

Solder and Braze Alloys

Honeywell Electronic Materials makes a wide range of solder and brazing alloys in a variety of forms including wire and preforms.

Please See
Important Notes
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COMPOSITION (wt.%)	DSC @ 20°C/min		WORKING (°C)	EQUILIBRIUM (°C)		DENSITY (g/cm ³)	STRENGTH (MPa)
	Melting	Freezing		Liquidus	Solidus		
Sn				232		7.28	
Sn 5Pb				225	183	7.42	
Sn 10Pb				220	183	7.55	
Sn 36Pb 2Ag			210 - 230	240	179		33.2
Sn 36.1Pb 1.4Ag			210 - 230	179		8.41	31.3
Sn 37Pb			210 - 230	183		8.40	26.7
Sn 50Pb				218	183	8.87	
Sn 3.5Ag	224	179	250 - 280	221		7.37	21.3
Sn 5Ag				240	221	7.39	
Sn 10Ag				295	221	7.51	
Sn 20Ag			350 - 380	370	221		
Sn 25Ag 10Sb	237	223	340 - 400	395	228	7.91	109.4
Sn 5Sb				240	232	7.25	47.0
Sn 8.5Sb	251	234	260 - 320	246	236	7.26	52.2
Sn 9Zn				199		7.27	
Pb				327		11.35	
Pb 3.5Sn				315	310		
Pb 5Ag 5Sn				292		11.00	
Pb 5Sn 2.5Ag	307	293	330 - 350	296	287	11.04	37.3
Pb 5Sn	316	291	330 - 350	315	305	11.04	25.0
Pb 10Sn	305	284	330 - 350	302	275	10.74	30.2
Pb 15Sn				288	183	10.48	
Pb 20Sn				280	183	10.21	
Pb 30Sn				257	183	9.72	
Pb 40Sn				238	183	9.28	
Pb 1.5Ag 1Sn	314	295	340 - 360	309	301	11.28	31.9
Pb 2.5Ag				304		11.33	
Pb 2.5Ag 2Sn	315	300	340 - 360	309	305	11.20	31.5
Pb 10Sb	250	236	280 - 300	243	238	10.60	
Pb 10Sb 2Sn	252	234	280 - 300			10.47	64.6
Pb 10Sb 10Sn	251	230	280 - 300	245	240	10.01	39.3
Pb 5In 2.5Ag			340 - 360	300		11.02	29.3
Pb 50In				209	180	8.86	
Ag				961		10.50	
Ag 5Cu 2.9Ge 0.075As				940	800	10.11	
Ag 24Cu 14.5In				705	630	9.50	
Ag 28Cu				780		10.01	
Ag 3Si				840		9.49	
In				157		7.31	
In 48Sn				118		7.30	
In 15Pb 5Ag				149		7.85	
In 3Ag				141		7.38	
Au				1063		19.30	
Au 20Sn				280		14.51	
Au 2Si				800	363	16.92	
Au 3.15Si				363		15.70	
Au 12Ge				356		14.67	
Bi				271		9.80	
Bi 42Sn				138		8.56	
Alloy 31	265	225	340-400	257	660	9.63	72.6
Alloy 37	270	213	340-400	257	710	9.74	62.0

PACKAGING MATERIALS DATA SHEET

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NOTES

1. Not all of the alloys and elements listed are usable for soldering and brazing. Several are included for reference purposes only.
2. Honeywell does not manufacture all of these alloys. Honeywell routinely ships the ones listed in **blue boldface** type. Please contact your Honeywell representative to inquire about manufacture of other alloys, either on the list or to be developed.
3. DSC is Differential Scanning Calorimetry in which the heat flow in and out of a sample is measured as the sample temperature is raised or lowered at a given rate.
4. Melting is defined as the largest DSC peak during heating at a rate of 20°C/min while freezing is the largest peak during cooling at the same rate. These temperatures describe the melting and freezing behavior during soldering and brazing much better than the equilibrium temperatures.
5. The working temperature range is based upon experience or is estimated to be approximately 30 to 50°C above the melting temperature (not the liquidus temperature). Additional considerations such as the wetting behavior of the alloy, atmosphere, use of flux, and nature of the package will affect this.
6. Equilibrium temperatures are based upon either the literature or DSC at 1°C/min. A single temperature indicates that the alloy undergoes an invariant reaction passing directly from the solid to the liquid.
7. The strength was evaluated in tension at 25°C using a 30mil (0.76mm) extruded wire.

Useful Conversion Factors

$$1 \text{ Troy Ounce} = 31.1035 \text{ g}$$

$$1 \text{ g/cm}^3 = 0.5269 \text{ T.O./in}^3$$

$$T \text{ (}^\circ\text{C)} = T \text{ (K)} - 273.15 = 1.8 [T \text{ (}^\circ\text{F)} - 32]$$



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