

Sinclair Manufacturing Company

Package Construction Common Materials Matrix – By Thermal Conductivity

Base Material	Thermal Conductivity W/M °K	Base CTE ppm/°C Rm Temp	Base Density lbs / cu in	Frame Material	Frame CTE ppm/°C Rm Temp	Insulator Material	Lead Material	Braze Material	Braze Melt Temp (°C)
Copper	390	17.70	0.3230	Steel	11.7	Direct Glass/Ceramic	52A; 52A-CC; GC	BT (721)	780
GlidCop	365	16.90	0.3210	Steel	11.7	Direct Glass/Ceramic	52A; 52A-CC; GC	BT (721)	780
E-60	240	6.10	0.0744	46 Alloy	7.90	Direct Glass/Ceramic	Kovar	Au/Sn	280
E-40	232	7.50	0.0831	46 Alloy	7.90	Direct Glass/Ceramic	Kovar	Au/Sn	280
Cu/W (20/80)	219	8.30	0.5628	NOTE 4		Direct Glass/Ceramic	Kovar	Au/Sn	280
Cu/W (15/85)	210	7.00	0.5925	NOTE 4		Direct Glass/Ceramic	Kovar	Au/Sn	280
Cu/W (10/90)	201	6.50	0.6159	NOTE 4		Direct Glass/Ceramic	Kovar	Au/Sn	280
Aluminum	167	23.40	0.0975			Soldered Feedthrus	NOTE 3	Au/Sn	280
Cu/Mo (15/85)	165	6.80	0.3610	Kovar	5.9	Direct Glass/Ceramic	Kovar	Au/Sn	280
AlSi CE13	160	13.00	0.0921			Soldered Feedthrus	NOTE 3	Au/Sn	280
AlSi CE11	149	11.00	0.0907			Soldered Feedthrus	NOTE 3	Au/Sn	280
Molybdenum	140	5.10	0.3663	Kovar	5.9	Direct Glass/Ceramic	Kovar	Au/Ge	356
AlSi CE9	129	9.00	0.0889			Soldered Feedthrus	NOTE 3	Au/Sn	280
AlSi CE7	120	7.00	0.0874			Soldered Feedthrus	NOTE 3	Au/Sn	280
Steel	45	11.70	0.2900	Steel	11.7	Direct Glass/Ceramic	52A; 52A-CC; GC	BT (721)	780
Titanium	20	8.41	0.1630			Soldered Feedthrus	NOTE 3	Au/Sn	280
Kovar	17	5.90	0.3020	Kovar	5.9	Direct Glass/Ceramic	Kovar	Cu	1083
48 Alloy	13	9.00	0.2980			Direct Glass/Ceramic	Kovar	Au/Sn	280
46 Alloy	11	7.90	0.2950			Direct Glass/Ceramic	Kovar	Au/Sn	280
42 Alloy	11	5.30	0.2930			Direct Glass/Ceramic	Kovar	Au/Sn	280
Invar (36)	10	2.30	0.2910			Direct Glass/Ceramic	Kovar	Au/Sn	280

Notes

1. Package Lead & Seal Types and Assembly Braze Materials not limited to the common choices listed above.
2. GlidCop Leads available for Direct Ceramic Seals or Soldered Ceramic Feedthrus only – not available with Glass Seals.
3. Soldered Feedthrus can be Matched Glass, Compression Glass, Ceramic, or Connector Types – Lead Material will be dependent upon Seal Type.
4. Cu/W Packages' Frame & Braze Materials dependent upon overall package size.
5. Base Materials with no associated Frame Material are single-material package housings.

Contact Sinclair for more information or to discuss your package requirements.