

# Electroplating & Plating Chiller

## Contents Table

- ▷1.What Is Electroplating?
- ▷2.What is Electroplating Chiller?
- ▷3.How Does An Electroplating Chiller Work ?
- ▷4.Why Need A Chiller For Electroplating &Plating Processing?
- ▷5.What's the Difference Between Air-cooled & Water-cooled Electroplating Chillers?
- ▷6.What Are the Differences Between Electroplating Scroll Chiller and Electroplating Screw Chiller?
- ▷7.What Are The Main Components of Electroplating Chillers?
  - 7.1 Compressor
  - 7.2 Evaporator
  - 7.3 Water Pump
  - 7.4 Condenser
  - 7.5 Controller Panel
- ▷8. What are the Key Features of An Electroplating Chiller?
- ▷9. What Are The Applications of an Electroplating Chiller?
- ▷10.What Are Advantages of an Electroplating Chiller for Your Electroplating &Plating Processing?
- ▷11.What Applications Does An Electroplating Chiller Used in?
- ▷12.How to Choose Right Electroplating Chiller for Your Electroplating Process?
- ▷13.Get a Quote on Industrial Electroplating Chillers Now

## 1.What Is Electroplating?

Electroplating is a process that uses an electric current to coat an object with a thin layer of metal. It is used for a variety of purposes, including enhancing the appearance of objects, providing corrosion resistance, improving electrical conductivity and changing surface properties.

## 2.What is Electroplating Chiller?

Electroplating chillers are uniquely designed cooling machines that effectively remove heat from Electroplating and plating processing systems.

Electroplating is a metal finishing process that applies a layer of metal instead of paint to the metal surface. The Electroplating chiller removes the heat generated during the electrochemical process through a water-cooled or air-cooled condenser.

Control valves and thermal sensors detect any changes in the temperature of the Electroplating process. It has environmentally friendly behavior due to ozone protecting refrigerant. It is known for its ease of installation and maintenance in a variety of applications.



*Electroplating Chiller*

### 3.How Does An Electroplating Chiller Work ?

Both air-cooled and water-cooled chiller systems can be installed next to vessels containing electrolytic fluids. The mechanism of cooling is simple. Liquid refrigerant is circulated through the metal finishing cooler and then through a heat exchanger to cool the Electroplating process solution. The heated refrigerant is sent back to the chiller to repeat the cycle.

Temperature changes within the Electroplating vessel are detected by a thermal regulating device installed inside it. When the heat generated by the Electroplating process increases, the regulating valve in the chiller system opens automatically or manually to allow coolant to flow through the heat exchanger and cool the container. When returning to the optimal temperature range, these valves close to avoid overcooling of the electrolysis process.

Another way to regulate Electroplating temperature is to use a cooling coil immersed directly in the Electroplating solution. While this method is less expensive to install, it has some disadvantages compared to standard anodized cooling systems that use external heat exchangers.

- Thermoregulation is less precisely controlled.
- The cooling coil may leak, introducing refrigerant into the Electroplating vessel, causing contamination and disrupting the oxidation process.
- Immersion cooling carries the risk of electrolytic chemical corrosion, which will increase operating costs.

## 4. Why Need A Chiller For Electroplating & Plating Processing?

As we know, most metal finishing processes, such as Electroplating or electroplating, generate a lot of heat. In order to ensure the high quality of the final product, this heat must be dissipated, so the Electroplating plating chiller can take advantage of metal finishing. The heat generated during the process maintains the optimal and suitable temperature required for Electroplating and plating process.

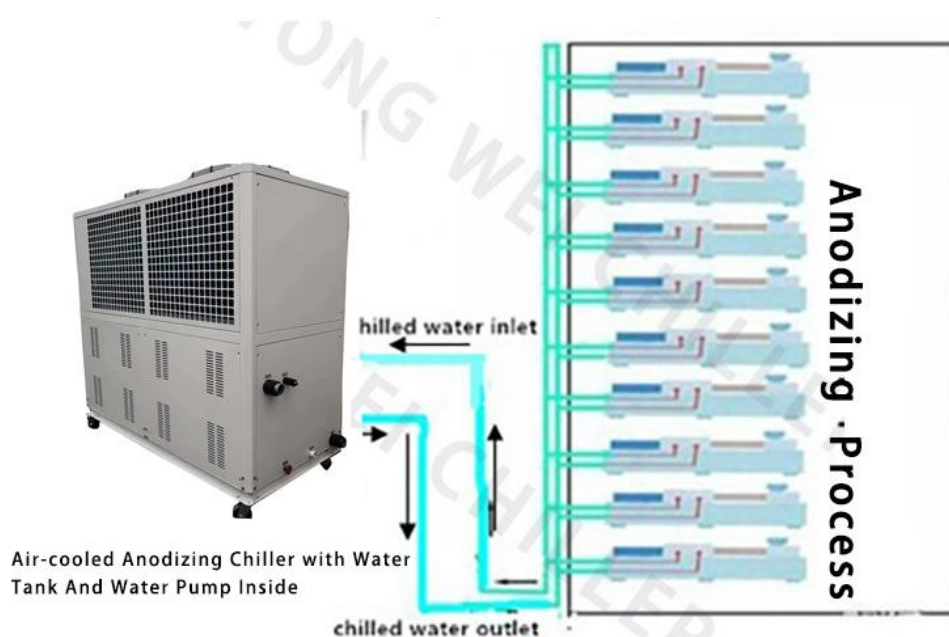
Electroplating combines with nature to create one of the best metal finishes in the world. This is a process that electrochemically controls, accelerates and enhances the oxidation of aluminum tubes, forming a durable, scratch-resistant coating on the surface. However, temperature control is one of the most important factor during Electroplating, electroplating and other metal finishing processes.

## 5. What's the Difference Between Air-cooled & Water-cooled Electroplating Chillers?

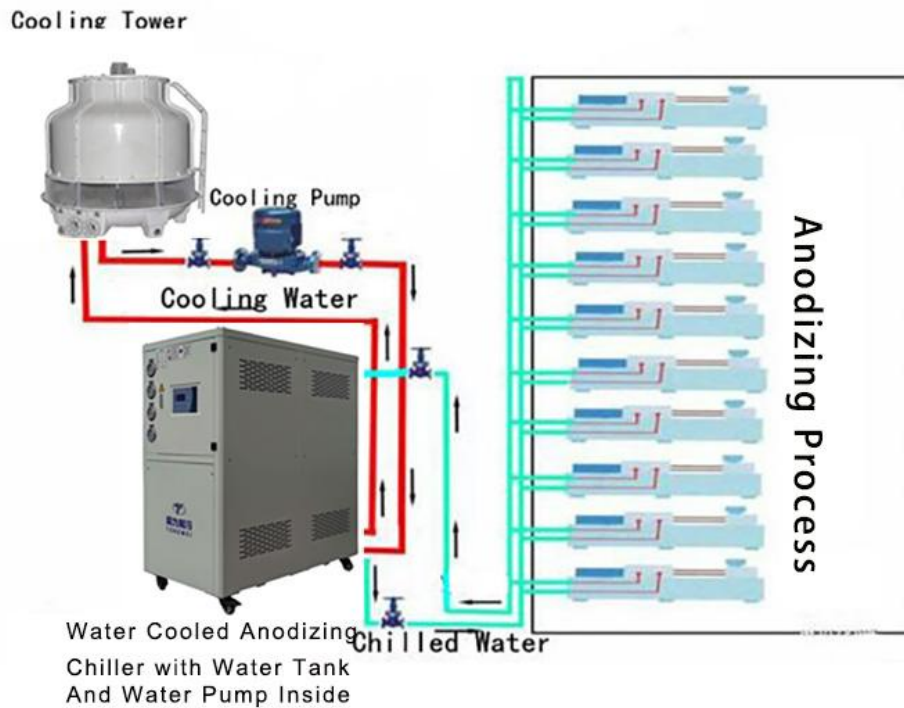
There are two types of Electroplating chiller: one is **air-cooled Electroplating chiller**, the other is **water-cooled Electroplating chiller**;

**Air-cooled Electroplating 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 Electroplating 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 Electroplating chiller.



*Air-Cooled Electroplating Chiller installation*



***Water-Cooled Electroplating Chiller installation***

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

## 6.What Are the Differences Between Electroplating Scroll Chiller and Electroplating Screw Chiller?

### Electroplating Scroll Chiller

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

### Electroplating Screw Chiller

- Above 60HP
- Hanbell/Bitzer Screw compressor
- Without water tank and water pump



*Air-cooled Electroplating Scroll Chiller*



*Air-cooled Electroplating Screw Chiller*



*Water-cooled Electroplating Scroll Chiller*



*Water-cooled Electroplating Screw Chiller*

Based on Constructing Design, the Electroplating Chiller is available as:

- Split Chiller
- Packaged Chiller

## 7.What Are The Main Components of Electroplating Chillers?

### 7.1 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(50Ton) Electroplating chiller , which is with **Panasonic** or **Danfoss** brand **Scroll** compressor ,

Above 60HP Electroplating chiller,which is with Hanbell or Bitzer screw compressor;



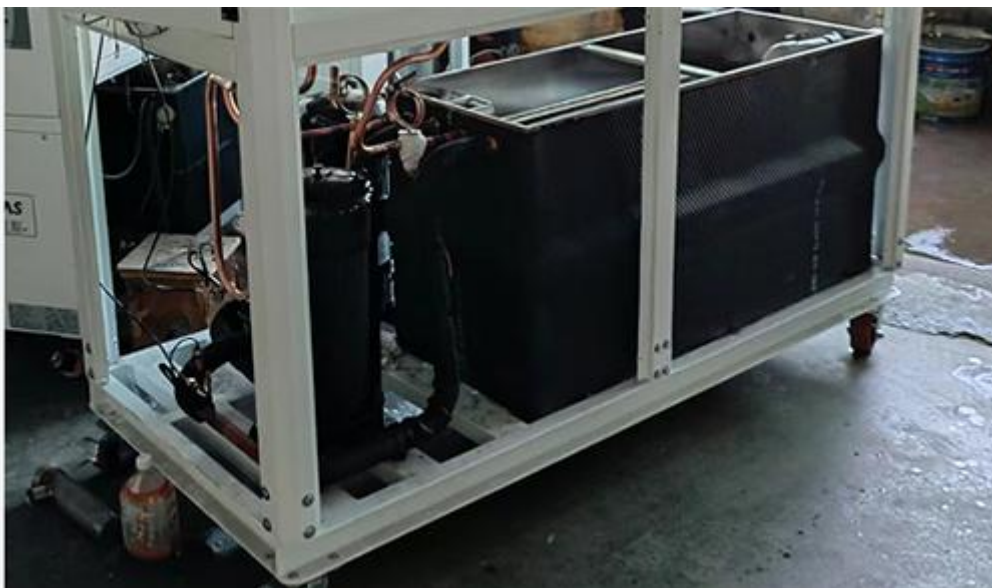
*Panasonic Compressor*

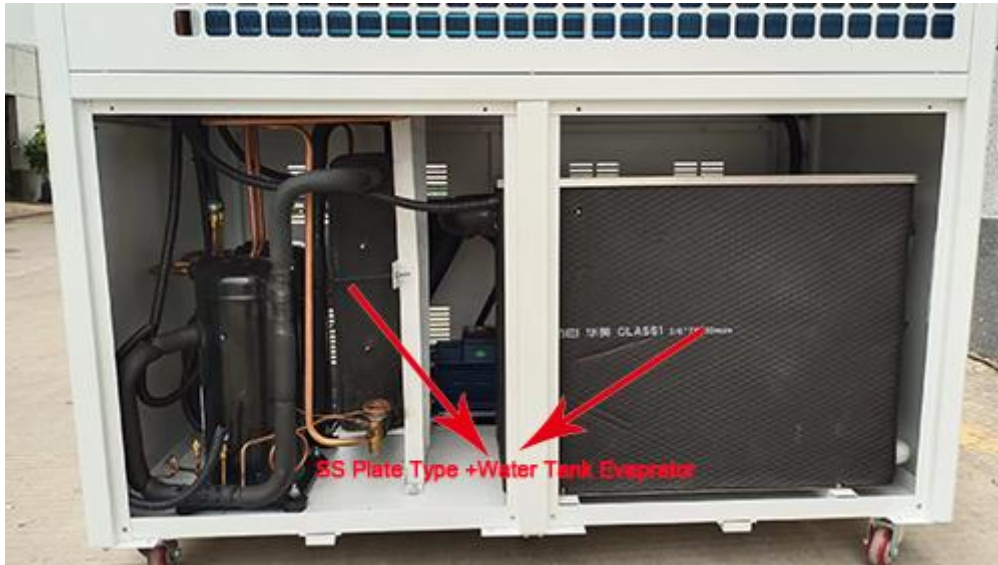


*Danfoss Compressor*

## 7.2 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*

### 7.3 Water Pump

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

ElectroplatingChiller is used with 304 Stainless Steel Water pump.



*Water Pump*



#### 7.4 Condenser

The condenser for air-cooled Electroplating 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 Electroplating chiller*

The condenser for water-cooled Electroplating 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 Electroplating chiller*

### 7.5 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*

## 8. What are the Key Features of a Electroplating Chiller?

- Energy-efficient Panasonic/Danfoss/Hanbell/Bitzer 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 /Shell And tube as evaporator

## 9.What Are The Applications of an Electroplating Chiller?

Electroplating cooling systems are known for their specific temperature regulation capabilities and heat dissipation. Its main applications are as follows:

- Laser Cooling
- Plating
- Electroplating
- Impregnation
- Powder Coating
- Metal Coating
- Titanium Electroplating
- Quench Cooling

- Commercial Electroplating
- Spot Welding
- Furnace Cooling
- Cooling for Induction furnace
- Chromic Acid Electroplating
- Die Casting

Our Electroplating chiller can accommodate other types of equipment as well. If you don't have your application here, please [contact us](#) for knowing more about.

## 10.What Are Advantages of an Electroplating Chiller for Your Electroplating &Plating Processing?

Material is anodized for several reasons, to ensure that anodized materials become more durable and long-lasting while expanding the range of applications they can be used for. Listed below are the main reasons why metals are anodized.

### **Improve corrosion resistance**

Materials that will be used in high humidity/water contact environments benefit from Electroplating their metal components. For example, ships and hulls, petroleum facility platform superstructures, and terminal equipment all require Electroplating to be sufficient to provide a corrosion-resistant coating.

### **Hardening and Abrasion Control**

After metal is anodized, its strength properties can be significantly improved. Unoxidized aluminum (in its non-anodized state) is soft and not suitable for applications that require reinforced components. In contrast, the resulting high tensile strength is valued and used in the manufacture of wear-resistant aluminum alloys.

### **Equipment Protection**

Some industrial processes that emit heat such as Electroplating and electroplating processes, are protected from thermal damage. The chilling effect makes electrochemical cells and rectifiers durable by discarding all extra heat.

## 11. What Application Does A Electroplating Chiller Used In?

Electroplating Chillers are widely used in many application ,some as below:

**Decorative Finishes:** Electroplating is often used to give objects an attractive and reflective surface. For example, gold, silver, and chrome plating are used in jewelry, tableware, and automotive parts.

**Anti-corrosion:** A layer of corrosion-resistant metal (such as zinc) can be electroplated on

objects made of non-corrosion-resistant materials to increase their service life.

**Conductivity:** Electroplating can improve the conductivity of materials. For example, copper plating is used in the electronics industry.

**Engineering and Manufacturing:** Electroplating is used in industries such as aerospace, automotive and medical device manufacturing to provide components with specific properties such as wear resistance, hardness and lubricity.

**Printed circuit boards (PCBs):** Electroplating is a key step in manufacturing PCBs, where copper is plated onto the surface to create conductive traces.

**Jewelry and Fashion Accessories:** Electroplating is widely used in the jewelry industry to coat base metals with a layer of gold or silver, creating a more affordable solid alternative to precious metals.

## 12.How to Choose Right Electroplating Chiller for Your Electroplating Process?

### How to calculate right cooling capacity for your Electroplating 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.

Let's see the below formula.

Cooling Capacity(kw)= Flow Rate(m<sup>3</sup>/h)\*Temp Change(T1-T2)/0.86

Heat Load= C(specific heat)\* M(quality output per hour )\*Temp Change(T1-T2)

Oversize the chiller by 20% Ideal Size in KW = KW x 1.2

Noted : T1:Incoming Water Temperature ( °C )      T2:Required Chilled Water Temperature(°C)

For example, what size of chiller is required to cool 5m<sup>3</sup> water from 25°C to 15 °c in 1 hour?

Temperature Differential = 25°C-15°C=10°C

Water Flow Rate = 5 m<sup>3</sup>/hour

Cooling Capacity in KW = 5 x 10 ÷ 0.86 = 58,14 KW

Oversize the chiller = 58.14 x 1.2 = 69.76 KW



69.96kw cooling capacity for chiller is required.

### **Types of Electroplatingchiller system?**

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

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

But Most customers use air cooled Electroplatingchiller ,which is more easily install and save space.

### **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;

## **13.Get a Quote on Industrial Electroplating Chillers Now**

As a leading *industrial chiller manufacturer*,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



**Guangdong Tongwei Machinery Co.,Ltd. [www.refrigerationchillers.com](http://www.refrigerationchillers.com)**

industrial chiller best suited to their unique process.

*Request a quote now on our Electroplating water chillers or learn about the other air-cooled chillers and water-cooled chillers.*