

## Alloy Properties Table

### ASSEMBLY MATERIALS

Product Type: Soft Solder Wire

#### Mechanical Properties for Lead Based Alloy

Alloy	Reflow Condition	For Customer's Reliability Test Reference							
	Melting Temperature (°C)	Density (g/cm <sup>3</sup> )	Hardness (HV0.1)	Tensile Strength (MPa)	Young Modulus (GPa)	Elongation (%)	Electrical Conductivity (m/Ωmm <sup>2</sup> )	Thermal Conductivity (W/m.K)	Coefficient of Expansion (μ/K)
Pb/Sn10/Ag2	284 - 292	10.8	11	20 - 35	15.8	20 - 25	4.9	55 (110°C)	27 (20 - 150°C)
Pb/Sn2.5/Ag2.5	299 - 304	11.17	< 10	27 - 30	19.0 - 21.0	40 - 45	5.5	53 (110°C)	29.8 (20 - 150°C)
Pb/Sn2/Ag2.5	299 - 304	11.17	< 10	27 - 30	20.0	40 - 45	5.5	53 (110°C)	29.1 (20 - 150°C)
Pb/Sn10	278 - 305	10.5	10	28 - 32	19.0	25 - 35	5.2	46	26.1 (20 - 150°C)
Pb/Sn1/Ag1.5	309	11.32	< 10	24 - 28	15	23 - 33	4.7	44	30 (20-150°C)
Pb/Sn5/Ag2.5	287 - 294	11.07	< 10	25 - 35	21.3	20 - 30	4.6	44 (110°C)	29 (20 - 150°C)
Pb/Sn5/Ag1.5	293 - 304	11.18	< 10	26 - 30	16.8	23 - 33	4.8	42 (110°C)	27.1 (20 - 150°C)
Pb/Sn5	306 - 315	11.14	10	22 - 23	14.0	27 - 32	< 5	34.7	29.1 (20 - 150°C)
Pb/In2.5/Ag5	308 - 317	11.19	-	40 - 42	-	23 - 28	4.4	28	30 (20 - 150°C)
Pb/In5/Ag5	290 - 310	11	-	35 - 37	21	20 - 25	3.5	25 (85°C)	27 (20 - 150°C)

#### Mechanical Properties for Lead Free Alloy

Alloy	Reflow Condition	For Customer's Reliability Test Reference							
	Melting Temperature (°C)	Density (g/cm <sup>3</sup> )	Hardness (HV0.1)	Tensile Strength (MPa)	Young Modulus (GPa)	Elongation (%)	Electrical Conductivity (m/Ωmm <sup>2</sup> )	Thermal Conductivity (W/m.K)	Coefficient of Expansion (μ/K)
Sn/Ag3.5	221	7.38	-	52	33.4	39 - 44	7.5	57	27.9 (20 - 200°C)
Sn/Ag20	221 - 395	7.77	~ 20	60 - 70	-	7 - 14	10.5	120	25.5 (80 - 200°C)
Sn/Ag25/Sb10	228 - 395	7.8	40	80 - 120	23	1 - 4	6.5	55	19.5 (80 - 200°C)
SnSb8.5	241 - 247	7.3	~ 19	40 - 50	-	40 ~ 50	6.2	58	20 (20 - 200°C)
SnSb5	232-241	7.3	~ 19	40-50	-	40-50	~ 6.2	57	20 (20°C)
SnAg1Cu0.5	217-220	7.51	~ 17	39.23	~ 17	~19.3	7.51	60	20 (20°C)
SnAg3Cu0.5	217-220	7.4	~ 19	49.03	16.6	19.3	7.51	58	21 (20°C)
SnAg4Cu0.5	217-220	7.5	~ 19	51.98	~ 17	~20	7.51	59	21 (20°C)
TEST REFERENCE	<b>HERAEUS</b>	<b>HERAEUS</b>	<b>ASTM E384-11</b>	<b>ASTM E8-09</b>	<b>ASTM E8-09</b>	<b>ASTM E8-09</b>	<b>ASTM E1004-09</b>	<b>ASTM E1530-06</b>	<b>ASTM E831 : 2006</b>

**Heraeus Electronics**  
Heraeus Deutschland GmbH & Co. KG  
Heraeusstraße 12 – 14  
63450 Hanau, Germany  
www.heraeus-electronics.com

**Americas**  
Phone +1 610 825 6050  
electronics.americas@heraeus.com

**China**  
Phone +86 21 3357 5457  
electronics.china@heraeus.com

**Asia Pacific**  
Phone +65 6571 7677  
electronics.apac@heraeus.com

**Europe, Middle East and Africa**  
Phone +49 6181 35 3069, +49 6181 35 3627  
electronics.emea@heraeus.com

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