MIDWEST TUNGSTEN SERVICE

Tips

Maintaining Your Metallizer

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Down time on a metallizing unit can be very costly in terms of repair and lost production. It is prudent, therefore, to follow a regular maintenance program and to be prepared for the more common breakdowns. This TIPs is intended to get you thinking about maintenance and is not complete or authoritative. It would be best for you to consider the documentation that came with your equipment as authoritative and use it to create your own maintenance policies and procedures. If you are missing documentation, we may be able secure copies for you.

THE CHAMBER

Leaks can occur from abuse or poor housekeeping. Recommended maintenance: Clean the door gasket with a clean cloth or soft brush each cycle to will remove any bits of dirt or metal flake which can damage the gasket. Examine gasket weekly for radial cuts which could cause leaks. Keep gasket lightly greased with a vacuum grease and replace at regular intervals or if gasket becomes brittle. Check safety interlocks and emergency vacuum break for proper operation.

Clean the porthole after each cycle to avoid stubborn buildups. Avoid use of caustics for this purpose as they trap water. Avoid the use of abrasives as these will cloud the porthole over time. A plastic shield or louver is recommended to keep porthole clean.

Multiple layers of deposits inside the chamber hold water vapor and increase the gas load of the chamber leading to longer pumpdowns and discolored parts. Clean the drip trough and sweep the bottom of the chamber daily. Strip the carriages and inside of the chamber on a regular basis. A metallizer running daily 8 hour shifts should be cleaned about monthly. Clean using caustic, wire brushes, or sandblast equipment. Thoroughly rinse all caustic residue and dry completely to avoid discolored parts. Seal all ports and feedthroughs to avoid contamination with caustic, blast media, or deposition residue. Consider removable shields and liners for the chamber if you do not have them already. Boron nitride or graphite release coatings can be used to coat clean surfaces to make them easier to clean.

VALVES

Keep valves clean and in good working order. Check that all air line oilers are filled and properly adjusted to insure adequate lubrication of air cylinders. Check high vacuum valve weekly for accumulated chips that can prevent valves from closing completely. Wipe the entire plenum area clean, with solvent, if necessary. Monthly, raise the high vacuum valve and remove the oil which has accumulated under the valve and on the sides of the diffusion pump to about the level of the pump's top jet. All high vacuum gaskets should be replaced yearly. Check all other valves weekly for proper operation. Disassemble valves every six months to clean and check for wear. All valve seals should be replaced yearly.

PUMPS

The mechanical pump depends on airtight seals on its moving parts. Oil provides a tight seal, lubricates moving parts, and holds water and debris in suspension. Many mechanical pump problems can be solved simply by flushing the pump and replacing the oil. Check oil level daily. Proper use of the pump's gas ballast will minimize contamination from water vapor. When replacing oil, operate pump until oil is hot, drain and then rotate pump to expel any trapped oil. Recommended maintenance for mechanical pumps includes replacing exhaust valve springs, exhaust valve discs, the solenoid valve, the spring and O-ring seal in the gas ballast check valve, and pump flush every six months. Check belts. If your pump is so equipped, also check and drain the oil mist separator and check the input and output temperatures on its water cooling loop.

The diffusion pump has no moving parts, so maintenance is simpler. Check sight glass monthly for potential loss of fluid. Note that slight discoloration of the oil does not affect its performance. A more thorough check should be performed at least annually. Check inlet and outlet water temperatures. Check for proper cooling water flow. Check that heaters are working properly. Occasionally you may be required to open the pump for cleaning. Never expose hot (+130° F) silicone oil to oxygen (air) or it will gel. Make sure all electrical and water connections are disconnected. With proper ventilation and protective gear, wash down interior and jets with alcohol or acetone and allow to dry. Clean any cold caps, baffles or traps above the pump. Replace O-rings.

FEEDTHROUGHS

For stationary feedthroughs, check fittings every six months for tightness and leaks. If feedthroughs contain moving parts, check bimonthly for tightness and leaks. Lubricate with high vacuum grease, if necessary. Keep a separate gun for high vacuum grease to avoid contamination. Check electrical feedthroughs for tightness and insulation. Check faces of electrical contacts in chamber for pitting and warpage. Replace or reface as needed. If spring loaded, check springs for fatigue or loss of temper.

GAUGES AND ELECTRICALS

Every six months, check for corrosion and tightness of all electrical connections (watch for live connections). Yearly, or as necessary check vacuum gauges for proper calibration. This can be done by replacing the gauge with one known to be properly calibrated or by employing a gauge calibration service company.

MISCELLANEOUS

Remove filament posts yearly and sand contact areas with fine sandpaper to remove oxidation and deposits. Replace worn filament post hardware. Adjust for proper spacing and alignment.

Stock spare parts - especially those replaced frequently, are mission critical, or are hard to get. Some suggestions: pump fluids, vacuum grease, rubber sheet for quick fixes, hose clamps, belts, gaskets, fuses, control panel lights, vacuum sealant paint, filament posts, door gasket, and buss cable. Regular maintenance significantly reduces costly and aggravating "emergencies". As a bonus, cycle times and scrap will be kept to a minimum.

MIDWEST TUNGSTEN SERVICE, INC.

800-626-0226 **fax: 630-325-3571**

630-325-1001 **www.tungsten.com**

540 Executive Drive, Willowbrook, IL 60527