles and fittings.
486 Dezincification Resistant Brass	Alloy 486 is a special forging and machining dezincification resistant brass. Water quench immediately after forging to attain dezincification resistant qualities without further heat treatment.
353 Bending, Swaging Brass	Where good machineability must be coupled with good ductility, this alloy should be selected. Severe cold working, riveting and stamping are possible. Typical applications include handles and electrical terminals.
377 Forging Brass	Alloy 377 is a standard forging or hot stamping brass. It features excellent hot working properties combined with good machineability. It can be hot stamped into complicated shapes and its lead content enables efficient machining operations to be carried out as a finishing operation for various forms of plumbers' brassware.
380 Section Brass	Section Brass is a readily extrudable alloy with a small aluminium content which results in a bright golden colour. This alloy is used for standard section shapes and flats, and is supplied in the extruded only condition with a minimum amount of cold work. Typical applications include angles, channels, flats, barrel bolts and all extruded brass shapes.
270 Brass (Wire)	65:35 Wire Brass is suited for many purposes. Full yellow in colour, strength and hardness are increased in comparison to the more pure copper metals, but ductility falls off as the metal becomes saturated with zinc. It has an excellent capacity for being cold worked, but is much less adaptable to being hot formed.
464 Naval Brass (Tobin Bronze)	The corrosion resistance of brass can be improved by the addition of tin. Such alloys are called Naval Brasses. These combine good mechanical strength with resistance to seawater and nil natural water corrosion. Typical applications include shafting, spindles and general marine hardware. Alloy 464 has reduced machineability in comparison to Alloy 385.
954 Aluminium Bronze	Alloy 954 is a high strength aluminium bronze. Alloy 954 is very hard and abrasion resistant, having excellent strength and wear resistance with reasonable machining properties. These properties remain good at elevated temperatures. Alloy 954 is suitable for high strength bearings, and has good impact resistance but poor anti seizure properties.
C22000 Gilding Metal	Gilding Metal - 90/10 alloy, known in the United States as red brass. Combines rich golden colour with the best combination of strength, ductility, and corrosion resistance available in the plain copper zinc series alloys. Particularly suitable for multi stage pressing operations (eg builders and cosmetic hardware). Excellent for use in architectural building components.
C26000 Cartridge Brass	Known commercially as 70/30 cartridge brass, this alloy has the best combination of strength and ductility of all the brasses. It has a high rate of work hardening, has a good corrosion resistance and good polishing and finishing characteristics. It is used for deep drawing or pressing operations and different tempers are made to meet these requirements.
C35600 Engraving Brass	This is engraving brass and is traditionally used for machine engraved nameplates due to its combination of high strength and free machining characteristics. This alloy punches with a burr-free edge from hard temper sheet or strip, and weathers to a warm brown bronze tone.
C51000 Phosphor Bronze	5% phosphor bronze alloy, the most widely used of the wrought phosphor bronzes, particularly in spring applications where excellent resistance and fatigue endurance of work hardened tempers are a major advantage. High strength and a low co-efficient of friction running against steel makes it also suitable for wear resistance guides and similar bearing applications.
C75700 Nickel Silver	This is a 12% nickel alloy which has good electrical and thermal conductivity, making it suitable for spring components, especially in the telecommunications industry. It has excellent cold working and soldering properties, which also makes it suitable for manufacturing jewellers for decorative and plated silverware.
65/35 Brass	Known as common brass, this is general-purpose alloy for industry, household and decorative purposes, mainly in tube form. It has good strength and ductility, is ideal for cold working, and has good corrosion resistance.
63/37 Brass	Known sometimes as "yellow brass" - the ductility of this alloy is lower than that of 70/30 brass, but it can still be formed well. It is generally used in similar applications to 65/35 and 70/30 alloys, but normally only available in tube form.
70/30 Brass	This alloy (cartridge brass) is also a general purpose tube alloy, having good strength and excellent ductility for severe forming. It has good corrosion resistance after stress relieving, and is ideal for cold working.
LG2 Leaded Gun Metal	Under British standard 1400 this is commonly referred to as leaded Gunmetal. Available in centrifugally and continuously cast products in stock lengths. Primarily used as a bushing and bearing material which is easily machined to size.

CORROSION RATINGS FOR BRASS ALLOYS

Alloy Groupings

1. **Gilding Metals**
   C22000-90/10
2. **Alpha Brasses**
   C26000, 63/37, 70/30, 274, 352, 353
3. **Alpha-Beta Brasses**
   360, C37000, 377, 380, 385, 486
4. **Naval Brasses**
   464
5. **Aluminium Bronzes**
   954
6. **Silicon Bronzes**
   655
7. **Nickel Silvers**
   C75700

Corrosion Rating Chart

E — **Excellent.** This metal should be suitable under most conditions of use.

G — **Good.** This metal offers good corrosion resistance. It may be considered in place of a metal with an 'E' rating when some rating other than corrosion resistance governs its use.

F — **Fair.** The metal offers fair corrosion resistance.

N — **Not to be used.** This metal is not suitable.

The accompanying charts give relative corrosion-resistance ratings for copper and the commonly used copper alloys. These ratings are based on consideration of laboratory test data, service experience and a general knowledge of corrosion resistant properties; however it must be fully recognised that the ratings are relative only, and definite unqualified recommendations of corrosion resistance cannot be made. When interpreting the data, it should be remembered that corrosion or rate of corrosion is greatly affected by conditions of exposure such as presence of oxidising agents, velocity of solution, aeration, temperature, and similar factors. In general, the information in the table refers to non-oxidising conditions, low velocities (below 1.2 metres per second) and ambient temperatures.

	Alloy Groupings						
Corrosive Media	1	2	3	4	5	6	7
Acetic Acid	G	N	N	N	G	G	G
Acetic Anhydride	G	N	N	N	G	G	G
Acetone	E	E	E	E	E	E	E
Acetylene	N	N	E	E	N	N	N
Alcohols	E	E	E	E	E	E	E
Alum	G	N	N	N	G	G	G
Alumina	E	E	E	E	E	E	E
Aluminium Chloride	G	N	N	N	G	G	G
Aluminium Hydroxide	E	E	E	E	E	E	E
Aluminium Sulphate	G	N	N	N	G	G	G
Ammonia, dry	E	E	E	E	E	E	E
Ammonia, moist	N	N	N	N	N	N	N
Ammonium Chloride	N	N	N	N	N	N	N
Ammonium Hydroxide	N	N	N	N	N	N	N
Ammonium Nitrate	N	N	N	N	N	N	N
Ammonium Sulphate	F	N	N	N	F	F	F
Amyl Acetate	E	G	G	G	E	E	E
Amyl Alcohol	E	E	E	E	E	E	E
Aniline	F	F	F	F	F	F	F
Aniline Dyes	F	F	F	F	F	F	F
Asphalt	E	E	E	E	E	E	E
Atmosphere, Industrial	E	G	G	G	E	E	E
Atmosphere, Marine	E	G	G	G	E	E	E
Atmosphere, Rural	E	E	E	E	E	E	E
Barium Carbonate	E	E	E	E	E	E	E
Barium Chloride	G	N	N	N	G	G	G
Barium Hydroxide	E	G	G	G	E	E	E
Barium Sulphate	E	E	E	E	E	E	E
Barium Sulphide	F	G	G	G	F	F	G
Beer	E	G	G	G	E	E	E
Beet Sugar Syrups	E	G	G	G	E	E	E
Benzine	E	E	E	E	E	E	E
Benzoic Acid	E	G	G	G	E	E	E
Benzol	E	E	E	E	E	E	E
Black Liquor, Sulphate Proc.	F	N	N	N	F	F	F
Bleaching Powder, wet	G	N	N	N	G	G	G
Borax	E	E	E	E	E	E	E
Bordeaux Mixture	E	G	G	G	E	E	E
Boric Acid	E	G	G	G	E	E	E
Brines	G	N	N	F	G	G	E
Bromine, Dry	E	E	E	E	E	E	E
Bromine Moist	G	N	N	N	G	G	G
Butane	E	E	E	E	E	E	E
Butyl Alcohol	E	E	E	E	E	E	E
Butyric Acid	G	F	F	F	G	G	G
Calcium Bisulphite	G	N	N	N	G	G	G
Calcium Chloride	G	N	N	F	G	G	E
Calcium Hydroxide	E	G	G	G	E	E	E
Calcium Hypochlorite	G	N	N	N	G	G	G

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Corrosive Media	Alloy Groupings 1	2	3	4	5	6	7
Cane Sugar Syrups	E	G	G	G	E	E	E
Carbolic Acid	G	G	G	G	G	G	G
Carbon Dioxide, Dry	E	E	E	E	E	E	E
Carbon Dioxide, Moist	G	F	F	F	G	G	G
Carbonated Water	G	F	F	F	G	G	G
Carbonated Beverages	G	F	F	F	G	G	G
Carbon Disulphide	G	E	E	E	G	G	G
Carbon Tetrachloride, Dry	E	E	E	E	E	E	E
Carbon Tetrachloride, Moist	G	N	N	N	G	G	G
Castor Oil	E	E	E	E	E	E	E
Chlorine, Dry	E	E	E	E	E	E	E
Chlorine, Moist	F	N	N	N	F	F	F
Chloracetic Acid	G	N	N	N	G	G	G
Chloroform, Dry	E	E	E	E	E	E	E
Chromic Acid	N	N	N	N	N	N	N
Cider	E	F	F	F	E	E	E
Citric Acid	E	F	F	F	E	E	E
Coffee	E	E	E	E	E	E	E
Copper Chloride	F	N	N	N	F	F	F
Copper Nitrate	F	N	N	N	F	F	F
Copper Sulphate	G	N	N	N	G	G	G
Corn Oil	E	G	G	G	E	E	E
Cottonseed Oil	E	G	G	G	E	E	E
Creosote	E	G	G	G	E	E	E
Crude Oil	G	F	F	F	G	G	G
Ethers	E	E	E	E	E	E	E
Ethyl Acetate	E	G	G	G	E	E	E
Ethyl Alcohol	E	E	E	E	E	E	E
Ethyl Chloride	G	F	F	F	G	G	G
Ethylene Glycol	E	G	G	G	E	E	E
Ferric Chloride	N	N	N	N	N	N	N
Ferric Sulphate	N	N	N	N	N	N	N
Ferrous Chloride	G	N	N	N	G	G	G
Ferrous Sulphate	G	N	N	N	G	G	G
Formaldehyde	E	F	F	F	E	E	E
Formic Acid	G	N	N	N	G	G	G
Freon	E	E	E	E	E	E	E
Fruit Juices	G	N	N	N	G	G	G
Fuel Oil	E	G	G	G	E	E	E
Furfural	E	F	F	F	E	E	E
Gasoline	E	E	E	E	E	E	E
Gelatine	E	E	E	E	E	E	E
Glucose	E	E	E	E	E	E	E
Glue	E	G	G	G	E	E	E
Glycerine	E	E	E	E	E	E	E
Hydrobromic Acid	F	N	N	N	F	F	F
Hydrocarbons, Pure	E	E	E	E	E	E	E
Hydrochloric Acid	F	N	N	N	F	F	F
Hydrocyanic Acid	N	N	N	N	N	N	N

Corrosive Media	Alloy Groupings 1	2	3	4	5	6	7
Hydrofluoric Acid	F	N	N	N	F	F	F
Hydrofluosilicic Acid	G	N	N	N	G	G	G
Hydrogen	E	E	E	E	E	E	E
Hydrogen Peroxide	G	F	F	F	G	G	G
Hydrogen Suphide, Dry	E	E	E	E	E	E	E
Hydrogen Sulphide, Moist	N	F	F	F	N	N	F
Kerosene	E	E	E	E	E	E	E
Lacquers	E	E	E	E	E	E	E
Lacquer Solvents	E	E	E	E	E	E	E
Lactic Acid	G	N	N	N	G	G	G
Lime	E	E	E	E	E	E	E
Lime-Sulphur	F	G	G	G	F	F	G
Linseed Oil	G	G	G	G	G	G	G
Magnesium Chloride	G	N	N	N	G	G	G
Magnesium Hydroxide	E	E	E	E	E	E	E
Magnesium Sulphate	E	F	F	F	E	E	E
Mercury	N	N	N	N	N	N	N
Mercury Salts	N	N	N	N	N	N	N
Methyl Alcohol	E	E	E	E	E	E	E
Methyl Chloride, Dry	E	E	E	E	E	E	E
Milk	E	G	G	G	E	E	E
Mine water	F	N	N	N	F	F	F
Natural Gas	E	E	E	E	E	E	E
Nitric Acid	N	N	N	N	N	N	N
Nitrogen	E	E	E	E	E	E	E
Oleic Acid	G	F	F	F	G	G	G
Oxalic Acid	G	N	N	N	G	G	G
Oxygen	E	E	E	E	E	E	E
Palmitic Acid	G	F	F	F	G	G	G
Paraffin	E	E	E	E	E	E	E
Phosphoric Acid	G	N	N	N	G	G	G
Potassium Carbonate	E	G	G	G	E	E	E
Potassium Chloride	G	N	N	F	G	G	E
Potassium Chromate	E	E	E	E	E	E	E
Potassium Cyanide	N	N	N	N	N	N	N
Potassium Dichromate, Acid	N	N	N	N	N	N	N
Potassium Hydroxide	G	F	F	F	G	G	E
Potassium Sulphate	E	G	G	G	E	E	E
Propane	E	E	E	E	E	E	E
Rosin	E	E	E	E	E	E	E
Sea Water	G	F	F	G	E	G	E
Sewage	E	F	F	G	E	E	E
Silver Salts	N	N	N	N	N	N	N
Soap Solutions	E	G	G	G	E	E	E
Sodium Bicarbonate	G	F	F	F	G	G	E
Sodium Bisulphate	G	N	N	F	G	G	E
Sodium Bisulphite	G	N	N	F	G	G	E
Sodium Carbonate	E	G	G	G	E	E	E
Sodium Chloride	G	N	N	F	G	G	E

Corrosive Media	Alloy Groupings 1	2	3	4	5	6	7
Sodium Chromate	E	E	E	E	E	E	E
Sodium Cyanide	N	N	N	N	N	N	N
Sodium Dichromate, Acid	N	N	N	N	N	N	N
Sodium Hydroxide	G	F	F	F	G	G	E
Sodium Hypochlorite	F	N	N	N	F	F	G
Sodium Nitrate	G	F	F	F	E	G	E
Sodium Peroxide	F	N	N	N	F	F	G
Sodium Phosphate	E	G	G	G	E	E	E
Sodium Silicate	E	G	G	G	G	E	E
Sodium Sulphate	E	G	G	G	E	E	E
Sodium Sulphide	F	G	G	G	F	F	G
Sodium Sulphite	G	N	N	N	G	G	G
Sodium Thiosulphate	F	G	G	G	F	F	G
Steam	E	F	F	E	E	G	E
Stearic Acid	G	F	F	F	G	G	G
Sugar Solutions	E	G	G	G	E	E	E
Sulphur, Dry	G	E	E	E	G	G	G
Sulphur, Molten	N	N	N	N	N	N	N
Sulphur Chloride, Dry	E	E	E	E	E	E	E
Sulphur Dioxide, Dry	E	E	E	E	E	E	E
Sulphur Dioxide, Moist	G	N	N	N	G	G	F
Sulphur Trioxide, Dry	E	E	E	E	E	E	E
Sulphuric Acid	G	N	N	N	G	G	G
Sulphurous Acid	G	N	N	N	G	G	F
Tannic Acid	E	G	G	G	E	E	E
Tar	E	G	G	G	E	E	E
Tartaric Acid	E	F	F	F	E	E	E
Toluene	E	E	E	E	E	E	E
Trichloracetic Acid	G	N	N	N	G	G	G
Trichlorethylene, Dry	E	E	E	E	E	E	E
Trichlorethylene, Moist	G	F	F	F	G	G	G
Turpentine	E	G	G	G	E	E	E
Varnish	E	E	E	E	E	E	E
Water, Potable	E	F	F	F	E	E	E
Zinc Chloride	F	N	N	N	F	F	F
Zinc Sulphate	G	N	N	N	G	G	G

Corrosion Resistance

Under certain conditions, the following types of corrosion may occur;

Dezincification

This is a particular type of corrosion which occurs when brasses containing more than 15% zinc come into contact with certain types of water. The zinc in the constituents of the alloy is preferentially attacked, and a weak porous copper mass is left behind with a consequent decrease in tensile strength. The main physical difference between dezincification and other forms of corrosion is that the size and shape of the material undergoing attack is basically unaltered. Brasses containing less than 15% zinc are highly resistant to dezincification, and the addition of 0.04% arsenic to brasses containing up to 37.5% zinc completely inhibits this form of attack. A tin content is also beneficial to corrosion resistance.

Stress Corrosion Cracking

This is often called 'season cracking' which occurs when certain stressed (eg cold drawn) copper alloys come into contact with corrosive media, such as ammonia, mercury, mercury salts etc. Residual stresses can be removed by stress relief annealing heat treatment. Coppers and gilding metals have a high resistence to stress corrosion and cracking, closely followed by the silicon and aluminium bronzes. The brasses and nickel silvers are less resistant to stress corrosion cracking.

Galvanic Corrosion

When two dissimilar metals are in contact with an electrolyte (usually a solution of an acid, alkali, or salt, which will conduct electricity) corrosion of the more active metal (anode) will take place while the less active metal (cathode) will be protected. The rate of corrosion will vary depending on the electro-chemical potential difference in the metals, the conductivity of the electrolyte, the size of the anode, and cathode areas. Metals should not be coupled together when the difference in voltage is greater than 0.3 volts. Hence, copper based alloys can be coupled together with little or no galvanic corrosion taking place, but when aluminium is coupled to copper or brass in sea water the aluminium corrodes and the copper or brasses are protected.

Products listed in this catalogue represent our standard range only. For information on other Brass and Copper products please contact your nearest Mico Metals Team - You'll find their address at the back of this catalogue.

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