

## COPPER HEAT PIPES

series: CHP



- Thermal conductivity 10-100 times greater than metal heat sinks.
- Power dissipation of 20-200W.
- Power density up to 25W/cm<sup>2</sup>.
- Space saving profile.
- Operating temperature: 0°C to + 250°C.
- Custom shapes and sizes available upon request.

Item	Description
Material	Copper
Wick Structure	Sintered
Working fluid	Pure Water
Life Time	20 years

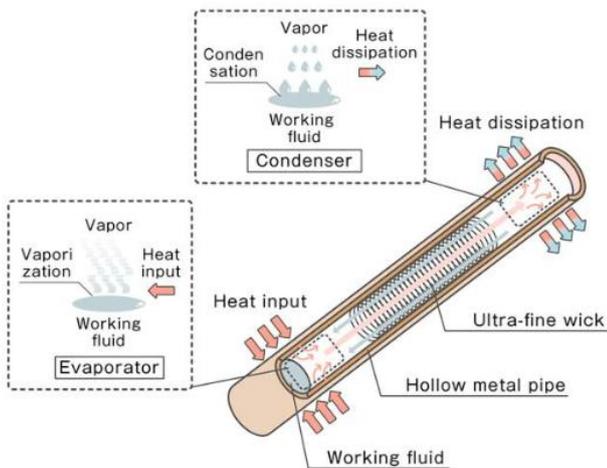
E-Catalogue

Part Number	Diameter (mm)	Length (mm)	Qmax (W)	Thermal Conductivity (W/mk)	Thermal Resistance (°C/W)
CHP-04-250S	4.0	250.0	10-15	1900 ~ 2850	0.2 ~ 0.3
CHP-05-070S	5.0	70.0	20-25	800 ~ 1000	0.2 ~ 0.25
CHP-05-100S	5.0	100.0	25-30	1750 ~ 2100	0.17 ~ 0.2
CHP-05-250S	5.0	250.0	20-25	3800 ~ 4750	0.2 ~ 0.25
CHP-05-300S	5.0	300.0	15-20	3600 ~ 4800	0.25 ~ 0.33
CHP-05-350S	5.0	350.0	10-15	2900 ~ 4350	0.33 ~ 0.5
CHP-06-070S	6.0	70.0	25-30	800 ~ 1200	0.17 ~ 0.2
CHP-06-350S	6.0	350.0	30-35	8700 ~ 10150	0.14 ~ 0.17
CHP-06-400S	6.0	400.0	25-30	8500 ~ 10200	0.17 ~ 0.2
CHP-08-150S	8.0	150.0	40-45	3600 ~ 4050	0.11 ~ 0.12
CHP-08-400S	8.0	400.0	30-35	10200 ~ 11900	0.14 ~ 0.17
CHP-08-450S	8.0	450.0	20-25	7800 ~ 9750	0.2 ~ 0.25
CHP-10-350S	10.0	350.0	70-80	20300 ~ 23200	0.06 ~ 0.07
CHP-10-400S	10.0	400.0	60-70	20400 ~ 23800	0.07 ~ 0.08
CHP-10-450S	10.0	450.0	50-60	19500 ~ 23400	0.08 ~ 0.1
CHP-10-500S	10.0	500.0	40-50	17600 ~ 22000	0.1 ~ 0.12
CHP-10-550S	10.0	550.0	30-40	14700 ~ 19600	0.12 ~ 0.17
CHP-10-600S	10.0	600.0	20-30	10800 ~ 16200	0.17 ~ 0.25
CHP-12-070S	12.0	70.0	40-50	1600 ~ 2000	0.1 ~ 0.12
CHP-12-100S	12.0	100.0	50-60	3500 ~ 4200	0.08 ~ 0.1
CHP-12-150S	12.0	150.0	80-90	7200 ~ 8100	0.05 ~ 0.06
CHP-12-200S	12.0	200.0	100-110	14000 ~ 17600	0.04 ~ 0.05
CHP-12-300S	12.0	300.0	90-100	21600 ~ 24000	0.05 ~ 0.06
CHP-12-350S	12.0	350.0	80-90	23200 ~ 26100	0.05 ~ 0.06
CHP-12-400S	12.0	400.0	70-80	23800 ~ 27200	0.06 ~ 0.07
CHP-12-450S	12.0	450.0	60-70	23400 ~ 27300	0.07 ~ 0.08
CHP-12-500S	12.0	500.0	50-60	22000 ~ 26400	0.08 ~ 0.1
CHP-12-550S	12.0	550.0	40-50	19600 ~ 24500	0.1 ~ 0.12
CHP-12-600S	12.0	600.0	30-40	16200 ~ 21600	0.12 ~ 0.16

### Working Mechanism

Copper heat pipes are used to transfer heat from one point to another, typically from a heat source to a heat sink. The heat pipe consists of a sealed tube or pipe that contains a working fluid such as water. The heat source causes the working fluid to evaporate, creating a vapour that travels to the cooler end of the pipe (condensing end) where it condenses back into a liquid. This process of evaporation and condensation allows the heat to be efficiently transferred along the length of the pipe.

Overall, the heat pipe works by utilizing the phase change of the working fluid to transfer heat from one location to another, providing a highly efficient and reliable method of heat transfer in various applications such as electronics cooling, HVAC systems and thermal management in industrial processes.



### Reliability Testing

Typical heat pipe life span is at least 20 years old and they can go through thousands of freeze/thaw cycles without damage. Heat pipe failure does occur, which is often due to a poor manufacturing process. This risk is eliminated by helium testing every copper heat pipe for leakage and Qmax performance:

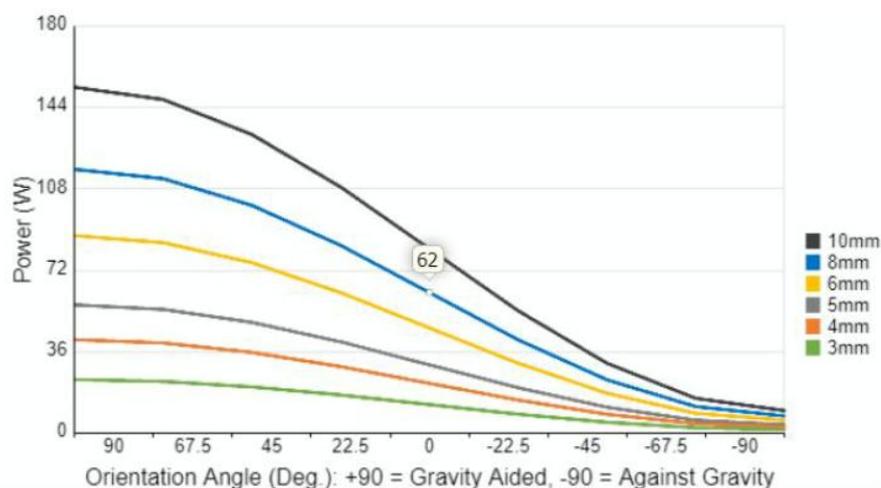
First Article Reliability	
Thermal Shock	1600 Cycles: -40°C to +100°C
Thermal Cycle	200 Cycles: -40°C to +80°C
High Temperature	28 Days @ 120°C, 48 hours @ 200°C
Low Temperature	96 hours @ -40°C
High Temp & High Humidity	96 hours @ 65°C and Humidity
Leak Check	100% High Pressure Helium
Mass Production	
Every Part/Module Tested	Burn-in, helium leak, performance

### Dimensional Specifications and Tolerances

Heat Pipe																			
Thickness\Dia. (mm)	Ø2	Ø3	Ø3	Ø4	Ø4	Ø4	Ø5	Ø5	Ø5	Ø6	Ø6	Ø6	Ø6	Ø8	Ø8	Ø8	Ø10	Ø10	Ø10
	Width (mm)																		
T=1.6	2.34	3.91	3.91	5.48	5.48	5.48	7.05	7.05	7.05	8.62	8.62	8.62	8.62	/	/	/	/	/	/
T=2.0	/	3.71	3.71	5.28	5.28	5.28	6.85	6.85	6.85	8.42	8.42	8.40	8.42	11.57	11.57	11.57	14.71	14.71	14.71
T=2.5	/	3.46	3.46	5.03	5.03	5.03	6.60	6.60	6.60	8.17	8.17	8.17	8.17	11.32	11.30	11.32	14.46	14.46	14.46
T=3.0	/	/	/	4.78	4.78	4.78	6.35	6.35	6.35	7.92	7.89	7.89	7.89	11.07	11.07	11.07	14.21	14.21	14.21
T=3.5	/	/	/	/	/	/	6.10	6.10	6.10	7.67	7.67	7.67	7.67	10.82	10.82	10.82	13.96	13.96	13.96
T=4.0	/	/	/	/	/	/	5.85	5.85	5.85	7.42	7.42	7.42	7.42	10.57	10.57	10.57	13.71	13.71	13.71
T=4.5	/	/	/	/	/	/	/	/	/	7.17	7.17	7.17	7.17	10.32	10.32	10.32	13.46	13.46	13.46
T=5.0	/	/	/	/	/	/	/	/	/	6.92	6.92	6.92	6.92	10.07	10.07	10.07	13.21	13.21	13.21
T=5.5	/	/	/	/	/	/	/	/	/	/	/	/	/	9.82	9.82	9.82	12.96	12.96	12.96
T=6.0	/	/	/	/	/	/	/	/	/	/	/	/	/	9.57	9.57	9.57	12.71	12.71	12.71
T=6.5	/	/	/	/	/	/	/	/	/	/	/	/	/	9.32	9.32	9.32	12.46	12.46	12.46
T=7.0	/	/	/	/	/	/	/	/	/	/	/	/	/	9.07	9.07	9.07	12.21	12.21	12.21
Wall Thickness	0.2	0.2	0.3	0.3	0.4	0.5	0.3	0.4	0.5	0.2	0.3	0.4	0.5	0.3	0.4	0.5	0.3	0.4	0.5
Bending Rmin	R9	R9	R9	R12	R12	R12	R15	R15	R15	R18	R18	R18	R18	R24	R24	R24	R30	R30	R30
Tolerance																			
Length	±1.0mm																		
Thickness	±0.05mm																		
Blunt end length	Ref. 7.0mm																		
Pinch-off Length	Ref. 13.0mm																		

### Power vs Orientation

The chart below shows heat pipe carrying capacity (Q<sub>max</sub>) vs Angle of Operation. At +90° the evaporator is directly below the condenser at -90°.

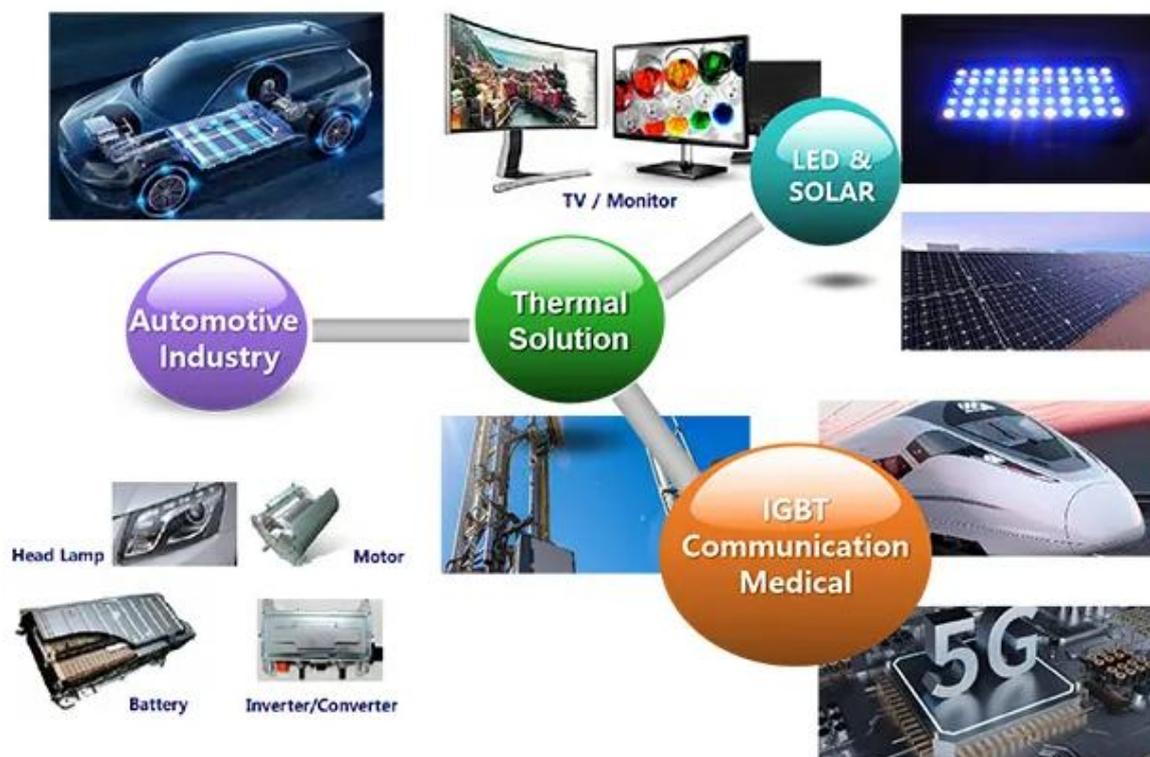


### Bending Considerations

Bending a copper heat pipe will affect the power handling capability, for which the following must be considered:

- Minimum bend radius is three times the diameter of the heat pipe.
- Every 45° bend will reduce  $Q_{max}$  by 2.5%. For example, an 8mm diameter heat pipe flattened to 2.5mm would have  $Q_{max}$  of 52W. Bending it 90° would result in a further 5% reduction.

### Application Examples



For copy of SDS document, please contact our [sales team](#).

### ANNOTATION

All specifications shown herein are typical values and are not guaranteed. It is recommended to test in the application for suitability.