

PLATING TANKS

Plating is a process of bonding metal to another metal or applying silver or chromium coating to the base metal as a form of protective shield against wear and corrosion. Plating also helps to enhance the appearance of a metal or plastic materials depending on which you are plating.



There are two methods of plating which is predominant in the industry, barrel plating, and rack plating. You can use both methods to plate both metals and plastic materials. No matter the method you want to use, there is need to consider the plating tank in which either the rack or barrel resides.

Plating tanks come in different sizes and with different materials. Presently, the industry has the plastic plating tanks, steel plating tanks, and hard chrome plating tanks. The choice for either of these tanks depends on the nature of your projects and the durability requirement of your choice.

Apart from types, plating tanks come in sizes. There are some large tanks and some small ones too. Some plating tanks can be up to 1500 gal while there are some that are as large as 9500 gals. The size depends on the specifications you give to those constructing the plating tank for you. Also, if you want to get a large plating tank, it is advisable to go for a lined steel tank. The reason to get a lined steel tank is that, while cleaning and painting the exterior of the lined steel tank, you can easily detect any small tears or pin-hole on the body of the tank.

You may think that it doesn't matter, but I tell you that if fail to detect a pin-hole on the outside of the plating tank, corrosion will take place between the steel tank and the lining. The result will be that one day, your plating solution will just pour out on the floor.

If you want to make use of a smaller tank, you can get one with polypro material. However, if you are making use of electric heaters, make sure that you have liquid-level controllers. Also, when ordering a polypro tank, ensure that there are adequate reinforcing bands placed properly. Otherwise, the tank will be bulging, and there will be breaks in the corner seams. Also, make sure that the seams at the corner are welded properly to avoid leaking.

One thing that will inform your design requirement is the plating method you want to use in the tank. If you want to design a barrel tank, you must make sure that the fabricators use heavy-duty construction because there is no room for damages in cases where your plating line tosses a plating barrel. On the other hand, if you are constructing a rack plating tank, you may not need to worry a lot about the tank design as regards to heaviness.

Also, before choosing to construct any tank, think about the space limitations. It is important to note that if you want to replace a steel tank with a polypro tank that has steel bands, it will not fit. Before ordering a plating tank, make sure that there is enough space so that if you to replace a steel plating tank with a polypro tank, it will be easy and also a right fit. Also, remember that a poly tank always occupy space because it has steel/poly girth bands.

Plating tank material

There are many plating tank materials available in the industry for different types of plating tank. For Plastic Plating Tank, the materials are as follows, Polypropylene, PVC, CPVC, and HDPE.

Polypropylene or PP as it is normally called is a thermoplastic which is made by combining propylene monomers. PP is used for many applications like consumer goods packaging, fabricating plastic parts for many industries of which automotive industry is one of them. It is also used to make special devices like textiles and living hinges. Polypropylene has a slippery surface, and as such, it is always a good substitute for other plastics like Acetal when it comes to producing gears which is a low-friction application.

Propylene material is mostly a good choice for plastic plating tanks because of the important characteristics it has. PP material is known for the following characteristics.

1. Chemical resistance
Propylene doesn't react speedily with acids and diluted bases, and this nature is why it is the best choice for making containers that will contain acids and bases mixture like first-aid products, plating tanks, cleaning agents, etc.
2. Tough and elastic
Polypropylene is readily elastic over a specific range of deflection. However, it considered as a tough material because it experiences deformation in the early stages of the deformation process. The term "tough" about materials means that the material can deform without breaking.
3. Fatigue resistance
This material retains its original shape even after much bending, torsion, or flexing.
4. Insulation
Polypropylene can resist electricity, and this characteristic is why manufacturers of electronic components make use of it often.
5. Transmissivity
Polypro transmissivity makes it a better choice for applications where little transfer of light is crucial but not when there is a need for high transmissivity.

As a part of thermoplastic materials, polypro can withstand heating. Polypro can be heated to 130 degree Celsius which is its melting point, allowed to cool and be heated again without any significant degradation. The reason for using Polypro very often is that it can adapt to different kinds of fabrication techniques. It is also able to work as a plastic and a fiber. You can manufacture polypro through many applications and methods making it versatile and preferable.

Advantages of polypro are numerous of which some are:

1. Affordable and available
2. It has flexural strength
3. Polypro has a slippery surface
4. It resists absorbing moisture
5. The material can resist chemicals
6. Has great resistance to fatigue
7. Polypro has great impact strength
8. It is a great electrical insulator.

Polyvinyl Chloride PVC is another common thermoplastic polymers after PP and PET, and it is white and brittle. PVC comes in two forms, rigid/unplasticized polymer and flexible plastic. PVC has the following characteristics:

1. Density; it is very dense when you compare it to other plastics
2. PVC is cheap and available
3. The material is very hard
4. It has great tensile strength.

The wide use of PVC in many applications is because of its high density which makes it hard and strong. It is also economical and durable. This nature of PVC is why you can find it in many industrial applications, e.g., Construction of plating tanks.

PVC has some interesting advantages as well. Some of the advantages of using PVC material are:

1. It is inexpensive and readily available
2. It is very dense making it hard and able to resist deformation from an impact.
3. Polyvinyl Chloride has an impressive tensile strength
4. It can also resist alkalis.

CPVC known as Chlorinated Polyvinyl Chloride is a material produced by the addition of chlorine to PVC in a fluidized bed chlorination process. This type of plastic material is compounded with necessary ingredients to achieve the desired properties for more processing. Due to the Chlorine which is added to PVC, it makes the CPVC material stronger to achieve a higher temperature, improved corrosion, and fire resistance. There are many advantages to using CPVC materials. Some of them are:

1. It comes in many sizes
2. CPVC is safe of potable water and also good for long-term usage.
3. It can resist tuberculation, deposits, and corrosion
4. The material can resist chloramine and chlorine
5. It is light in weight for easy and safe transportation
6. It is resistance to water hammer and noise
7. It is durable and tough and can survive installations on the job site
8. CPVC has no scrap value, so it is safe from theft
9. It is compatible with pipes or fittings.
10. It has an impressive appearance.

HDPE standing for High-Density Polyethylene is another popular plastic which is versatile as it appears in many applications. It can be used for a heavy-duty damp proof membrane for buildings, or use it for light and flexible films and bags. It has the low-density type, but the one that is used for plating tanks is the High-Density type.

HDPE can be used for applications like Jerri cans, chemical drums, toys, picnic ware, carboys, kitchenware and household, cable insulation, food wrapping material, carrier bags and plastic plating tanks.

HDPE has many characteristics that make it popular and impressive

1. It is a flexible plastic material
2. It is translucent and waxy
3. It can withstand different weather
4. It has good low-temperature toughness
5. HDPE is easy to process using many methods
6. It is available and affordable
7. It can resist chemicals strongly.

Each of these plastic materials used in the construction of plastic plating tanks is all high-quality materials to ensure durability and good plating experience.

For the steel tanks, the materials are usually Steel or stainless, and they are always lined depending on what you specify. For the Hard Chrome Plating Tanks, they are lined with Titanium or Koroseal. For Plastic tanks, Steel tanks and Hard Chrome tank, there are usually extra reinforcements, exhaust slots and bus bar support.

Stainless steel plating tank

This type of plating tank serves different plating needs. Some of the brands of stainless steel plating tanks come with rubber and PVC coating in the interior. Some stainless plating tanks are suitable for Nickel plating, Bright chrome plating, Zinc plating, and Hard chrome plating depending on the requirements.

Some stainless steel tanks come with internal drop-in liners which will suit the process application very well. There are linings like Semi-hard rubber, Lead, Antimonial//lead, Stainless Steel, Tin/lead lining, Rigid PVC/Polygrass (PP)/PVDF Flexible(PVC)/CPVC, Spray Galvanizing, Fiberglass-reinforced Plastics (FRP) for corrosion resistance.

You can also get plain stainless steel plating tanks. You can choose any material you want for the fabrication of the plating tank especially when you want to solve the problem of corrosion specifically. The material available for the tanks are all cost-effective and durable.

If you desire the fabrication of plain double welded plating tank that is tailor-made to be self-supporting in any dimension, shape, and volume you want, you can get it. You can use this type of plain tank for Electroplating, Storage, Anodizing, Phosphate, Electropolishing, Pickling and all many process requirements other than the ones we have mentioned here. Also, a stainless steel tank that can handle many processes often come fabricated from Perspex, Rigid PVC Polyvinyl Chloride, Polypropylene, Polyglass PP, Linear Polyethylene, CPVC, PVDF, Stainless Steel 304/316, Mild steel. When you place an order from a good manufacturer, you will get other items with it like, reinforcement, legs, and rim. For the external coating, the best stainless steel tank will have epoxy paint or FRP in Isotholic, Vinyl plaster resins or Bisphenol that will be acid and alkali resistant.

Plastic plating tank

Plastic tanks can come in any of the plastic above materials like Polypro, PCV, HDPE, and CPVC. Some plastic tanks from good manufacturers can come with reinforcements if you add it to your specifications. There are many reasons for the

popularity of using heated plastic tanks. These types of tanks are preferable because the solutions commonly used for electroplating and other applications are usually corrosive. Some of the processes like plating, cleaning, etching of circuit boards and other components for electronics products, electroplating and metal finishing operations use these corrosive plating solutions.

Some of the plastic materials like Polyethylene, polypropylene, fiberglass reinforced plastic and polyvinyl chloride (PVC) all have high resistance capacity against corrosion. The only downside to these plastic tank materials is that they are combustible and the tank heaters are a dangerous source of ignition.



Therefore, if you are using plastic plating tank, you must make sure that there are adequate protection and regular maintenance of these tanks to prevent a fire hazard. Don't forget, when there is a fire from the plastic plating tank, other parts around like plastic piping and ductwork will also catch fire and spread it to other areas.

Heaters of plastic plating tank

There are two types of heaters commonly used to heat the fluids in both plastic and plastic-lined tanks.

1. Electrical Resistive Element Heaters

In electric Immersion heaters, the heating element is usually submerged in the processing solution. To protect is from corrosion, there is an outer sheathing that does the work and the method of heating the liquid is through conduction. External Heaters; these heaters reside outside the plastic plating tank, and it uses conduction to heat the liquid. Infrared Heaters; this element is always separated from the liquid with quartz glass. As for the heating of the liquid, it occurs through radiant energy absorption.

2. Heat exchangers

This item is used to separate the heating device remote from the heated tank. The source of the heat may be from a heat transfer fluid flowing through the tubes.

If you are using a plastic plating tank, you must be very careful to avoid fire hazards as a result of heated plastic tank fires. Many reasons for fire hazards with plastic tanks is that when automatic controllers fail to shut off the tank heater as a result of electric malfunction, fouled or corroded connection or frayed wires on the interlock at the lower level, a fire can occur. Also, if the immersion heater installation doesn't have a proper design but installed very close to the tank wall, low controls or sludge zone may lead to a fire hazard.

To prevent any form of fire hazard in the workshop while using a plastic plating tank, follow the following recommendations: Make use of plating tanks with non-combustible materials like a steel tank, stainless tank or quartz materials. But if you must use tanks made of plastic materials, make sure that you use those materials that meet Class 4910 Standard or its equivalent.

1. Use heaters like these as listed based on effectiveness
2. External heat exchanger which uses hot or steam
3. Low watt density electric immersion heaters
4. Ordinary electric immersion heaters.

5. Interlock electric immersion heaters so that they can activate the alarm and de-energize automatically upon
6. Low liquid level when any part of the heater element is exposed.
7. High liquid temperature is at 15 degree Celsius or 25 degrees Fahrenheit above the safe operating temperature.
8. Shut off the heaters when there is idle time or when the tank is unoccupied. Don't use the timer to turn the heater off when the tank is not occupied.
9. Make sure that there are a quarterly inspection testing and maintenance of the tank's heater control and interlocks as the manufacturers recommend. The best time to carry out the checks might be when you are draining or filling the tank.
10. Open a testing and maintenance record keeping system so that when there is a deficiency, the necessary corrections will be made.
11. Instruct the tank operators to desist from using it when there is a faulty equipment
12. Get automatic sprinkler protection that meets NFPA 13 standards
13. Train all the operators on heater functions and possible hazards that may occur.
14. Carry out a hazard evaluation for every new heater plastic tanks or tanks that come with plastic linings.

Hard chrome plating tank liners

It is a common knowledge that hard chrome electroplating solution breaks down the tank liners where oxygen and the plating solution meets. The reason for this is the evaporation of plating solution which makes the fumes to condensate on the tank liner.

When this situation occurs, the concentration of the condensate becomes higher than what PVC can hold. The result is that the tank liner will break down at that area while the other parts of the liner under the plating solution will still be very strong. Initially, people used another PVC layer as a shield for the upper-level solution and the lower solution levels. Unfortunately, this cover was still of PVC and susceptible to the condensate attack. The only thing is that the PVC layer will reduce the speed at which the liner will break down till it can no longer withstand.

Recently an innovation brought about a solution that will eliminate the problem of tank liner breakdown and enable you to use the liner until the expected lifetime. So instead of using PVC to make the shield, manufacturers use LFP CrossFilm. This material is 100% PTFE Teflon, but it has a higher mechanical strength than the normal PTFE Teflon. Since LFP CrossFilm is a Teflon Material, it is chemically inert and not subject to any form of breakdown. If you want your tank liner to last longest, then use Koroseal PVC liner that has an LFP CrossFilm skirt.

Chrome plating tank design

One of the popular liners in the processing industry is the rigid PVC box liners. To achieve an optimum construction, manufacturers use a state-of-the-art plastic welding and new technologies like adding corner inserts.

If the manufacturers installed a bonded PVC (Koroseal) inner liner is with a conductive adhesive, it allows users to test sparks. Box liners improve the service life of a chrome tank than a flexible bag liner that usually temporary. When you use linings, it provides a better protection than what coating can offer.

Many people in the process industry now rely on rectangular tanks with tank liners because they can contain the corrosive solutions for plating and metal finishing. For structural strength, the tank depends on concrete or steel while the tank lining shields the substrate from corrosion.

Using bonded PVC linings is what the industry depend on although they can also use materials like lead, polyolefins, rubber, and fluoropolymers. Plastics with the help the tank to resist alkalis and acids. Pressure and temperature can pose a problem

while you also need to consider impact resistance.

Any tank that has bonded linings are usually economical when you compare it to the others. These types of tanks also stay longer and reliable throughout their service lives. Another innovation in the process industry is using rigid PVC or CPVC box liners to improve the tanks that are already existing.

