



TECHNICAL BULLETIN

Pumps used in plating must be chosen with the same care as selecting chemicals. Plating shop pumps recirculate plating solutions through a filter, transfer solutions, pump from original containers into a bath or other container.

Problems can abound, such as: (1) Chemicals may range in pH from 1-14. (2) Hot chemicals can cause suction cavitation to reduce efficiency and cause noise, impeller wear and seal damage. (3) Cooling chemicals may cause crystalline formations to abrade moving parts. (4) Specific gravities of chemicals greater than 1.0 require correct motor horsepower. (5) Motors often operate in hot, unvented areas, requiring proper enclosure selection.

Material compatibility

Materials must be compatible with chemicals to be pumped. Most plating solutions and many chemicals are corrosive, and pump materials must resist chemical attack. Corrosion-resistant chlorinated polyvinyl chloride (CPVC) pumps are made in many sizes, pressure ranges and flow rates. CPVC withstands temperatures to 200F and somewhat higher at low pressures.

Polypropylene is suitable but not as versatile as CPVC. Teflon or Kynar are also available for specific solutions. Corrosion-resistant alloys are also available. Material used for seals and gaskets must be considered.

Pump selection

Pump sizing is largely determining the desired pressure and flow rate. Most pumps are of horizontal design and available in many flow rate/pressure combinations and available as direct-driven or as magnetic-coupled seal-less. Which to choose? It depends on use conditions.

A direct-drive pump requires selecting the seal carefully to minimize wear and failure. Mechanical seals provide precision fit, are self-adjusting and are available as water-flushed seals.

A closed-loop, double water-flushed seal system also is available when an external source of water is not available, or if seal is to be self-contained.

How To:

...select the right pump for plating

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Vertical pumps must have their drive motors mounted at the tank, which may cause a space problem. Fumes and mist from the plating bath can be a problem too, so protect the motor if necessary. They are often used to pump waste solution from sumps.

Drum pumps are narrow enough to self-prime liquids through the bung opening. To add chemicals for pH control, or to add brightener, use a diaphragm or piston type metering pump. Such pumps could be operated on timers or amp-hour meters.

What speed and hp?

Centrifugal pumps are available with various motor speeds, such as

1725 or 3450 rpm. The lower speed pump has half the flow, one-fourth the pressure and requires one-eighth the horsepower.

Pump ratings are based on moving a liquid with a specific gravity at 1.0. Increase the pump motor horsepower in direct proportion to the specific gravity for a direct-drive pump. For a magnetic-coupled pump, trim the impeller to pump higher specific gravity liquids.

In any match-up of pump and motor, make sure the piping is adequate. Piping too narrow can starve the pump and ruin efficiency.

The Ten Commandments of pumping

1. Strain foreign objects from pump.
2. Use siphon breakers on suction and discharge piping.
3. Provide proper electrical power with proper overload protection.
4. Never starve the pump; use oversize suction piping for distance, elevated temperatures, vaporization or high atmospheric elevations.
5. Carefully choose materials that contact the liquid.
6. Determine flow, pressure and size of pump required. Match the

rpm and hp of drive motor to the specific gravity of the liquid being pumped.

7. Install a valve on a centrifugal pump discharge to prevent overloading the motor, or use a nonoverloading motor for the entire performance range.

8. Keep adequate spare parts on hand.

9. Install standby pumps when uninterrupted pumping is mandatory.

10. Always read operating instructions.