

Vacuum Metallizing Electrical Problems

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There are frequent problems in the metallizing chamber that may be electrical, but not recognized as such. We would like to review some problems and highlight the electrical aspects.

A typical filament, such as our #141Z, uses up to approximately 35 amps per filament. The amperage - whatever it might be - has to be uniform to each filament, otherwise we have a series of problems. One is an inconsistent evaporation of the evaporant from filament to filament; e.g. some filaments may be balled and some may not. Some filaments may have a short life vs. a long life. When you look into the chamber as they're firing, all the filaments should light up simultaneously. If the filaments begin to light at one end or light up in sequence down the buss bar, then you have a cause of irregularities.

CORRECTION: One way to correct a lack of uniform lighting is to loop the buss bar. That is, bring in a circuit so that you are getting the electrical energy flowing in a uniform manner from both ends of the bar.

On intermittent lighting, you should check the stand-off bars as to how they are made and how they clamp. Good stand-off bars yield uniform contact.

CORRECTION: See our TIPS on STAND-OFF BARS.

There is sometimes an inability of a system to handle various types of metals. One metal will evaporate very well and another with a different filament and a different type of evaporant might not evaporate at all. You cannot change evaporants without giving consideration to power supplies.

A machine might be old and may have a low kVA rating. It may have a rebuilt control panel. If your kVA is okay, when the rheostat dial is turned up and you don't seem to get results, there is either a wiring problem or a burn out problem inside your electrical control panel.

CORRECTION: The kVA is usually noted on a plate inside the back of the control panel: check it out. Have your electrician check out the wiring. If you need more power, there are people available to handle the problem at a reasonable cost.

Electrical controls. Many companies turn to automation for uniform firing. Frequently the system fails to complete the automatic cycle. Valves are opened and closed with a cylinder of one type or another. This cylinder is activated through a unit called a solenoid. Solenoids transfer an electrical current to a mechanical operation. Unfortunately, many solenoids have close tolerances as to what voltage they will work with. A good solenoid that is set up for 110 volts might not operate properly if there is a 10% variation in the voltage. If there is a spike in the line, that is an excessive amount of energy flowing through the system, or if there is a low voltage because several adjacent units are turned on simultaneously, there is a good chance that the solenoid will not operate correctly.

CORRECTION: Take a read-out of your power during a working day.

Excessive pump time is also an occasional problem that is sometimes caused by an electrical misadventure. Usually this is a problem with a bad timer or with the cooling system. In the case of the temperature control, there is a possibility of fine dust being attracted magnetically to contact points and throwing the unit off. There is also the possibility of maladjustment of the temperature control. That is, they are getting ready to move and act as the correct temperature is approached or the unit may lag behind for one reason or another. If the unit is tilted, usually an item we do not anticipate, or hit sharply, there can be a need for readjustment. This readjustment is easy, if you are knowledgeable in this area.

CORRECTION: Use a pyrometer and check the temperatures.

The same kind of a problem is related to the air release timer. Here again, we can end up with excessive pump down time because of a delay with the timer.

The relays are a weak point in old systems and occasionally when one burns out it may not be noticed in the production run. Modern systems no longer use relays.

IF YOU NEED MORE INFORMATION, DO NOT HESITATE TO CONTACT US.

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