
**EMISSION MEASUREMENT CENTER
GUIDELINE DOCUMENT (GD-041)**

Determination of Chromium Emissions From Decorative And Hard Chromium Electroplating And Anodizing Operations: Comment on Section 3.1.9 of Method 306A of 40 CFR Part 63, Appendix A: Vacuum Pump Performance.

Background

Section 3.1.9 of Method 306A specifies a vacuum pump unit, Gast Model 0522-V103-G18DX, or equivalent, as being commercially available for assembly of the Method 306A sampling train. The referenced pump model is a nonlubricating, carbon vane unit, capable of delivering at least 1.5 cfm at 15 in. Hg vacuum.. Additionally, Section 5.1.1.5 of Method 306A specifies that the sampling traing system, including the pump, shall not exceed a leak rate of 0.02 cfm at 15 in. Hg.

Discussion

EPA was recently notified that Gast has discontinued the Model 0522-V103-G18DX pump. For replacement, EPA recommends the Gast Model 0523-V3-G582DX or equivalent, capable of delivering at least 1.5 cfm at 15 in. Hg vacuum. The replacement Model 0523-V3-G582DX is a lubricating style pump with resin vanes. A nonlubricating carbon vane pump is no longer recommended for this application because the carbon vanes have been found to often seize as well as produce leakage problems.

It has been reported that the resin vane pump will produce a higher vacuum (26.5 in. Hg) than the carbon vane pump (26.0 in. Hg). Users report that with a minor conversion (installation of a modified oiler), the replacement resin vane pump will provide leak-proof operation. According to Gast, the replacement resin vane pump system includes a filter, muffler, and a siphon-type oiler. The siphon-type oiler requires that a small amount of outside air be injected to transport the oil vapors to the resin vanes. Intjection of this outside air into the pump makes it impossible for the lubricated pump system to provide a leak-proof operation.

An optional leak-proof oiler assembly (Gast No. AA 680K or equivalent) can be used to convert the replacement resin vane pump to a leak-proof system. The leak-proof conversion for the lubricated pump unit consists of the following steps:

- 1) Obtain special leak-proof oiler assembly, Gast No. AA 680K, or equivalent, that

replaces the siphon oiler that was supplied with the Gast lubricating pump.

2) Place pipe dope or Teflon tape around threads of a 1/4" pipe plug, being careful to not allow loose tape ends to extend beyond the plug end; loose tape pieces can result in seizure of the pump vanes.

3) Install the 1/4" pipe plug in the oiler inlet side port.

4) Modify the AA 680K oiler by drilling a 1/4" O.D. hole in the head /cap assembly (drill completely through inlet/outlet openings). The 1/4" O.D. hole should extend through the entire head/cap assembly (side to side).

5) Insert a pipe cleaner "wick" in the center of the head/cap assembly. The wick should extend upward from the bottom inside of the oiler to ~ 1" through the center opening of the head/cap and toward the direction that the airflow will travel. This wick will produce a capillary action that will allow oil vapors to lubricate the resin vanes. Also it may be necessary to install a small orifice in the oiler cap head or plug any inside extra oiler cap holes that would allow excessive oil vapors from the oiler reservoir to be transferred to the pump system.

6) Install the replacement oiler unit to tubing leading to the inlet top port of the pump in a upright position so that oil can be easily placed in the glass reservoir. Use Teflon tape or dope to seal the fittings and wrap Teflon tape around the oiler glass or aluminum jar/thimble threads to assure no leaks. Eliminate any loose Teflon tape ends that may be withdrawn into the vanes.

7) User may also elect to install the standard filter assembly on the inlet side of the pump to collect loose particles (silica gel, etc.).

8) Install standard muffler assembly on the outlet pump port to control noise and collect excess oil.

Conclusion

Leak-proof pump performance can be achieved with the Gast Model 0523-V3-G582DX pump, or equivalent, by modifying the optional oiler assembly, No. AA 680K, and installing it on the resin vane lubricating pump.

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