High performance filler and Straight copper tube

For preventions and repairs of leaks from water cooling holes

Copper paste filler

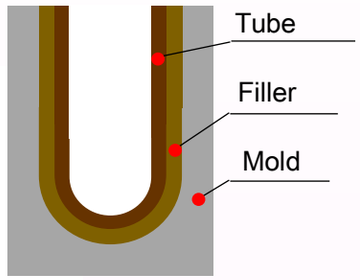
Patented

It shows high thermal conductivity and cooling effect by filling the gap of the cooling hole.

★Weight ratio
・Copper powder 85 to 90%
・Resin 5%

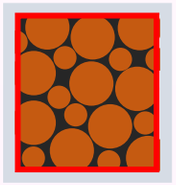
▲Mix with curing agent ●when using

Good filling property



The resin in the paste will be carbonized at around 300 ℃ during casting and that changes the thermal conductivity.
Resin：About 0.35 (W/mK)
Carbon: About 24 (W/mK)

Filler ▶
Enlarged image
■・・ Carbide
■・・ Copper



Features

①Fluid・・・・・・・・・・・・・・・・・・・・・・・・・Fills the gap evenly

②High thermal conductivity・・・・・・・High cooling effect

③Can be heat-treated after curing・・・No need of removing it at nitriding

(about 600 ℃)

Straight copper tube

Extremely thin copper tubes made by deep drawing press process.

They can produce thin pipes that cannot be made by cutting.

Higher thermal conductivity comparing to stainless steel that improves the cooling effect.

Tube outer diameter	Maximum length (mm)	Thickness
Φ3, Φ4, Φ5	150	0.3 t
Φ4, Φ5	200	
Φ6	130	
Φ6, Φ7, Φ8, Φ9, Φ10	300	0.5 t
Φ11,Φ12,Φ13,Φ14,Φ16,Φ18,Φ20	300	0.8 t

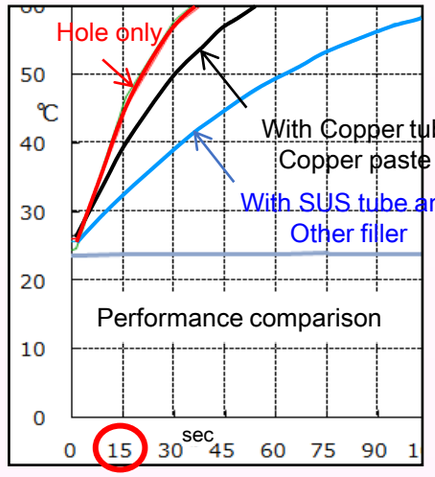
Thermal conductivity
Unit (W/mK)

Copper・・・390
Stainless・・16

*Shapes other than straight (such as tubes with two diameters or flat tips) can also be produced. Please contact us for more information.

Using both copper paste filler and copper tube further enhances the cooling effect.

Temperature rise test result



Virtual curing time 15 seconds later

Circled part ○in the chart

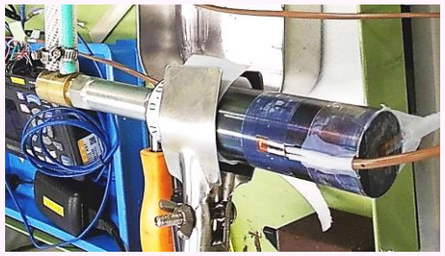
Hole only			
25℃	→	45℃	20℃ rise
Copper tube and Cuprum Paste			
25℃	→	40℃	15℃ rise
SUS tube and Other filler			
25℃	→	33℃	8℃ rise

Thermal conductivity

Changes of mold temperature when 100 ℃ water is poured in each cooling hole.

Leakage is considered to be caused by stress corrosion cracking due to rust in the cooling hole. But if the copper tube and copper paste filler are used from the beginning…

•It facilitates stable operation by reducing the risk of water leakage.
•It extends the mold life by preventing rust

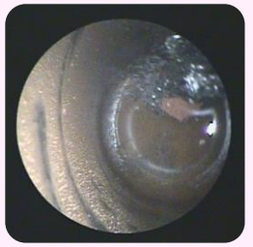


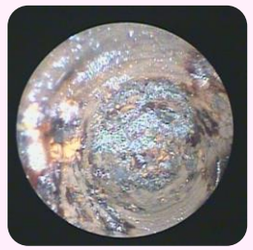
▲Temperature rise test

Inside the cooling hole after casting for certain times.

Copper tube was **used** (Inside the copper tube) ▶

No rust can be seen





◀ Copper tube was **not used** (hole only)

Rust occurred in the cooling hole.

The two photos above were after 25,000 cycles of casting. The effect of forming oxide film on copper can also be expected on metal mold at almost the same level.

As the number of cycles increases, the rust progresses and grows like scales.
Regular cleaning maintenance is required.