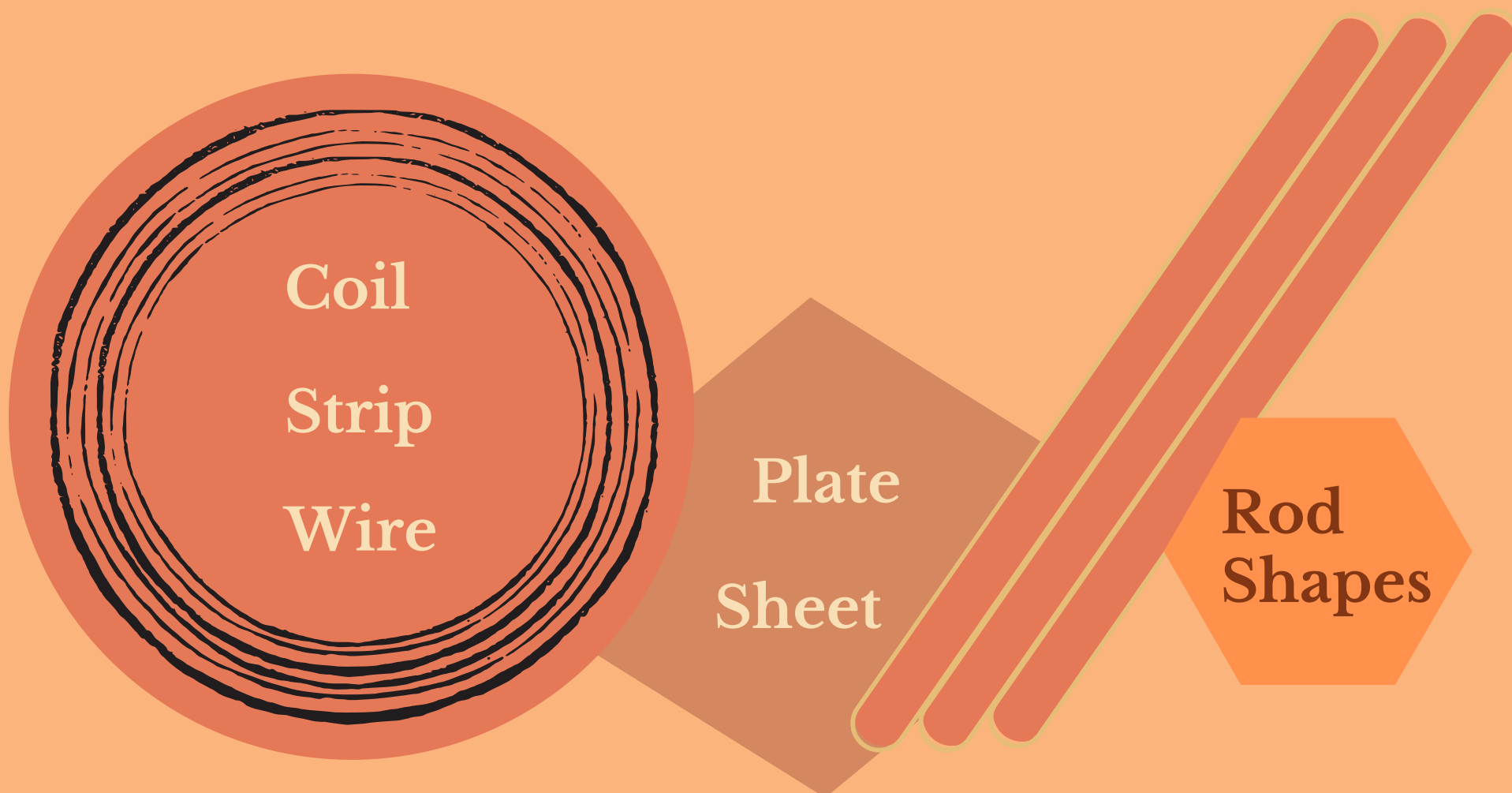




# Grace Alloy Corp.

## Copper Alloy Product Catalog



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GA strives for your optimum

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## Product Range

### Strip and Plate:

Follows JIS Specifications or Customized Requirements

#### Copper Materials:

- C1020
- C1100
- C1201
- C1220

#### Phosphor Bronze Materials:

- C5102
- C5111
- C5191
- C5210

#### Red Brass Materials:

- C2300
- C2200

#### Lead Frame Materials:

- C1921
- C1940

#### Brass Materials:

- C2600
- C2680
- C2801
- Others

#### Copper - Tin Materials:

- C1441

\*Other alloy number may be available upon request

### Wire, Bar, and Shapes

Follows JIS, ASTM, and European Specifications or Customized Requirements

#### Copper Materials:

- C1020
- C1100
- C1201
- C1220

#### Brass Materials:

- C2600
- C2700
- C2800
- C36000
- C3601
- C3602
- C3603
- C3604
- C3605
- C3712
- C3771



# About Us

**Grace Alloy Corp.** is a trading company. Our team has accumulated more than three decades of extensive experience in stainless steel, carbon steel, aluminum, copper alloy, and other non-ferrous materials. We specialize in supplying and purchasing materials in the forms of but not limited to:

- Coils
- Strips
- Precision strips (CSP)
- Sheets
- Plates
- Checkered Plates
- Thick Plates
- Pipes
- Fittings
- Tubes (round/square/rectangular)
- Wire rods
- Gratings
- Bars (flat/angle/round/square/hexagon)
- Water tanks
- Laser-cutting machines
- Welding machines
- Shearing machines
- Leveling machines

Our sources abide by international specifications. We strive to put every product to its optimal use and provide our valuable customers with a one-stop and personalized purchasing experience. Our supplies are used in various industries, including construction, transportation, public infrastructure, home appliances, interior design, commercial kitchenware, automobiles, electronics, food service, etc.

The earnest teamwork, rigorous profession, respected market reputation, and solid trust have developed firm networks worldwide. Networking with various suppliers allows us to provide favorable pricing, shorter delivery time, more amicable minimum order quantity (MOQ), diverse country of origin, and integrated services for our customers.

The collaborations that encompass both the domestic and international spheres are indicative of our competence, competitiveness, and confidence in rendering genuine services along with prime quality to our clients.

Maintaining a long-term, stable, smooth, and satisfying cooperative relationship with customers and suppliers serves as our topmost priority. The prospective aim of Grace Alloy Corp. is to forge cohesion that facilitates a mutually beneficial platform for each party included.

## Copper Materials Product Range: Chemical Composition and Mechanical Properties

RoHS Certified

### Copper Materials Product Range: Chemical Composition and Mechanical Properties

Alloy No.		C1020	C1100	C1201	C1220				
Chemical Composition (%)		Cu: > 99.96 O <sup>2</sup> : < 0.002%	Cu: > 99.90 O <sup>2</sup> : < 0.045%	Cu: > 99.90 P: 0.004 - 0.015 O <sup>2</sup> : < 0.004%	Cu: > 99.0 P: 0.015 - 0.040 O <sup>2</sup> : < 0.004%				
Tensile Strength (Kgf/mm <sup>2</sup> )	O	> 20	> 20	> 20	> 20				
	1/4H	22 -28	22 -28	22 -28	22 -28				
	1/2H	25 -32	25 -32	25 -32	25 -32				
	H	> 28	> 28	> 28	> 28				
Elongation (%)	O	> 35	> 35	> 35	> 35				
	1/4H	> 25	> 25	> 25	> 25				
	1/2H	> 15	> 15	> 15	> 15				
	H	-	-	-	-				
Vickers Hardness (HV)	O	JIS Standard	GAC Standard	JIS Standard	GAC Standard	JIS Standard	GAC Standard	JIS Standard	GAC Standard
		-	< 70	-	< 70	-	< 70	-	< 70
	1/4H	55 - 100	65 - 85	55 - 100	65 - 85	55 - 100	65 - 85	55 - 100	65 - 85
	1/2H	75 - 120	80 - 100	75 - 120	80 - 100	75 - 120	80 - 100	75 - 120	80 - 100
	H	> 80	> 90	> 80	> 90	> 80	> 90	> 80	> 90

## Copper Materials Product Range: Physical Properties

RoHS Certified

### Copper Materials Product Range: Physical Properties

Alloy No.		C1020	C1100	C1201	C1220
Modulus of Elasticity (GPa)	O				
	1/4H	118	118	118	118
	1/2H				
	H				
Electric Conductivity (%IACS)	O				
	1/4H	$\geq 97$	$\geq 97$	$\geq 90$	$\geq 80$
	1/2H				
	H				
Specific Heat Capacity (J/kg*k)	O				
	1/4H	385	385	385	385
	1/2H				
	H				
Density (g/cm <sup>3</sup> )	O				
	1/4H	8.94	8.94	8.94	8.94
	1/2H				
	H				
Coefficient of Thermal Expansion ( $\times 10^{-6}/K$ )	O				
	1/4H	17.7	17.7	17.7	17.7
	1/2H				
	H				
Thermal Conductivity W/ (m*K)	O				
	1/4H	391	391	381	339
	1/2H				
	H				

## Red Brass Materials Product Range: Chemical Composition and Mechanical Properties

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### Red Brass Materials Product Range: Chemical Composition and Mechanical Properties

Alloy No.		C2200	C2300		
Chemical Composition (%)		Cu: 89.0 - 91.0 Fe: < 0.05 Pb: < 0.05 Zn: Balance	Cu: 84.0 - 86.0 Fe: < 0.05 Pb: < 0.05 Zn: Balance		
Tensile Strength (Kgf/mm <sup>2</sup> )	O	> 23	> 25		
	1/4H	26 - 34	28 - 36		
	1/2H	29 - 37	31 - 39		
	H	> 34	> 36		
Elongation (%)	O	> 35	> 40		
	1/4H	> 25	> 28		
	1/2H	> 20	> 23		
	H	-	-		
Vickers Hardness (HV)	O	JIS Standard -	GAC Standard < 90	JIS Standard -	GAC Standard < 90
	1/4H	-	85 - 105	-	85 - 105
	1/2H	-	105 - 125	-	105 - 125
	H	-	> 120	-	> 120

## Red Brass Materials Product Range: Physical Properties

RoHS Certified

Red Brass Materials Product Range: Physical Properties			
Alloy No.		C2200	C2300
Modulus of Elasticity (GPa)	O	118	118
	1/4H		
	1/2H		
	H		
Electric Conductivity (%IACS)	O	≥ 43	≥ 37
	1/4H		
	1/2H		
	H		
Specific Heat Capacity (J/kg*k)	O	377	377
	1/4H		
	1/2H		
	H		
Density (g/cm <sup>3</sup> )	O	8.8	8.75
	1/4H		
	1/2H		
	H		
Coefficient of Thermal Expansion (x 10 <sup>-6</sup> /K)	O	18.4	18.7
	1/4H		
	1/2H		
	H		
Thermal Conductivity W/(m*K)	O	188	159
	1/4H		
	1/2H		
	H		



# Brass Materials Product Range: Chemical Composition and Mechanical Properties

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Brass Materials Product Range: Chemical Composition and Mechanical Properties									
Alloy No.		C2600		C2680		C2801		Other	
Chemical Composition (%)		Cu: 68.5 - 71.5 Fe: < 0.05 Pb: < 0.05 Zn: Balance		Cu: 64.0 - 68.0 Fe: < 0.05 Pb: < 0.05 Zn: Balance		Cu: 59.0 - 62.0 Fe: < 0.07 Pb: < 0.10 Zn: Balance		Cu: Negotiation Fe: Negotiation Pb: Negotiation Zn: Negotiation	
Tensile Strength (Kgf/mm <sup>2</sup> )	O	> 28		> 28		> 33		-	
	1/4H	33 - 42		33 - 42		36 - 45		-	
	1/2H	36 - 45		36 - 45		42 - 50		-	
	3/4H	39 - 50		39 - 50		40 - 50		-	
	H	42 - 55		42 - 55		> 48		-	
	EH	53 - 63		53 - 63		> 55		-	
	SH	58 - 68		58 - 68		-		-	
	ESH	> 63.5		> 63.5		-		-	
Elongation (%)	O	> 40		> 40		> 35		-	
	1/4H	> 35		> 35		> 25		-	
	1/2H	> 28		> 28		> 15		-	
	3/4H	> 20		> 20		> 10		-	
	H	-		-		-		-	
	EH	-		-		-		-	
	SH	-		-		-		-	
	ESH	-		-		-		-	
Vickers Hardness (HV)	O	JIS Standard	GAC Standard	JIS Standard	GAC Standard	JIS Standard	GAC Standard	JIS Standard	GAC Standard
		-	< 90	-	< 90	-	< 100	-	-
	1/4H	75 - 125	90 - 110	75 - 125	90 - 110	85 - 145	90 - 115	-	-
	1/2H	85 - 145	110 - 135	85 - 145	110 - 135	105 - 160	110 - 140	-	-
	3/4H	95 - 160	130 - 145	95 - 165	130 - 145	-	120 - 150	-	-
	H	105 - 175	140 - 160	105 - 175	140 - 160	> 130	> 140	-	-
	EH	145 - 195	> 160	145 - 195	> 160	-	> 160	-	-
	SH	165 - 215	> 180	165 - 215	> 180	-	-	-	-
ESH	>180	> 185	>180	>185	-	-	-	-	

## Brass Materials Product Range: Physical Properties

RoHS Certified

### Brass Materials Product Range: Physical Properties

Alloy No.		C2600	C2680	C2801	Other
Modulus of Elasticity (GPa)	O	110	103	103	-
	1/4H				
	1/2H				
	3/4H				
	H				
	EH				
	SH				
	ESH				
Electric Conductivity (%IACS)	O	24.0 - 28.7	24.0 - 28.7	24.3 - 28.3	-
	1/4H				
	1/2H				
	3/4H				
	H				
	EH				
	SH				
	ESH				
Specific Heat Capacity (J/kg*k)	O	377	377	377	-
	1/4H				
	1/2H				
	3/4H				
	H				
	EH				
	SH				
	ESH				

## Brass Materials Product Range: Physical Properties

RoHS Certified

### Brass Materials Product Range: Physical Properties

Alloy No.		C2600	C2680	C2801	Other
Density (g/cm <sup>3</sup> )	O	8.53	8.47	8.39	-
	1/4H				
	1/2H				
	3/4H				
	H				
	EH				
	SH				
	ESH				
Coefficient of Thermal Expansion ( x 10 <sup>-6</sup> / K)	O	19.9	20.3	20.8	-
	1/4H				
	1/2H				
	3/4H				
	H				
	EH				
	SH				
	ESH				
Thermal Conductivity W/ (m*K)	O	121	117	121	-
	1/4H				
	1/2H				
	3/4H				
	H				
	EH				
	SH				
	ESH				

# Phosphor Bronze Materials Product Range: Chemical Composition and Mechanical Properties

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## Phosphor Bronze Materials Product Range: Chemical Composition and Mechanical Properties

Alloy No.		C5102	C5111	C5191	C5210				
Chemical Composition (%)		Cu+Sn+P: > 99.5 Fe: < 0.10 Pb: < 0.02 Zn: < 0.20 Sn: 4.5 - 5.5 P: 0.03 - 0.35	Cu+Sn+P: > 99.5 Fe: < 0.10 Pb: < 0.02 Zn: < 0.20 Sn: 3.5 - 4.5 P: 0.03 - 0.35	Cu+Sn+P: > 99.5 Fe: < 0.10 Pb: < 0.02 Zn: < 0.20 Sn: 5.5 - 7.0 P: 0.03 - 0.35	Cu+Sn+P: > 99.7 Fe: < 0.10 Pb: < 0.02 Zn: < 0.20 Sn: 7.0 - 9.0 P: 0.03 - 0.35				
Tensile Strength (Kgf/mm <sup>2</sup> )	1/2H	48 - 58	42 - 52	50 - 62	48 - 62				
	3/4H	-	46 - 56	-	-				
	H	58 - 68	50 - 60	60 - 70	58 - 72				
	EH	63 - 72	58 - 67	65 - 73	70 - 80				
	SH	> 68	> 66	>= 70	75 - 85				
	ESH	-	-	-	79 - 90				
Yield Strength (Kgf/mm <sup>2</sup> )	1/2H	-	-	>= 46	>= 37				
	3/4H	-	-	-	>= 47				
	H	-	>= 45	>= 53	>= 54				
	EH	-	>= 52	>= 61	>= 60				
	SH	-	>= 58	>= 69	>= 70				
	ESH	-	-	-	>= 75				
Elongation (%)	1/2H	> 15	> 12	> 20	> 27				
	3/4H	-	> 10	-	-				
	H	> 7	> 7	> 8	> 20				
	EH	> 4	> 3	> 5	> 11				
	SH	-	-	-	> 9				
	ESH	-	-	-	> 5				
Vickers Hardness (HV)		JIS Standard	GAC Standard	JIS Standard	GAC Standard	JIS Standard	GAC Standard	JIS Standard	GAC Standard
	1/2H	130 - 190	140 - 170	120 - 180	140 - 170	150 - 205	140 - 170	140 - 205	140 - 170
	3/4H	-	160 - 190	-	160 - 190	-	160 - 190	-	160 - 190
	H	170 - 220	180 - 210	150 - 220	180 - 210	180 - 230	180 - 210	185 - 235	180 - 210
	EH	190 - 230	200 - 230	170 - 220	200 - 230	200 - 210	200 - 230	210 - 260	200 - 230
	SH	> 200	220 - 250	>= 200	220 - 250	> 210	220 - 250	230 - 270	220 - 250
ESH	-	-	-	-	-	-	245 - 285	230 - 260	

## Phosphor Bronze Materials Product Range: Physical Properties

RoHS Certified

### Phosphor Brass Materials Product Range: Physical Properties

Alloy No.		C5102	C5111	C5191	C5210
Modulus of Elasticity (GPa)	1/2H	110	110	105	110
	3/4H				
	H				
	EH				
	SH				
	ESH				
Electric Conductivity (%IACS)	1/2H	≥ 15	≥ 20	≥ 13	≥ 11
	3/4H				
	H				
	EH				
	SH				
	ESH				
Specific Heat Capacity (J/kg*k)	1/2H	377	377	377	377
	3/4H				
	H				
	EH				
	SH				
	ESH				

## Phosphor Bronze Materials Product Range: Physical Properties

RoHS Certified

### Phosphor Brass Materials Product Range: Physical Properties

Alloy No.		C5102	C5111	C5191	C5210
Density (g/cm <sup>3</sup> )	1/2H	8.86	8.86	8.83	8.80
	3/4H				
	H				
	EH				
	SH				
	ESH				
Coefficient of Thermal Expansion ( x 10 <sup>-6</sup> / K)	1/2H	17.8	17.8	18.0	18.2
	3/4H				
	H				
	EH				
	SH				
	ESH				
Thermal Conductivity W/ (m*K)	1/2H	71	84	67	63
	3/4H				
	H				
	EH				
	SH				
	ESH				

# Lead Frame Material Product Range: Chemical Composition and Mechanical Properties

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Lead Frame Material Product Range: Chemical Composition and Mechanical Properties			
Alloy No.		C1921	C1940
Chemical Composition (%)		Cu: Balance Fe: < 0.05 - 0.15 P: < 0.015 - 0.05	Cu: Balance Fe: < 2.1 - 2.6 P: < 0.015 - 0.15 Zn: 0.05 - 0.2
Tensile Strength (Kgf/mm <sup>2</sup> )	O	26 - 35	30 - 38
	1/4H	28 - 38	31 - 42
	1/2H	30 - 43	37 - 44
	3/4H	-	-
	H	34 - 47	42 - 49
	EH	>= 38	47 - 51
	SH	-	49 - 53
	ESH	-	51 - 56
Elongation (%)	O	>= 30	>= 15
	1/4H	>= 15	>= 6
	1/2H	>= 4	>= 5
	3/4H	-	-
	H	>= 4	>= 2
	EH	-	-
	SH	-	-
	ESH	-	-
Vickers Hardness (HV)	O	GAC Standard < 100	GAC Standard 80 - 105
	1/4H	90 - 120	95 - 120
	1/2H	100 - 130	115 - 135
	3/4H	-	-
	H	110 - 140	125 - 145
	EH	>= 130	135 - 150
	SH	-	140 - 155
	ESH	-	>= 145

## Lead Frame Materials Product Range: Physical Properties

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Lead Frame Materials Product Range: Physical Properties			
Alloy No.	C1921	C1940	
Modulus of Elasticity (GPa)	O		
	1/4H		
	1/2H		
	3/4H	126	121
	H		
	EH		
	SH		
	ESH		
Electric Conductivity (%IACS)	O		
	1/4H		
	1/2H		
	3/4H	$\geq 85$	$\geq 60$
	H		
	EH		
	SH		
	ESH		
Specific Heat Capacity (J/kg*k)	O		
	1/4H		
	1/2H		
	3/4H	385	385
	H		
	EH		
	SH		
	ESH		



## Lead Frame Materials Product Range: Physical Properties

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Lead Frame Materials Product Range: Physical Properties			
Alloy No.		C1921	C1940
Density (g/cm <sup>3</sup> )	O	8.94	8.91
	1/4H		
	1/2H		
	3/4H		
	H		
	EH		
	SH		
	ESH		
Coefficient of Thermal Expansion ( x 10 <sup>-6</sup> / K)	O	16.9	17.9
	1/4H		
	1/2H		
	3/4H		
	H		
	EH		
	SH		
	ESH		
Thermal Conductivity W/ (m*K)	O	-	262
	1/4H		
	1/2H		
	3/4H		
	H		
	EH		
	SH		
	ESH		

# Copper - Tin Alloy Material Product Range: Chemical Composition and Mechanical Properties

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## Copper - Tin Alloy Material Product Range: Chemical Composition and Mechanical Properties

Alloy No.		C1441	
Chemical Composition (%)		Cu: Balance Fe: < 0.02 Pb: < 0.03 Zn: < 0.1 Sn: 0.1 - 0.2 P: 0.001 - 0.002	
Tensile Strength (Kgf/mm <sup>2</sup> )	1/2H	25 - 35	
	H	28 - 40	
	EH	36 - 45	
	SH	> 39	
Elongation (%)	1/2H	> 10	
	H	> 2	
	EH	-	
	SH	-	
Vickers Hardness (HV)		JIS Standard	GAC Standard
	1/2H	60 - 120	-
	H	90 - 125	-
	EH	100 - 135	-
	SH	> 115	-

## Copper - Tin Alloy Material Product Range: Physical Properties

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Copper - Tin Alloy Material Product Range: Physical Properties		
Alloy No.		C1441
Modulus of Elasticity (GPa)	1/2H	118
	H	
	EH	
	SH	
Electric Conductivity (%IACS)	1/2H	≥ 78
	H	
	EH	
	SH	
Specific Heat Capacity (J/kg*k)	1/2H	-
	H	
	EH	
	SH	
Density (g/cm <sup>3</sup> )	1/2H	8.9
	H	
	EH	
	SH	
Coefficient of Thermal Expansion (x 10 <sup>-6</sup> /K)	1/2H	17.3
	H	
	EH	
	SH	
Thermal Conductivity W/ (m*K)	1/2H	143 - 360
	H	
	EH	
	SH	

## Reflow Tin-Plated Copper Product Range: Strip and Plate

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### Reflow Tin-Plated Copper: Base Materials

		Brass 黃銅	Bronze 磷銅	Copper 紅銅	Cu-Fe Lead Frame 銅鐵合金
Base Materials		C2600	-	-	-
		C2680	C5102	C1020	-
		C2801	C5191	C1100	-
		Others may be available upon request	C5111	C1201	C1921
	C5210		C1220	C1940	
Dimensions	Strip Thickness (mm)	0.1 - 0.8 mm			
	Width (mm)	Max. 300mm			
	Per Coil Weight	Max. 2400 kgs			
	Pre-Plating	Cu 0.4 - 0.6 $\mu$ m			
	Reflow Tin Plating	Sn 0.8 - 2.0 $\mu$ m (up to 2.5 $\mu$ m may be available upon request)			

## Copper Alloy Wire, Rod, and Shapes

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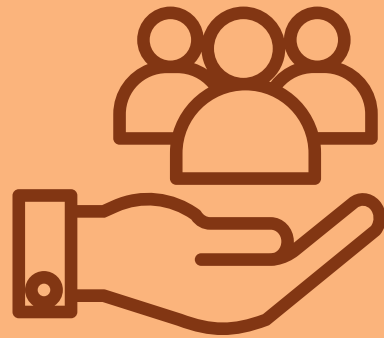
Specifications: JIS, ASTM, and European Standards

### Copper Alloy Round Rod and Bar Product Range

Oxygen - Free Copper	Tough - Pitch Copper	Phosphor - Deoxide Copper	Brass	Free - Cutting/ Machining Brass	Forging Brass
<b>C1020</b>	<b>C1100</b>	<b>C1201</b>	<b>C2600</b>	<b>C36000</b>	<b>C3712</b>
<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>
		<b>C1220</b>	<b>C2700</b>	<b>C3601</b>	<b>C3771</b>
		<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>
			<b>C2800</b>	<b>C3602</b>	
			<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	
				<b>C3603</b>	
				<ul style="list-style-type: none"> <li>Extruded + Drawing Rod</li> </ul>	
				<b>C3604</b>	
				<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	
				<b>C3605</b>	
				<ul style="list-style-type: none"> <li>Extruded Rod</li> <li>Extruded + Drawing Rod</li> </ul>	

• Other shapes such as hexagon and square are available.

# Grace Alloy Corp.



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