

Metal Finishing Chiller

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The finishing of forged metal parts is critical to manufacturing high-quality products that can withstand the rigors of industrial and commercial use. Anodizing (electrochemical metal oxide deposition), electroplating and welding generate large amounts of heat and therefore require cooling systems.

Industrial chiller manufacturers offer efficient metal finishing chillers for different applications.



Metal Finishing Process

1.What is A Metal Finishing Chiller?

A Metal Finishing Chiller is a specialized cooling system used in metalworking and manufacturing processes that require precise temperature control. It is employed to cool various chemicals, solutions, or baths used in metal finishing operations. These operations can include processes like electroplating, anodizing, passivation, and various types of coating applications.



Metal Finishing Chiller

The process of metal finishing is generally accompanied by a large amount of heat generated by the machining. If this heat cannot be dissipated in time, it will not only seriously affect the quality of the final processing result, but also cause irreversible serious damage to the processing equipment itself over time, thereby greatly increasing processing costs. Therefore, the metal finishing industry cannot do without the help of chillers.

2.Why Does Metal Finishing Process Need Chillers ?

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3.What Applications Do Metal Finishing Chillers Used In?

Metal finishing processes often generate large amounts of heat energy, which if not properly dissipated can adversely affect the quality of the finished product. Several industrial cooling options exist to accommodate the heat generated during the processing of these metals.

Outlined below are some applications where metal finishing coolers are critical.

- Laser cooling
- Anodizing
- Paint and powder coating
- Quench cooling
- Furnace cooling
- Induction furnace coil cooling
- Die casting cooling
- Spot welding
- Waterjet cutting
- Plasma cutting
- Thermal spraying

4.What's the Difference Between Air-cooled & Water-cooled

Metal Finishing Chillers?

There are two types of Metal Finishing chiller: one is **air-cooled Metal Finishing chiller** ,the other is **water-cooled Metal Finishing chiller** ;

Air-cooled Metal Finishing chillers use ambient air to dissipate heat from the brewing processes. They are energy-efficient, space-saving, and less maintenance that helps save money.

Water-cooled Metal Finishing chillers use water from an external water cooling tower to dissipate heat from the brewing processes. These systems are longer lifespan, Relatively quiet, and more consistent cooling performance than the air-cooled Metal Finishing chiller.

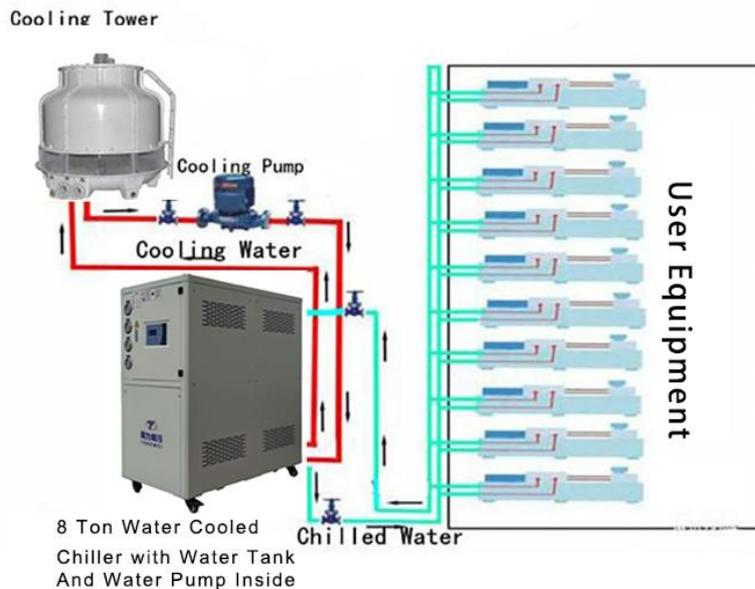
Air Cooled Chiller Installation Drawing



Chiller Built with Water Tank Inside

Air-cooled Metal Finishing Chiller Installation Drawing

Water Cooled Chiller Installation Drawing



Water-cooled Metal Finishing Chiller Installation Drawing

Should you choose an air-cooled or water-cooled Metal Finishing chiller? [Contact Us](#) for help determining the best solution for you.

5.What is the Difference Between Plasma Cutting Scroll Chiller and Metal FinishingScrew Chiller?

Metal Finishing Scroll Chiller

- 1/2HP-60HP(2KW-170KW)
- Danfoss/Panasonic Scroll Compressor
- Built with water tank and water pump

Metal Finishing Screw Chiller

- Above 60HP(Above 170KW)
- Hanbell/Bitzer Screw compressor
- Without water tank and water pump



Air-cooled Metal Finishing Scroll Chiller



Air-cooled Metal Finishing Screw Chiller



Water-cooled Metal Finishing Scroll Chiller



Water-cooled Metal Finishing Screw Chiller

6.What Are The Main Components of Metal Finishing Chillers?

6.1 Compressor

The compressor is the key mover in water chiller because it produces pressure variations to stir the refrigerant around.

From 1/2HP(1/2 Ton) to 60HP(5oTon) Metal Finishing chiller , which is with **Panasonic** or **Danfoss** brand **Scroll** compressor ,



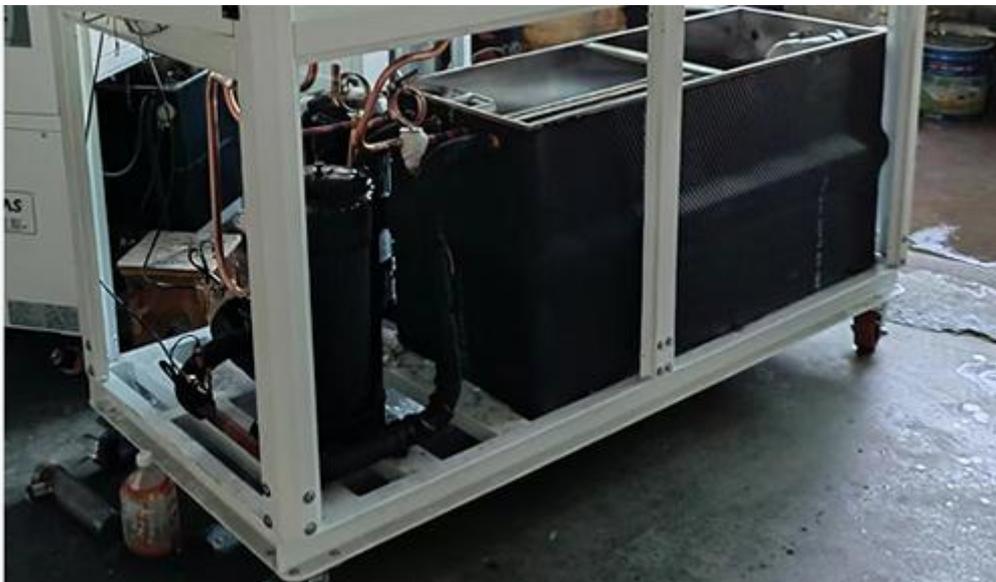
Panasonic Compressor

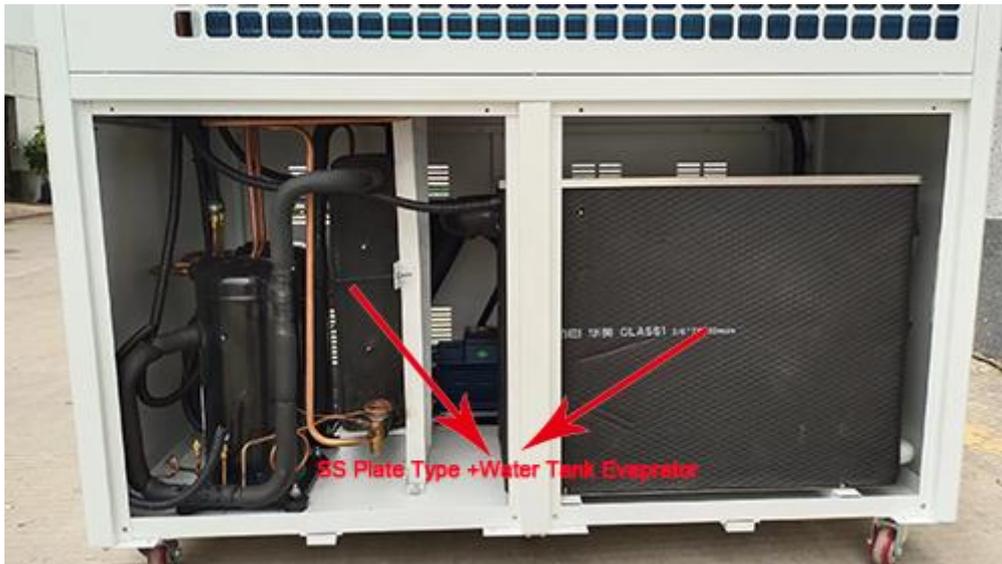


Danfoss Compressor

6.2 Evaporator

The evaporator is a crucial component of air-cooled water chiller, as it is responsible for extracting heat from the liquid being cooled, it is located between the compressor and the expansion valve. There are three types of evaporators : **coil in water tank evaporator , shell and tube evaporator, 304SS stainless steel plate type evaporator.**





SS Plate Type+ Water Tank Evaporator



Shell and Tube Evaporator

6.3 Water Pump

The water pump is designed to increase the pressure and the flow of the chilled water in a closed space.



Water Pump



High Pressure Water Pump

6.4 Condenser

The condenser for air-cooled Metal Finishing cooler is equipped with efficient cross-seam fins and female threaded copper tubes for high heat exchange efficiency and good stability. Its function is to cool down the refrigerant steam released from the compressor into a liquid or gas-liquid mixture.



Aluminum fin+fan Condenser for air -cooled Metal Finishing chiller

The condenser for water-cooled Metal Finishing cooler is shell and tube ,with the internal copper tubes employing an outer thread embossing process. This design effectively enhances the heat exchange efficiency between the refrigerant and water during the process. Compared to traditional smooth copper tubes, the outer thread embossing process increases the surface area of the copper tubes, thereby expanding the contact area for heat exchange and improving the thermal conductivity of the condenser. This optimization design allows the condenser of the water-cooled chiller to transfer heat from the refrigerant to the water more rapidly and consistently, enabling the water to carry away the heat.



Shell and tube Condenser for water-cooled waterjet cutting chiller

6.5 Controller Panel

Water chillers use precision digital temperature controller, it RS485 communication port, which can do remote monitoring and control. Simple operation, low failure rate, high safety factor, easy installation.



Controller Panel

7. What are the Key Features of a Metal Finishing Chiller?

- Energy-efficient Panasonic/Danfoss compressor
- 304 Stainless steel water pump
- Chilled Outlet water temperature control 7°C to 25°C
- Precise temperature controller
- Environment-friendly refrigerant R407c/r410a
- PID temperature controller
- Easy installation ,operation and low cost of maintenance
- 304 Stainless Steel Coil in SS water tank as evaporator

8.How to Choose Right Laser Chiller for Your Metal Finishing Process?

How to calculate right cooling capacity for your Metal Finishing chillers?

One of the most frequently ask about how we can know the cooling capacity for chillers.

The range of a chiller at which it can discharge heat from a heated fluid is called cooling capacity.

The cooling capacity of a laser Chiller ranges from 1/2KW to 100KW.

To determine the chiller size needed for your metal finishing operation, follow this formula:

Obtain output of rectifier (Amp & Volts)

Obtain total BTUs (Total BTUs = Amps x Volts x 3.414)

Calculate KWs of cooling capacity (KW = BTU ÷ 3412)

Size chiller by rounding up to the closest standard unit size

For example:

Rectifier output is 1,000 Amps & 24 Volts

Total BTU's = 1,000 x 24 Volts x 3.414 = 81,936

Tons = 81,936 ÷ 3412 = 24KW

This application will require a 24 KW cooling capacity chiller unit

Types of Metal Finishing chiller system?

There are two types of chiller : **Air Cooled Metal Finishing Chiller** and **Water Cooled Metal Finishing Chiller**.

Water cooled chiller needs a separated water cooling tower and water cooling pump ,if you don't have existing water cooling tower,we suggest you use air cooled chiller; But if your ambient temperature is very high above 55°C ,we suggest you use water cooled chiller , as it is easier to dissipate heat for water cooled chiller with water cooling tower.

Whether chillers need built-in Tank or not?

In a chiller system, a tank is usually equipped to buffer the thermal load of the chiller.

But should we choose a built-in type of tank or an external type of tank?

A chiller with a built-in tank is easier to install and can be used simply by connecting a water pipe to your application.

But it has a limited capacity and is not suitable for applications with larger chilled water demands.External tank's capacity can be customized according to specific needs.

It can buffer a larger heat load, store more chilled water, but the installation will be more troublesome.

If you don't have external water tank ,we suggest our chiller built-with water tank ,which is easy for you to install.

Cooling capacity unit conversion?

1 KW=860 kcal/h ;

1 TON=3.517 KW;

1 KW=3412 Btu/h;

9.Contact Us to Learn More About Our Metal Finishing

Chillers

We engineer and produce high-quality process chillers compatible with a broad range of industrial processes.

Depending on your needs, we also offer *custom chillers* to ensure that each client receives the industrial chiller best suited to their unique process.

[Request a quote now](#) on our Metal Finishing water chillers or learn about the other *air-cooled chillers* and [water-cooled chillers](#).